State of Utah

JON M. HUNTSMAN, JR.
Governor

GARY R. HERBERT
Lieutenant Governor

Department of Administrative Services
KIMBERLY K. HOOD
Executive Director

Division of Facilities Construction and Management
DAVID G. BUXTON
Director

ADDENDUM NO. 4

Date: April 6, 2009

	Company	Contact	Fax
To:	Explus Inc.	Brett Beach	703-260-0790
	Kubik Maltbie Inc.	Charles M. Maltbie, Jr.	856-234-0760
	Pacific Studio	Marc Burns	206-783-5409
	Superior Exhibits & Design Inc.	Duncan R. Miller	847-364-9386

From: Rick James, Project Manager, DFCM

Reference: Exhibit Fabrication and Installation – Utah Museum of Natural History
University of Utah
DFCM Project No. 02243750

Subject: **Addendum No. 4**

Pages	Addendum Cover Sheet	2	pages
	Revised Project Schedule	1	page
	100% Complete Exhibit Drawings	270	pages
	Graphic Package	182	pages
	Interpretive Outline	189	pages
	Specifications	463	pages
	Interested Firms List	12	pages
	Cost Proposal Attachment	5	pages
	Total	1,124	pages

Note: This Addendum shall be included as part of the Contract Documents. Items in this Addendum apply to all drawings and specification sections whether referenced or not involving the portion of the work added, deleted, modified, or otherwise addressed in the Addendum. Acknowledge receipt of this Addendum in the space provided on the Bid Form. Failure to do so may subject the Bidder to Disqualification.

While we contend that SB220 should only be potentially applicable to a contract issued after the effective date of said bill, this is to clarify that for purposes of this contract, regardless of the execution or effective dates of this contract, the status of Utah Law and remedies available to the State of Utah and DFCM, as it relates to any matter referred to or affected by said SB220, shall be the Utah law in effect at the time of the issuance of this Addendum.

4.1 **SCHEDULE CHANGES:** See Revised Project Schedule

4.1.1. The 100% Exhibit Final Design Documents available at 3:00 PM MDT Monday, April 6, 2009

4.1.2 Last Date to Submit Questions for Final Addendum 4:00 PM MDT Thursday, April 16, 2009 to Rick James – DFCM E-mail rjames@utah.gov Fax 801-538-3267 .

4.1.3 Final Addendum Deadline (exception for bid delays) 2:00 PM MDT Wednesday, April 22, 2009 on the DFCM website.

4.1.4 Prime Contractors Turn In Cost Proposals and Cost Reduction Proposals 12:00 Noon MDT Monday, April 27, 2009 to DFCM, 4110 State Office Bldg SLC, UT.

4.1.5 Subcontractor List Due 12:00 Noon MDT Tuesday, April 28, 2009 to DFCM, 4110 State 0ffice Bldg, SLC, UT Fax 801-538-3677.

4.2 GENERAL ITEMS:

4.2.1 See the attached 100% Complete Exhibit Drawings

4.2.2 General Conditions clarifications:

4.2.2.1 Refer to General Conditions 1.1 Basic Definitions. Under the definition of "A/E" add the following: The Term A/E as used in these General Conditions and Supplementary General Conditions shall be deemed to refer to the "Exhibit Designer."

4.2.2.2 Refer to General Conditions 1.1 Basic Definitions. Under the definition of the term "Contractor", add the following: The word "Contractor" as used in these General Conditions and Supplementary General Condition shall be deemed to be refer to the "Exhibit Fabricator".

4.2.3 Refer to the attached "Interested Firms" list. Additional names have been added to the list.

4.2.4 Question: My secondary request was regarding the bid form. It would be VERY helpful to have even a very rough draft of the bid form so that we would have some idea of how to structure our internal estimating files.
Answer: See attached "Cost Proposal Attachment" which is to be submitted along with the Cost Proposal Form provided in the original RFP document.

4.2.5 Question: The last day to submit questions for final addendum is April 7, 2009. Is it possible to have that date extended to April 10, 2009 to allow a more complete review of the documents by all of the trades that will be participating on this project? It is anticipated that all other dates would remain as noted.
Answer: See the current revised schedule in this addendum.

4.2.6 Question: During the Dust Controlled Environment, will it be possible for the exhibit fabricator to establish an office inside the facility?
Answer: After the Substantial Completion Date of the general contractor, Big-D (which is anticipated to be July 15, 2010), it will be possible for the exhibit fabricator to establish a temporary office inside the exhibit area. This is what is referred to as the "dust free time period".

	STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES **Division of Facilities Construction and Management**	**DFCM**

PROJECT SCHEDULE – REVISED
PER ADDENDUM NO. 4 DATED APRIL 6, 2009

PROJECT NAME: EXHIBIT FABRICATION AND INSTALLATION - UTAH MUSEUM OF NATURAL HISTORY UNIVERSITY OF UTAH – SALT LAKE CITY, UTAH
DFCM PROJECT #: 02243750

Event	Day	Date	Time	Place
Request for Proposals and 80% Complete Exhibit Design Documents Available	Thursday	February 5, 2009	4:00 PM MST	DFCM 4110 State Office Bldg SLC, UT and the DFCM web site *
Non-Mandatory Pre-Proposal Audio Conference Meeting	Wednesday	February 11, 2009	1:00 PM MST	Call (308) 344-6400 Enter Meeting Number: 824220# See attached agenda on web site*
Last Day to Submit Questions prior to submittal of Statements of Qualifications	Thursday	February 26, 2009	4:00 PM MST	Rick James – DFCM E-mail rjames@utah.gov **Fax (801) 538-3267**
Addendum Deadline	Tuesday	March 3, 2009	2:00 PM MST	DFCM web site *
Prime Contractors turn in References, Statements of Qualifications, Management Plans (including Schedule), and Termination/Debarment Certifications	Tuesday	March 17, 2009	3:00 PM MDT	DFCM 4110 State Office Bldg SLC, UT
Short Listing by Selection Committee**. 100% Exhibit Final Design Documents Available**	**Monday**	**April 6, 2009**	**3:00 PM MDT**	**DFCM web site ***
Last Date to Submit Questions for Final Addendum	**Thursday**	**April 16, 2009**	**4:00 PM MDT**	**Rick James – DFCM** **E-mail rjames@utah.gov** **Fax (801) 538-3267**
Final Addendum Deadline (exception for bid delays)	**Wednesday**	**April 22, 2009**	**2:00 PM MDT**	**DFCM web site ***
Prime Contractors Turn In Cost Proposals and Cost Reduction Proposals	**Monday**	**April 27, 2009**	**12:00 NOON MDT**	**DFCM** **4110 State Office Bldg** **SLC, UT**
Subcontractor List Due	**Tuesday**	**April 28, 2009**	**12:00 NOON MDT**	**DFCM** **4110 State Office Bldg** **SLC, UT** **Fax 801-538-3677**
Interviews	Thursday	April 30, 2009	TBA	TBA
Announcement	Monday	May 4, 2009		DFCM web site *
Notice to Proceed				TBD
Exhibits Installation Begins in a Dust-Controlled Environment	Thursday	March 18, 2010		
Exhibits Installation Continues in a Dust-Free Environment	Thursday	July 15, 2010		Estimated to be the time of the Building Substantial Completion Date. Building is being constructed by separate Contractor
Substantial Completion Date	Friday	December 31, 2010		Exhibits Fabricator

* DFCM's web site address is **http://dfcm.utah.gov**.

Exhibit No. 2 – 4/6/2009 – (Revised and Updated List) Interested Firms –
Exhibit Fabrication
Utah Museum of Natural History

	Firm	Contact 1	Additional Contacts
1	Palcoprep Inc. (Sub-contactor)	Frank Hadfield President Palcoprep Inc. Box1750 Drumheller,Alberta,Canada T0J 0Y0 Phone. 403.823.7727 Fax. 403.823.7737 email: palcoprp@telus.net Website www.palcoprep.com	
2	Geograph Industries Inc.	Matt Panzeca mattpanzeca@geograph-ind.com Geograph Industries Inc. 475 Industrial Dr. Harrison, OH 45030 Account Representative Work: (513) 202-9200 Cell: (513) 226-0476 Fax: (513) 202-9255	
3	Academy Studios	Sarah Bruce, Sales Assistant 415-883-8999 ext 141 70 Galli Drive Novato, CA 94949 sbruce@academystudios.com	Dean Weldon, CEO/President Academy Studios Tele: 415-883-8999 ext 103 Cell: 415-686-1625 dean.weldon@academystudios.com
4	Lexington	Rosalie Kessing Director of Marketing & Business Development Lexington 12660 Branford St. Los Angeles, CA 91331 818-768-5768 p 818-768-4217 f rkessing@lex-usa.com www.lex-usa.com	

5	Hadley Exhibits	Paul Warner National Account Executive Hadley Exhibits Inc. 1700 Elmwood Avenue Buffalo, New York 14207 716-874-3666 x-3018 (p) 716-874-9994 (f) www.hadleyexhibits.com pwarner@hadleyexhibits.com	
6	EWI Worldwide	Allison Partain Executive Director Museum Services Exhibit Works d. 734-367-8240 c. 734-604-9201 13211 Merriman Livonia, MI 48150 ewiworldwide.com http://www.ewiworldwide.com APartain@ewiworldwide.com EWI Worldwide	
7	YESCO	Brian Wignall YESCO 5119 S. Cameron St. Las Vegas, NV 89118 Ph: (702) 876-8080 Cell: (702) 595-2262 bwignall@yesco.com	
8	Design Craftsmen, LLC	Alan Simon COO Design Craftsmen, LLC Justin HessEstimating Manager Design Craftsmen, LLC 2200 James Savage Road Midland, MI 48642	Jerry Grieser Vice President of Sales, Western Division Design Craftsmen, LLC 3838 Carson Street, Suite 316 Torrance, CA 90503 310-792-8282 Fax: 310-792-8273

		989-496-3220 Fax: 989-496-3522 Email: ajs@design-craftsmen.com jmh@design-craftsmen.com	Email: grg@design-craftsmen.com Internet: www.design-craftsmen.com
9	Superior Exhibits and Design Inc.	Duncan R. Millar Project Director Superior Exhibits and Design Inc. 777 Lunt Ave. Elk Grove Village, IL 60007 Office: 847-364-9380 ext 46 Fax 847-364-9386 Cell: 847-848-5653 dmillar@superiorexhibits.com	
10	Chicago Scenic Studios, Inc.	Bob Doepel Chicago Scenic Studios, Inc. 1315 N. North Branch St. Chicago, Il. 60642 Rdoepel@chicagoscenic.com Ph. 312.274.9900 Fx.312.274.9901	Diane Langhorst Director of Marketing Chicago Scenic Studios 1315 N. North Branch Street Chicago, IL 60642 312.274.9900, ext. 215 dlanghorst@chicagoscenic.com www.chicagoscenic.com
11	Kubik Maltbie, Inc.	Steve Hammell Kubik Maltbie, Inc. shammell@maltbie.com 856-234-0052 x142 856-234-0762 Fax 708 Fellowship Road, Mount Laurel, New Jersey, 08054 http://www.maltbie.com	Gary Brooks gbrooks@maltbie.com Chuck Maltbie cmaltbie@maltbie.com JoAnn Buttaro IAdministrative Assistant I 856 234 0052 ext. 129 I Fax: 856 234 0760

12	Edwards Technologies Inc Midwest	David A Krueger Edwards Technologies Inc Midwest 2574 N 8 Mile Road Sanford MI 48657 989-941-0456 Bus kruegerdak@charter.net	
13	Color-Ad,Inc	S.K.Rao Sr.VP (Business Operations) Color-Ad,Inc 7200 Gary Road Manassas,VA,20109 703-631-9100 (Ext.119) 703-631-7849 skrao@color-ad.com	
14	Interior Construction Specialists	Bryan Webb Preconstruction Manager Interior Construction Specialists direct 801.563.3690 cell 801.558.4376 BWebb@LaytonCompanies.com	
15	Design & Production, Inc.	Dan Moalli Vice President Design & Production, Inc. 7110 Rainwater Place Lorton, VA 22079 703.550.8640 - office 703.550.7117 - direct 703.339.0296 - fax DMoalli@d-and-p.com www.d-and-p.com	

16	Edwards Technologies Inc Midwest	David A Krueger Edwards Technologies Inc Midwest 2574 N 8 Mile Road Sanford MI 48657 989-941-0456 Bus 989-430-5414 Cell kruegerdak@charter.net	
17	Exhibit Concepts Inc.	Jerry Spangler, jspangler@exhibitconcepts.com Ph: 937-535-0258 Fx: 937-454-2003 Exhibit Concepts Inc. 700 Crossroads Court Vandalia, Ohio 45377	Duane Landes Project Manager Exhibit Concepts, Inc. 700 Crossroads Court Vandalia, Ohio 45377 dlandes@exhibitconcepts.com Phone 937-535-0251 Cell 937-313-0068 Fax 937-454-2003
18	Split Rock Studios	Lisa Friedlander x717 or direct 651-789-4717 Split Rock Studios 2071 Gateway Blvd. Arden Hills, MN 55112 main 651-631-2211 800-433-9599 fax 651-631-0707 lfriedlander@splitrockstudios.com www.splitrockstudios.com	Dan Widerski x733 or direct 651-789-4733 main 651-631-2211 800-433-9599 fax 651-631-0707 dwiderski@splitrockstudios.com www.splitrockstudios.com
19	Pacific Studio	Marc Burns Pacific Studio 5311 Shilshole Avenue NW Seattle, WA 98107 www.pacific-studio.com 206-783-5226, ext 112 206-783-5409 fax 425-829-4697 cellular	

20	H.B. STUBBS COMPANIES	DAVID HANCOCK manager interpretive services H.B. Stubbs Company, LLC - West 15 EAST 82ND DRIVE SUITE 155 GLADSTONE, OR 97027 503.496.3131 x 302 503.329.7331 cell 503.496.3138 fax dhancock@hbstubbs.com www.hbstubbs.com	Glen Board, Director of Environments C: 586-933-7631 gboard@hbstubbs.com Lola Monsen, Account Manager C: 801-484-5242 lmonsen@hbstubbs.com HB Stubbs Companies 1957 South 4800 West Salt Lake City, Utah 84104 801-973-7887 phone 801-977-0849 fax
21	Munters Corporation	Munters Corporation Moisture Control Services 1-800-MUNTERS (686-8377) mcsinfo@munters.com www.munters.us Courtney.Tyler@munters.com	
22	CREATIVE ENVIRONS, INC.	Jeffrey Spoor CREATIVE ENVIRONS, INC. http://www.creativenvirons.com 11328 Business Park Blvd., Jacksonville, FL 32256 (904) 260-7770 (904) 260-7789 Fax (904) 514-9434 Cel jeffspoor@creativenvirons.com	
23	American Stone, Inc.	Toby Winchester American Stone, Inc. 4040 South 300 West	

		Salt Lake City, UT 84107 off: 801-262-4300 fax: 801-262-4474 cell: 801-330-0948 e-mail: twinchester@american-stone.com	
24	FMI Corporation	Arianne Dooley Consultant Associate FMI Corporation 55 Madison Street, Suite 410 Denver, CO 80206 T 303.398.7232 F 303.377.3535 email: mailto:adooley@fminet.com web site: www.fminet.com	
25	ASI Modulex	Stephanie Snyder Sales Consultant (303) 755-0997 office ext. 4003 (866) 353-6981 e-fax (303) 910-1349 cell ASI Modulex 6665 S. Kenton Street Suite 202 Englewood, CO 80111 stephanie.snyder@asimodulex.com	
26	GLASBAU HAHN America	Jana Lyn Thirlwall GLASBAU HAHN America 15 Little Brook Lane Newburgh, NY 12250 T 403-230-0168 F 403-398-3933 www.glasbau-hahn.com janalyn.thirlwall@glasbau-hahn.com	

27	Explus Incorporated	Brett Beach – Dir. of Business Dev. 703-260-0780 x128 44156 Mercure Circle Dulles, VA 20166 (703) 260-0780 • (703) 260-0790 bbeach@explusinc.com	
28	Trade Show Fabrications	Chris Albaugh Trade Show Fabrications 5845 Wynn Road, Las Vegas, NV 89118 Office: (702) 798-9868 ext. 120 Cell: (702) 232-7086 Fax: (702) 798-9878 Email: calbaugh@tsfexhibit.com Website: www.tsfexhibit.com	
29	Operand - explore | interactivity	Jim Notarianni Director Business Development Operand - explore | interactivity 59 Grand Street #2, NY, NY 10013 t 212.334.4600 x 124 m 248.890.5690 w www.operand.com e jimn@operand.com b http://blog.operand.com	
30	Mad Systems	Tricia Rodriguez Mad Systems 733 N Main Street Orange, Ca 92868 Ph: 714-259-9000 Fx: 714-259-9001 tricia@madsystems.com	

31	Wild Sanctuary	Bernie Krause, PhD chirp@wildsanctuary.com Wild Sanctuary POB 536 Glen Ellen, CA 95442 707-996-6677 Google Earth zooms: http://earth.wildsanctuary.com	
32	Kullman	Kullman One Kullman Corporate Campus Lebanon, New Jersey 08833 T 908-236-0220 F 908-236-0848 kullmaninfo@blackpearlmedia.com www.kullman.com	
33	AVI-SPL	Bill Taylor CTS Account Manager AVI-SPL 3683 West 2270 South | Suite C | West Valley City, Utah 84120 p: 801-973-9111 ext: 7611 | f: 801-975-1223 bill.taylor@avispl.com www.avispl.com	
34	ImpersaNature Studios Inc.	Eyre Brandon brandone@impersanature.com ImpersaNature Studios Inc. 8415 S. 700 W. Unit 11 Sandy, UT 84070 Adam Eaton - Owner/Designer/Fabricator 801-618-9776 adame@impersanature.com	

35		Christopher Foster Vice President of Sales and Marketing 600 First Avenue, Suite 214A Seattle WA 98104 Tel: 888-567-2678 Cell: 407-496-2618 cfoster@costofwisconsin.com www.costofwisconsin.com	
36	EXPLUS Incorporated	Pansy Parker Business Development Coordinator EXPLUS Incorporated 44156 Mercure Circle Dulles, VA 20166 P: 703.260.0780 x124 F: 703.260.0790 pparker@explusinc.com www.explusinc.com	
37	Nichols Development Group	Renae Stucki Nichols Development Group 435.865.7630 435.865.7640 renae@nicholsdev.com	
38	Western Division Manager	Michael Blasingim Western Division Manager Batten & Shaw, Inc. 9176 South 300 West, Suite 2 Sandy, Utah 84070 Office: 801-352-2044 Fax: 801-352-2045 Cell: 615-406-3302 MikeBlasingim@bsinet.us	

39	Pangaea Designs	Dennis Wilson Pangaea Designs 2445 Eliot Street Denver, CO 80211 tel/fax: 303-477-9058 cell: 303-590-5809 toll free: 1-888-772-6423 Lynne Wright web: www.pangaeadesigns.com email: pangaeadesigns@comcast.net	
40	AECOM	John Stobart AECOM Design D 714.567.2757 C 714.244.6252 john.stobart@aecom.com AECOM 999 Town and Country Road Orange, California 92868 T 714.567.2400 F 714.567.2729 www.aecom.com	
41	The Holbek Group, Inc	Allen Green The Holbek Group, Inc. 978-544-1900 978-544-1157 fax agreen@holbekgroup.com www.holbekgroup.com	
42	Motivational Systems	Kim Beales Marketing Manager 2200 Cleveland Ave., National City, CA 91950 P 619/292-7869 F 619/477-2302 kbeales@motivational.com http://www.MotivationalSystems.com	

43	Richard Webber Museum Productions	Richard Webber Museum Productions 1205 Manhattan Avenue – Unit 145A Brooklyn, NY, 11222 Tel: 718-349-3133 Fax: 718-349-8188 Email: rwebbermpi@earthlink.net http://www.richardwebber.com	

UTAH MUSEUM OF NATURAL HISTORY
COST PROPOSAL ATTACHMENT

Date: 04.02.09

		Budget Amount	Sub-Totals
Level 2, Canyon			
1	Topographic Model & graphic rails		
2	Collections Wall graphics & object mounting		
	Canyon Total:		
Level 3, Mineral Hall			
1	Case fronts & graphics		
2	Lighting		
	Mineral Hall Total:		
Level 2, Utah Futures			
1	Graphics & Case wall system		
2	Single Sided Glass Artifact Showcase		
3	Curved railing with reader rail panels		
4	Talk back recording station		
	Utah Futures Total:		
Level 2, Our Backyard			
1	Crawl Through Cave with live displays		
2	Tree Area		
3	House & Garden Center		
4	Water Area		
5	Lighting		
6	Graphics		
	"Our Backyard" Children's Gallery Total :		
Level 2, Earth Lab			
1	Magnetic Activity Wall		
2	Graphics		
	Earth Lab Total :		
Level 2 & 3, Past Worlds, Pleistocene / Eocene			
1	Pleistocene Groundform		
2	Eocene Groundform		

2	LC Tableau Diorama
3	Gryposaurus Activities
4	Single Sided Glass Artifact Showcase (Kaiparowits Diversity)
5	Single Sided Glass Artifact Showcase (North Horn)
6	Single Sided Glass Artifact Showcase (Cedar Mountain)
7	Falcarius / Nothronychus platform
8	New Finds platform
	Past Worlds, Late Cretaceous Total:

Level 2, Past Worlds, Late Jurassic

1	Late Jurassic Groundform
2	Single Sided Glass Artifact Showcase (Clevland Lloyd Quarry)
3	CLDQ Monitor enclosures & penny graph interactive
4	Dino Dig
5	Ceratopsian Wall install
	Past Worlds, Late Jurassic Total:

1	PW Rails
2	PW Graphics
3	PW Lighting

Past Worlds, All Observatory Areas Grand Total:

Level 3, Lake

1	Intro & section intro panels
2	Dynamic lake flooring
3	North Biota Specimen Display
4	South Biota Specimen Display
5	Sediment Display
6	Wetlands Diorama
7	Shoreline Diorama
8	Filtration Interactive
9	GSL Birds
10	People and the Lake AV & Watershed AV enclosures
11	Formation Interactive
12	Migration Map Interactive
13	Talk back
14	LK Rails
15	LK Graphics

6	Double Sided Glass Artifact Showcase (Pottery)
7	Double Sided Glass Artifact Showcase (Weapons/Lithics)
8	Glass Artifact tablecase (Ornaments)
9	Glass Artifact tablecase (Footware)
10	Glass Artifact tablecase (Range Creek)
11	Table activities
12	Inset cases
13	FP Rails
14	FP Graphics
15	FP Lighting

First Peoples Total:

Level 3, Danger Cave Lab

1	Scenic modeled cave wall
2	Inset display cases
3	Stratigraphic Sand Display
4	DC Graphics
5	DC Lighting

Danger Cave Lab Total:

Level 3, The Land

1	MDF exhibit panels
2	Stone panels
3	Stone countertops
4	MRM Plants flip books with scent interactive
5	CP Prosauropod Fossil display
6	CP Erosion stream table
7	CP Statigraphy wall
8	CP Plants flip books with scent interactive
9	CP Sand Dune Interactive
10	CP Pothole Aquarium
11	B&R Earthquake Interactive
12	B&R Seismograph display
13	B&R Expansion Interactive
14	B&R Plants flip books with scent interactive
15	B&R Human Reactions
16	B&R Homestead Cave
17	B&R Utah's Cambrian
18	Drive Through Time

4	Keratin Investigation
5	Double Sided Glass Artifact Showcase (Keratin)
6	Interactive Cell Models
7	What Cells can do
8	Photosynthesis Interactive
9	Double Sided Glass Artifact Showcase (Organisms)
10	Pollination interactive
11	Jaw Movement interactive
12	Tarantula display
13	Double Sided Glass Artifact Showcase (Populations)
14	Population Interactive
15	Stickleback Fish display
16	Harvester Ant display
17	Hot Desert Diorama
18	Cold Desert Diorama
19	Montane Forest Diorama
20	Alpine Diorama
21	Human Interactions
22	Talk back
23	West Gallery Wall
24	Homonin Evolution
25	LF Rails
26	LF Graphics
27	LF Lighting
	Life Total:

Level 5, Native Voices

1	Single Sided Glass Artifact Showcase (National Tribes)
2	Intro wall
3	Curved Configuration, Flat Segmented Single Sided Glass Artifact Showcases
4	Generational Memory
5	Table Activities
6	Inset cases
7	NV Rails
8	NV Graphics
9	NV Lighting
	Native Voices Total:

Level 5, Sky

UTAH MUSEUM OF NATURAL HISTORY
COST PROPOSAL ATTACHMENT

Date: 04.02.09

10	SK Rails	
11	SK Graphics	
12	SK Lighting	
	Sky Total:	

UTAH MUSEUM OF NATURAL HISTORY

EXHIBIT DESIGN DRAWING SET

100% FINAL DESIGN DOCUMENTS
PREPARED BY RALPH APPELBAUM ASSOCIATES
SUBMITTED APRIL 2, 2009

DRAWING LIST

SHEET #	DRAWING TITLE
X0-00-0.00	Drawing List
X0-00-0.01	Symbols & Abbreviations
PLANS	
X1-L2-0.00	Level 2 Plan
X2-L3-0.00	Level 3 Plan
X3-L4-0.00	Level 4 Plan
X4-L5-0.00	Level 5 Plan
LEVEL 2	
X2-CN-1.00	Partial Plan: Trailhead
X2-CN-2.00	Elevations & Sections: Trailhead
X2-CN-2.01	Elevations & Sections: Trailhead
X2-CN-3.00	Details: Trailhead Topo map
X2-CN-3.10	Details: Trailhead Bench Monitors
X2-UF-1.00	Partial Plan: Utah Futures
X2-UF-2.00	Elevations & Sections: Utah Futures
X2-UF-3.00	Details: Utah Futures
X2-UF-5.10	Exhibit Case Layouts: Carbon Story
X2-BY-1.00	Partial Plan / RCP: 'Our Backyard' Childrens Gallery
X2-BY-2.00	Elevations & Sections: 'Our Backyard'
X2-BY-2.10	Elevations & Sections: 'Our Backyard' House Area
X2-BY-3.00	Details: 'Our Backyard' – water table
X2-BY-3.01	Details: 'Our Backyard' – underground crawl
X2-BY-3.02	Details: 'Our Backyard' – free play area
X2-PW-1.00	Partial Plan: Past Worlds (Lower)
X2-PW-1.10	Partial Plan: Past Worlds (Lower)
X3-PW-1.00	Partial Plan: Past Worlds (Upper)
X2-PW-2.00	Elevations & Sections: Past Worlds
X2-PW-2.01	Elevations & Sections: Past Worlds
X2-PW-2.02	Platform Elevations: Past Worlds -PL
X2-PW-2.03	Platform Elevations: Past Worlds -EO
X2-PW-2.04	Platform Elevations: Past Worlds -LC
X2-PW-2.05	Platform Elevations: Past Worlds -LJ
X2-PW-3.00	Details: Past Worlds, Cretaceous Diorama
X2-PW-3.10	Details: Past Worlds, Eocene Diorama
X2-PW-4.10	Interactives: Past Worlds, Build a Mammoth & Ice Age Dinner Table
X2-PW-4.20	Interactives: Past Worlds, Gryposaurus Activities & Dino Dig
X2-PW-4.30	Interactives: Past Worlds, Clevland Llyod Quarry
X2-PW-5.10	Exhibit Case Layouts: Past Worlds, Pleistocene Mammals
X2-PW-5.20	Exhibit Case Layouts: Past Worlds, Eocene Green River Formation
X2-PW-5.30	Exhibit Case Layouts: Past Worlds, LC North Horn Formation
X2-PW-5.40	Exhibit Case Layouts: Past Worlds, LC Cedar Mountain Formation
X2-PW-5.50	Exhibit Case Layouts: Past Worlds, LC Kaiparowits Diversity
X2-PW-5.51	Exhibit Case Layouts: Past Worlds, LC Kaiparowits Diversity
X2-PW-5.52	Exhibit Case Layouts: Past Worlds, LC Kaiparowits Diversity
X2-PW-5.60	Exhibit Case Layouts: Past Worlds, LJ Clevland Llyod Quarry
X2-PW-6.00	Inset/Rail Case Layouts: Past Worlds, LC & LJ
X2-PW-6.10	Inset/Rail Case Layouts: Past Worlds, PL & EO
X2- EL-1.00	Partial Plan: Earth Lab
X2- EL-2.00	Elevations & Sections: Earth Lab
X2- EL-6.00	Case Layouts: Earth Lab, Triassic Plants

LEVEL 3	
X3-MH-1.00	Partial Plan: Mineral Hall
X3-MH-2.00	Elevations & Sections: Mineral Hall
X3-MH-6.00	Inset Case Layout: Mineral Hall
X3-LK-1.00	Partial Plan / RCP: Lake
X3-LK-2.00	Elevations & Sections: Lake
X3-LK-2.01	Elevations & Sections: Lake
X3-LK-3.00	Details: Lake, Video Well
X3-LK-3.01	Details: Lake, Lake floor & Intro panels
X3-LK-3.02	Details: Lake, Biota displays
X3-LK-3.10	Details: Lake, Wetlands Diorama/ filtation
X3-LK-3.11	Details: Lake, Shoreline Diorama
X3-LK-3.12	Details: Lake, Migrations
X3-LK-4.10	Interactives: Lake, Wetlands Filtration
X3-LK-4.20	Interactives: Lake, Formation
X3-LK-4.21	Interactives: Lake, Formation
X3-LK-6.00	Rail/Inset Case Layouts: Lake
X3-FP-1.00	Partial Plan: First Peoples Obsv.
X3-FP-2.00	Elevations & Sections: First Peoples
X3-FP-2.01	Elevations & Sections: First Peoples
X3-FP-2.02	Elevations & Sections: First Peoples
X3-FP-3.00	Details: First Peoples, Median Village Rails
X3-FP-3.01	Details: First Peoples, median village Rails
X3-FP-3.02	Details: First Peoples, median village Rails
X3-FP-3.03	Details: First Peoples, median village Rails
X3-FP-4.10	Interactives: First Peoples, Activity tables
X3-FP-4.11	Interactives: First Peoples, Activity tables
X3-FP-5.10	Exhibit Case Layouts: First Peoples, Settlement/ Subsistence
X3-FP-5.20	Exhibit Case Layouts: First Peoples, Trade
X3-FP-5.30	Exhibit Case Layouts: First Peoples, Weapons/ Lithics
X3-FP-5.40	Exhibit Case Layouts: First Peoples, Ornaments
X3-FP-5.50	Exhibit Case Layouts: First Peoples, Footwear
X3-FP-5.60	Exhibit Case Layouts: First Peoples, Pottery Making/ Typology
X3-FP-5.70	Exhibit Case Layouts: First Peoples, Textiles/ Basketry
X3-FP-5.80	Exhibit Case Layouts: First Peoples, Range Creek
X3-FP-6.00	Inset/Rail Case Layouts: First Peoples, First Peoples
X3-DC-1.00	Partial Plan: Dry Caves
X3-DC-2.00	Sections & Elevations: Dry Caves
X3-DC-6.00	Inset Case Layouts: Dry Caves
X3-LD-1.00	Partial Plan: The Land Obsv.
X3-LD-2.00	Elevations & Sections: Land, MRM
X3-LD-2.01	Elevations & Sections: Land, MRM
X3-LD-2.02	Elevations & Sections: Land, CP
X3-LD-2.03	Elevations & Sections: Land, B&R
X3-LD-3.00	Details: Land, Typ. Details
X3-LD-3.10	Details: Land, Typ. CP Detail Plan
X3-LD-3.11	Details: Land, Typ. CP/ B&R Sections
X3-LD-3.12	Details: Land, Typ. CP/ B&R Sections
X3-LD-3.20	Details: Land, Seismic Wall LD4.E03
X3-LD-3.30	Details: Land, Human Interactions LD4.E04.tt01
X3-LD-3.40	Details: Land, Homestead Cave LD4.E10.tt01
X3-LD-3.50	Details: Land, Utah's Cambrian LD4.E07
X3-LD-4.00	Interactives: Land, Erosion table
X3-LD-4.01	Interactives: Land, Erosion table
X3-LD-4.10	Interactives: Land, Earthquake Platform
X3-LD-4.11	Interactives: Land, Earthquake Platform
X3-LD-4.20	Interactives: Land, Expansion
X3-LD-4.21	Interactives: Land, Expansion table
X3-LD-4.30	Interactives: Land, Plant Smell/ Flip-books

LEVEL 4	
X4-LF-1.00	Partial Plan: Life, Intro - Organisms
X4-LF-1.10	Partial Plan: Life, Organisms - Eco-Systems
X4-LF-2.00	Elevations & Sections: Life
X4-LF-2.01	Elevations & Sections: Life
X4-LF-2.02	Developed Elevations: Life
X4-LF-2.03	Developed Elevations: Life
X4-LF-2.04	Developed Elevations: Life
X4-LF-2.05	Developed Elevations: Life
X4-LF-3.00	Details: Life, Typical Sections
X4-LF-3.01	Details: Life, Wall/ Panel Details
X4-LF-3.10	Details: Life, DNA
X4-LF-3.11	Details: Life, DNA
X4-LF-3.12	Details: Life, DNA helix
X4-LF-3.20	Details: Life,Cells
X4-LF-3.30	Details: Life, Organisms
X4-LF-3.31	Details: Life, Organisms - Live Display
X4-LF-3.32	Details: Life, Organisms - Live Display
X4-LF-3.40	Details: Life,Populations
X4-LF-3.50	Details: Ecosystem - Hot Desert
X4-LF-3.60	Details: Life, Ecosystem - Cold Desert
X4-LF-3.70	Details: Life, Ecosystem - Montane Forest
X4-LF-3.80	Details: Life, Ecosystem - Alpine
X4-LF-3.90	Details: Life, Human Interactions
X4-LF-4.00	Interactives: Life, Protein Synthesis
X4-LF-4.10	Interactives: Life, Keratin Sequencing Game
X4-LF-4.20	Interactives: Life, Build a Plant cell
X4-LF-4.21	Interactives: Life, Build an Animal cell
X4-LF-4.30	Interactives: Life, Photosynthesis
X4-LF-4.50	Interactives: Life, Pollenation
X4-LF-4.60	Interactives: Life, Jaw Movement
X4-LF-5.10	Exhibit Case Layouts: Life, Keratin
X4-LF-5.20	Exhibit Case Layouts: Life, Organisms
X4-LF-5.30	Exhibit Case Layouts: Life, Populations
X4-NL-1.00	Partial Plan: Naturalist Lab
X4-NL-2.00	Elevations & Sections: Naturalist Lab

LEVEL 5	
X5-NV-1.00	Partial Plan: Native Voices
X5-NV-2.00	Elevations & Sections: Native Voices
X5-NV-2.01	Case Elevations & Sections: Native Voices
X5-NV-3.00	Details: Native Voices
X5-NV-3.01	Details: Native Voices
X5-NV-3.02	Details: Native Voices
X5-NV-3.10	Details: Native Voices, Activity tables
X5-NV-3.20	Details: Native Voices, Storytelling Area
X5-NV-5.10	Exhibit Case Layouts: Native Voices, National Tribes
X5-NV-5.20	Exhibit Case Layouts: Native Voices, Ute
X5-NV-5.30	Exhibit Case Layouts: Native Voices, Shosone
X5-NV-5.40	Exhibit Case Layouts: Native Voices, Goshute
X5-NV-5.50	Exhibit Case Layouts: Native Voices, Paiute
X5-NV-5.60	Exhibit Case Layouts: Native Voices, Navajo
X5-SK-1.00	Partial Plan: Sky
X5-SK-2.00	Elevations & Sections: Sky
X5-SK-2.01	Elevations & Sections: Sky
X5-SK-3.00	Details: sky, Helioscope/ Sun Table
X5-SK-3.10	Details: Sky, Terrace Equipment
TYPICAL DETAILS	
X-TYP-1.00	Typical Details: Glass Cases - Schedule
X-TYP-1.10	Typical Details: Glass Cases - Brackets and Plinths
X-TYP-1.20	Typical Details: Glass Cases - Typical
X-TYP-1.30	Typical Details: Glass Cases - NV
X-TYP-1.40	Typical Details: Glass Cases - CLQ
X-TYP-1.41	Typical Details: Glass Cases - Partitions & Lifts
X-TYP-1.50	Typical Details: Glass Cases - Collection Wall
X-TYP-1.60	Typical Details: Glass Cases - Table Cases
X-TYP-2.00	Typical Details: Acylic Cases - Schedule
X-TYP-2.01	Typical Details: Acylic Cases
X-TYP-2.02	Typical Details: Acylic Cases
X-TYP-2.03	Typical Details: Acylic Cases
X-TYP-3.00	Typical Details: Exhibit Rails - Ramps
X-TYP-3.10	Typical Details: Exhibit Case Rails
X-TYP-3.20	Typical Details: Exhibit Rails - Typical
X-TYP-3.30	Typical Details: Exhibit Rails - Slab edge
X-TYP-3.40	Typical Details: Exhibit Rails - AV & Terrace
X-TYP-4.00	Typical Details: Natural History Now Display System: Intro / Graphic
X-TYP-4.01	Typical Details: Natural History Now Display System: Open Display
X-TYP-4.02	Typical Details: Natural History Now Display System: Cases
X-TYP-4.03	Typical Details: Natural History Now Display System: AV

EXHIBIT AUDIO VISUAL	
AV- 01	Level 2 AV
AV- 02	Level 3 AV
AV- 03	Level 4 AV
AV- 04	Level 5 AV
AV- 100 - 132	Block Diagrams
EXHIBIT LIGHTING	
LX-L2-1.00	Level 2 Lighting Plan
LX-L3-1.00	Level 3 Lighting Plan
LX-L4-1.00	Level 4 Lighting Plan
LX-L5-1.00	Level 5 Lighting Plan
LX-L2-0.01	Level 2 RCP
LX-L3-0.01	Level 3 RCP
LX-L4-0.01	Level 4 RCP
LX-L5-0.01	Level 5 RCP
LX2-UF-1.00	Level 2 Utah Futures Plan
LX2-UF-1.02	Level 2 Utah Futures RCP
LX2-UF-2.00	Level 2 Utah Futures
LX2-BY-1.00	Level 2 Our Backyard Plan
LX2-BY-1.02	Level 2 Our Backyard RCP
LX2-BY-2.00	Level 2 Our Backyard
LX2-PW-1.00	Level 2 Past Worlds Plan
LX2-PW-1.02	Level 2 Past Worlds RCP
LX3-PW-1.02	Level 3 Past Worlds RCP
LX2-PW-2.00	Level 2 Past Worlds
LX2-EL-1.00	Level 2 Earth Lab Plan
LX2-EL-1.02	Level 2 Earth Lab RCP
LX2-EL-2.00	Level 2 Earth Lab
LX3-MH-1.00	Level 3 Mineral Hall
LX3-LK-1.02	Level 3 Lake RCP
LX3-LK-2.00	Level 3 Lake
LX3-LK-2.01	Level 3 Lake
LX3-FP-1.00	Level 3 First Peoples Plan
LX3-FP-1.02	Level 3 First Peoples RCP
LX3-FP-2.00	Level 3 First Peoples
LX3-FP-2.01	Level 3 First Peoples
LX3-DC-1.00	Level 3 Danger Cave Plan
LX3-DC-1.02	Level 3 Danger Cave RCP
LX3-DC-2.00	Level 3 Danger Cave
LX3-LD-1.00	Level 3 Land Plan
LX3-LD-1.02	Level 3 Land RCP
LX3-LD-2.02	Level 3 Land
LX3-LD-2.03	Level 3 Land
LX3-LD-3.00	Level 3 Land
LX4-LF-1.00	Level 4 Life Plan
LX4-LF-1.02	Level 4 Life RCP
LX4-LF-2.00	Level 4 Life
LX4-NL-1.00	Level 4 Naturalist Lab Plan
LX4-NL-1.02	Level 4 Naturalist Lab RCP
LX4-NL-2.00	Level 4 Naturalist Lab
LX5-NV-1.00	Level 5 Native Voices Plan
LX5-NV-1.02	Level 5 Native Voices RCP
LX5-NV-2.01	Level 5 Native Voices
LX5-SK-1.00	Level 5 Sky Plan
LX5-SK-1.02	Level 5 Sky RCP
LX5-SK-2.00	Level 5 Sky

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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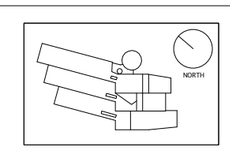


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Drawing List

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 0243750
Sheet No.
X0-00-0.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

GENERAL NOTES

1. DRAWINGS CONTAINED IN THIS SET ARE PART OF RAA 100% FINAL DESIGN PACKAGE, WHICH INCLUDES SPECIFICATIONS AND GRAPHIC PACKAGE. SEE GRAPHICS PACKAGE FOR GRAPHICS PANEL SCHEDULE. INTERPRETIVE OUTLINES ARE PROVIDED FOR REFERENCE TO DESCRIBE THE EXHIBIT ELEMENTS.

2. ANY VARIANCE BETWEEN THE DRAWINGS AND SPECIFICATIONS NOTED BY THE CONTRACTOR OR SUBCONTRACTORS SHALL BE PROMPTLY NOTED AND TRANSMITTED TO THE OWNER AND EXHIBIT DESIGNER IN WRITING.

3. IF THE CONTRACTOR OBSERVES THAT ANY PORTION OF THE DRAWINGS IS AT VARIANCE IN ANY RESPECT WITH APPLICABLE LAWS, BUILDING CODES OR REGULATIONS, THE CONTRACTOR IS RESPONSIBLE FOR NOTIFYING THE OWNER AND EXHIBIT DESIGNER PROMPTLY IN WRITING. IF THE CONTRACTOR PERFORMS ANY WORK CONTRARY TO ANY CODES OR REGULATIONS, THE CONTRACTOR SHALL ASSUME FULL RESPONSIBILITY THEREFOR AND SHALL BEAR ALL COSTS ATTRIBUTED THERETO.

4. NEITHER THIS DRAWING, NOR ANY SUCH IDEAS, ARRANGEMENTS, DESIGNS OR PLANS SHALL BE APPROPRIATED BY OR DISCLOSED TO ANY PERSON, FIRM OR CORP. FOR ANY PURPOSE EXCEPT BY THE SPECIFIC WRITTEN PERMISSION OF RAA.

5. WRITTEN DIMENSIONS ON DRAWINGS SHALL HAVE AUTHORITY OVER SCALED. CONTRACTORS AND MANUFACTURERS SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE JOB AND INFORM RAA OF ALL VARIATIONS FROM THE DRAWINGS PRIOR TO PERFORMANCE OF WORK.

6. RAA SHALL FIRST SEE AND APPROVE CONTRACTORS FULL SIZE SHOP DRAWINGS PRIOR TO ANY FABRICATION.

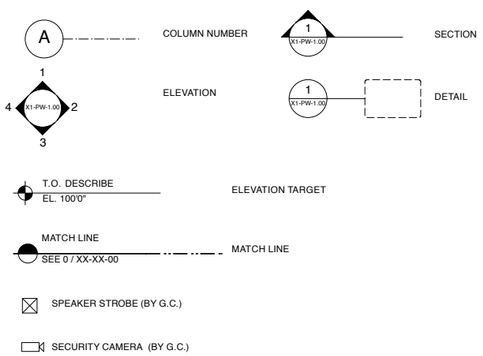
7. THE EXHIBIT DESIGN DRAWINGS HEREWITH REPRESENT DESIGN INTENT ONLY. IT IS THE RESPONSIBILITY OF THE FABRICATOR TO VERIFY AND INSURE STRUCTURAL INTEGRITY OF THE DESIGN WITH A LICENSED STRUCTURAL ENGINEER AND ASSURE THAT ALL LOCAL CODES AND REGULATIONS ARE FULFILLED.

8. ALL INTERACTIVES SHALL BE ENGINEERED AND PROTOTYPED PRIOR TO FABRICATION. TESTING AND CLIENT REVIEW SHALL BE PART OF OVERALL FABRICATION SCHEDULE.

9. ALL AV EQUIPMENT & WIRING BY AV INTEGRATOR (NOT IN EXHIBIT FABRICATION SCOPE); EXHIBIT CONTRACTOR (X.C.) TO COORDINATE INTEGRATION OF ALL AV ELEMENTS INTO EXHIBITRY.

10. ALL HANGING STRUCTURES + EXHIBIT ELEMENTS OVER 6' WILL REQUIRE STRUCTURAL REVIEW

GRAPHIC SYMBOLS



ABBREVIATIONS

AV	AUDIO VISUAL
AVI	AUDIO VISUAL INTEGRATOR
ABV.	ABOVE
A.R.E	ABOVE REFERENCE ELEVATION
ADJ.	ADJACENT OR ADJUSTABLE
A/C	AIR CONDITIONING
AL.	ALUMINUM
ANOD.	ANODIZED
APPRX.	APPROXIMATE
ARCH.	ARCHITECT(URAL)
ASP	ACTIVATED SOUND PANEL
BLKG.	BLOCKING
BD.	BOARD
BLDG.	BUILDING
BM.	BEAM
BOT.	BOTTOM
BTWN.	BETWEEN
B.O.	BY OTHERS OR BOTTOM OF
C.I.P.	CAST IN PLACE
CLG.	CEILING
℄	CENTER LINE
CL.	CLOSET
CLG.	CEILING
CLR.	CLEAR
CM.	CONSTRUCTION MANAGER
CMU.	CONCRETE MASONRY UNIT
COL.	COLUMN
CONC.	CONCRETE
CONST.	CONSTRUCTION
CONT.	CONTINUOUS OR CONTINUE
CP.	CENTER POINT
CTR.	CENTER
DEMO.	DEMOLITION
DEPT.	DEPARTMENT
DET.	DETAIL
DES.	DESIGNER
DIA.	DIAMETER
DIAG.	DIAGONAL
DIM.	DIMENSION
DR.	DOOR
DN.	DOWN
DWG.	DRAWING
(E)	EXISTING
E	EAST
E-W	EAST-WEST
EA.	EACH
EF.	EACH FACE
ELEC.	ELECTRICAL
EL.	ELEVATION
EMER.	EMERGENCY
EQ.	EQUAL
EQUIP.	EQUIPMENT
EXT.	EXTERIOR
FIN.	FINISH
F.F.	FINISH FLOOR
FLR.	FLOOR
FLUOR.	FLUORESCENT
F.O.G.	FACE OF GLASS
F.O.W.	FACE OF WALL
FT.	FOOT
FURR.	FURRING
G.C.	GENERAL CONTRACTOR
GT.	GROUT
GYP. BD.	GYPSUM BOARD
HD. WD.	HARD WOOD
H.V.A.C.	HEATING, VENTILATION & A/C
HT.	HEIGHT
H.M.	HOLLOW METAL
I.D.	INSIDE DIMENSION/DIAMETER
I.F.	INSIDE FACE
INCL.	INCLUDE
INFO.	INFORMATION
INSUL.	INSULATION
INT.	INTERIOR
JT.	JOINT
LAM.	LAMINATED
LH	LEFT HAND
LT.	LIGHT
LOC.	LOCATION
MAX.	MAXIMUM
MFRG.	MANUFACTURER(ING)
MECH.	MECHANICAL
MED.	MEDIUM
MTL.	METAL
MIN.	MINIMUM
MISC.	MISCELLANEOUS
(N)	NEW
N	NORTH
(NIC)	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
O.D.	OUTSIDE DIMENSION/DIAMETER
O.F.	OUTSIDE FACE
OPG.	OPENING
OPP.	OPPOSITE
PL.	PLATE
PLYWD.	PLYWOOD
PPA	POLSHEK PARTNERSHIP ARCHITECTS
PRELIM.	PRELIMINARY
PT.	POINT
PTD.	PAINTED
PTN.	PARTITION
R	RADIUS
RAA	RALPH APPELBAUM ASSOCIATES
R.C.P.	REFLECTED CEILING PLAN
REF.	REFERENCE
REINF.	REINFORCE (D) (ING)
REQ'D.	REQUIRED
RH.	RIGHT HAND
REV.	REVISED
S	SOUTH
SCHED.	SCHEDULE
SHT.	SHEET
SIM.	SIMILAR
SPEC.	SPECIFICATION
SQ.	SQUARE
SQ. FT.	SQUARE FOOT
SS.	SILK SCREEN
ST. STL.	STAINLESS STEEL
STL.	STEEL
STD.	STANDARD
STRUC.	STRUCTURAL
TBD	TO BE DETERMINED
TEL.	TELEPHONE
TEMP.	TEMPERED
THK.	THICK
THRU	THROUGH
TOC.	TOP OF CONCRETE
TYP.	TYPICAL
U.O.N.	UNLESS OTHERWISE NOTED
U.V.	ULTRA VIOLET
VERT.	VERTICAL
V.I.F.	VERIFY IN FIELD
W	WEST, WIDTH, WIDE
W/	WITH
W/O	WITHOUT
WD.	WOOD
XC.	EXHIBIT CONTRACTOR

FINISH SCHEDULE

METAL SCHEDULE

NO.	EXHIBIT FINISH CODE	DESCRIPTION	COLOR	SPEC	SUPPLIER	CONTACT/ REP	COMMENTS
1	X-MTL-1	BLACK METAL					BLACK TINTED LACQUER
2	X-MTL-2	CORTEN STEEL					

FINISH SCHEDULE

NO.	EXHIBIT FINISH CODE	DESCRIPTION	COLOR	SPEC	SUPPLIER	CONTACT/ REP	COMMENTS
1	X-WD-1	WOOD VENEER PANELS	TBD	COR PRODUCT	BETTONCOURT		TABLE BASES
2	X-WD-2	RECYCLED PAPER PANELS	TBD	PAPERSTONE OR EQ.	BETTONCOURT		RAILS/ TABLETOPS
3	X-WD-3	WOOD VENEER	TBD	QUARTER SAWN MAPLE			LIFE ECOSYSTEM PANELS
4	X-WD-4	PLYWOOD	TBD	APPELPLY	SIERRA PINE		RAILS/ TABLETOPS
5	X-PN-1	TRANSCLUSCENT PANELS	TBD	3 FORM RESIN			FLIP BOOK PANELS
6	X-MDF-1	TINTED LAQUERED MDF	TBD	MEDITE II W/ LOW VOC SEAL	SIERRA PINE		TYPICAL WALL PANELS
7	X-RB-1	RECYCLED RUBBER	TBD	ECOSURFACES OR EQ.			OUR BACKYARD /DANGER CAVE
8	X-ST-1	STONE COMPOSITE PANEL	TBD	SQUAK MOUNTAIN STONE OR EQUAL			OUR BACKYARD WATER AREA
9	X-ST-2	SANDSTONE SLAB	TBD	3" TH. ROUGH SLAB	STATE STONE		LAND COLORADO PLATEAU TABLES
10	X-F-1	WOOL FELT	TBD	BUFFALO FELT OR EQ.			OUR BACKYARD SEATING
11	X-F-2	STRETCHED FABRIC	TBD	CREATION BAUMANN OR EQ.			OUR BACKYARD LEAVES
12	X-F-3	FABRIC ON SUBSTRATE	TBD	CREATION BAUMANN OR EQ.			CASEWORK PANELS
13	X-C-1	CEMENTICIOUS SCIM COAT	TBD	HYBRIDIZED CEMENT			PW PLATFORMS

PAINT SCHEDULE

NO.	EXHIBIT FINISH CODE	DESCRIPTION	COLOR	SPEC	SUPPLIER	CONTACT/ REP	COMMENTS
1	X-PT-1	LATEX PAINT FINISH	WHITE	PRIMER + 2 COATS OF FINISH	BENJAMIN MOORE OR EQUAL		FINAL COLOR SPEC # TBD
2	X-PT-2	LATEX PAINT FINISH	TBD	PRIMER + 2 COATS OF FINISH	BENJAMIN MOORE OR EQUAL		FINAL COLOR SPEC # TBD
3	X-PT-3	LATEX PAINT FINISH	TBD	PRIMER + 2 COATS OF FINISH	BENJAMIN MOORE OR EQUAL		FINAL COLOR SPEC # TBD
4	X-PT-4	LATEX PAINT FINISH	TBD	PRIMER + 2 COATS OF FINISH	BENJAMIN MOORE OR EQUAL		FINAL COLOR SPEC # TBD
5	X-PT-5	LATEX PAINT FINISH	TBD	PRIMER + 2 COATS OF FINISH	BENJAMIN MOORE OR EQUAL		FINAL COLOR SPEC # TBD
6	X-PT-6	LATEX PAINT FINISH	TBD	PRIMER + 2 COATS OF FINISH	BENJAMIN MOORE OR EQUAL		FINAL COLOR SPEC # TBD

GLASS / ACRYLIC SCHEDULE

NO.	EXHIBIT FINISH CODE	DESCRIPTION	COLOR	SPEC	SUPPLIER	CONTACT/ REP	COMMENTS
1	X-IGL-1	CLEAR GLASS		CLEAR TEMPERED			POLISH EXPOSED EDGES
2	X-IGL-2	CLEAR GLASS		LAMINATED LOW IRON			POLISH EXPOSED EDGES, HARDWARE AS SPEC'D ON DRAWINGS
3	X-AC-1	CLEAR ACRYLIC		SCRATCH RESISTANT, P30 BONDING			

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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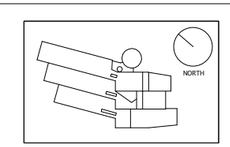


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

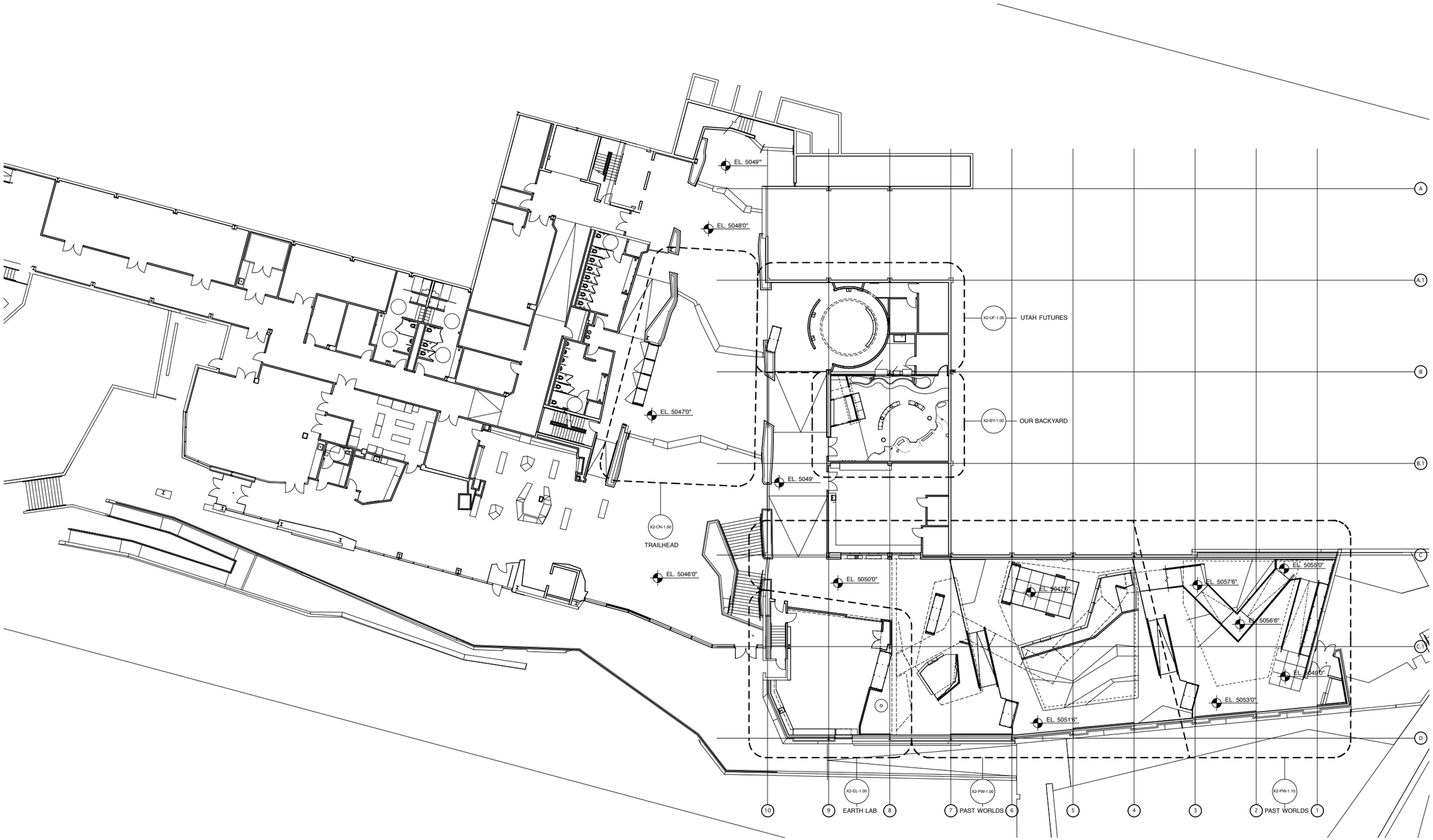
Sheet Title
Symbols & Abbreviations

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 0224375O
Sheet No.
X0-00-0.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

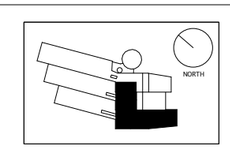


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Structural Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	**Landscape Architect**	**Lighting**	**Audio Visual**	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Design Workshop, Inc. 1796 Prospector Avenue Park City, Utah 84060 435.655.0915 tel.	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue	Name / Date
FD WS2rev	Sept.22, 2008
FD WS2	Sept.9, 2008
100% DD	June 2, 2008
XG 60% CD	May 5, 2008
WS9	March. 26, 2008
WS8	Feb. 20, 2008
WS7	Dec. 18, 2007
50% DD	Sept. 18, 2007
WS6	July 11, 2007
WS5	May 23, 2007
WS4	April 12, 2007

No. / Issue	Name / Date
100% FD	April.1, 2009
95% FD	March.16, 2009
80% FD	Dec.19, 2008
FD WS4	Nov.18, 2008
FD WS3	Oct.16, 2008

Sheet Title
Level 2 Plan

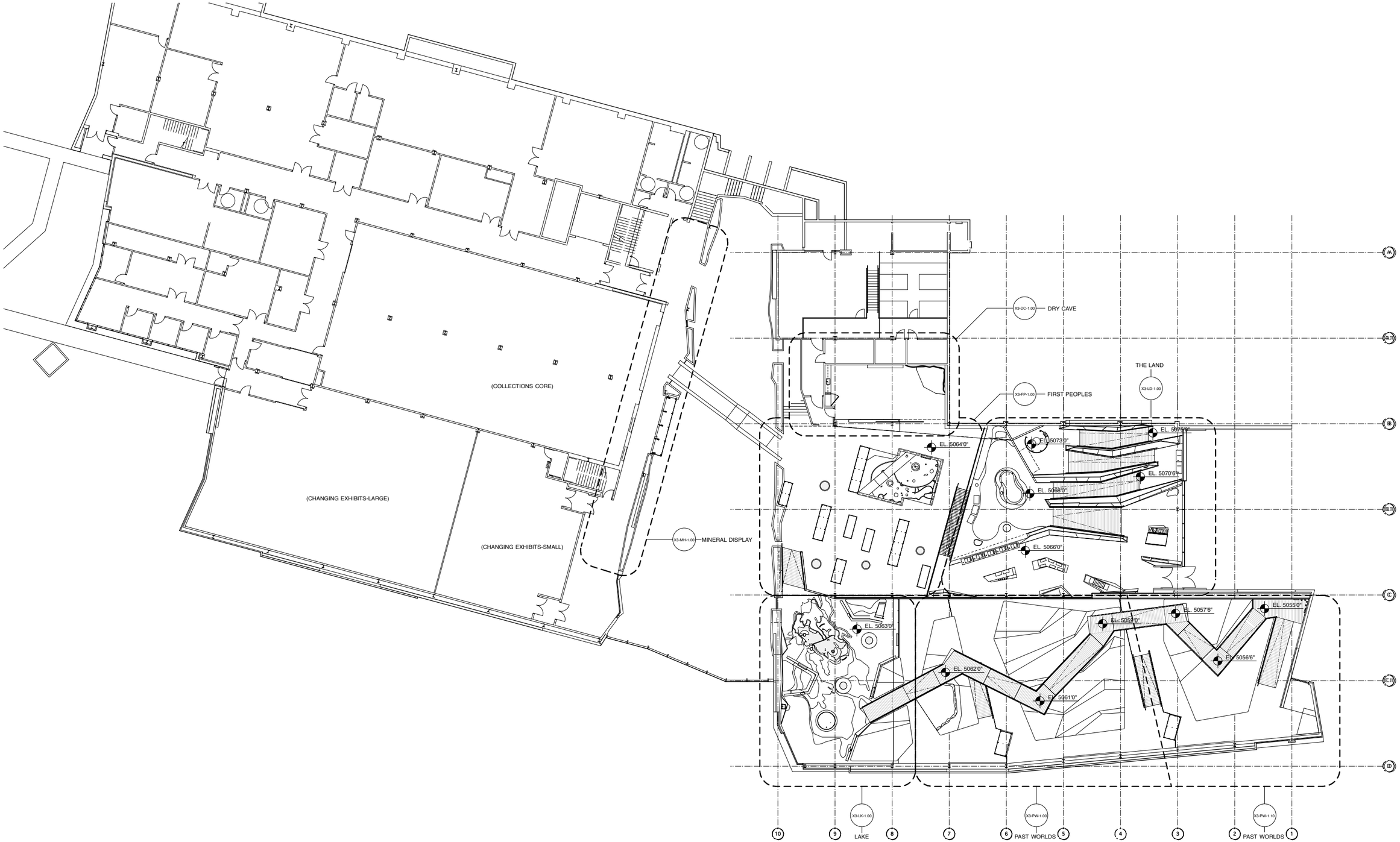
Date
April 1, 2009

Project No.
0275

Scale*
1/16"=1'-0"

Sheet No.
X2-L2-0.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

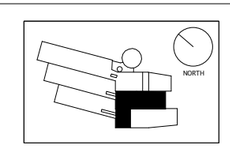


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

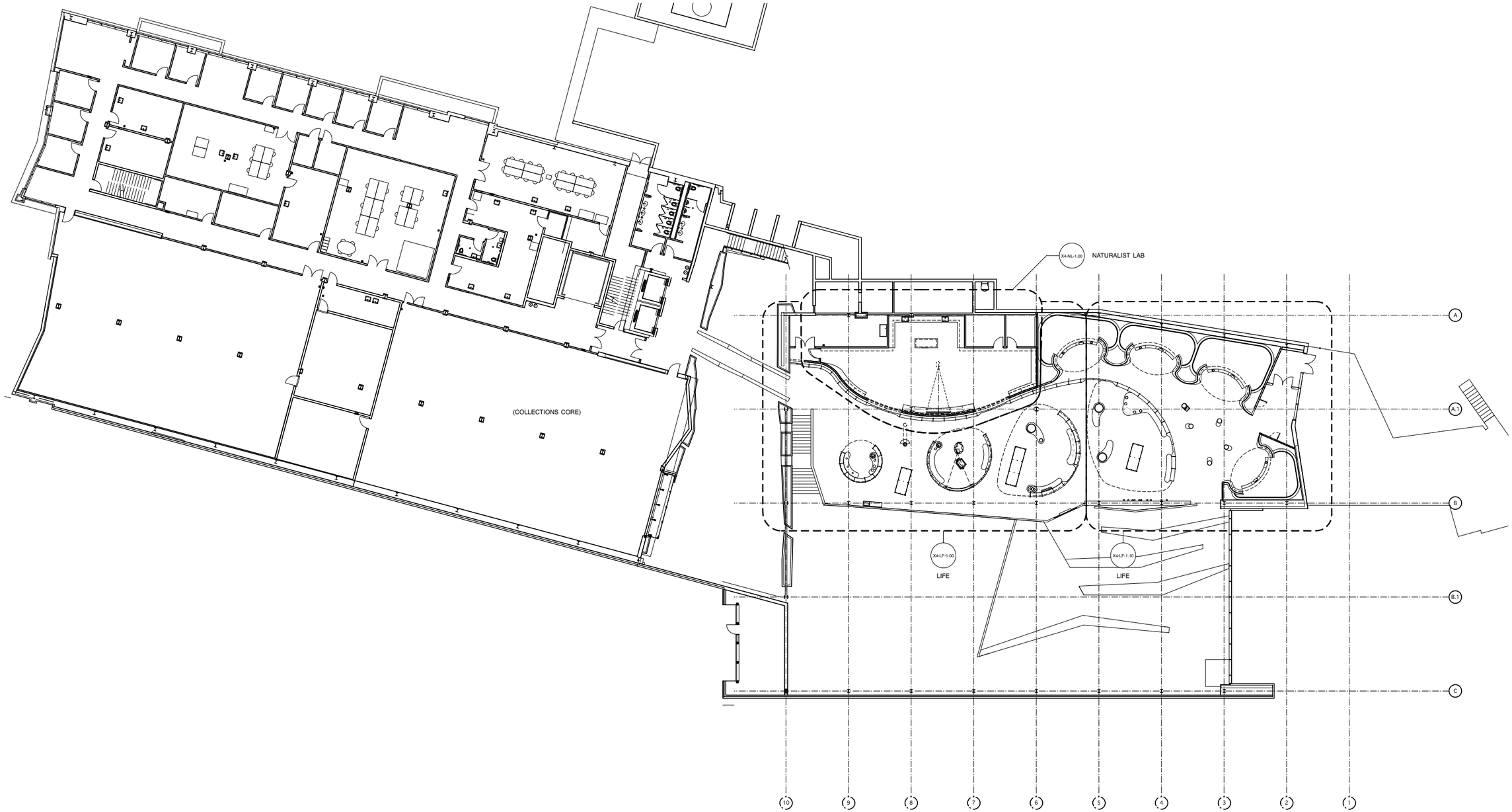
Sheet Title
Level 3 Plan

Date
April 2, 2009

Scale*
1/16"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X3-L3-0.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
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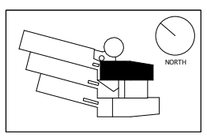


Key Plan

No. / Issue Name / Date

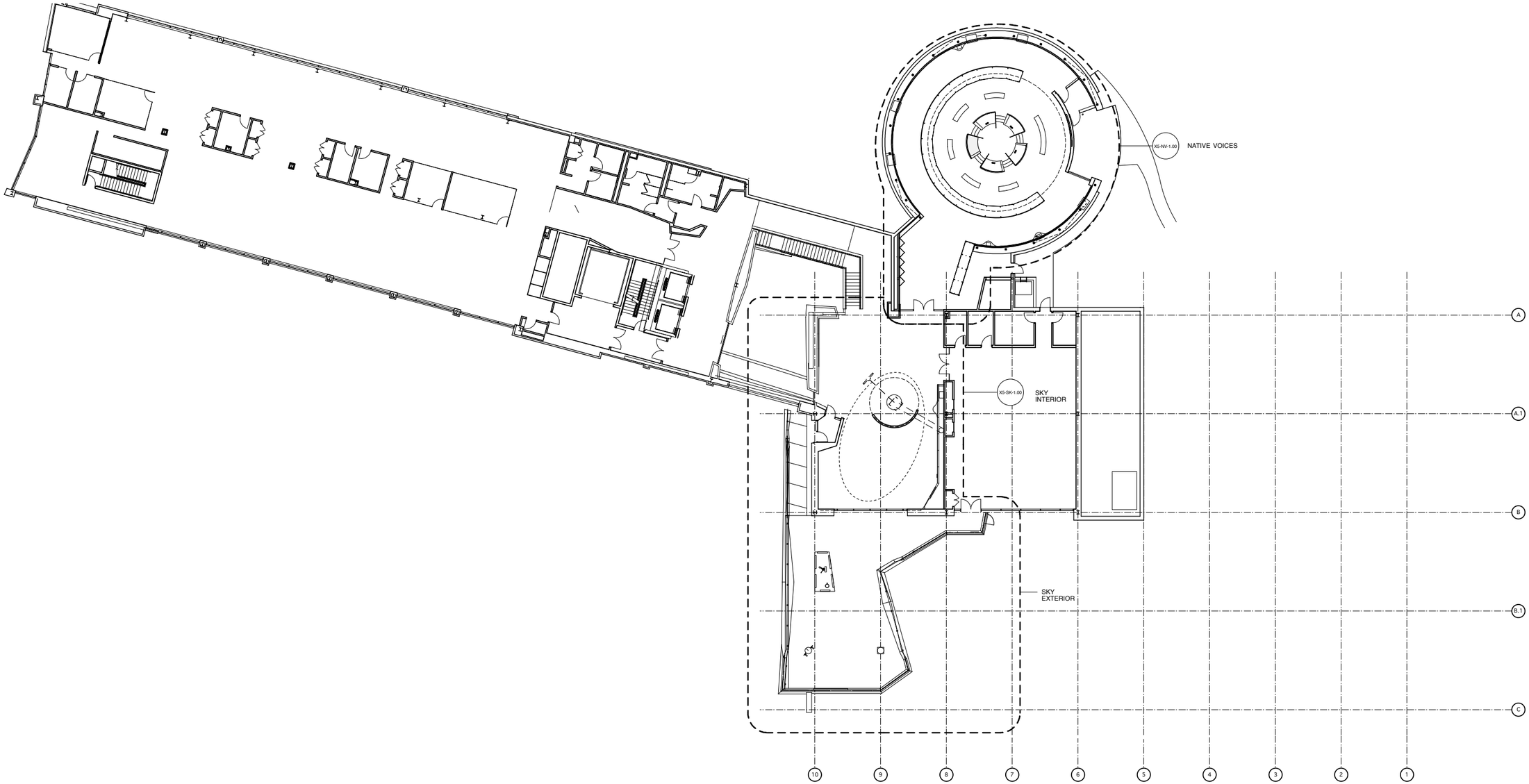
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Level 4 Plan

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/16"=1'-0"	X4-L4-0.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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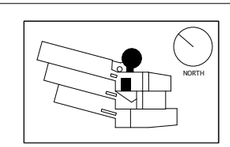


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

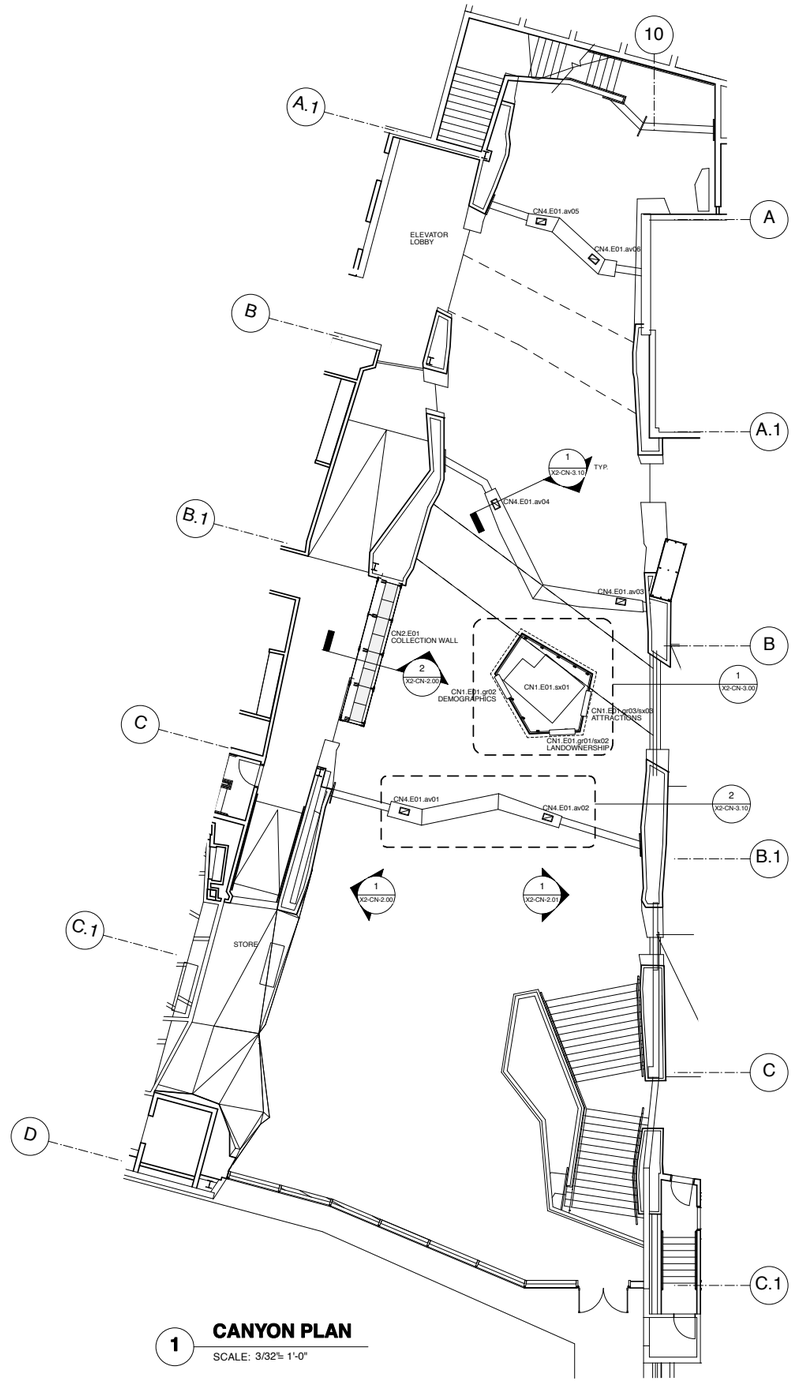
Sheet Title
Level 5 Plan

Date
April 2, 2009

Scale*
1/16"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X5-L5-0.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **CANYON PLAN**

SCALE: 3/32"= 1'-0"

NOTE:

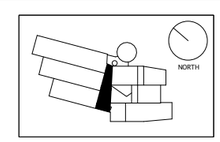
COLLECTION WALL AND CANYON FURNISHINGS ARE IN BASE BUILDING SCOPE (N.I.C).

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

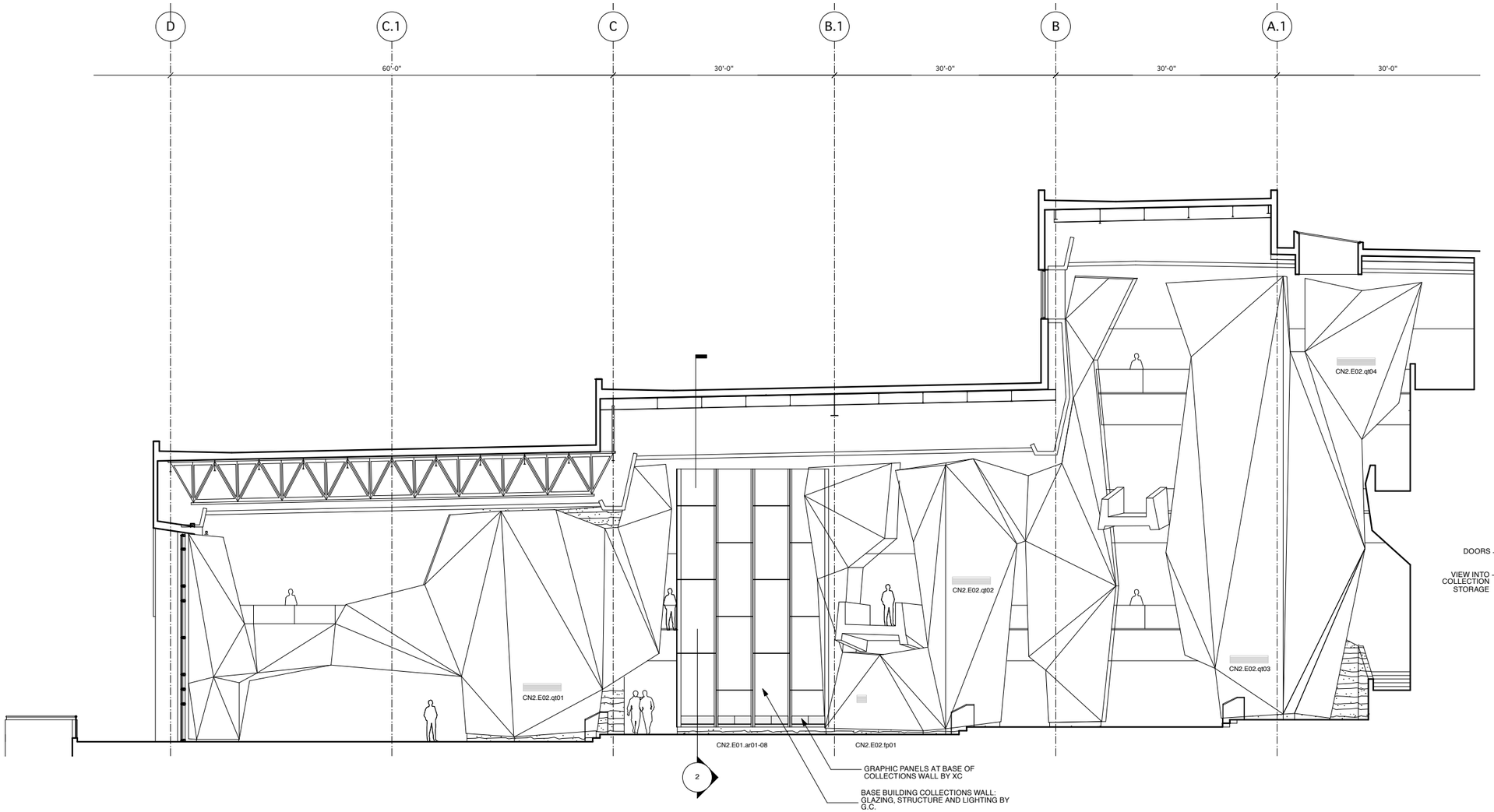
No. / Issue Name / Date

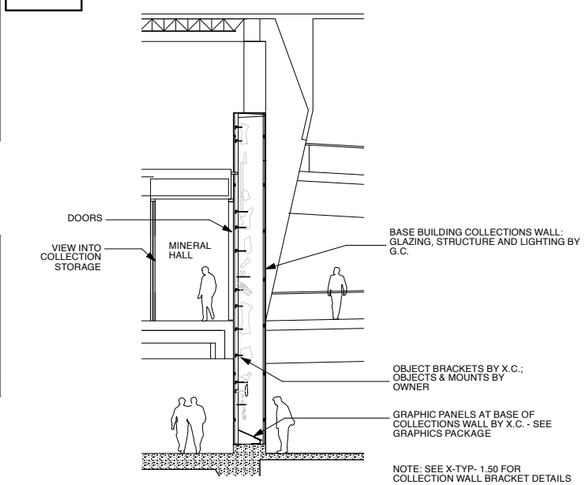
Sheet Title

Partial Plan: Trailhead

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X2-CN-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")





1 **CANYON SECTION LOOKING NORTH**

SCALE: 1/8" = 1'-0"

2 **CANYON SECTION**

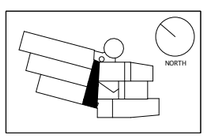
SCALE: 1/8" = 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Elevations & Sections: Trailhead

Date

April 2, 2009

Scale*

As Noted

RAA Project No. 0275

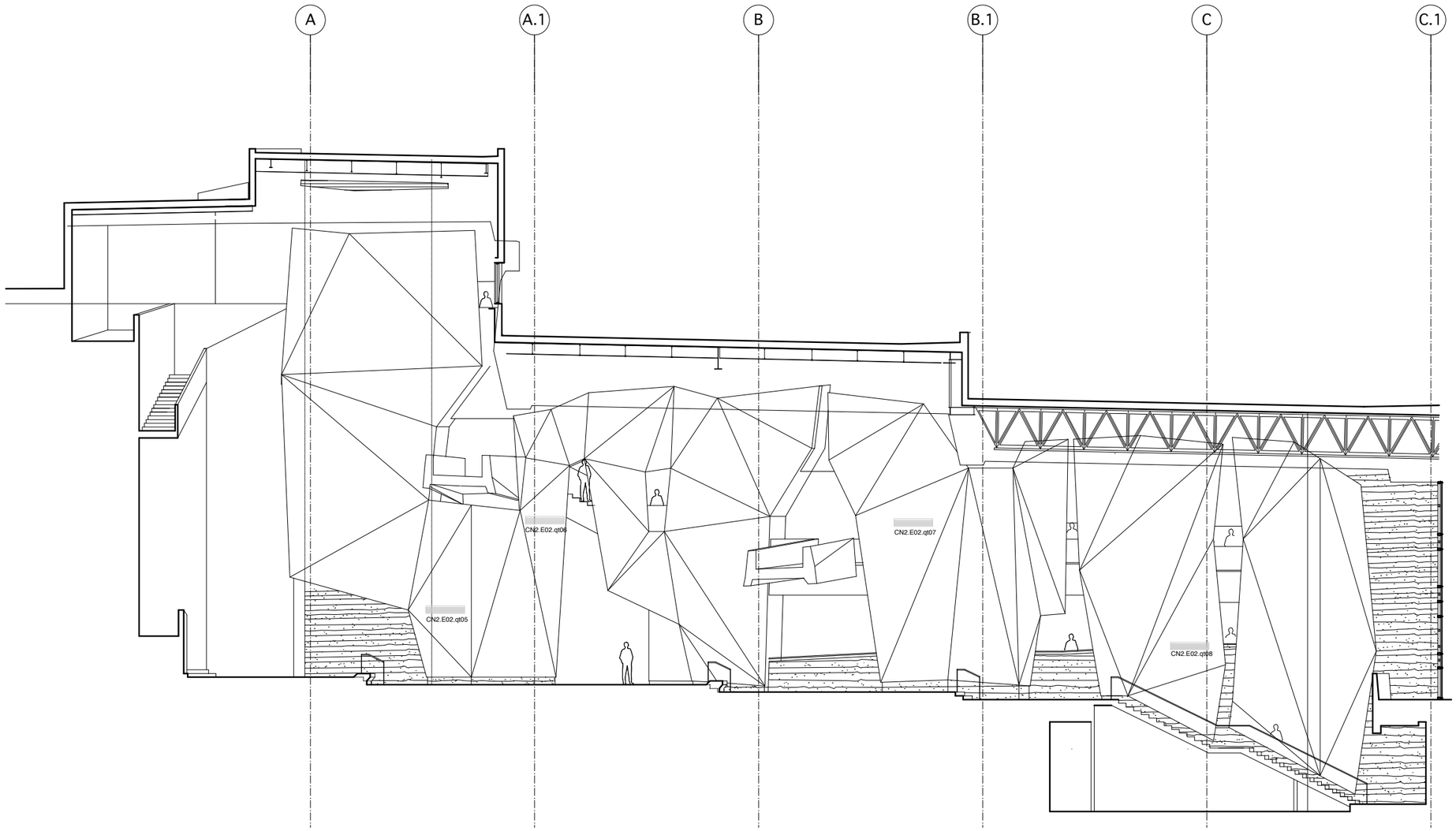
U. of U. Project No. 0872-9630

DFCM Project No. 0243750

Sheet No.

X2-CN-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **CANYON SECTION LOOKING SOUTH**

SCALE: 1/8" = 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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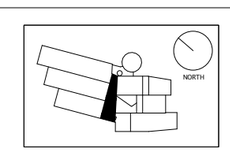
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Elevations & Sections: Trailhead

Date

April 2, 2009

Scale*

As Noted

RAA Project No. 0275

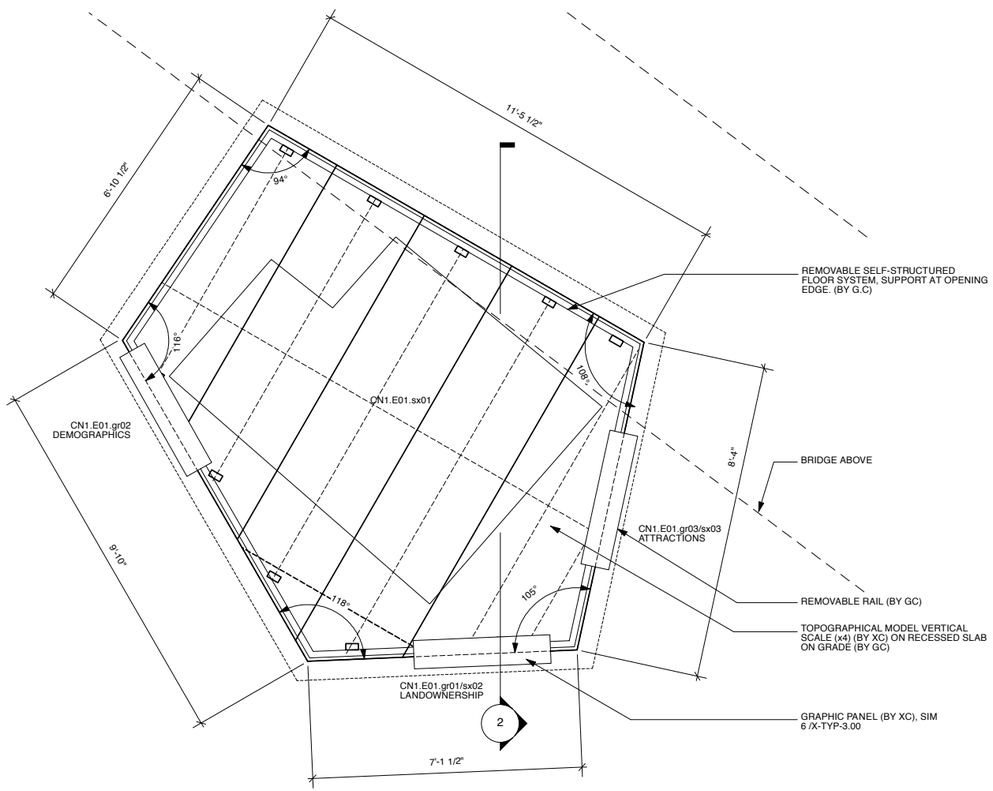
U. of U. Project No. 0872-9630

DFCM Project No. 0224375O

Sheet No.

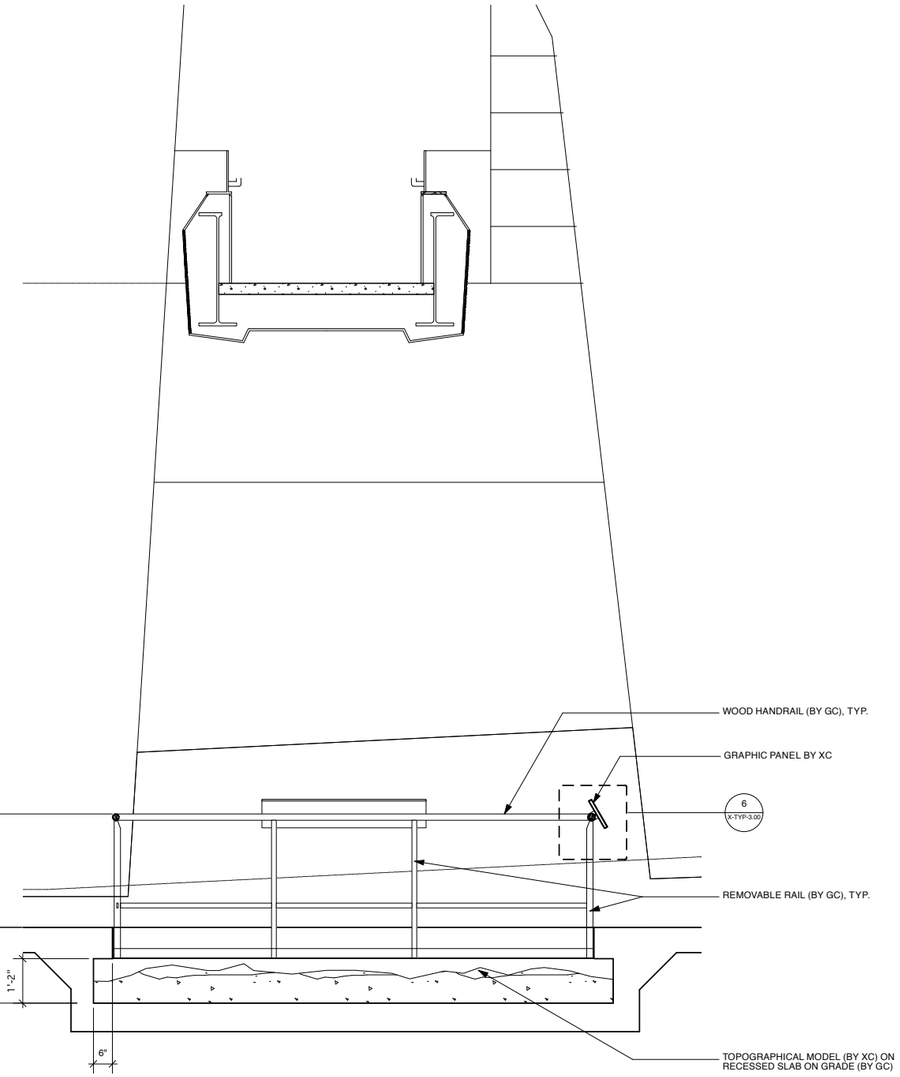
X2-CN-2.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 PLAN UTAH TOPO. MAP

SCALE: 1/2" = 1'-0"



2 CANYON SECTION LOOKING SOUTH

SCALE: 1/2" = 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

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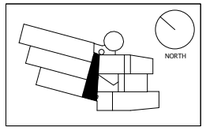


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

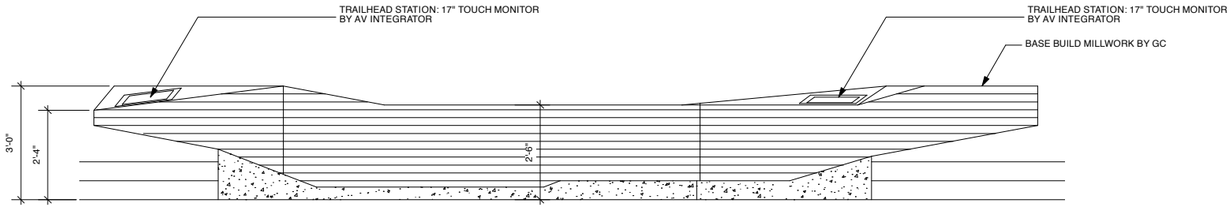
Sheet Title
Details:
Trailhead Topo Map

Date
April 2, 2009

Scale*
As Noted

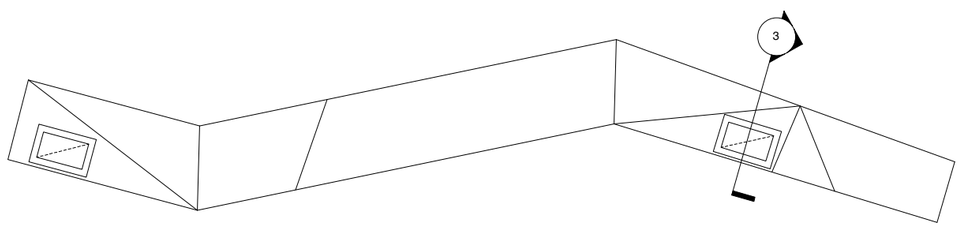
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X2-CN-3.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



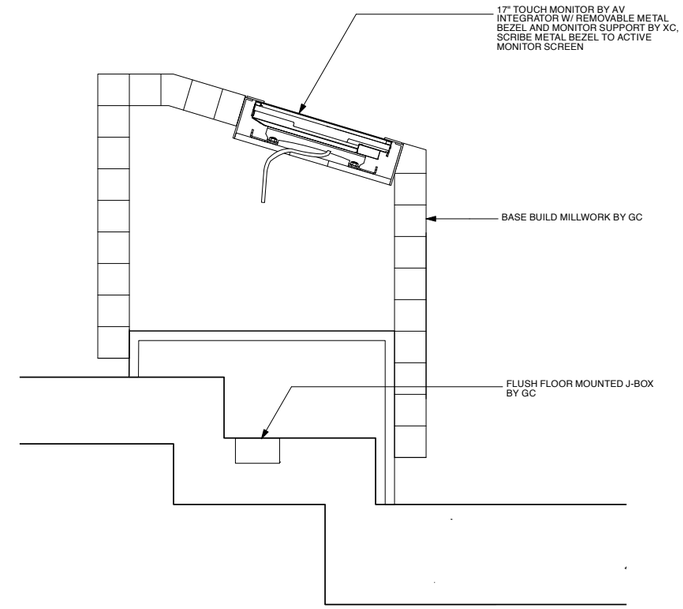
1 **TYP. ELEVATION: PLAN TRAILHEAD BENCH**

SCALE: 1/2"= 1'-0"



2 **TYP. PLAN: TRAILHEAD BENCH**

SCALE: 1/2"= 1'-0"



3 **TYP. SECTION: TRAILHEAD BENCH**

SCALE: 1/2"= 1'-0"

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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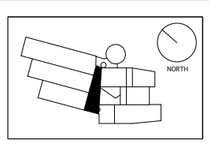


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Details:
Trailhead Bench Monitors

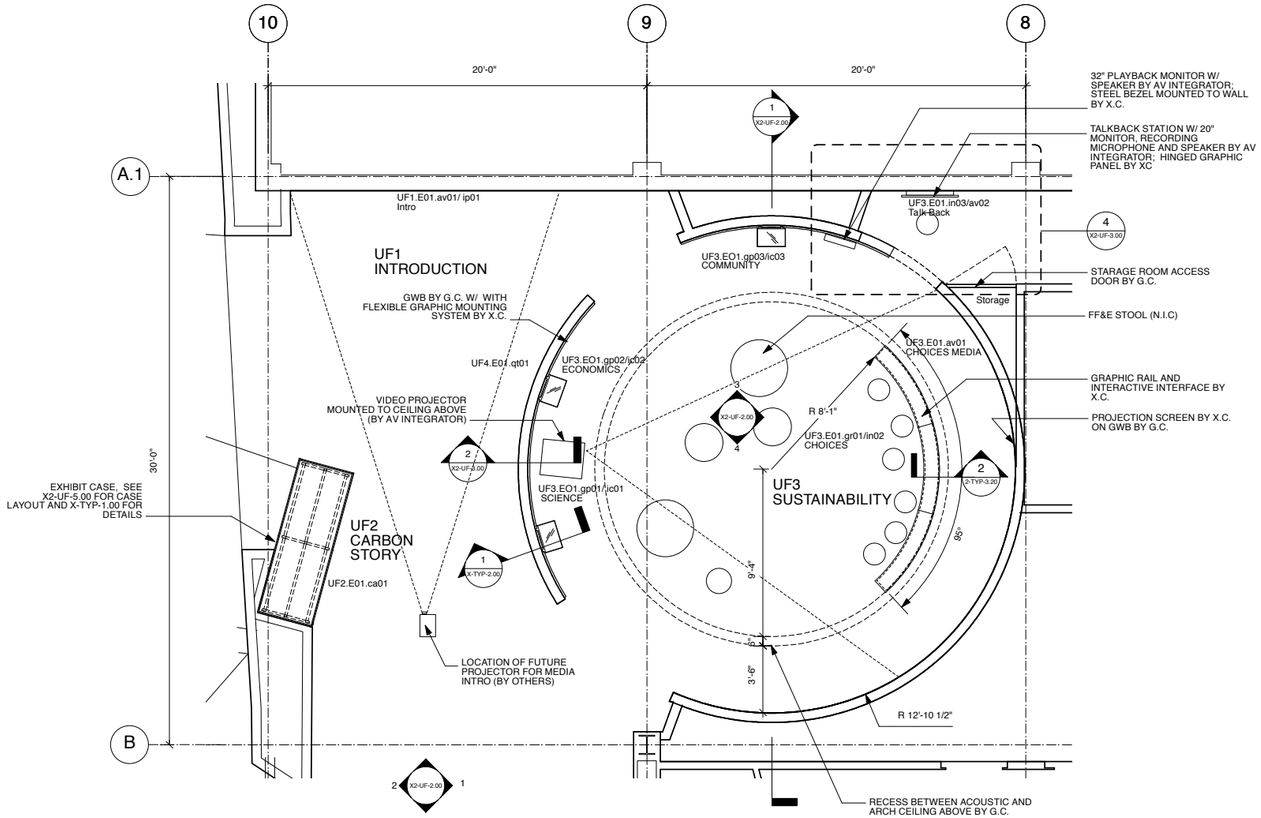
Date
April 2, 2009

Scale*
As Noted

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

X2-CN-3.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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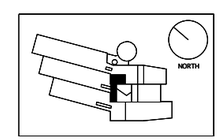


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

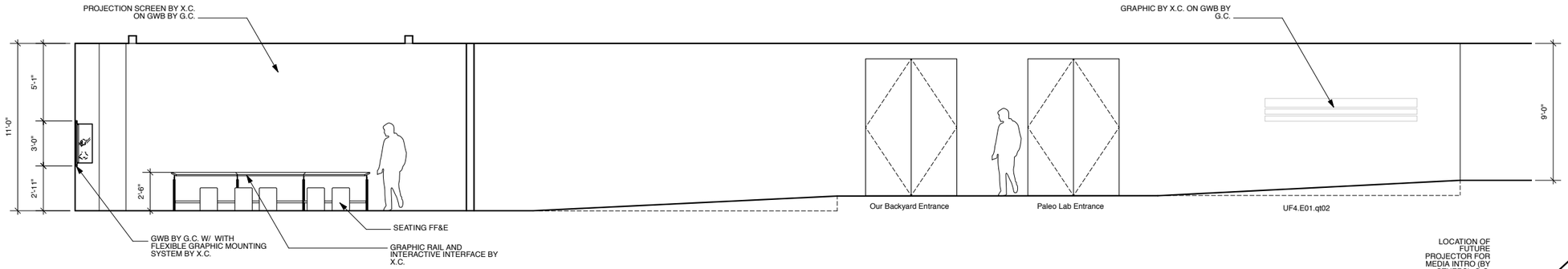
Sheet Title
Partial Plan:
Utah Futures

Date
April 2, 2009

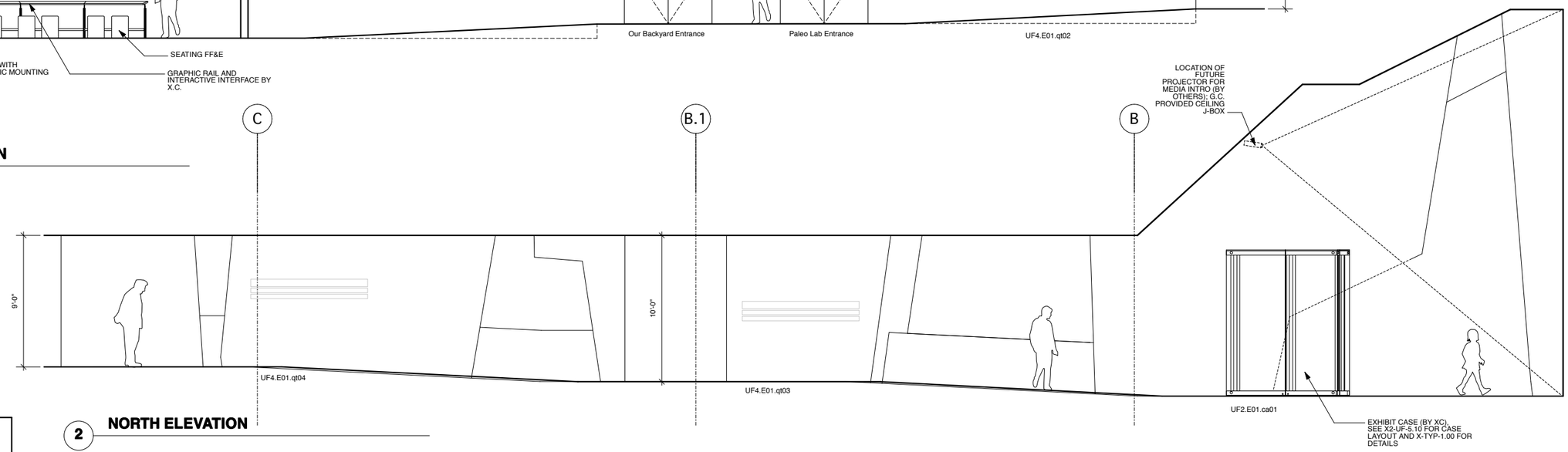
Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X2-UF-1.00

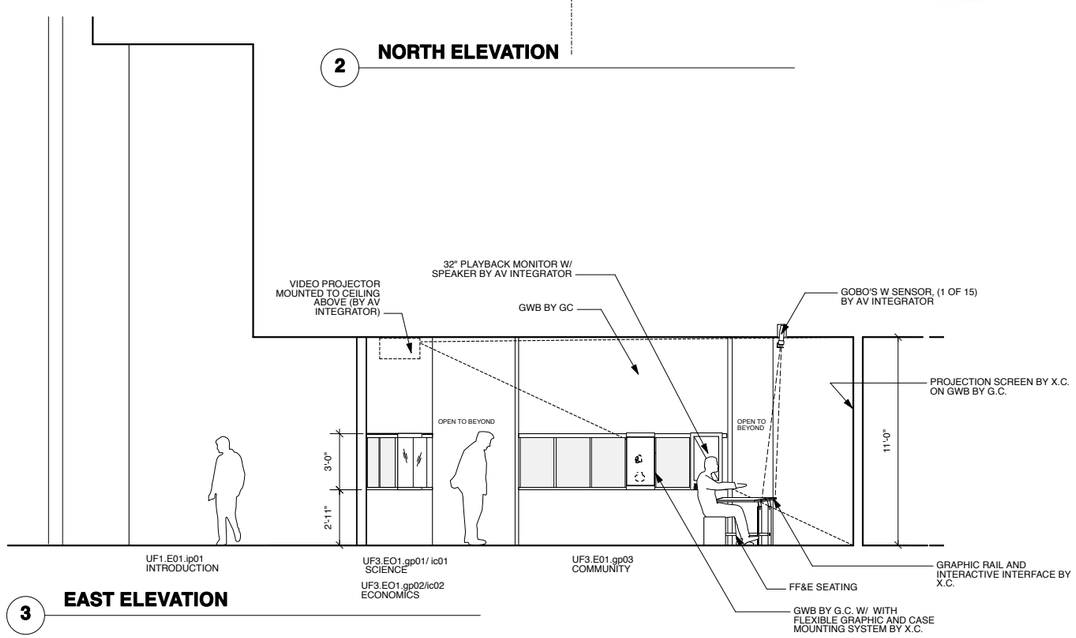
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



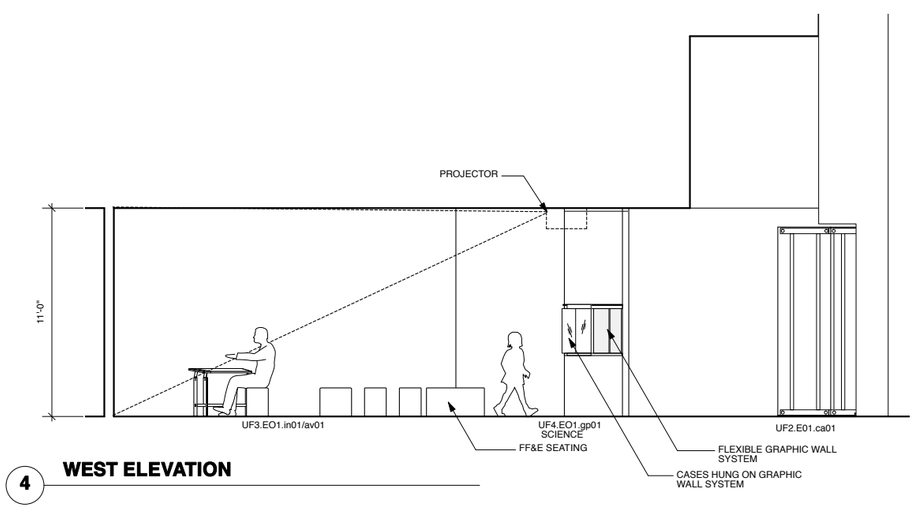
1 **SOUTH ELEVATION**



2 **NORTH ELEVATION**



3 **EAST ELEVATION**



4 **WEST ELEVATION**

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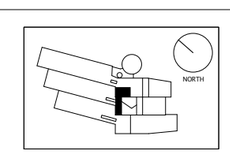


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Elevations & Sections:
Utah Futures

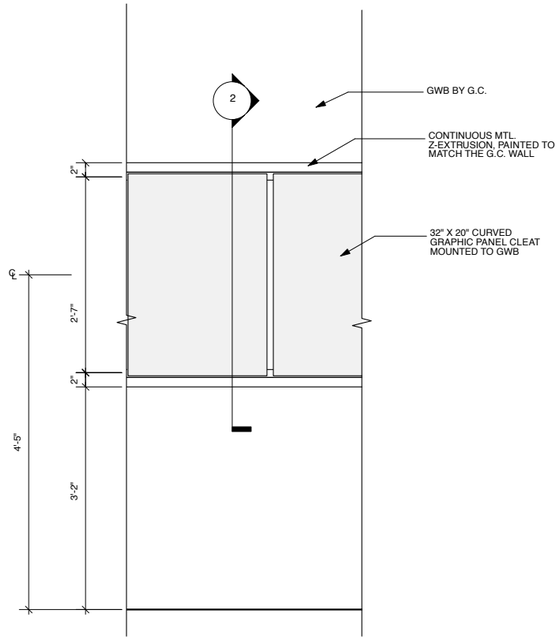
Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

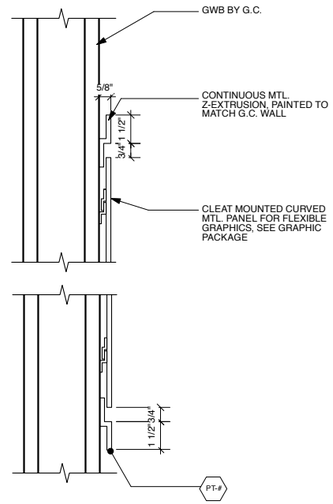
X2-UF-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



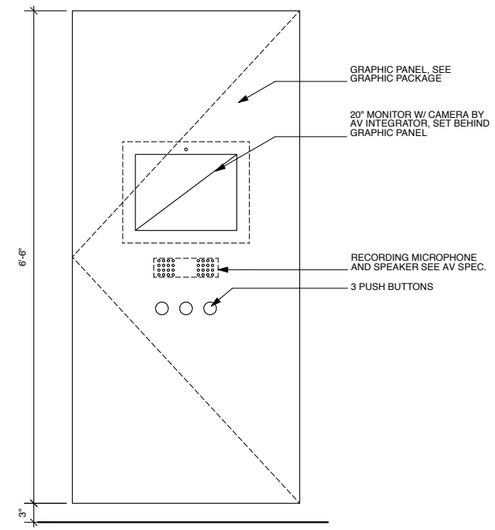
1 GRAPHIC WALL SYSTEM

SCALE: 1" = 1'-0"



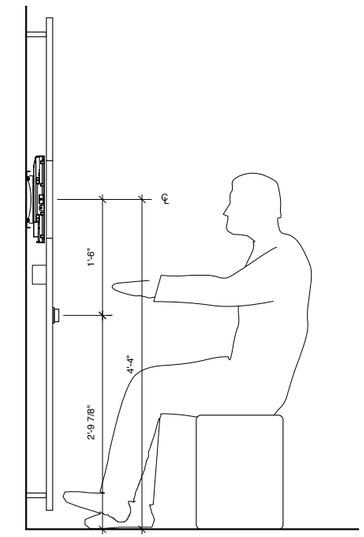
2 GRAPHIC WALL SYSTEM DETAIL SECTION

SCALE: 3" = 1'-0"



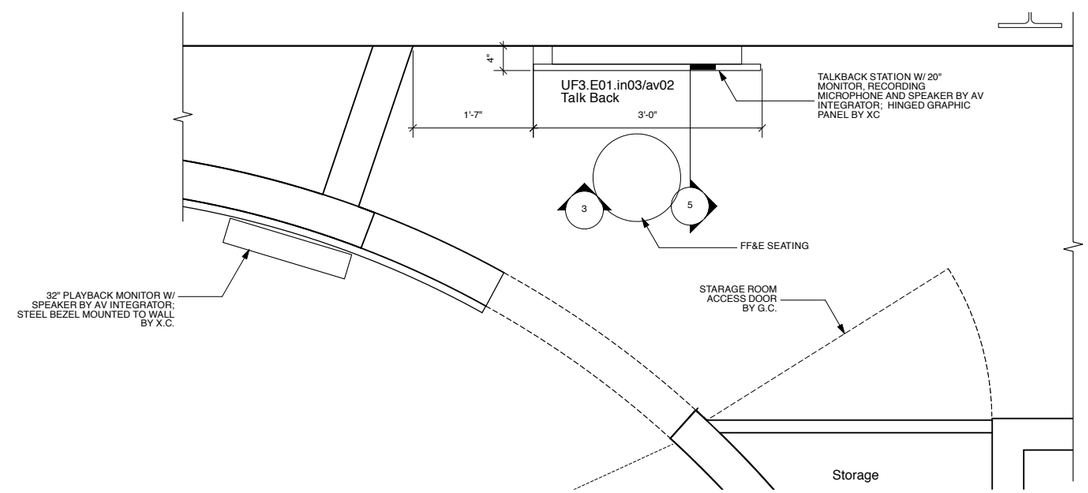
3 TALK BACK

SCALE: 1"= 1'-0"



5 TALK BACK DETAIL SECTION

SCALE: 1"= 1'-0"



4 TALK BACK DETAIL PLAN

SCALE: 1" = 1'-0"

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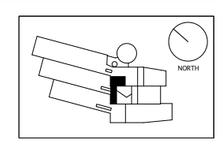


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

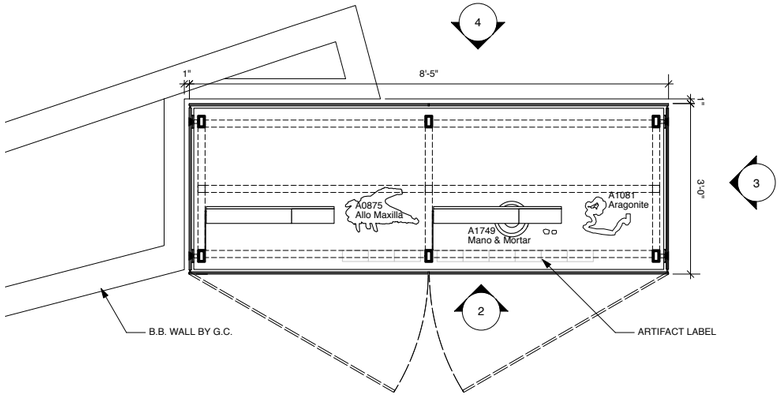
Sheet Title
Details:
Utah Futures

Date
April 2, 2009

Scale*
As Noted

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X2-UF-3.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

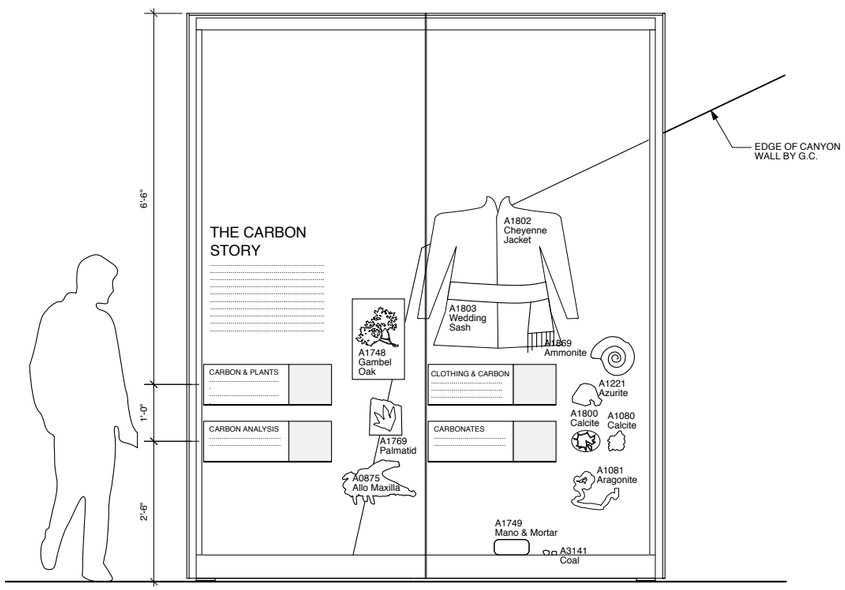


1 PLAN

SCALE: 3/4"= 1'-0"

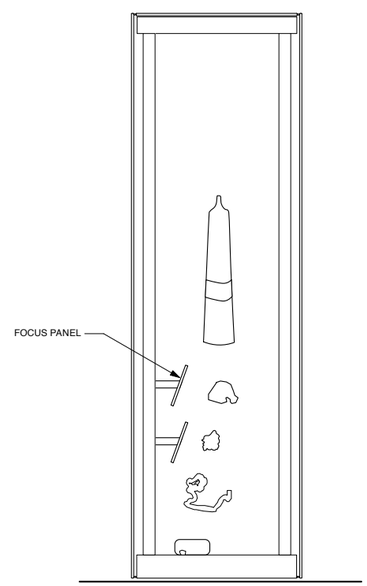
ARTIFACT MOUNTING SCHEDULE

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A0875					x			
A1080					x			
A1081						x		
A1221						x		
A1748					x			
A1749				x				
A1769					x			
A1800						x		
A1802							x	
A1803							x	
A1869					x			
A3141				x				



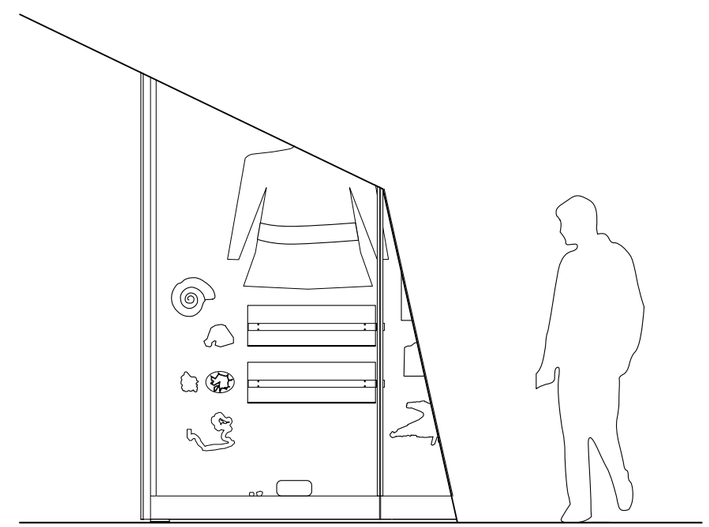
2 ELEVATION

SCALE: 3/4"= 1'-0"



3 ELEVATION

SCALE: 3/4"= 1'-0"



4 ELEVATION

SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

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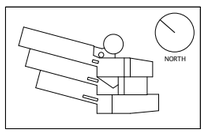


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

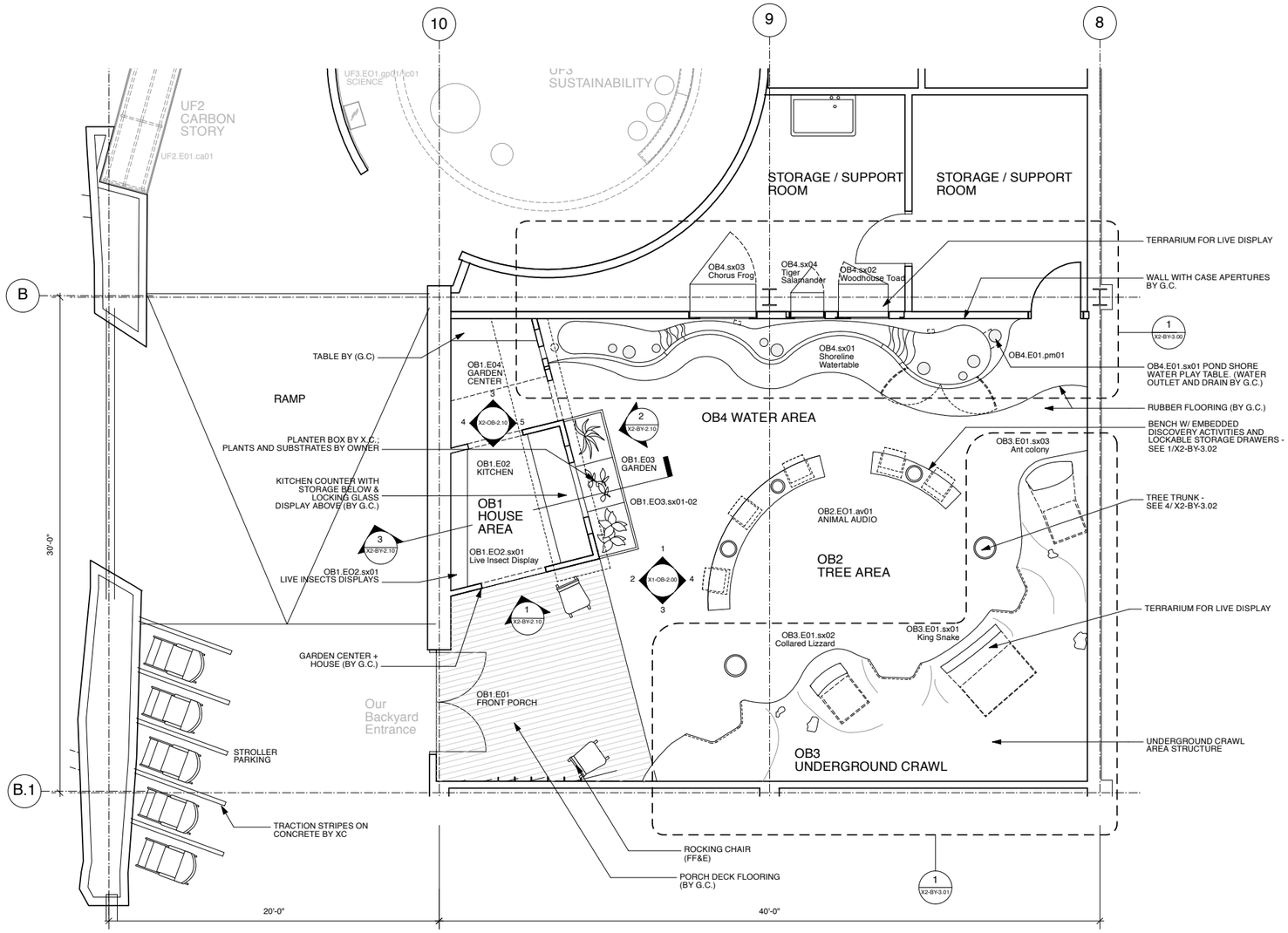
100% Final Design April 2, 2009

Sheet Title

Exhibit Case Layouts:
Carbon Story, UF2.E01.ca01

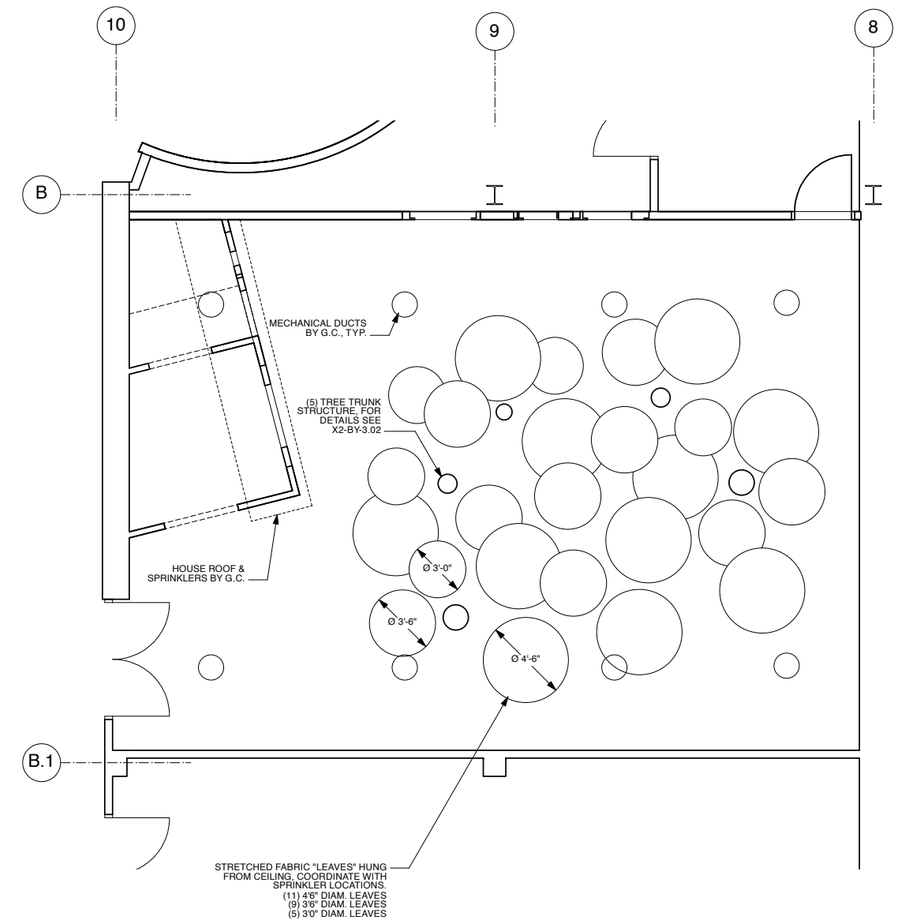
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3/4"=1'-0"	X2-UF-5.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 PLAN

SCALE: 1/4"= 1'-0"



2 REFLECTED CEILING PLAN

SCALE: 1/4"= 1'-0"

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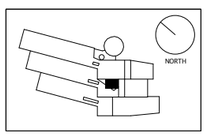


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

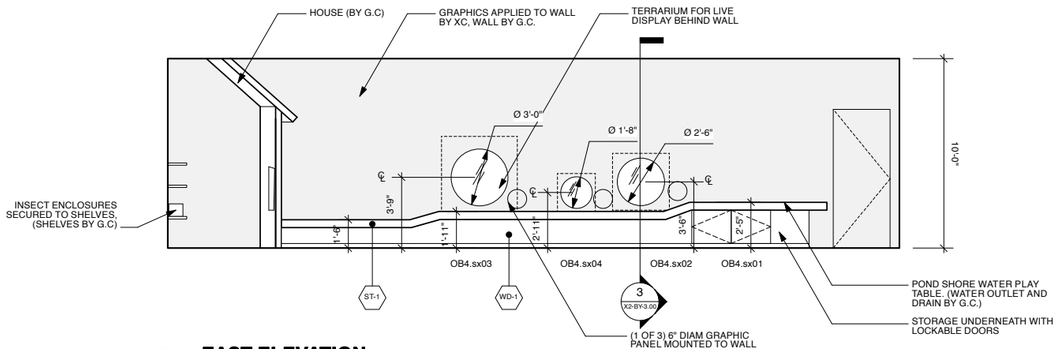
100% Final Design April 2, 2009

Sheet Title

Partial Plan / RCP:
'Our Backyard'/Children's Gallery

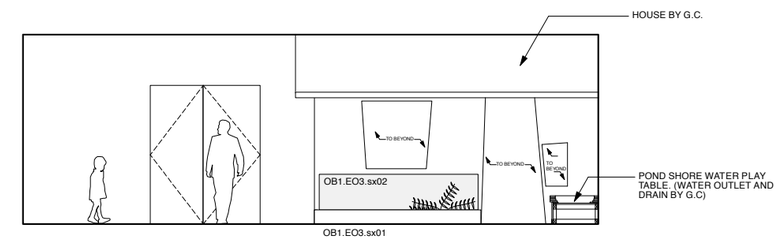
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X2-BY-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



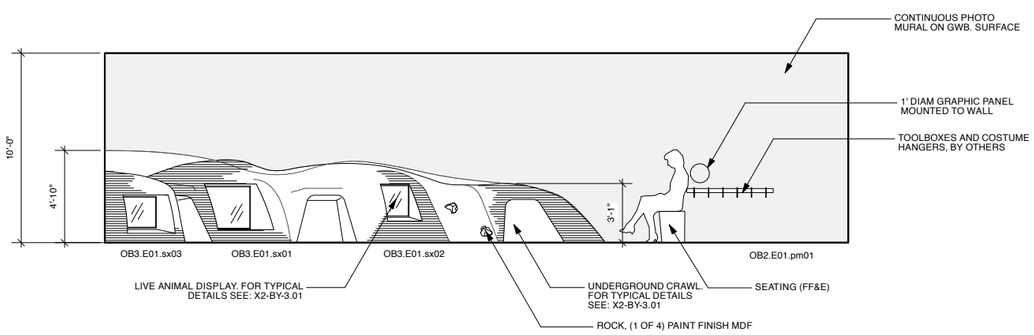
1 EAST ELEVATION

SCALE: 1/4"= 1'-0"



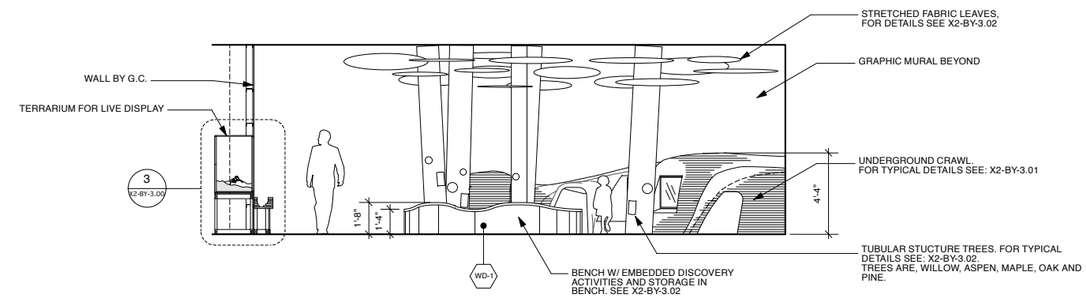
2 NORTH ELEVATION

SCALE: 1/4"= 1'-0"



3 WEST ELEVATION

SCALE: 1/4"= 1'-0"



4 SOUTH ELEVATION

SCALE: 1/4"= 1'-0"

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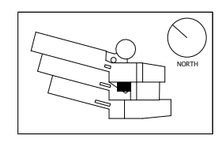


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

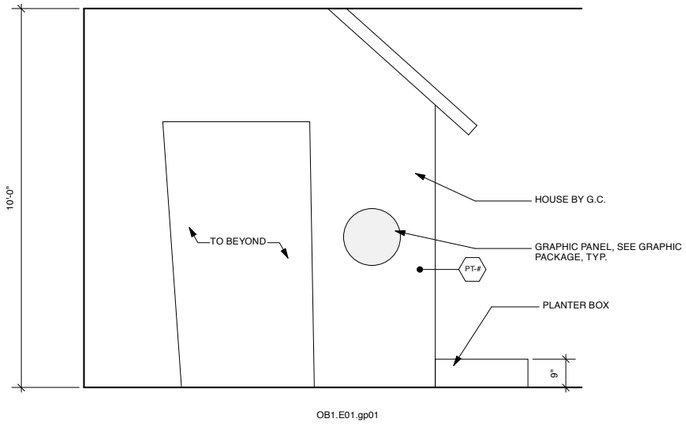
Sheet Title
Elevations & Sections:
'Our Backyard'

Date
April 2, 2009

Scale*
1/4"=1'-0"

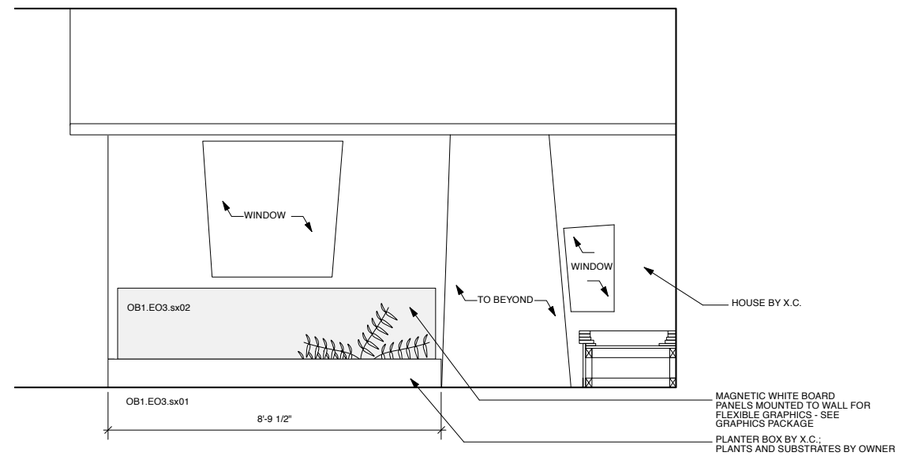
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X2-BY-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



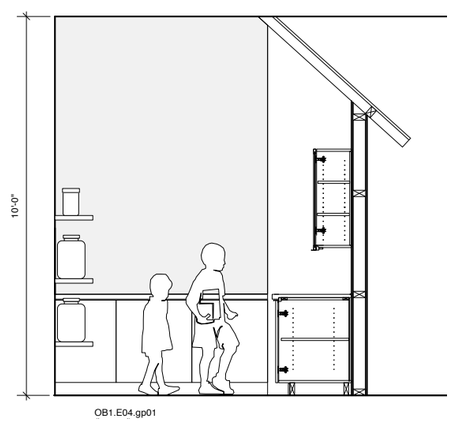
1 SOUTH ELEVATION: KITCHEN AREA

SCALE: 1/2"= 1'-0"



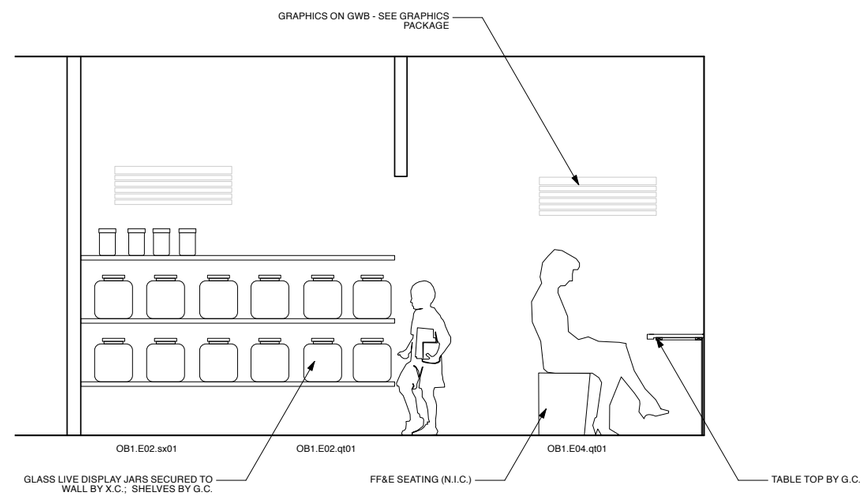
2 NORTH ELEVATION: KITCHEN AREA

SCALE: 1/2"= 1'-0"



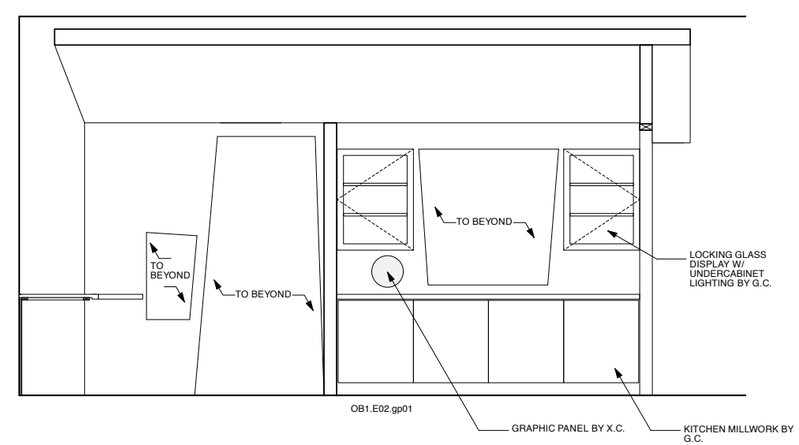
3 SOUTH SECTION: KITCHEN AREA

SCALE: 1/2"= 1'-0"



4 NORTH SECTION: KITCHEN AREA

SCALE: 1/2"= 1'-0"



5 SOUTH SECTION: KITCHEN AREA

SCALE: 1/2"= 1'-0"

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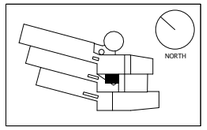


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

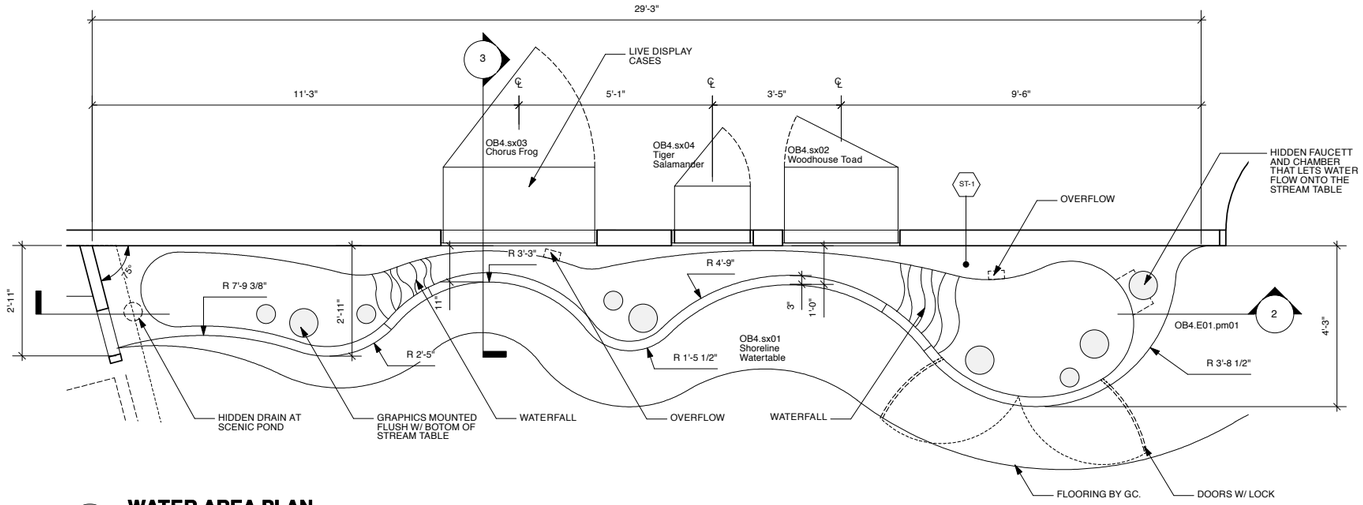
No. / Issue Name / Date

Sheet Title

Elevations & Sections:
'Our Backyard' House Area

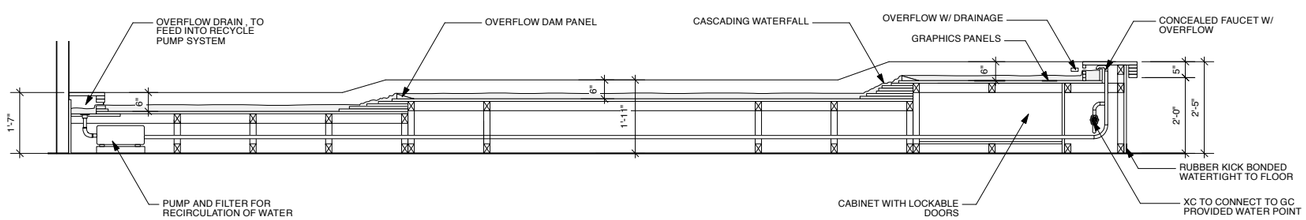
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
1/2"=1'-0"	X2-BY-2.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 WATER AREA PLAN

SCALE: 1/2"= 1'-0"



2 SECTION

SCALE: 1/2"= 1'-0"

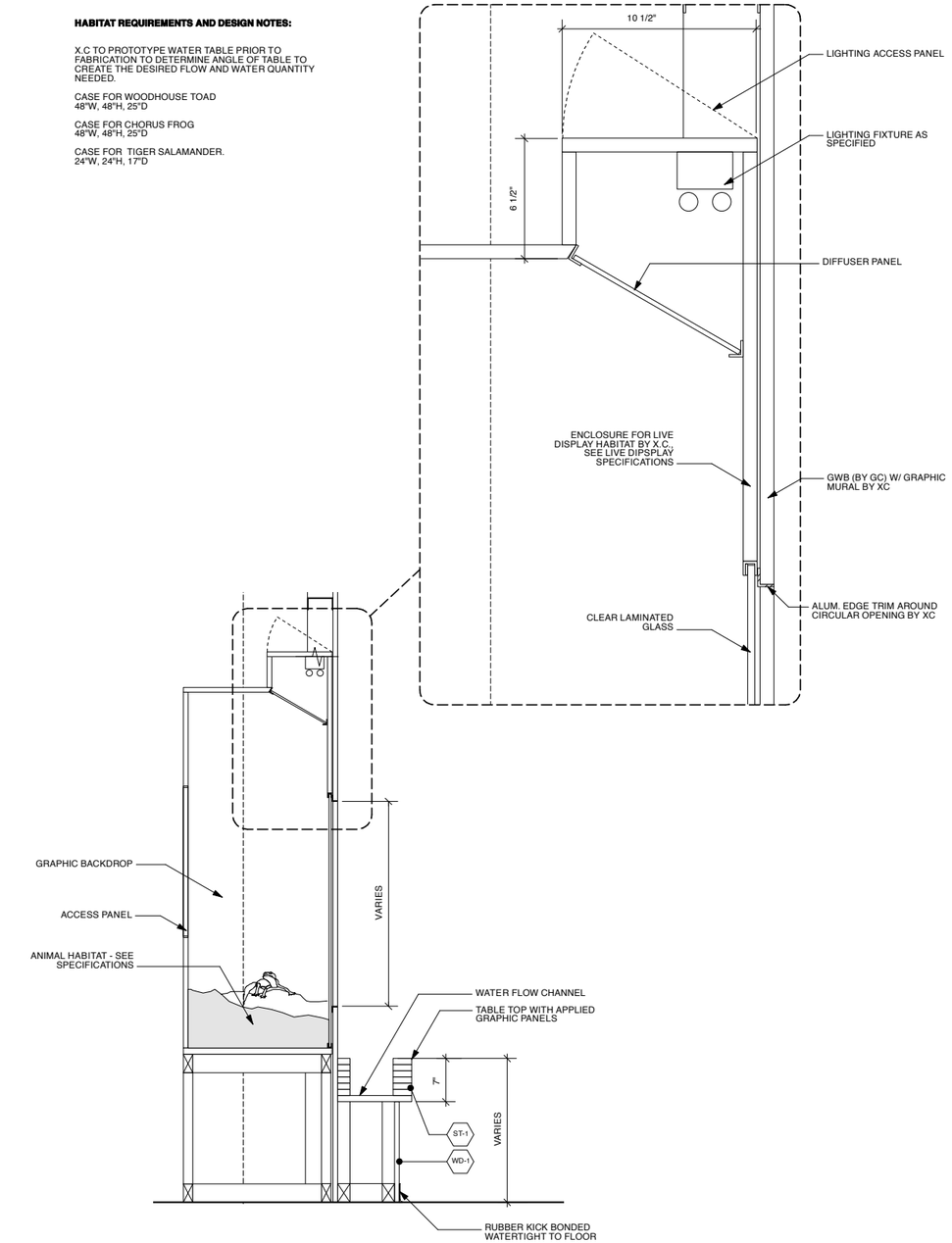
HABITAT REQUIREMENTS AND DESIGN NOTES:

X.C TO PROTOTYPE WATER TABLE PRIOR TO FABRICATION TO DETERMINE ANGLE OF TABLE TO CREATE THE DESIRED FLOW AND WATER QUANTITY NEEDED.

CASE FOR WOODHOUSE TOAD
48"W, 48"H, 25"D

CASE FOR CHORUS FROG
48"W, 48"H, 25"D

CASE FOR TIGER SALAMANDER.
24"W, 24"H, 17"D



3 WATER AREA SECTION

SCALE: 1"= 1'-0"

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Exhibit Construction

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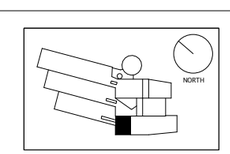


Key Plan

No. / Issue Name / Date

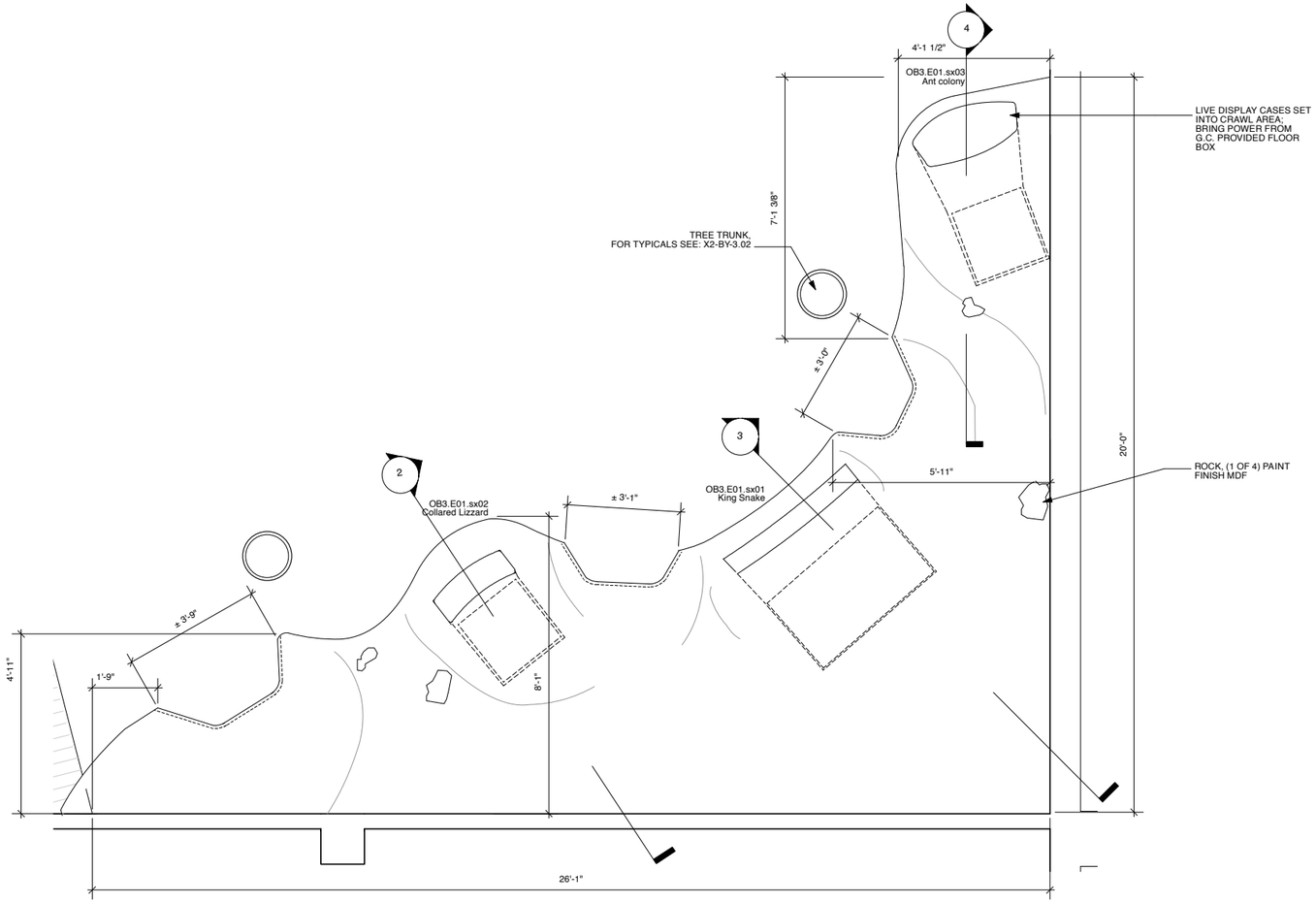
100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Details:
'Our Backyard' Water table

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X2-BY-3.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **DETAIL PLAN**

SCALE: 1/2"= 1'-0"

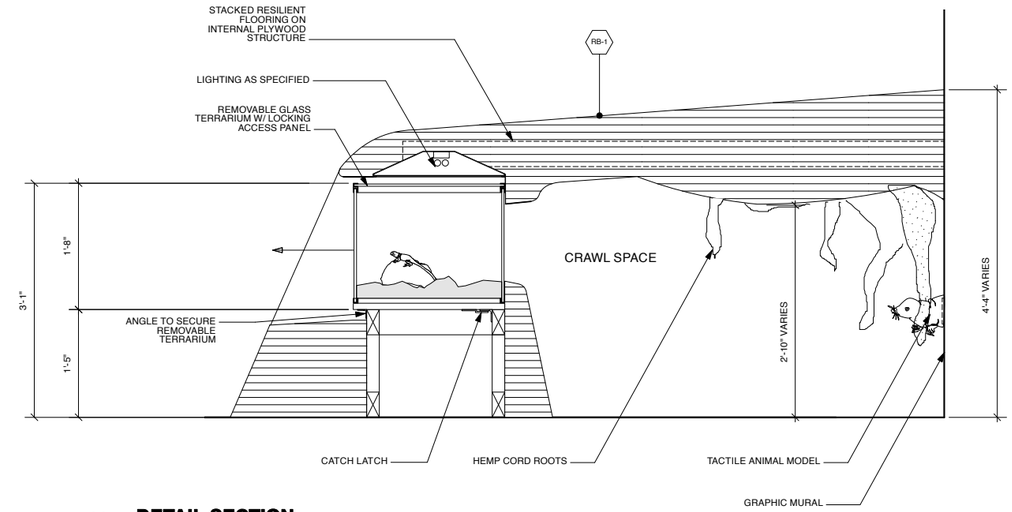
HABITAT REQUIREMENTS AND DESIGN NOTES:

1. TANKS TO BE EASILY REMOVABLE FOR MAINTENANCE
2. PROVIDE HEAT STRIPS IN TANKS

CASE FOR
KING SNAKE
28"W, 48"H, 24"D

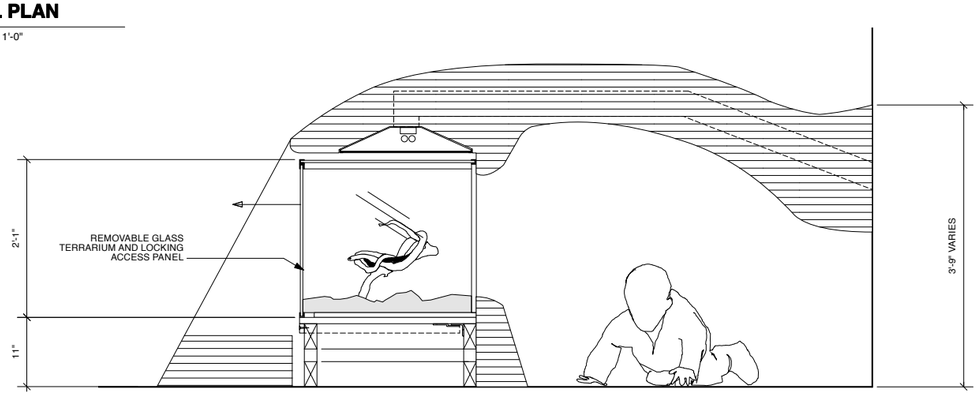
CASE FOR
COLLARD LIZZARD
24"W, 24"D, 18"D

CASE FOR
ANT COLONY
24"W, 24"D, 18"D



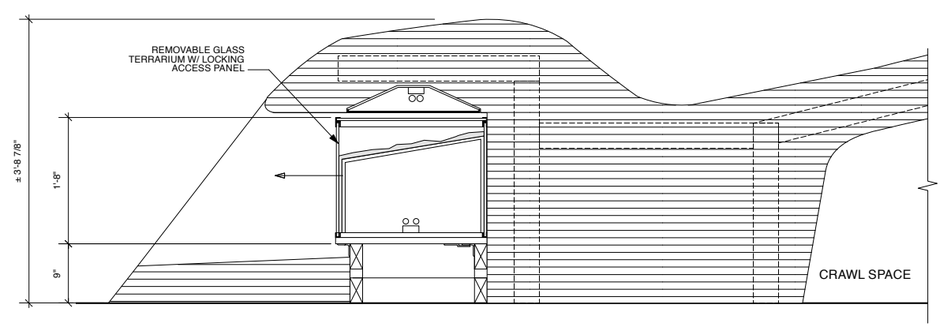
2 **DETAIL SECTION**

SCALE: 1"= 1'-0"



4 **DETAIL SECTION**

SCALE: 1"= 1'-0"



3 **DETAIL SECTION**

SCALE: 1"= 1'-0"

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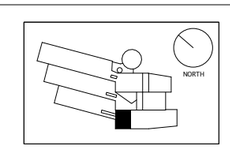


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

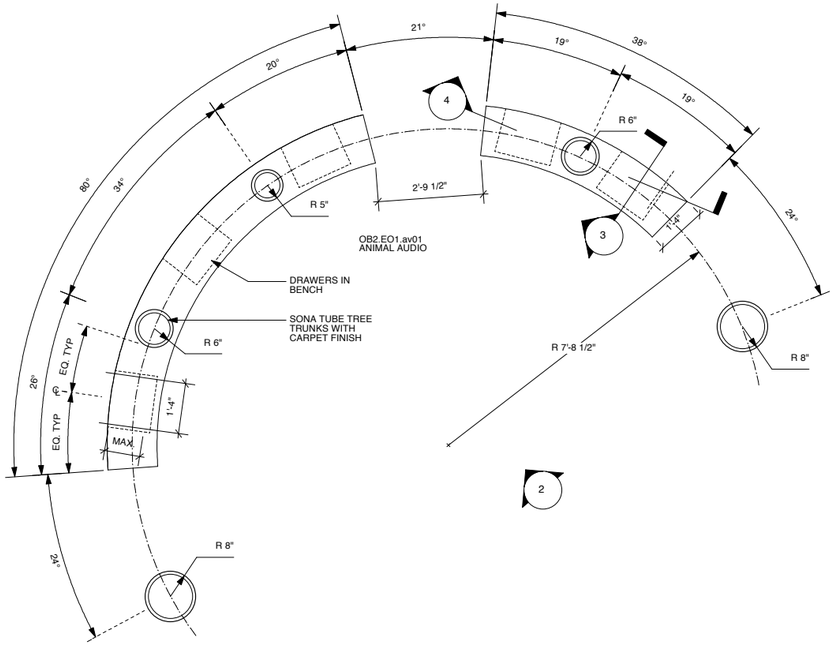
Sheet Title
Details:
'Our Backyard' Underground Crawl

Date
April 2, 2009

Scale*
As Noted

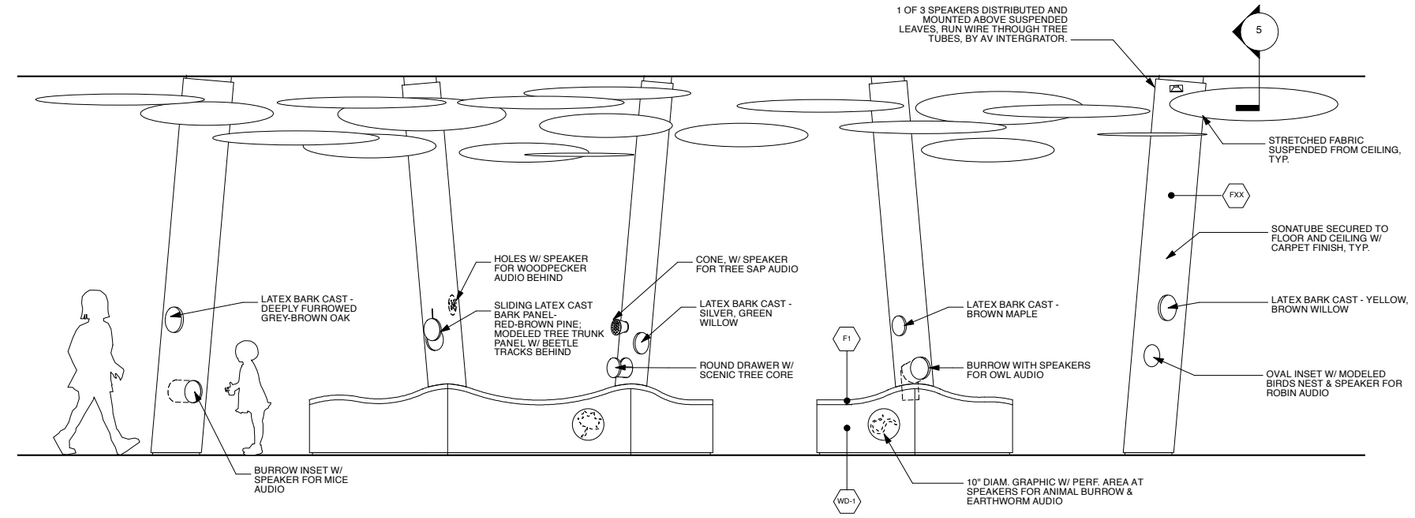
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X2-BY-3.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



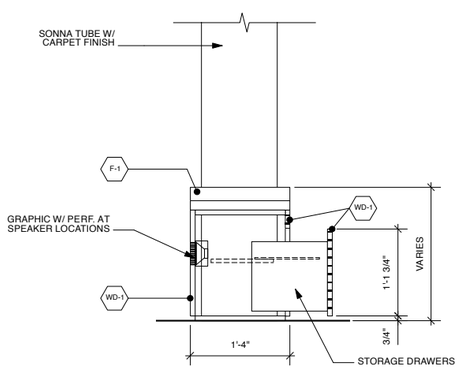
1 DETAIL PLAN

SCALE: 1/2"= 1'-0"



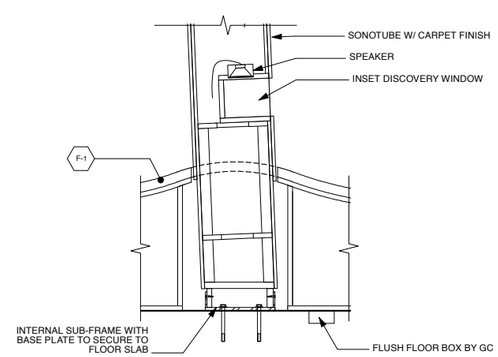
2 DEVELOPED ELEVATION

SCALE: 1/2"= 1'-0"



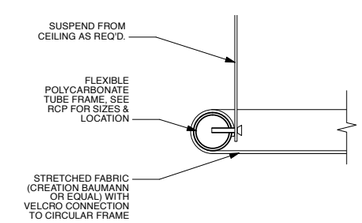
3 TYPICAL TREE SECTION

SCALE: 1"= 1'-0"



4 TYPICAL TREE SECTION

SCALE: 1"= 1'-0"



5 TYPICAL LEAF SECTION DTL.

SCALE: 6"= 1'-0"

NOTES:

1. 6" DIAM. BARK SAMPLE TO BE FASTENED TO TREE W/ VELCRO OR EQUAL.
2. INSETS TO BE 6" DIAM. OPENING W/ EDGE TRIM

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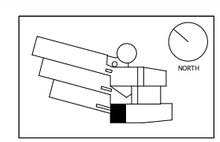


Key Plan

No. / Issue Name / Date

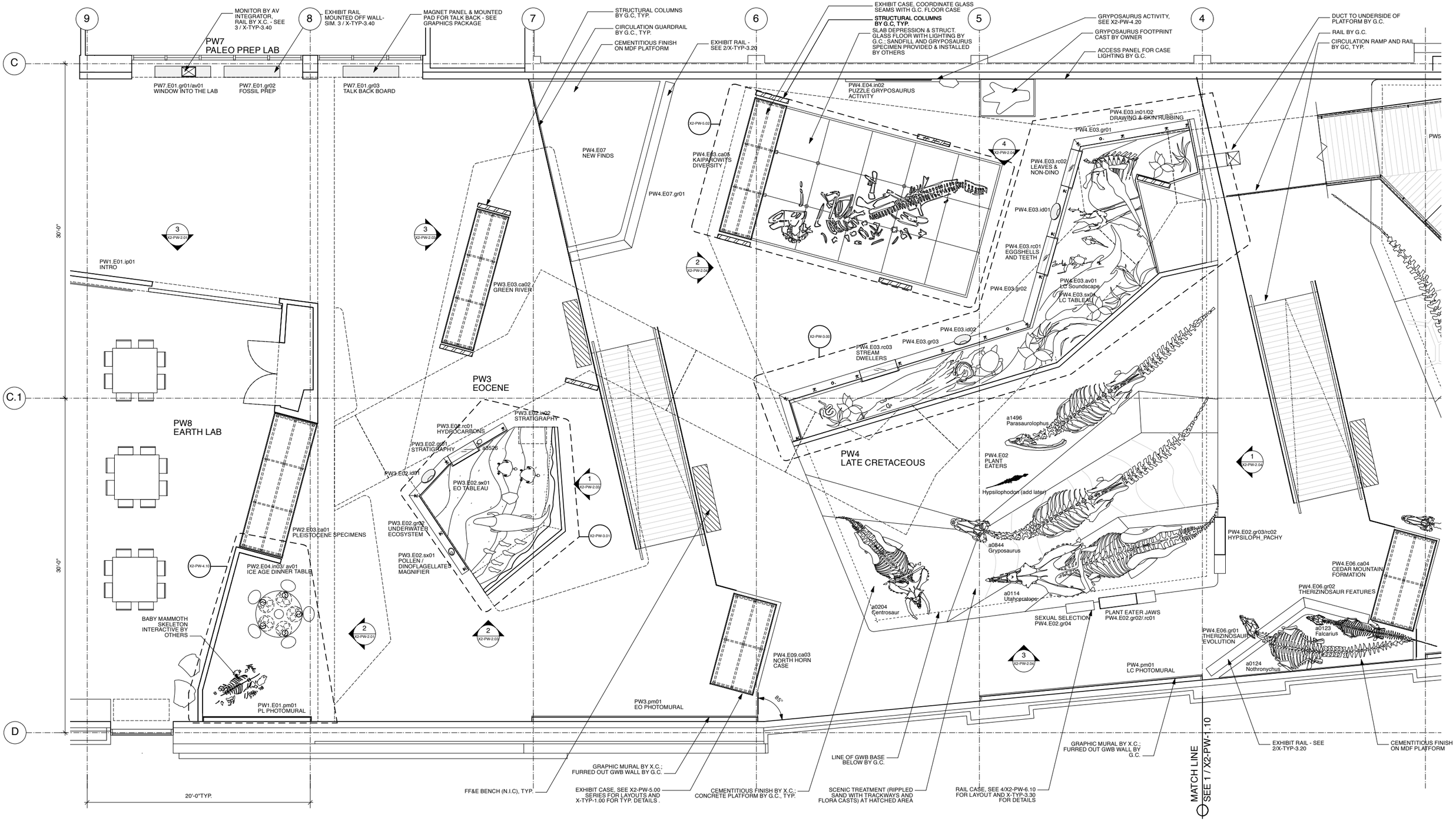
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Details:
'Our Backyard' Free Play Area

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X2-BY-3.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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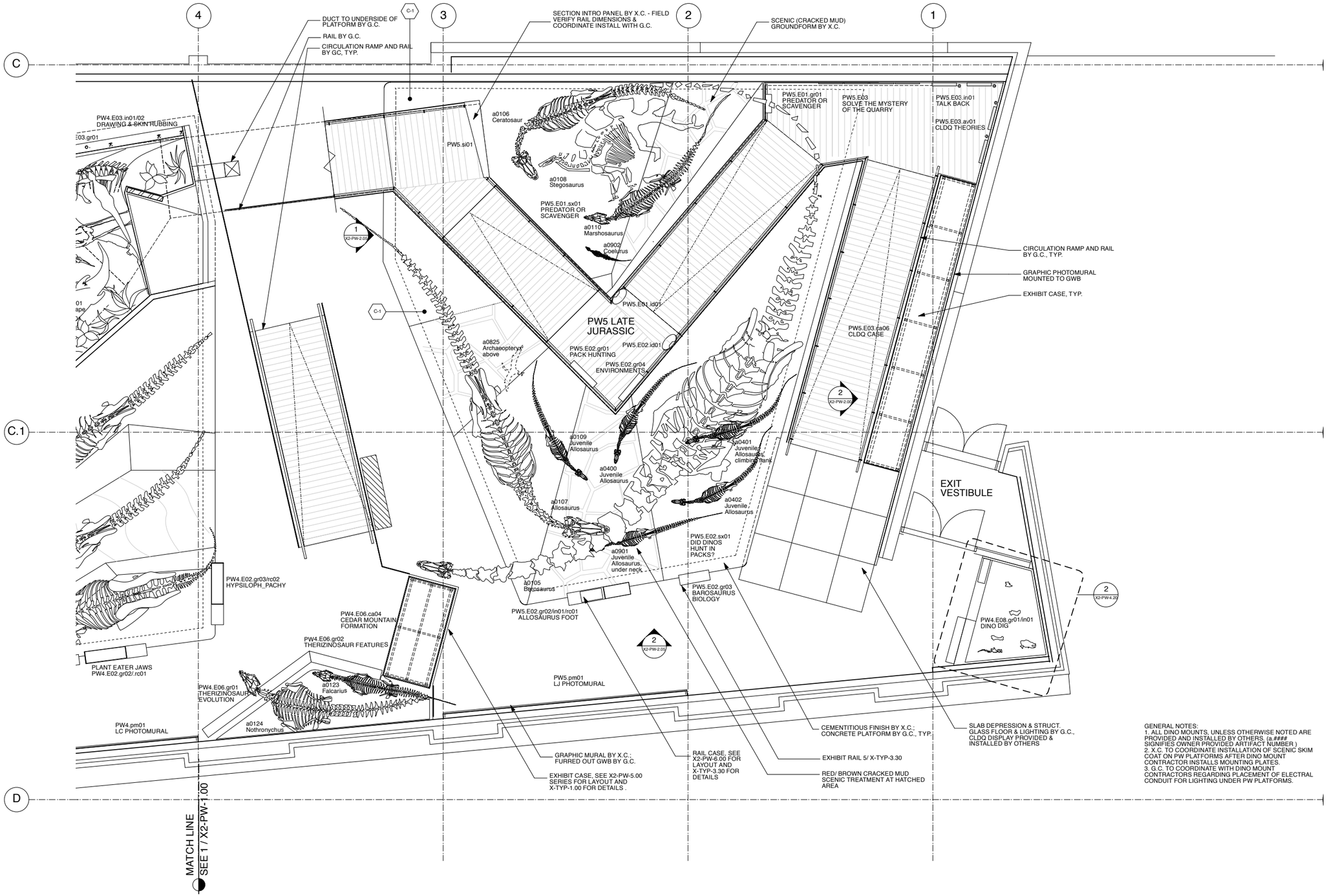
Key Plan

No. / Issue Name / Date	No. / Issue Name / Date
	100% Final Design April 2, 2009

Sheet Title
Partial Plan:
Past Worlds (lower)

Date April 2, 2009	RAA Project No. 0275 U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale* 1/4"=1'-0"	Sheet No. X2-PW-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



GENERAL NOTES:
1. ALL DINO MOUNTS, UNLESS OTHERWISE NOTED ARE PROVIDED AND INSTALLED BY OTHERS. (a.#### SIGNIFIES OWNER PROVIDED ARTIFACT NUMBER)
2. X.C. TO COORDINATE INSTALLATION OF SCENIC SKIM COAT ON PW PLATFORMS AFTER DINO MOUNT CONTRACTOR INSTALLS MOUNTING PLATES.
3. G.C. TO COORDINATE WITH DINO MOUNT CONTRACTORS REGARDING PLACEMENT OF ELECTRAL CONDUIT FOR LIGHTING UNDER PW PLATFORMS.

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Exhibit Construction

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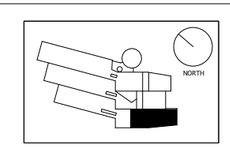

Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Partial Plan:
Past Worlds (lower)

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X2-PW-1.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

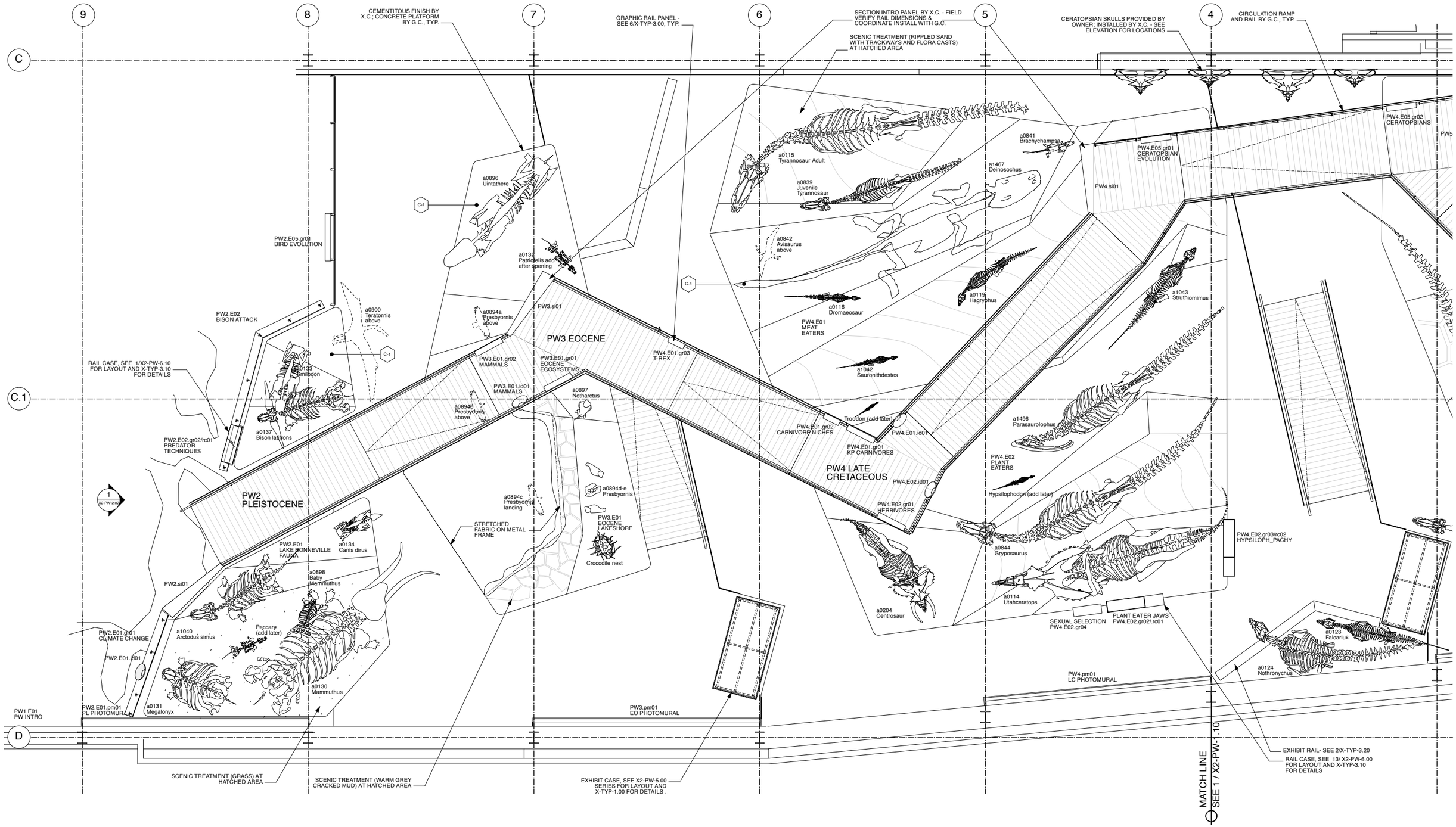

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Exhibit Construction

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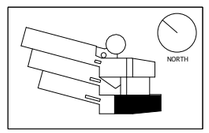


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

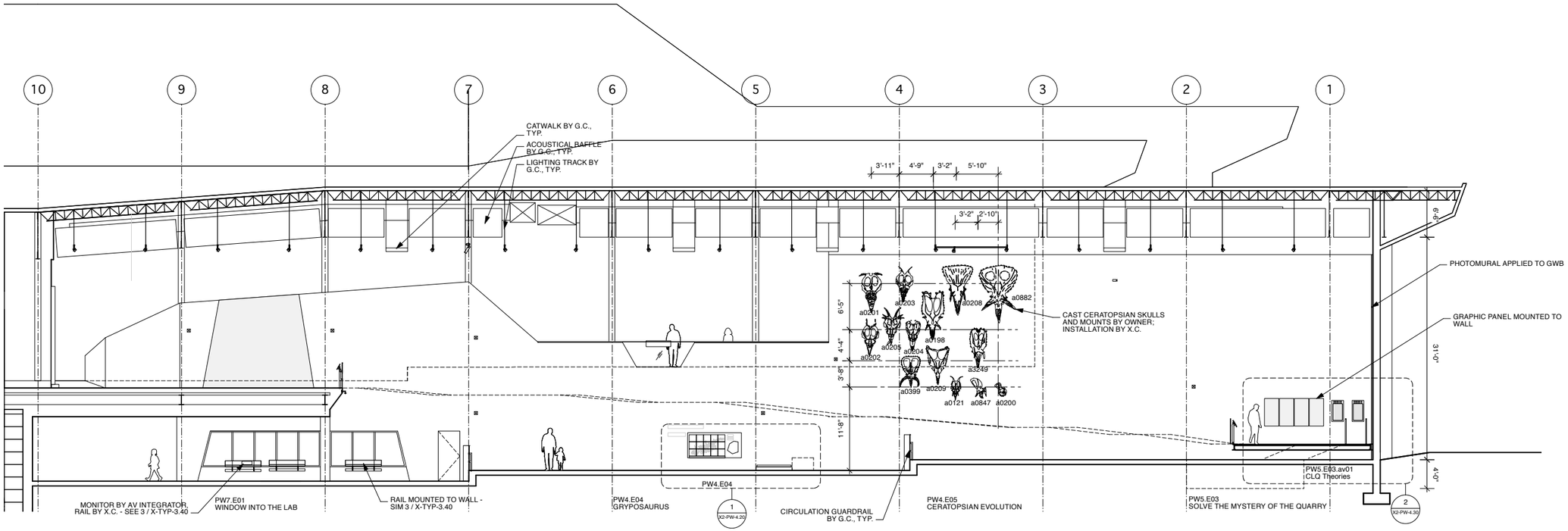
Sheet Title
Partial Plan:
Past Worlds (upper)

Date
April 2, 2009

Scale*
1/4"=1'-0"

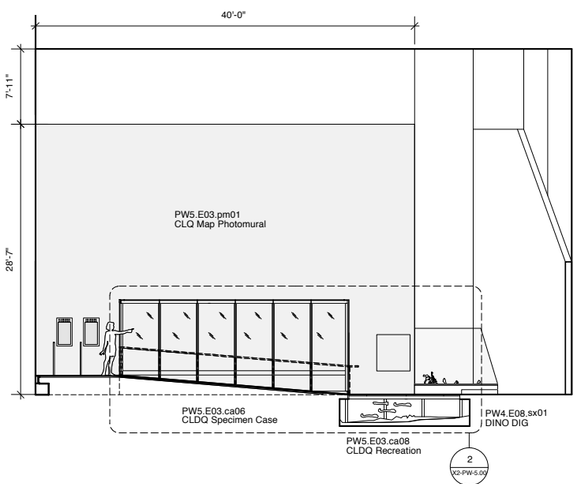
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X3-PW-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



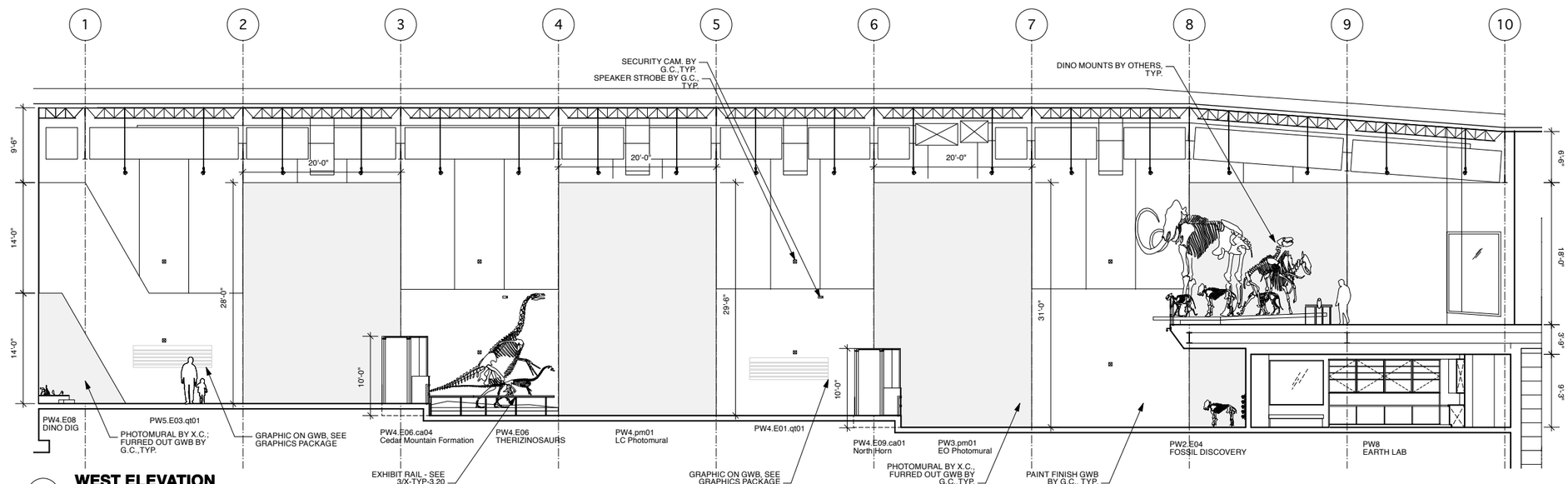
1 EAST ELEVATION

SCALE: 1/8" = 1'-0"



2 SOUTH ELEVATION

SCALE: 1/8" = 1'-0"



3 WEST ELEVATION

SCALE: 1/8" = 1'-0"

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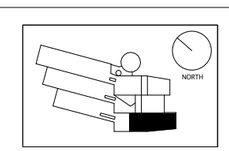


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Elevations & Sections: Past Worlds

Date

April 2, 2009

Scale*

1/8"=1'-0"

RAA Project No. 0275

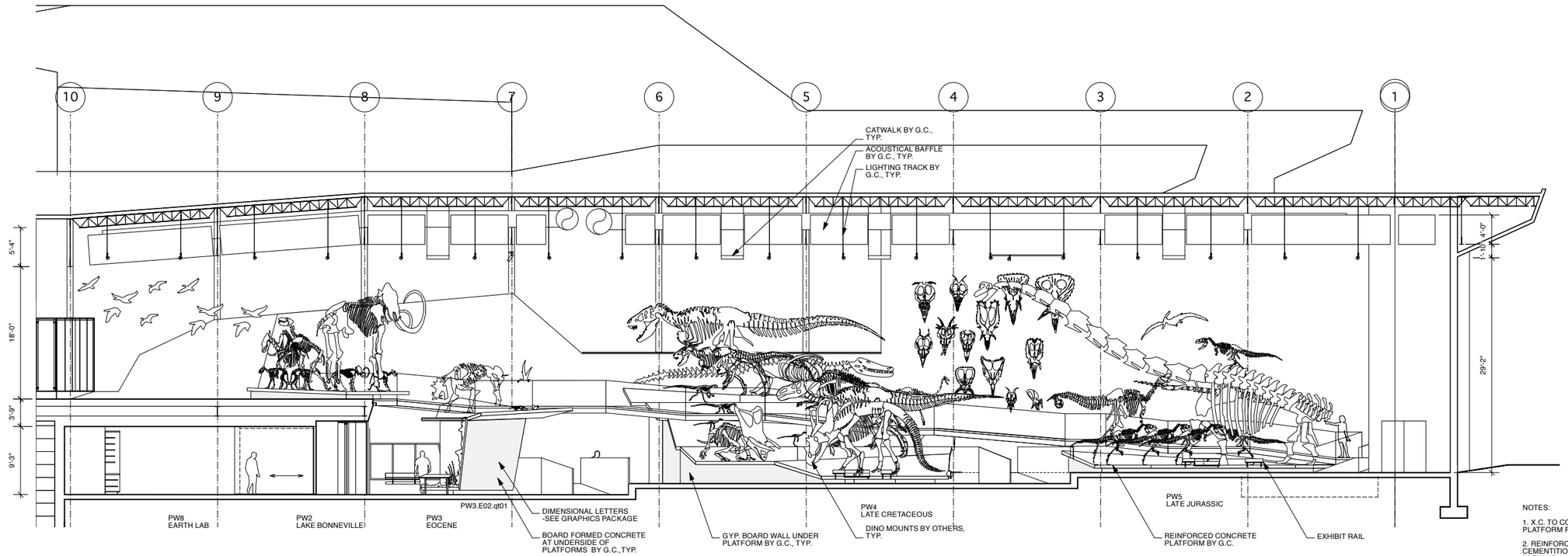
U. of U. Project No. 0872-9630

DFCM Project No. 02243750

Sheet No.

X2-PW-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



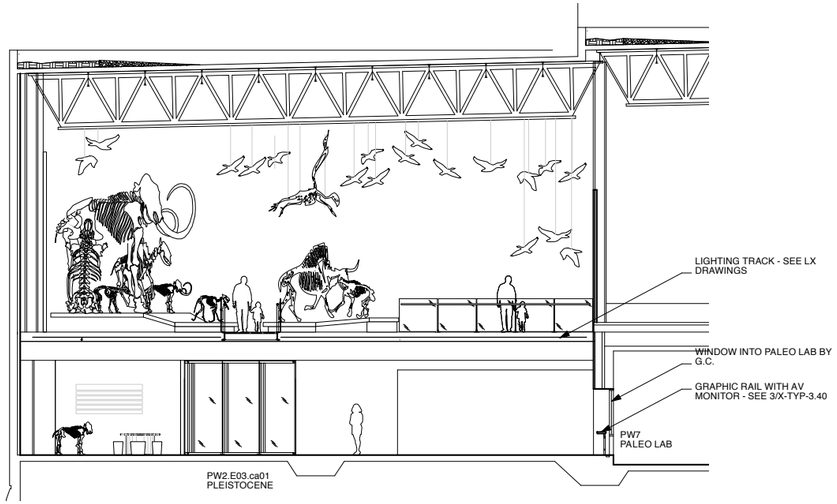
NOTES:

1. X.C. TO COORDINATE INSTALLATION SCHEDULE FOR PLATFORM FINISHES WITH DINO MOUNT CONTRACTORS.

2. REINFORCED CONCRETE PLATFORMS BY G.C., CEMENTITIOUS SCIM COAT & SCENIC FINISH BY XC, AS NOTED IN PLANS

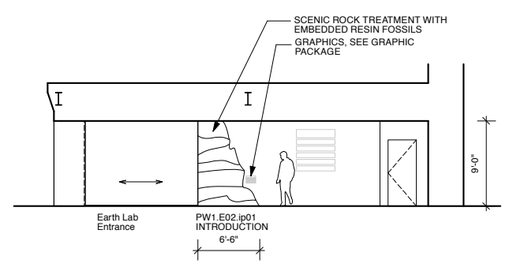
1 EAST ELEVATION

SCALE: 1/8" = 1'-0"



2 NORTH ELEVATION

SCALE: 1/8" = 1'-0"



3 WEST ELEVATION

SCALE: 1/8" = 1'-0"

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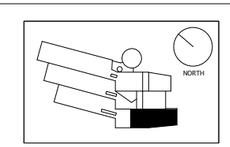


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

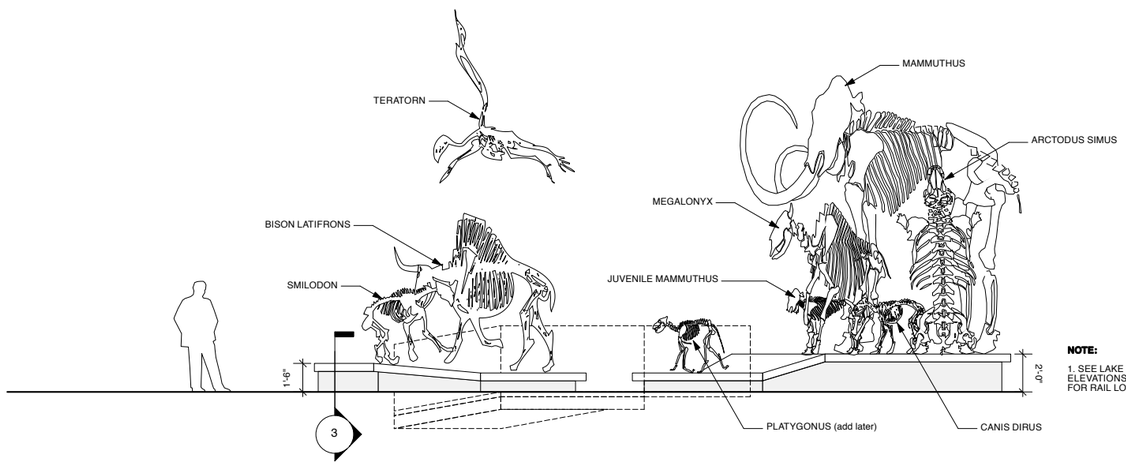
No. / Issue Name / Date

Sheet Title

Elevations & Sections: Past Worlds

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/8"=1'-0"	X2-PW-2.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

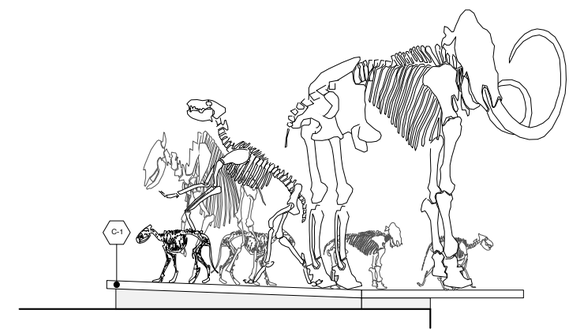


NOTE:

1. SEE LAKE OBSERVATORY PLAN AND ELEVATIONS AND TYPICAL RAIL DETAIL DWGS FOR RAIL LOCATIONS AND DETAILS

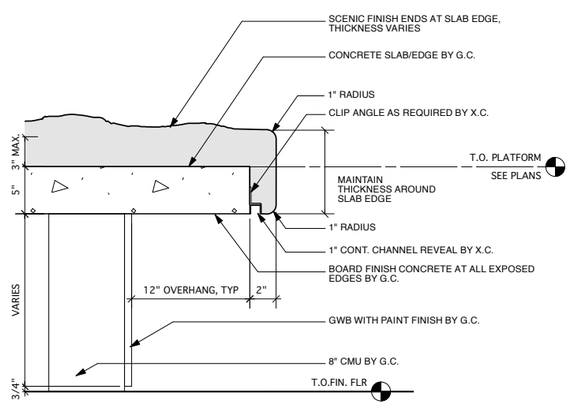
1 NORTH ELEVATION PLEISTOCENE PLATFORM

SCALE: 1/4"= 1'-0"



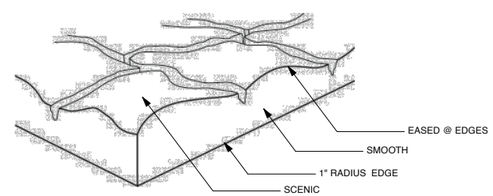
2 EAST ELEVATION PLEISTOCENE PLATFORM

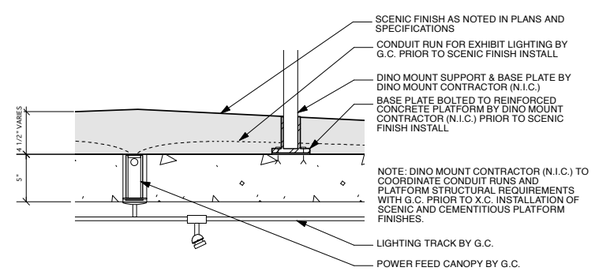
SCALE: 1/4"= 1'-0"



3 SECTION DETAIL: SLAB OVERHANG

SCALE: 1 1/2"= 1'-0"





4 SECTION DETAIL: DINO MOUNT CONNECTION

SCALE: 1 1/2"= 1'-0"

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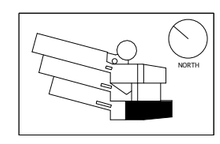


Key Plan

No. / Issue Name / Date

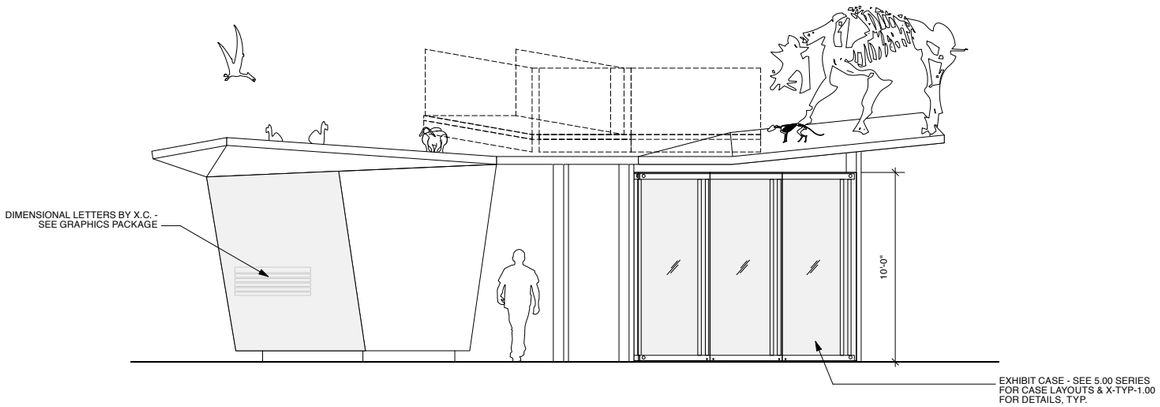
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Elevations & Sections:
Past Worlds - PL

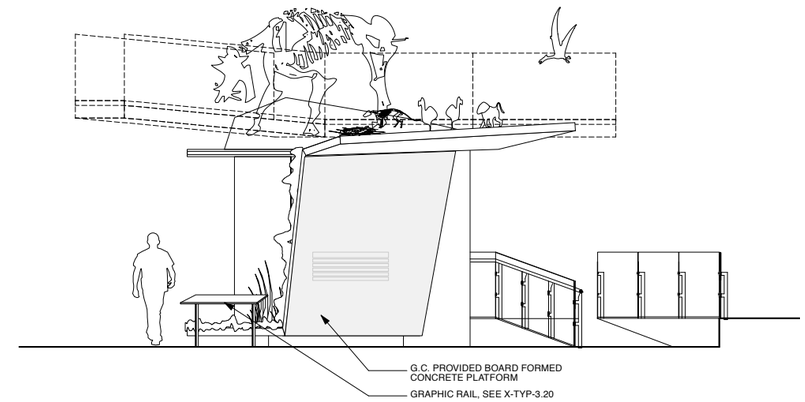
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X2-PW-2.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



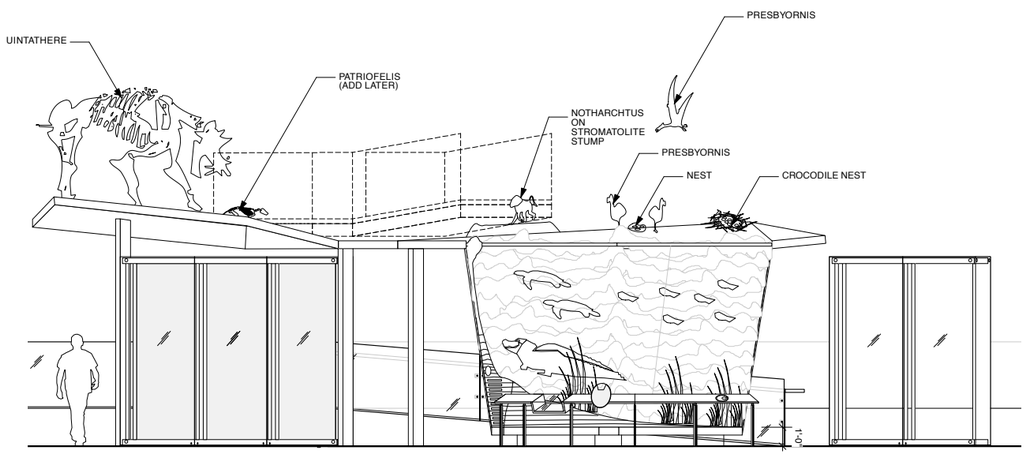
1 SOUTH ELEVATION EOCENE PLATFORM

SCALE: 1/4"= 1'-0"



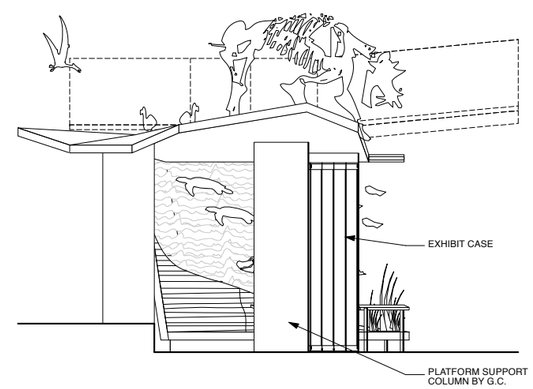
2 WEST ELEVATION EOCENE PLATFORM

SCALE: 1/4"= 1'-0"



3 NORTH ELEVATION EOCENE PLATFORM

SCALE: 1/4"= 1'-0"



4 EAST ELEVATION EOCENE PLATFORM

SCALE: 1/4"= 1'-0"

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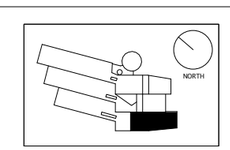


Key Plan

No. / Issue Name / Date

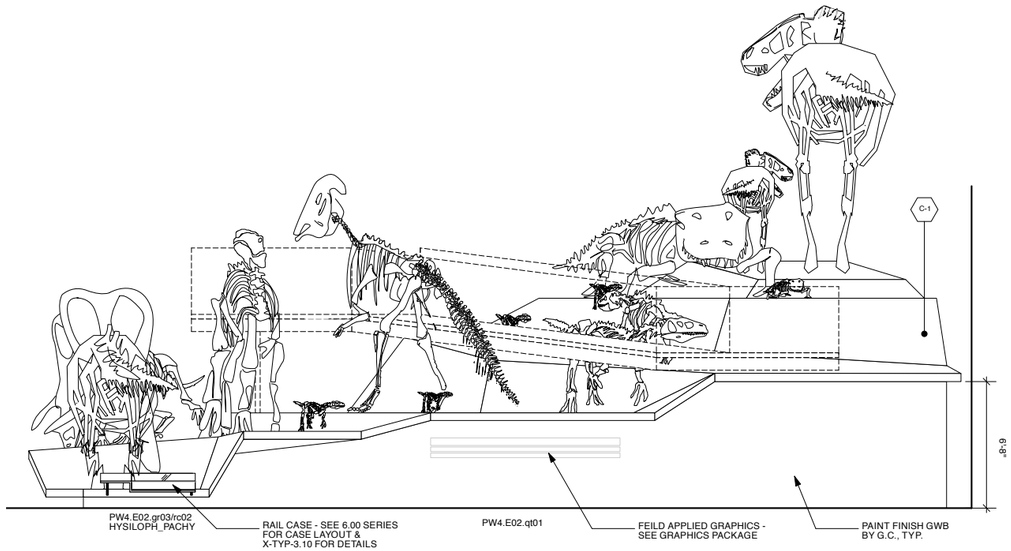
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Elevations & Sections:
Past Worlds - EO

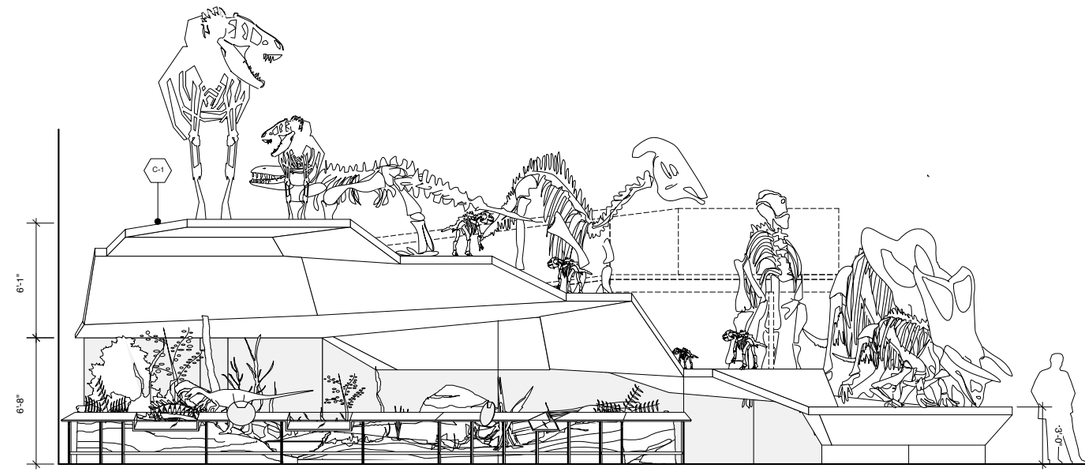
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X2-PW-2.03

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 SOUTH ELEVATION LATE CRETACEOUS PLATFORM

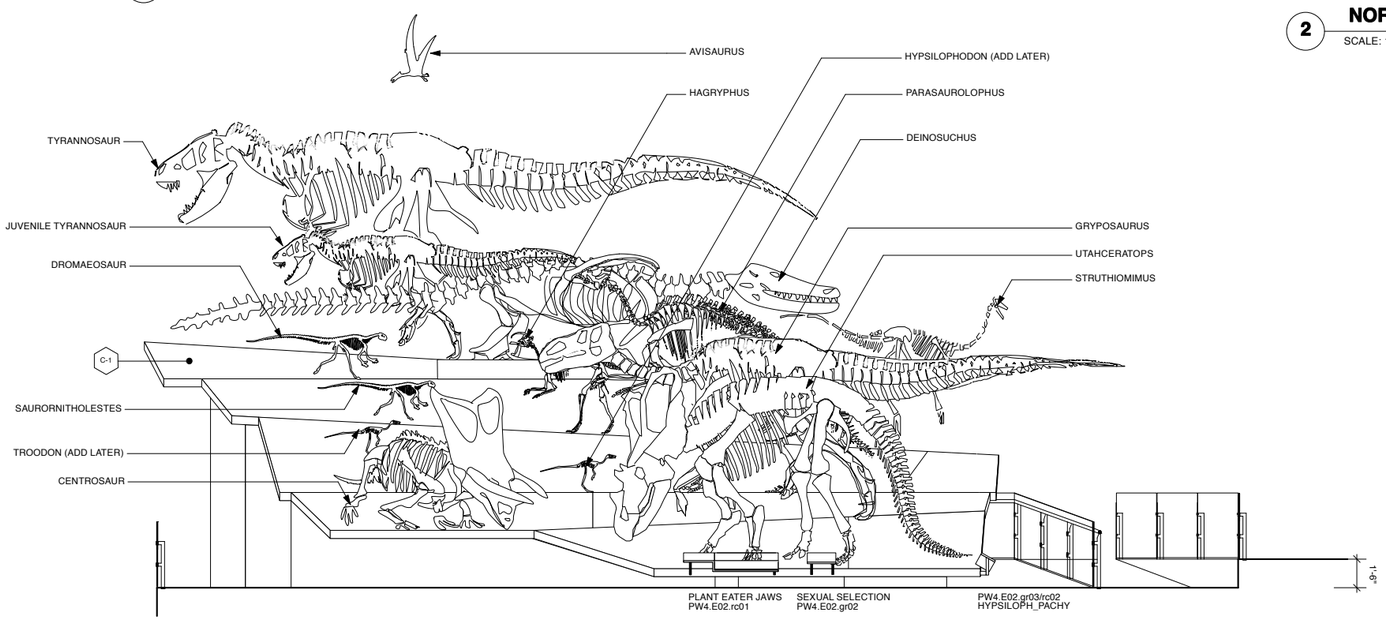
SCALE: 1/4"= 1'-0"



NOTE: SEE X2-PW-3.00 FOR DIORAMA DETAILS

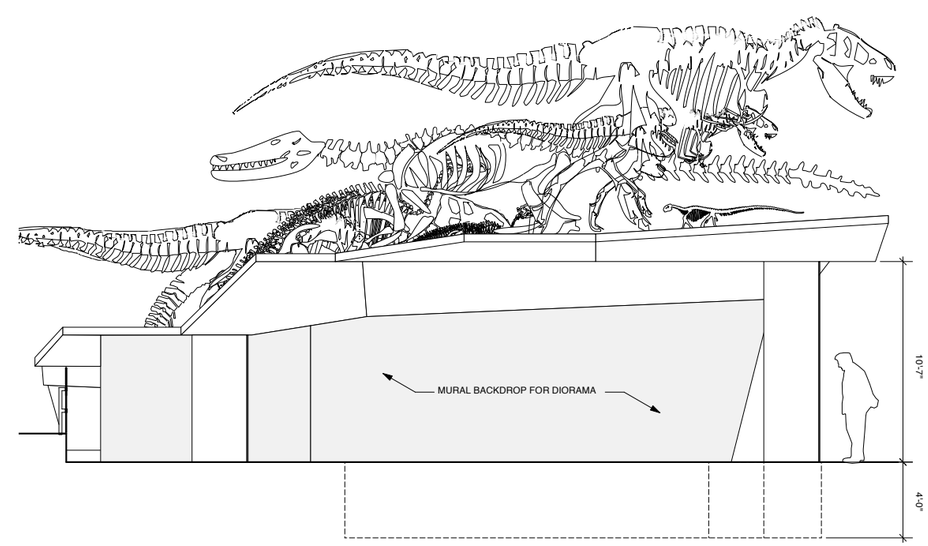
2 NORTH ELEVATION LATE CRETACEOUS PLATFORM

SCALE: 1/4"= 1'-0"



3 WEST ELEVATION LATE CRETACEOUS PLATFORM

SCALE: 1/4"= 1'-0"



4 EAST ELEVATION LATE CRETACEOUS PLATFORM

SCALE: 1/4"= 1'-0"

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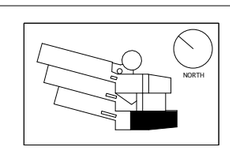


Key Plan

No. / Issue Name / Date

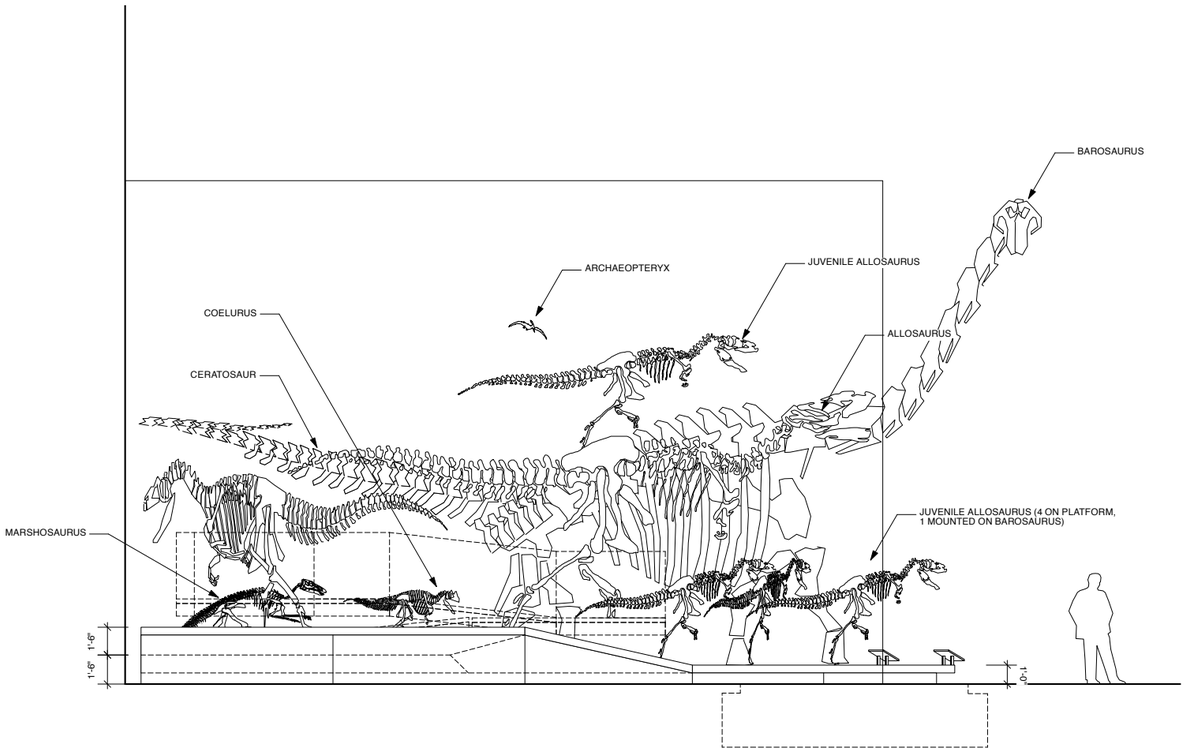
100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Elevations & Sections:
Past Worlds - LC

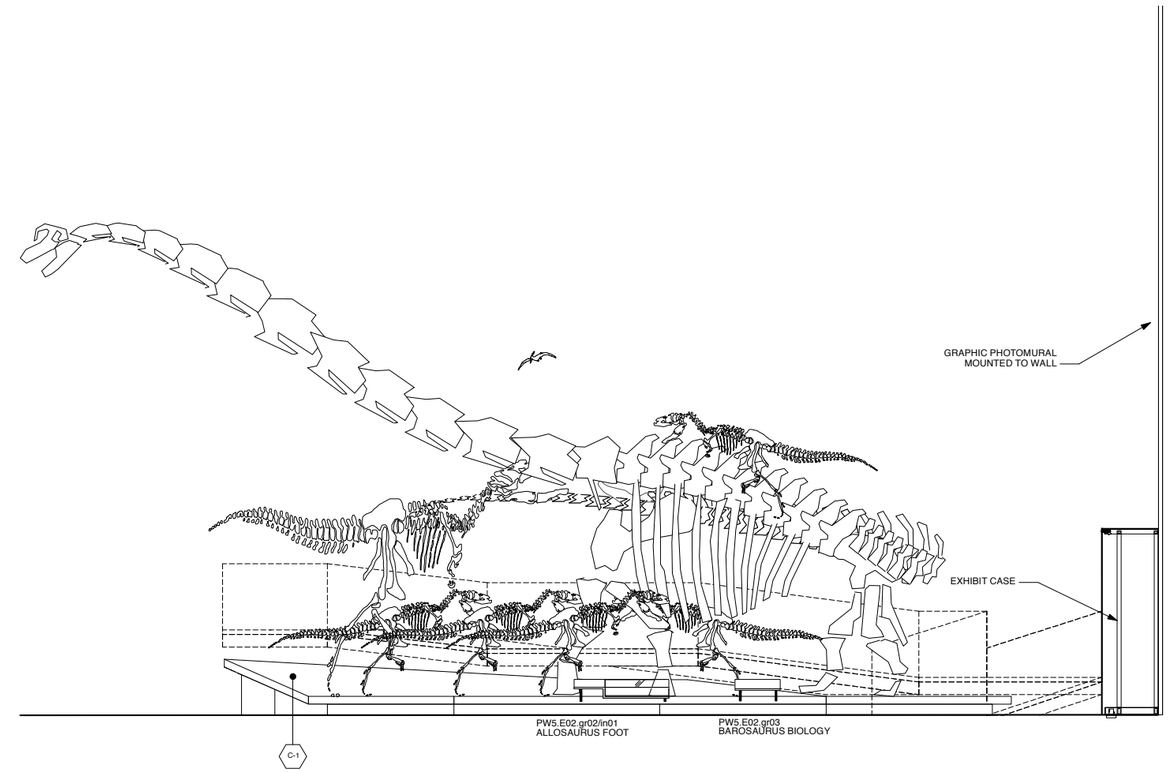
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 0243750
Scale* 1/4"=1'-0"	Sheet No. X2-PW-2.04

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 SOUTH ELEVATION LATE JURASSIC PLATFORM

SCALE: 1/4"= 1'-0"



2 EAST ELEVATION LATE JURASSIC PLATFORM

SCALE: 1/4"= 1'-0"

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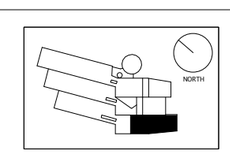


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

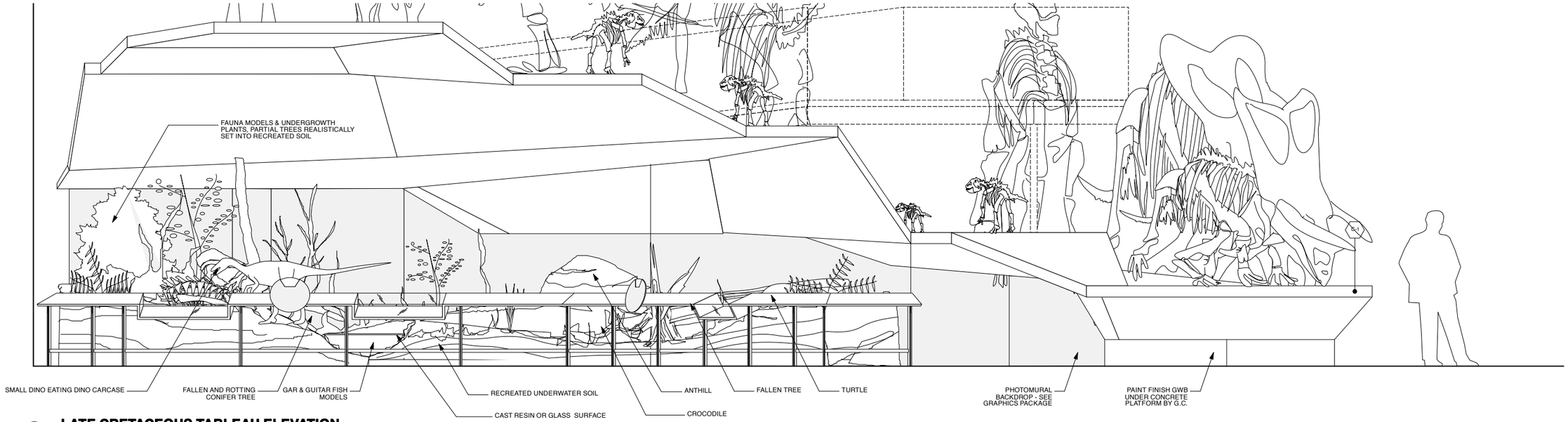
No. / Issue Name / Date

Sheet Title

Elevations & Sections:
Past Worlds - LJ

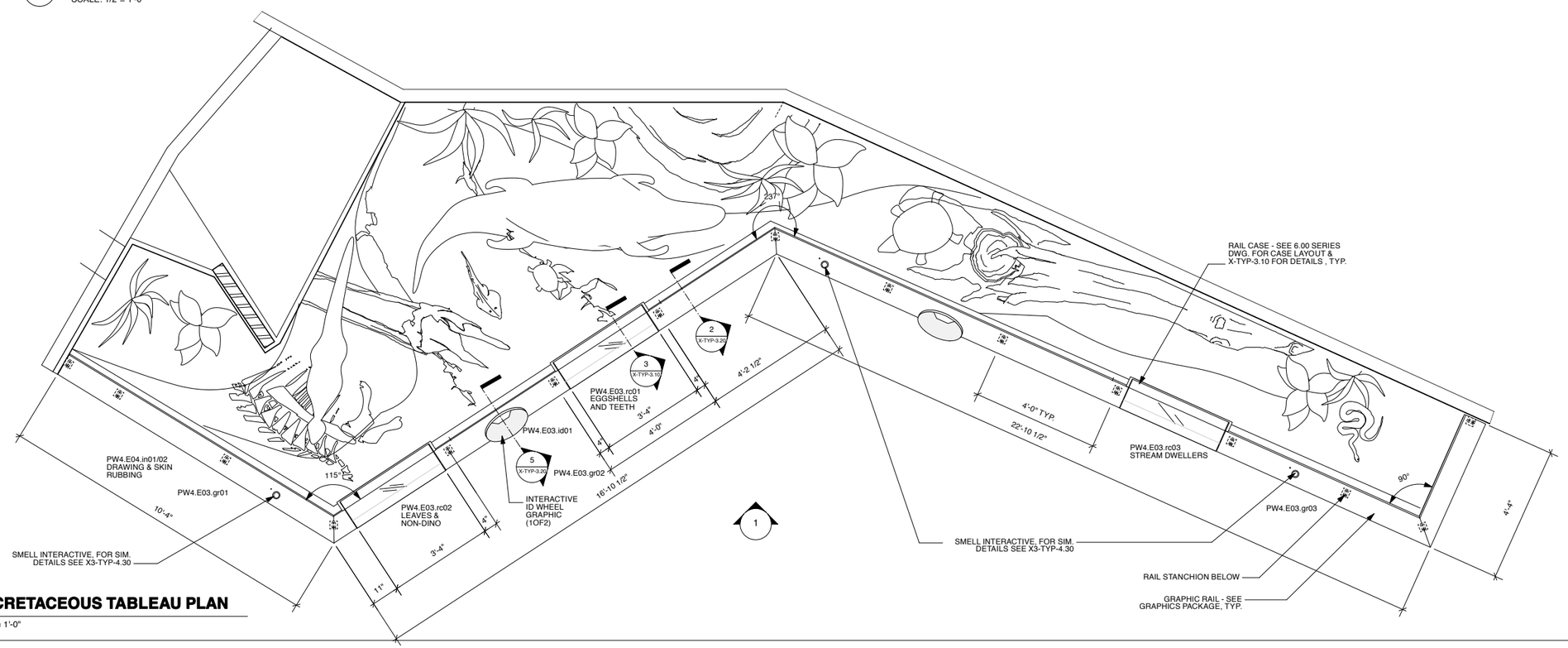
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X2-PW-2.05

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 LATE CRETACEOUS TABLEAU ELEVATION

SCALE: 1/2"= 1'-0"



2 LATE CRETACEOUS TABLEAU PLAN

SCALE: 1/2"= 1'-0"

NOTES:

1. SEE SPECIFICATIONS FOR DIORAMA NOTES.
2. XC TO PROVIDE SAMPLES OF ALL SURFACES PRIOR TO FABRICATION
3. SEE X-TYP-3.10 & 3.20 FOR TYPICAL RAIL DETAILS
4. SEE GRAPHICS PACKAGE AND SPECIFICATIONS FOR ADDITIONAL INFO ON GRAPHIC RAILS

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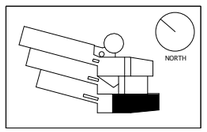


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

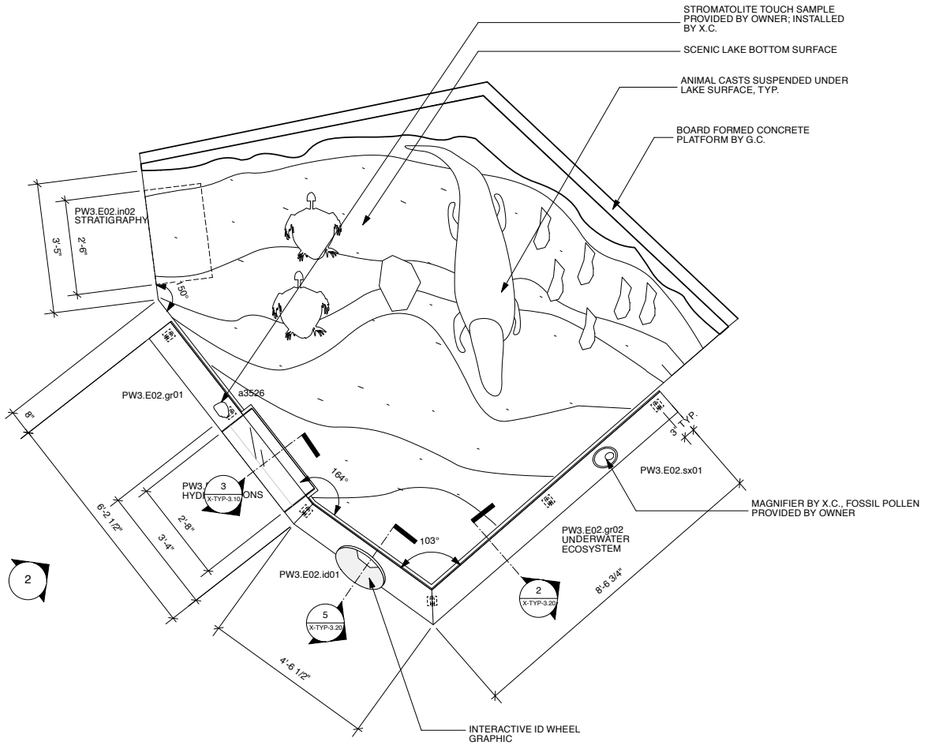
100% Final Design April 2, 2009

Sheet Title

Details: Past Worlds Obsv.
Late Cretaceous Diorama

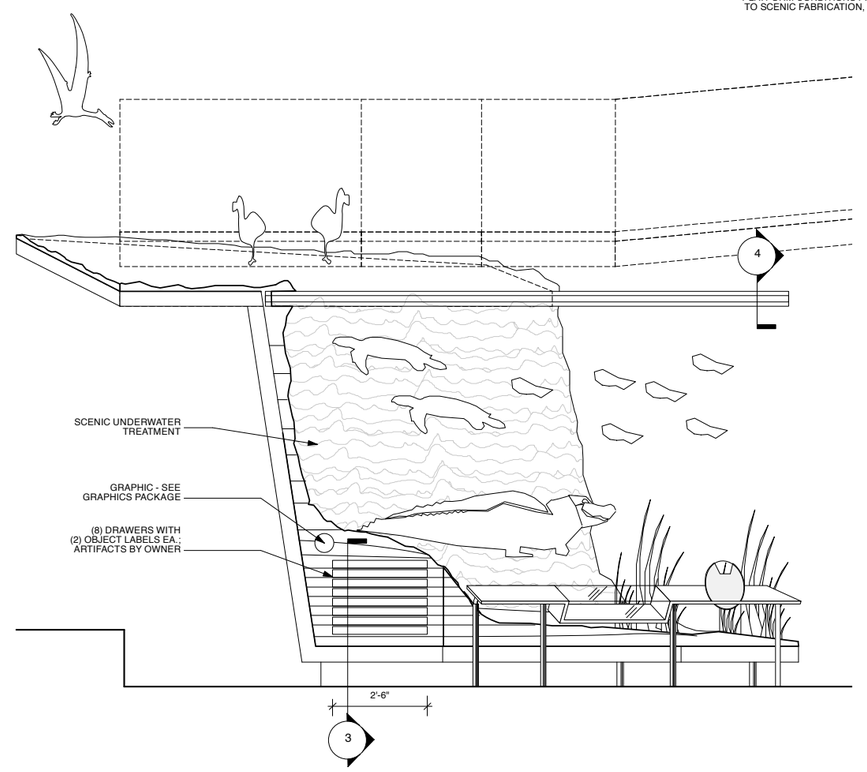
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/2"=1'-0"	X2-PW-3.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



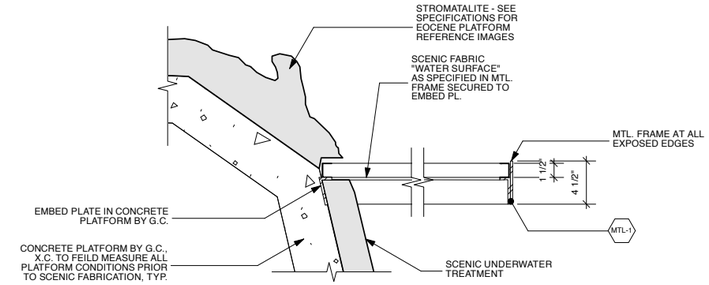
1 PLAN: EOCENE TABLEAU

SCALE: 1/2"= 1'-0"



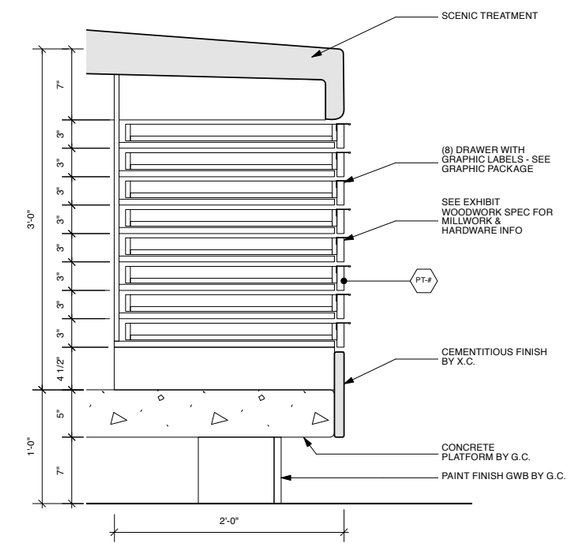
2 ELEVATION: EOCENE TABLEAU

SCALE: 1/2"= 1'-0"



4 SECTION DETAIL: "WATER SURFACE"

SCALE: 1 1/2"= 1'-0"



3 SECTION DETAIL: STRATIGRAPHY

SCALE: 1 1/2"= 1'-0"

NOTES:

1. SEE SPECIFICATIONS FOR DIORAMA NOTES.
2. XC TO PROVIDE SAMPLES OF ALL SURFACES PRIOR TO FABRICATION
3. SEE X-TYP-3.10 & 3.20 FOR TYPICAL RAIL DETAILS
4. SEE GRAPHICS PACKAGE AND SPECIFICATIONS FOR ADDITIONAL INFO ON GRAPHIC RAILS

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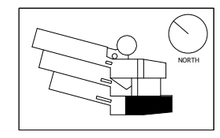


Key Plan

No. / Issue Name / Date

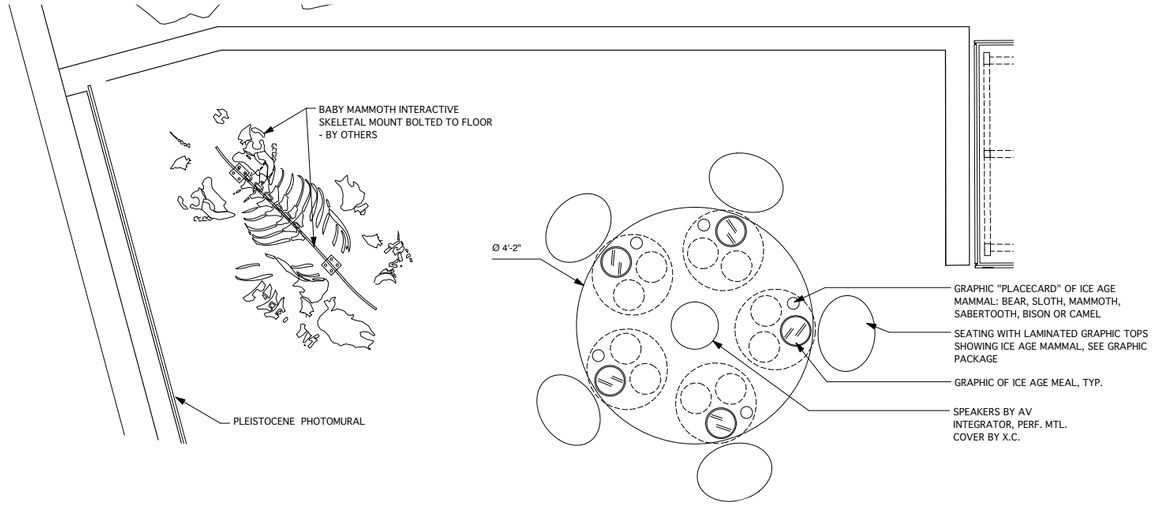
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Details: Past Worlds Obsv.
Eocene Diorama

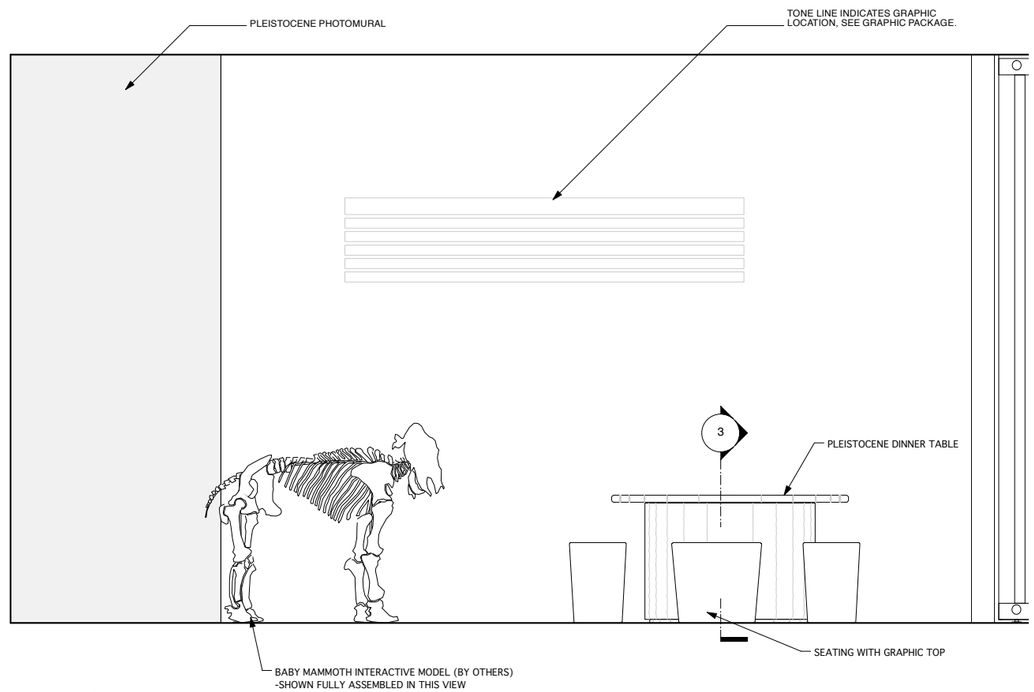
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X2-PW-3.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



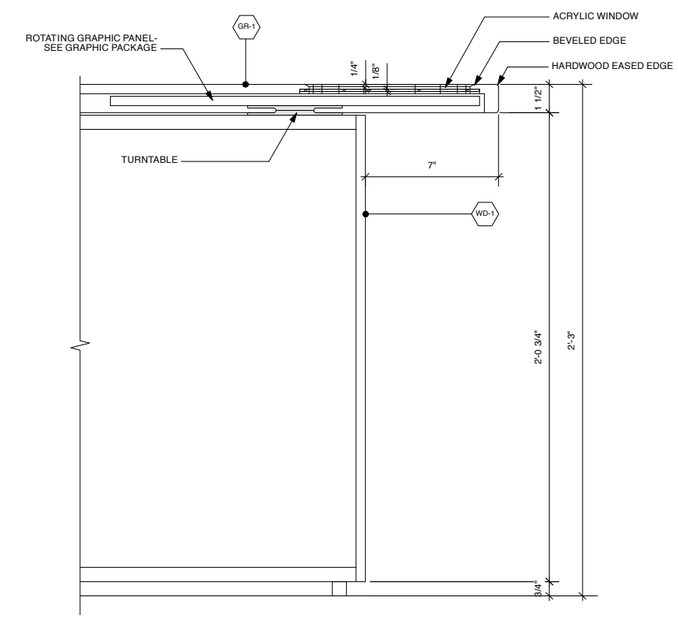
1 PLAN

SCALE: 3/4" = 1'-0"



2 ELEVATION

SCALE: 3/4" = 1'-0"



3 SECTION: ICE AGE DINNER TABLE

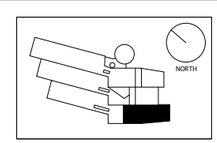
SCALE: 3" = 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

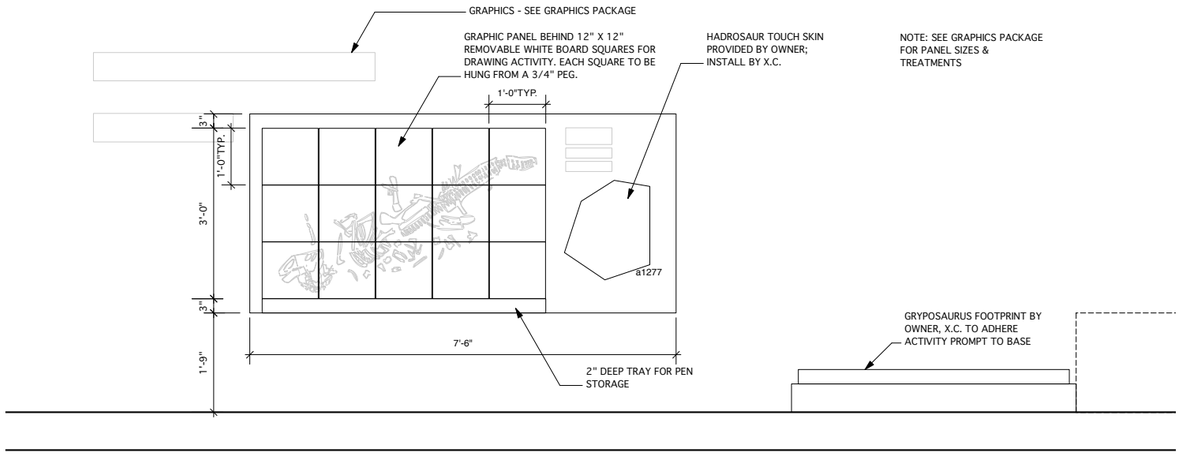
100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Interactives:
Past Worlds, Ice Age Dinner Table

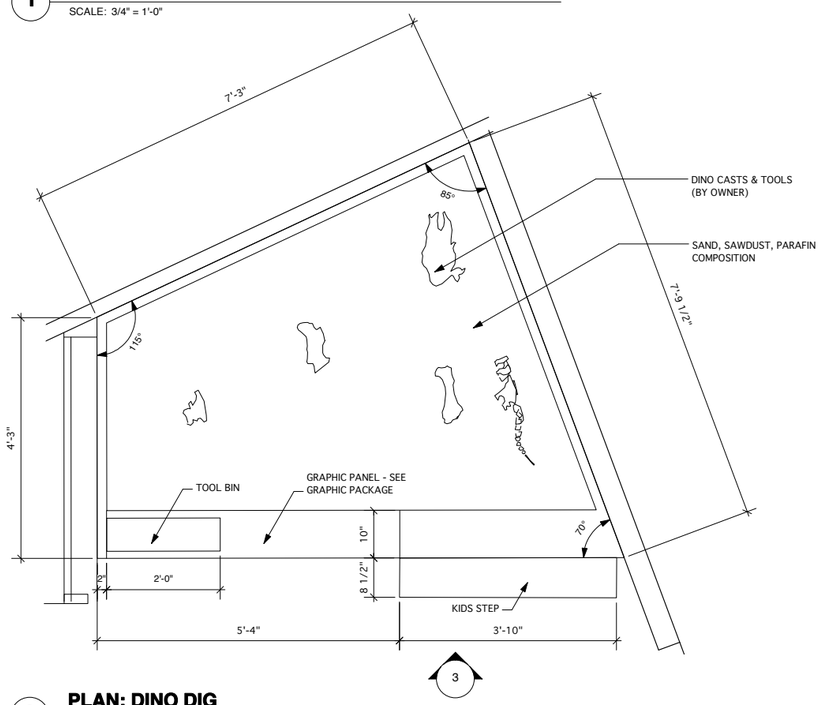
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X2-PW-4.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



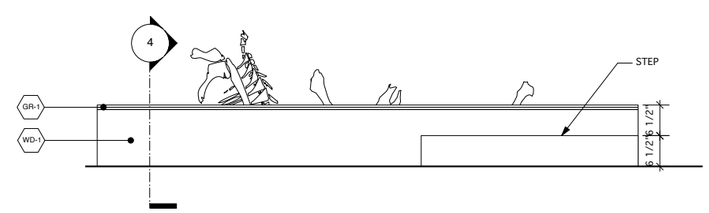
1 **ELEVATION: GRYPOSAURUS ACTIVITIES**

SCALE: 3/4" = 1'-0"



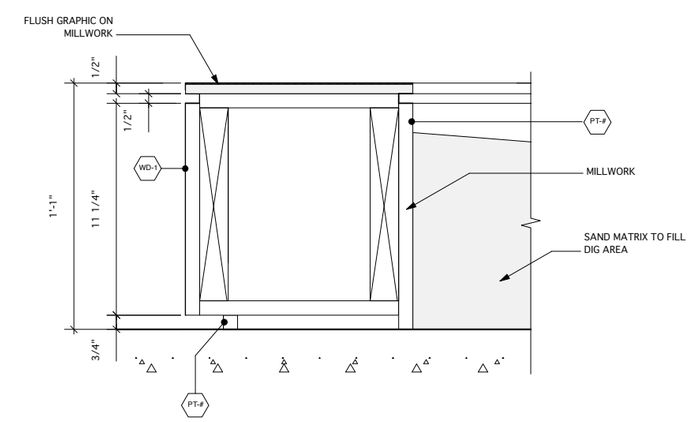
2 **PLAN: DINO DIG**

SCALE: 3/4" = 1'-0"



3 **ELEVATION: DINO DIG**

SCALE: 3" = 1'-0"



4 **SECTION DETAIL: DINO DIG**

SCALE: 3/4" = 1'-0"

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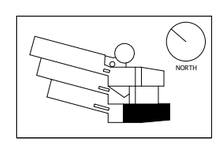


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

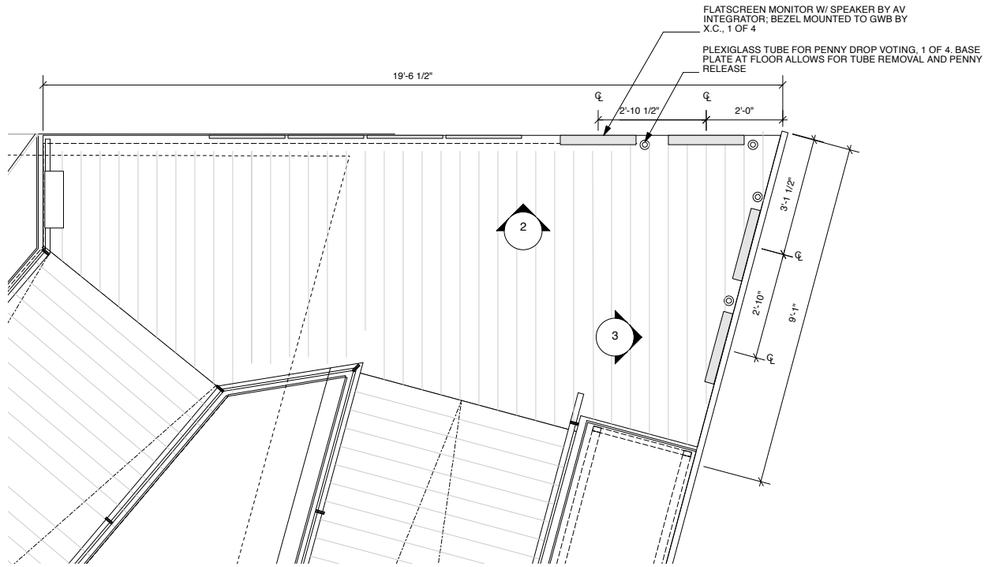
No. / Issue Name / Date

Sheet Title

Interactives: Past Worlds
Gryposaurus Activity and Dino Dig

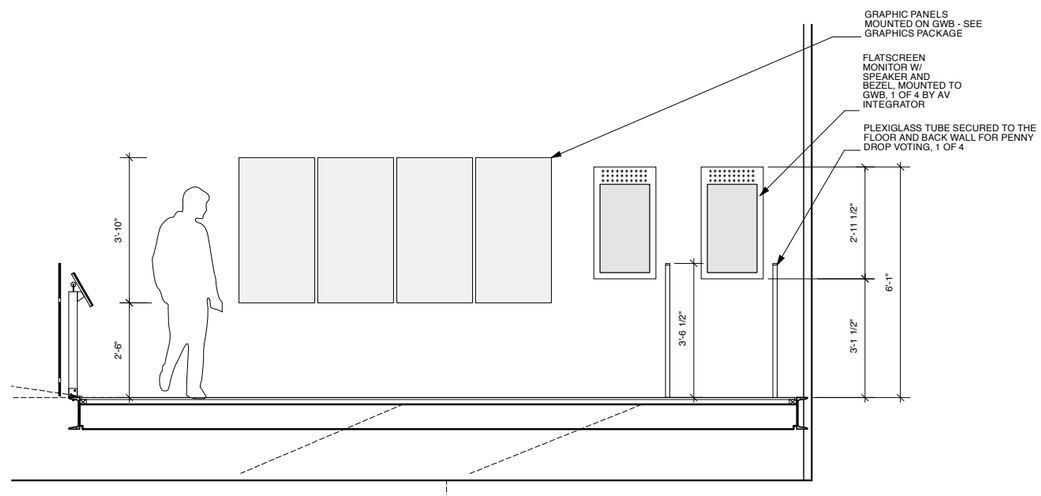
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
varies	X2-PW-4.20

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



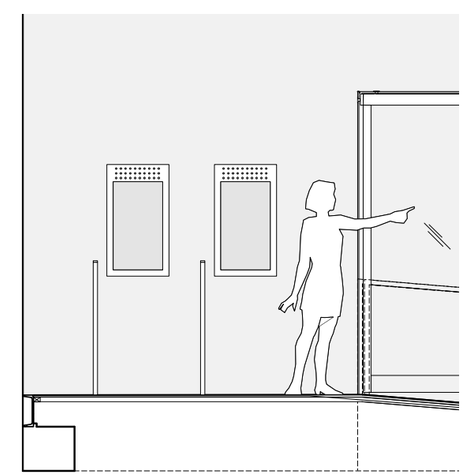
1 PLAN: CLEVELAND LLYOD DINOSAUR QUARRY

SCALE: 1/2" = 1'-0"



2 EAST ELEVATION

SCALE: 1/2" = 1'-0"



3 SOUTH ELEVATION

SCALE: 1/2" = 1'-0"

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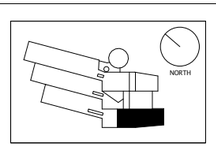


Key Plan

No. / Issue Name / Date

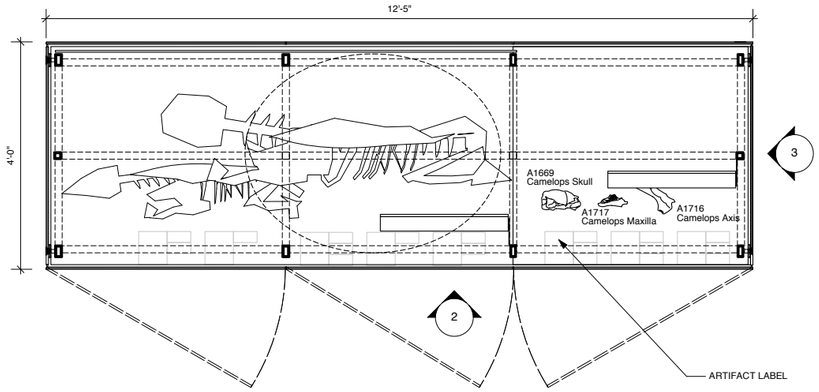
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Interactives: Past Worlds
Cleveland Llyod Dinosaur Quarry

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X2-PW-4.30

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

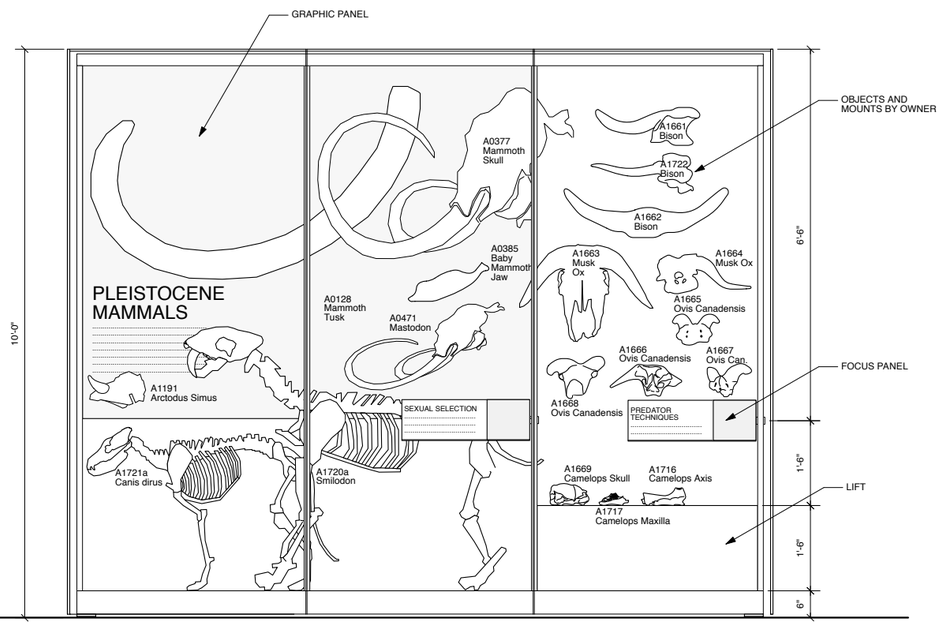


1 PLAN

SCALE: 3/4"= 1'-0"

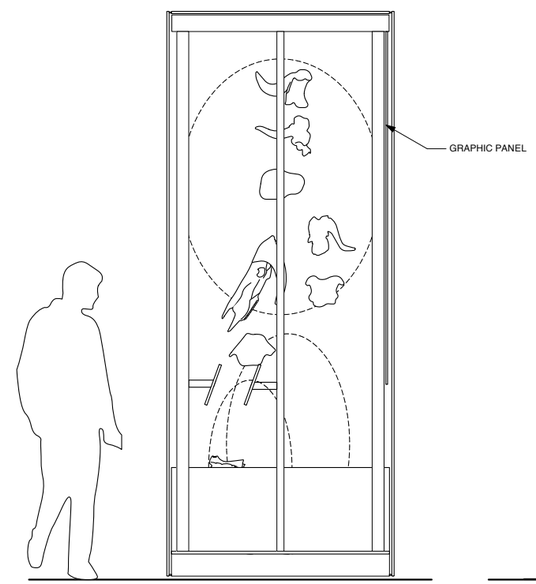
ARTIFACT MOUNTING SCHEDULE

Artifact #	Partition	Graphic Panel	Backar Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A0128		x						
A0377						x		
A0385		x						
A0471		x						
A1191		x						
A1661						x		
A1662						x		
A1663					x			
A1664					x			
A1665					x			
A1666							x	
A1667					x			
A1668					x			
A1669				x				
A1716				x				
A1717				x				
A1720				x				
A1721				x				
A1722						x		



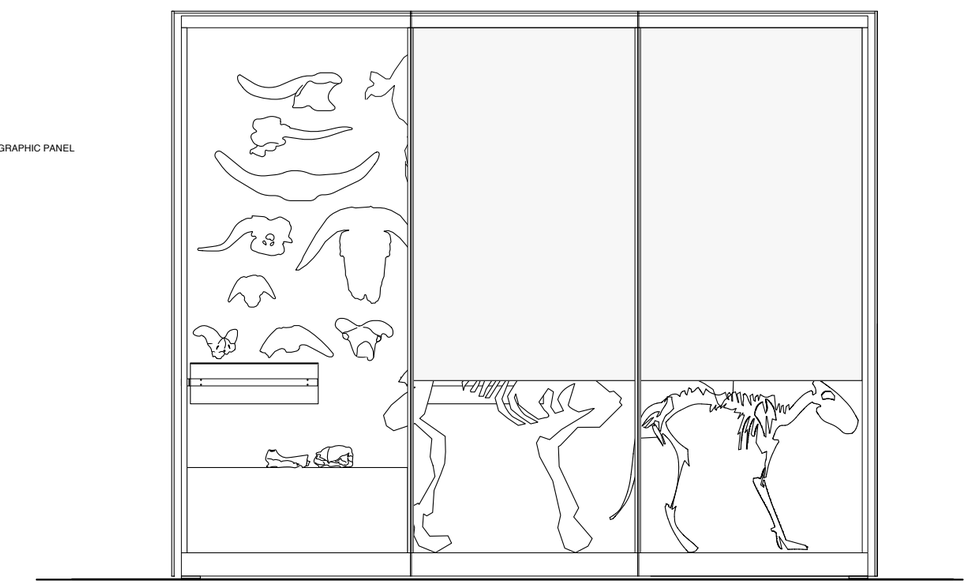
2 ELEVATION

SCALE: 3/4"= 1'-0"



3 ELEVATION

SCALE: 3/4"= 1'-0"



4 ELEVATION

SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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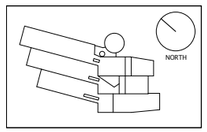


Key Plan

No. / Issue Name / Date

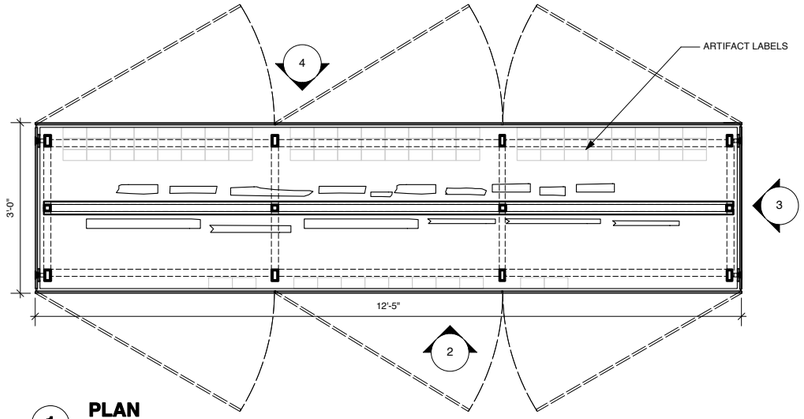
100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Exhibit Case Layouts:
Past Worlds, PW2.E03.ca01

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale* 3/4"=1'-0"	Sheet No. X2-PW-5.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



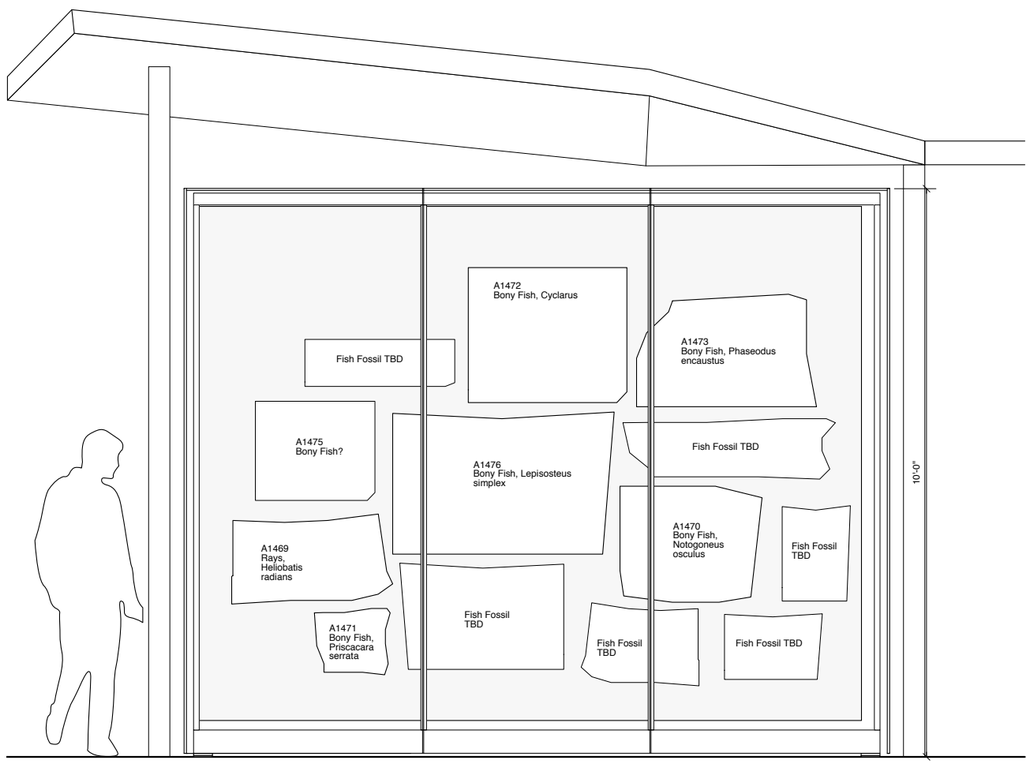
1 PLAN
SCALE: 3/4"= 1'-0"

NOTE:

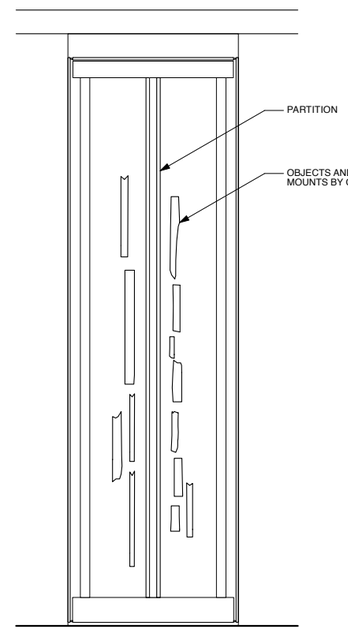
1. ALL OBJECTS MOUNTED OF PARTITION

ARTIFACT MOUNTING SCHEDULE

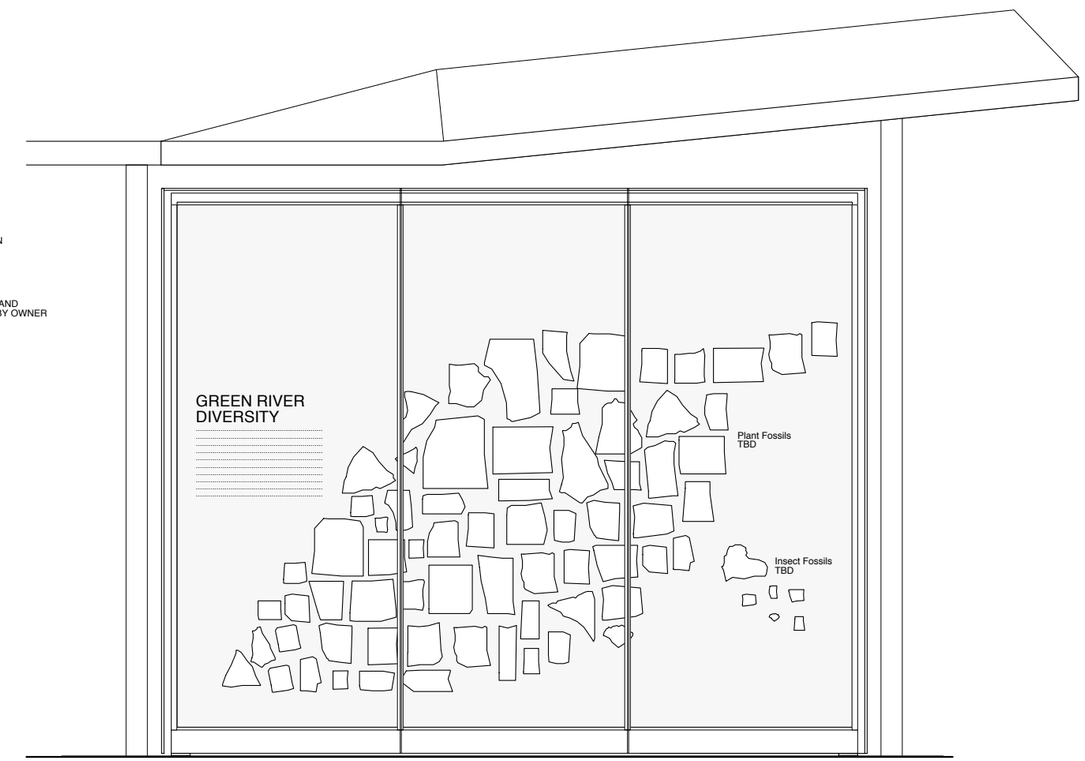
Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A1469	x							
A1470	x							
A1471	x							
A1472	x							
A1473	x							
A1476	x							



2 ELEVATION
SCALE: 3/4"= 1'-0"



3 ELEVATION
SCALE: 3/4"= 1'-0"



4 ELEVATION
SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

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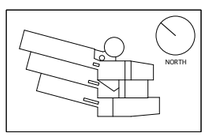


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009
No. / Issue Name / Date

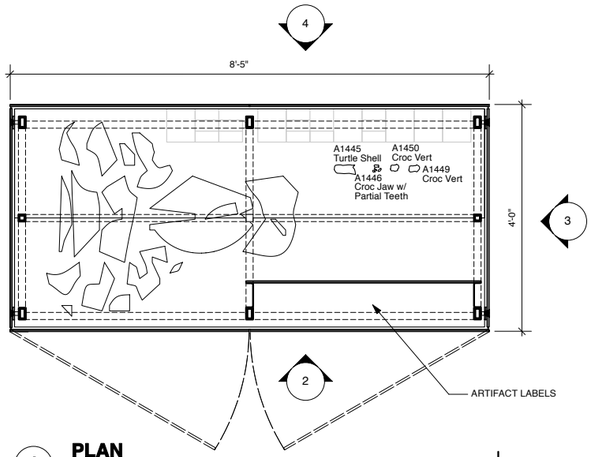
Sheet Title
Exhibit Case Layouts:
Past Worlds, PW3.E03.ca02

Date
April 2, 2009

Scale*
3/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X2-PW-5.20

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

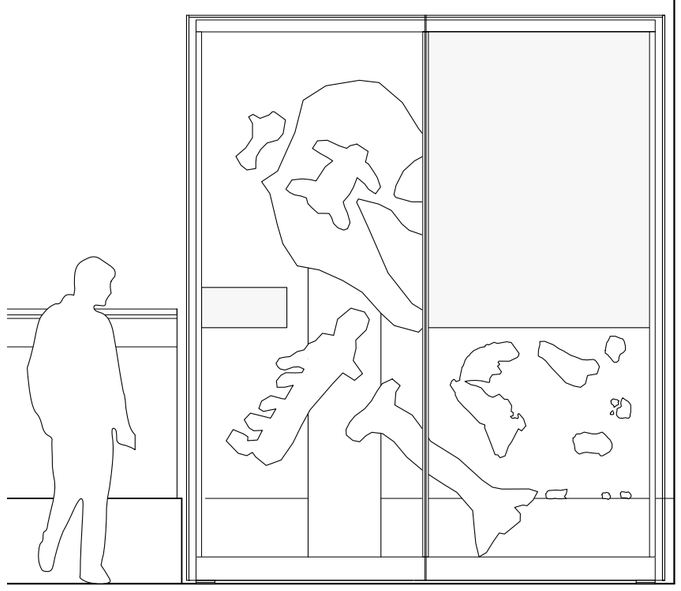


1 PLAN

SCALE: 3/4"= 1'-0"

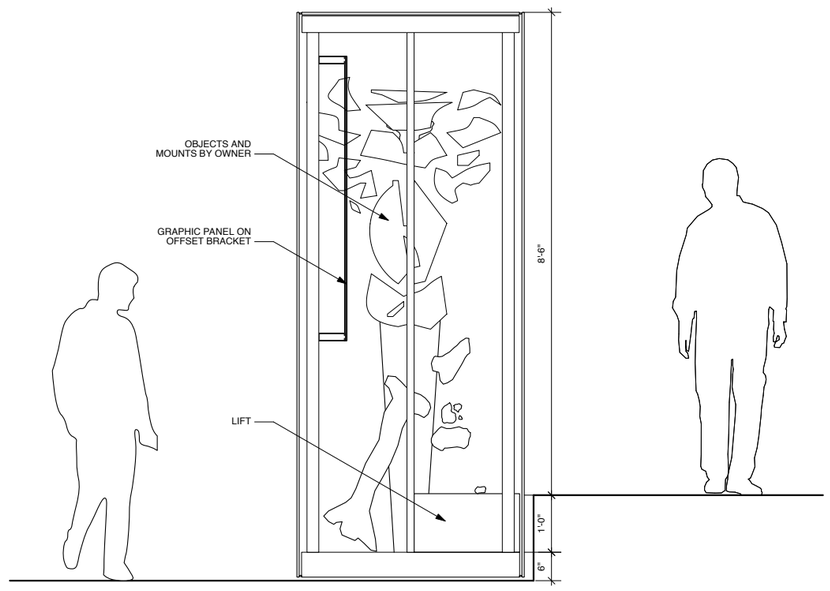
ARTIFACT MOUNTING SCHEDULE

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A1271				x				
A1272					x			
A1273					x		x	
A1274							x	
A1275					x		x	
A1443					x			
A1444					x			
A1445				x				
A1446				x				
A1447					x			
A1448							x	
A1449				x				
A1450				x				
A1451	x							
A1452	x							
A1453							x	



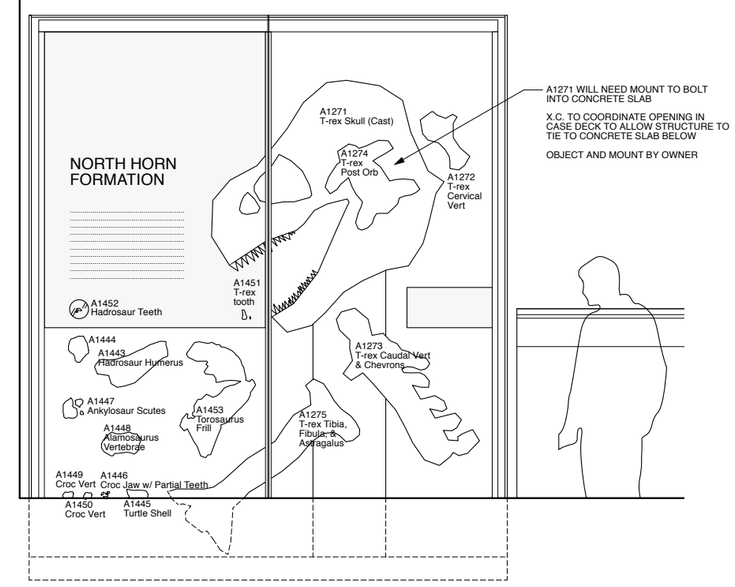
2 ELEVATION

SCALE: 3/4"= 1'-0"



3 ELEVATION

SCALE: 3/4"= 1'-0"



4 ELEVATION

SCALE: 3/4"= 1'-0"

NOTE:

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2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

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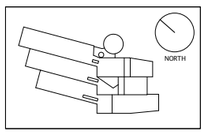


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

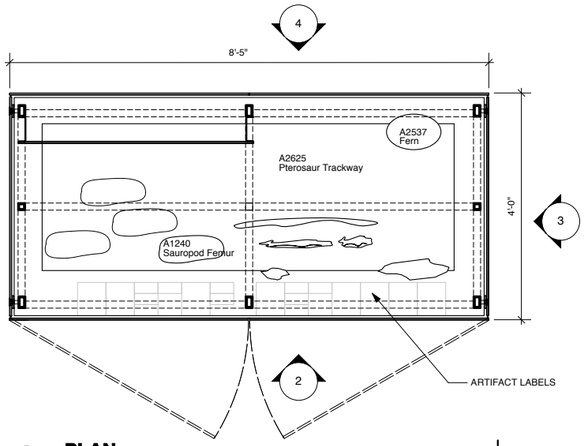
Sheet Title
Exhibit Case Layouts:
Past Worlds, PW4.E09.ca03

Date
April 2, 2009

Scale*
3/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X2-PW-5.30

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

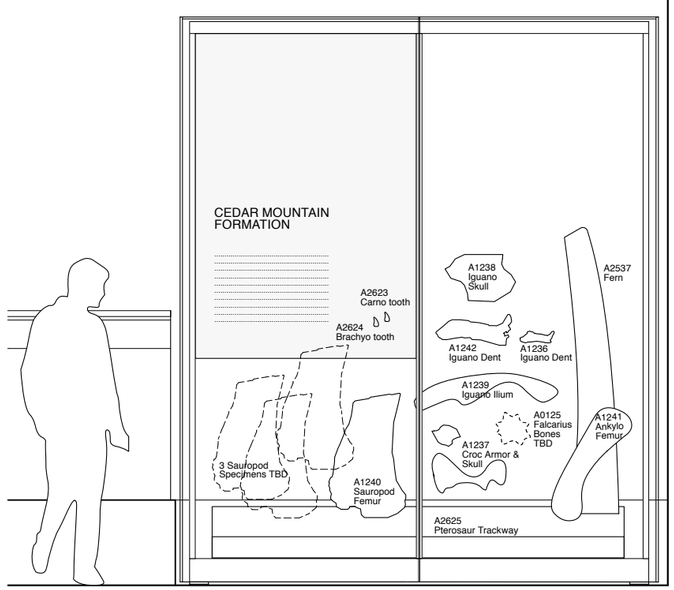


1 PLAN

SCALE: 3/4"= 1'-0"

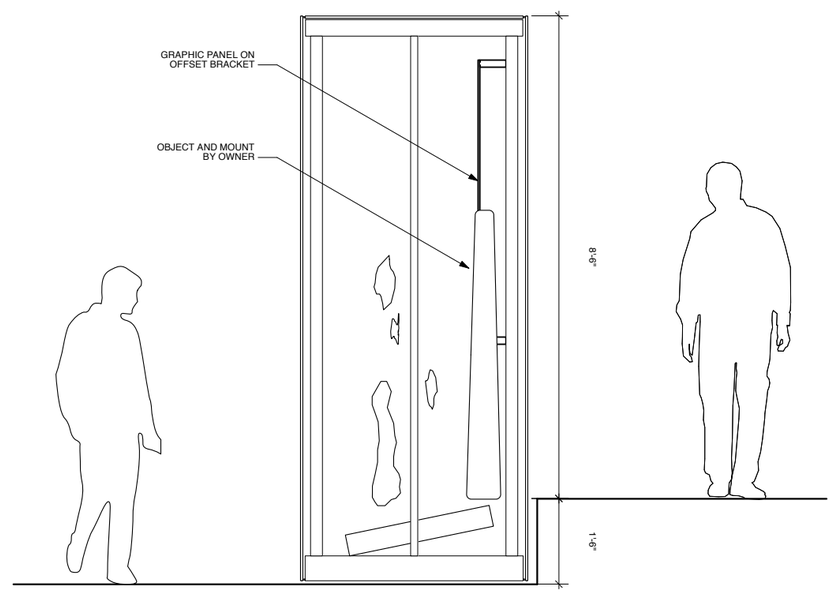
ARTIFACT MOUNTING SCHEDULE

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A0125							x	
A1236							x	
A1237						x		
A1238					x			
A1239						x		
A1240						x		
A1241					x			
A1242					x			
A2537							x	
A2623	x							
A2624	x							
A2625				x				



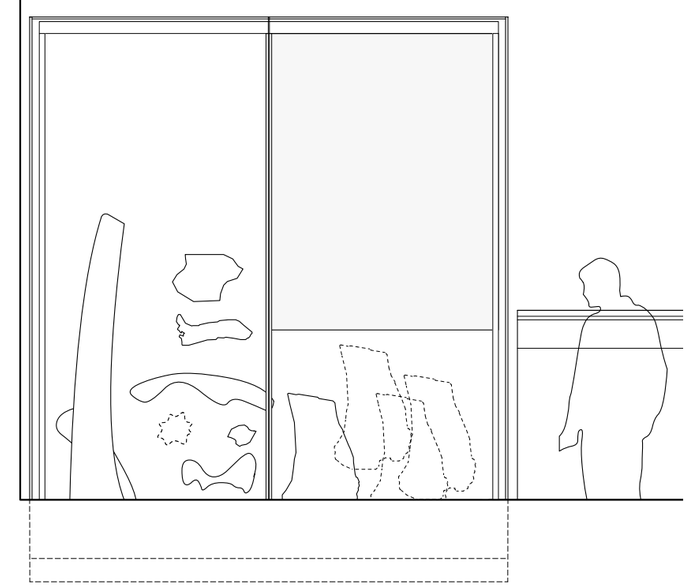
2 ELEVATION

SCALE: 3/4"= 1'-0"



3 ELEVATION

SCALE: 3/4"= 1'-0"



4 ELEVATION

SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

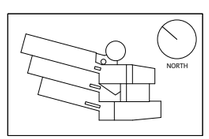
2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

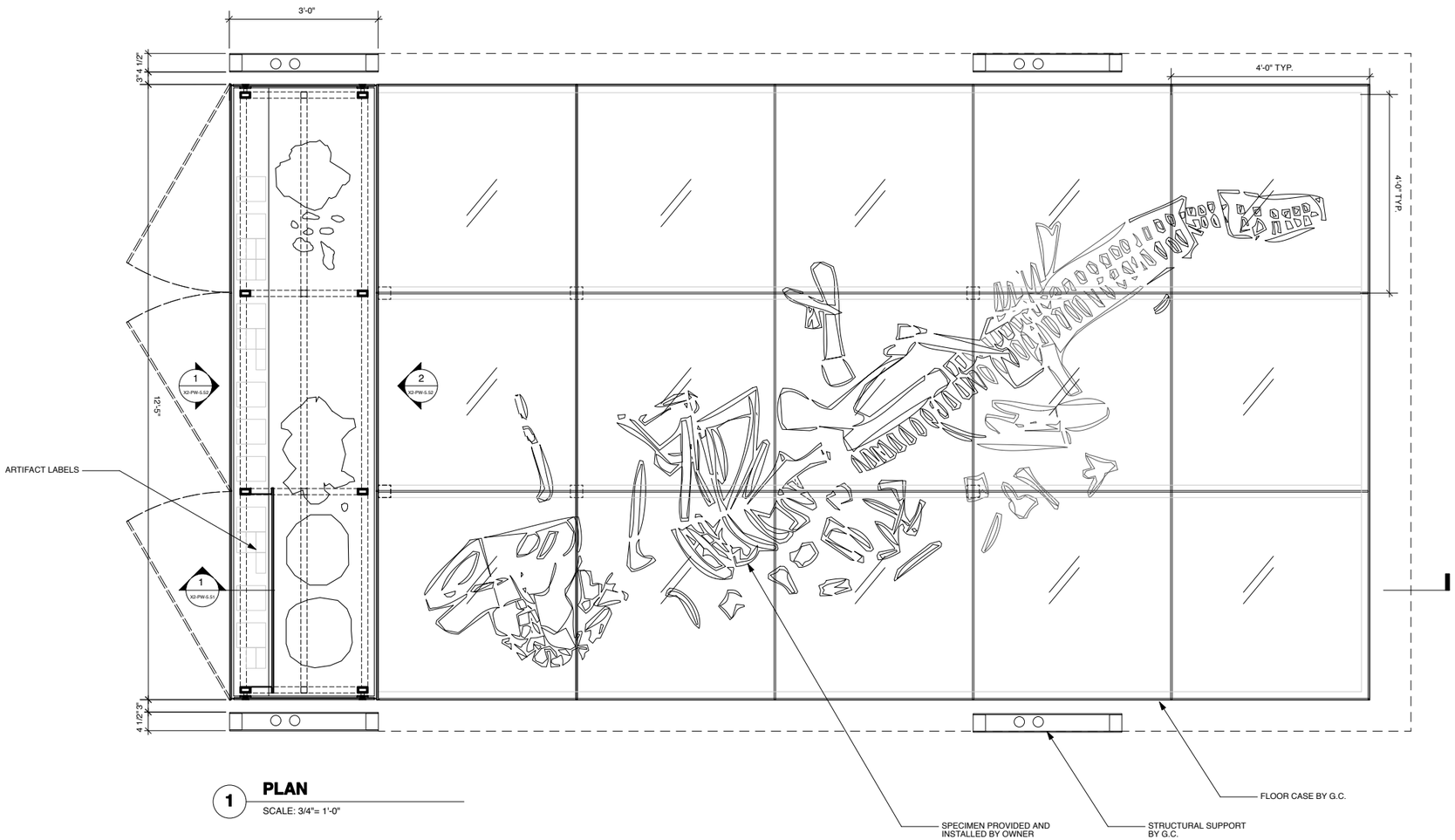
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Exhibit Case Layouts:
Past Worlds, PW4.E06.ca04

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
1/2"=1'-0"	X2-PW-5.40

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **PLAN**

SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

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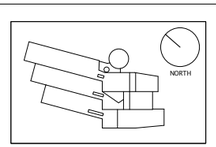
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

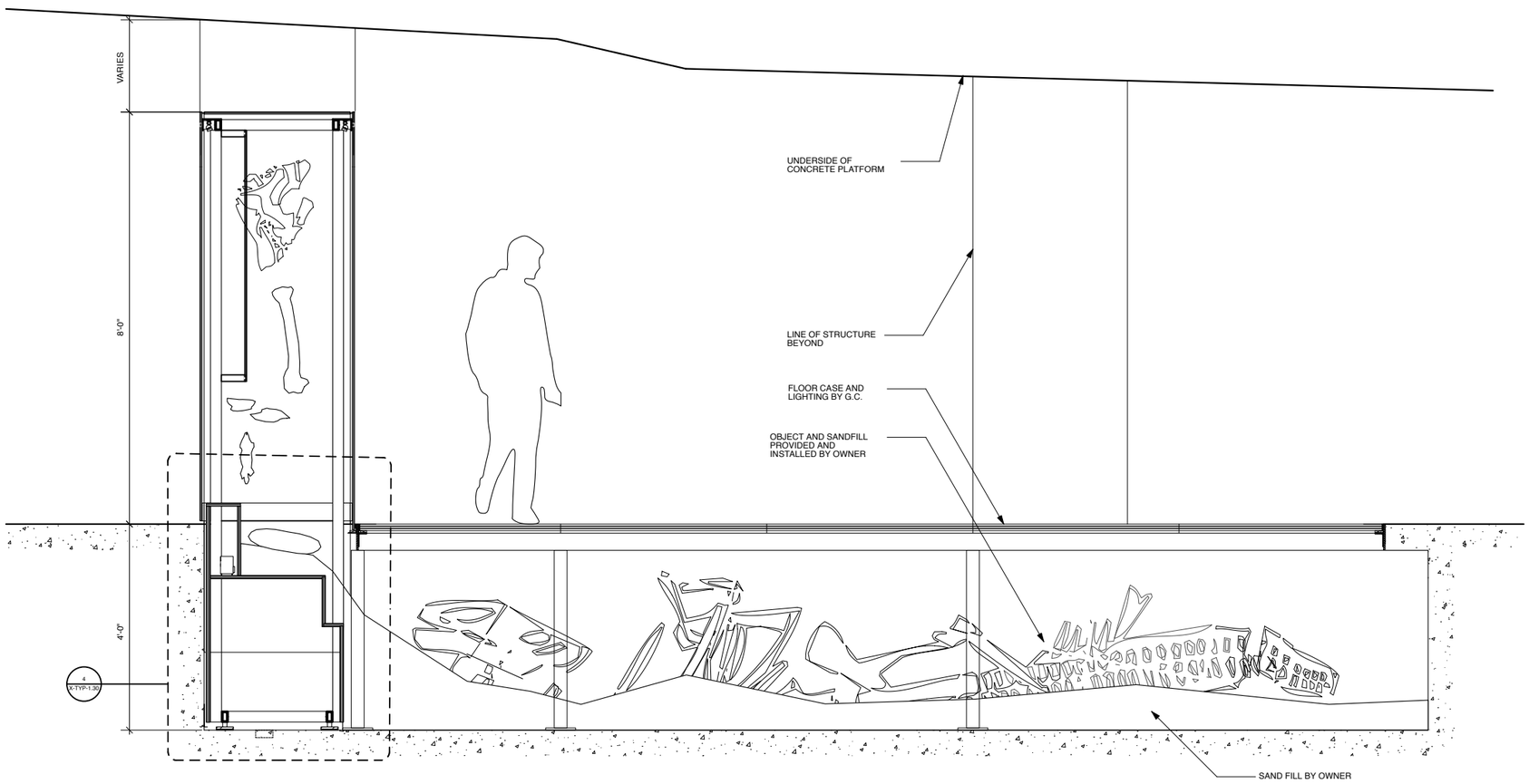
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Exhibit Case Layouts:
Past Worlds, PW4.E03.ca05

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
3/4"=1'-0"	X2-PW-5.50

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **SECTION**

SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

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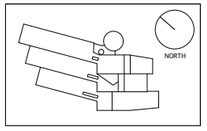


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

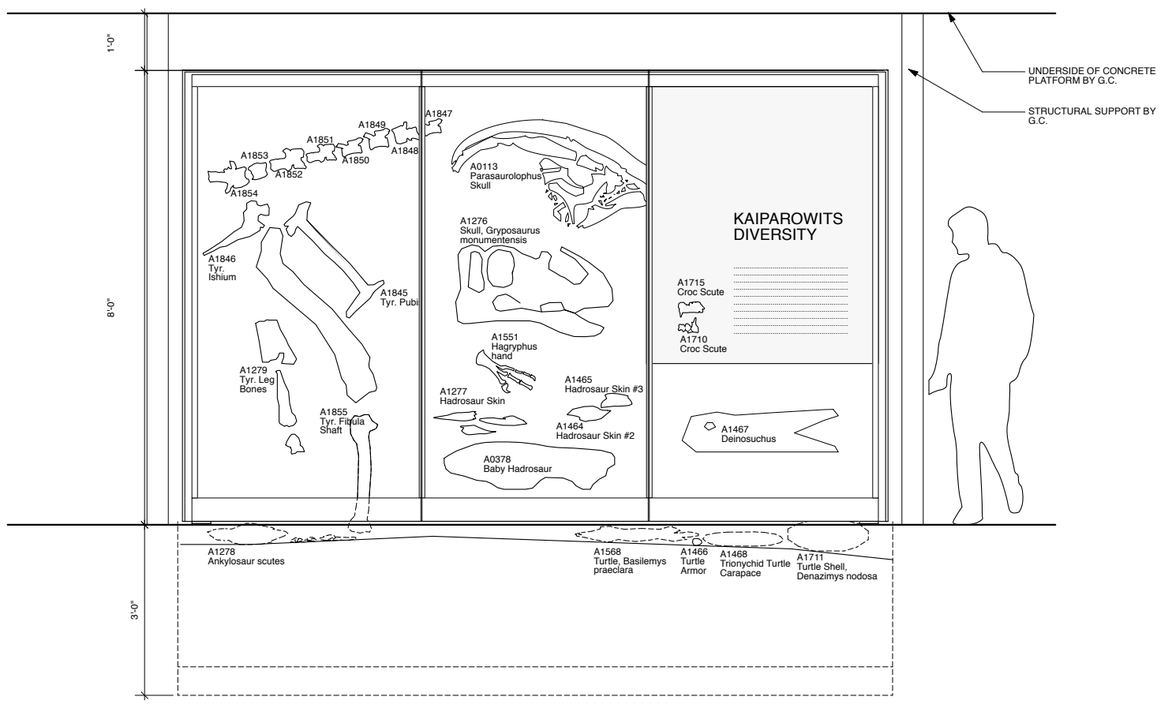
Exhibit Case Layouts:
Past Worlds, PW4.E03.ca05

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3/4"=1'-0"	X2-PW-5.51

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

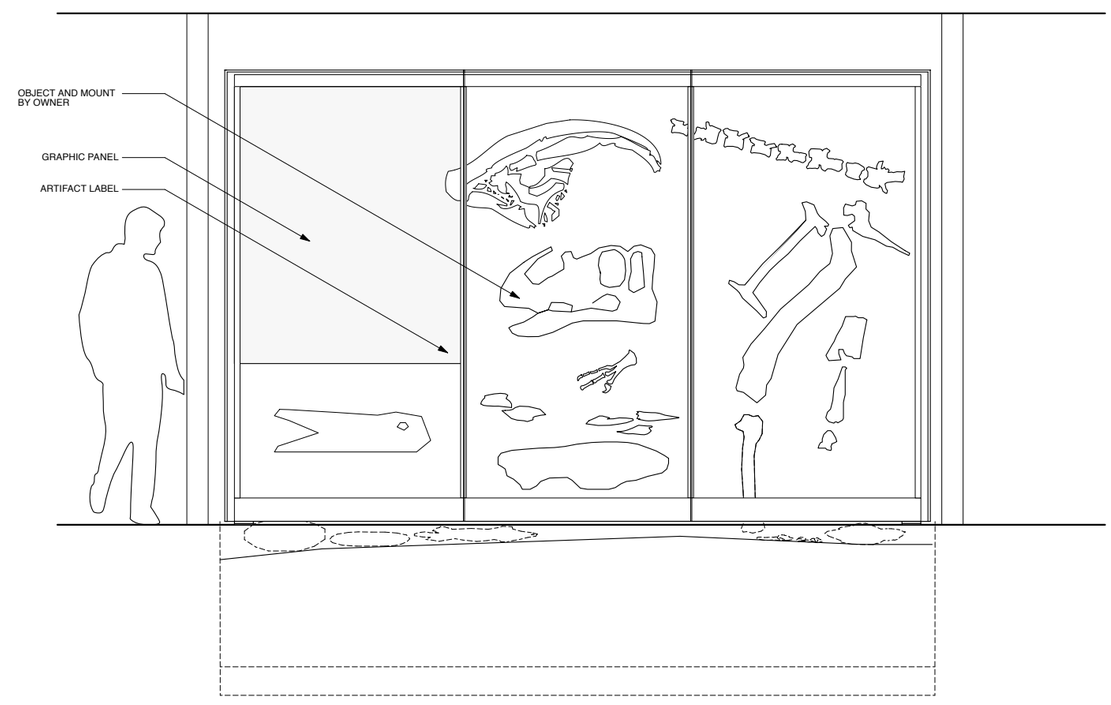
ARTIFACT MOUNTING SCHEDULE

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A0113								x
A0378								x
A1276								x
A1277					x			
A1278				x				
A1279								x
A1464					x			
A1465					x			
A1466				x				
A1467								x
A1468				x				
A1551					x			
A1568				x				
A1710	x							
A1711				x				
A1715	x							
A1845						x		
A1846						x		
A1847								x
A1848								x
A1849								x
A1850								x
A1851								x
A1852								x
A1853								x
A1854								x
A1855						x		



1 **ELEVATION**

SCALE: 3/4"= 1'-0"



2 **ELEVATION**

SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

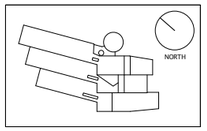
2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Exhibit Case Layouts:
Past Worlds, PW4.E03.ca05

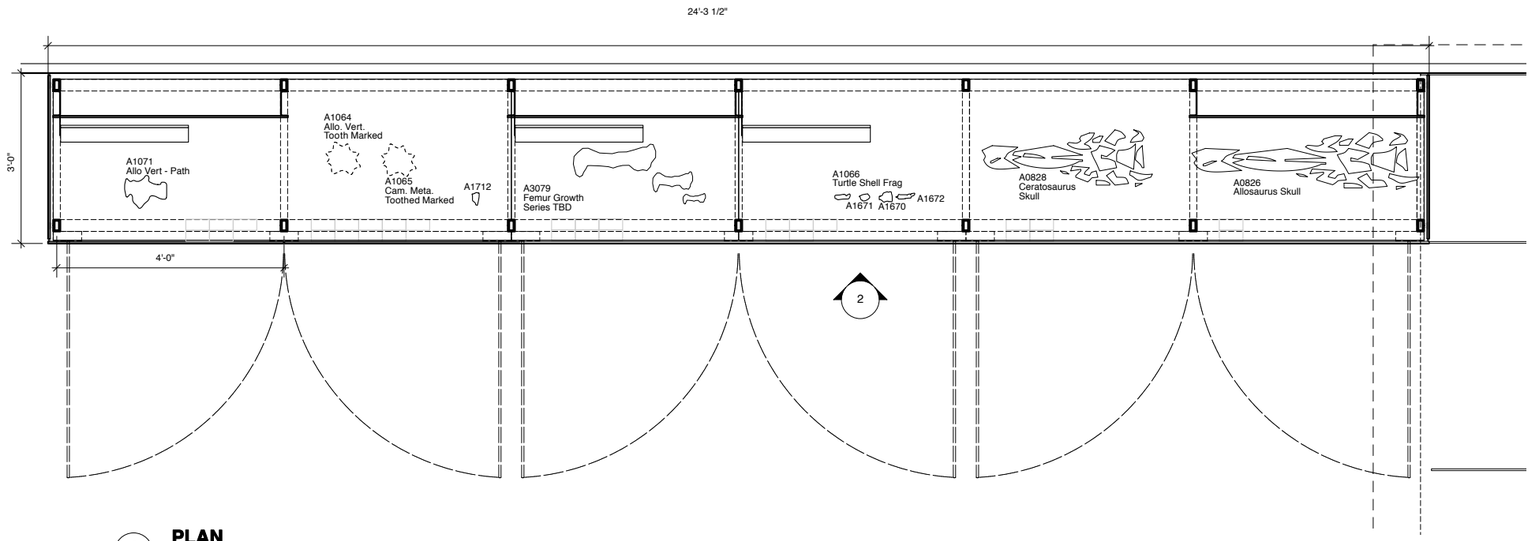
Date: April 2, 2009

Scale*: 3/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

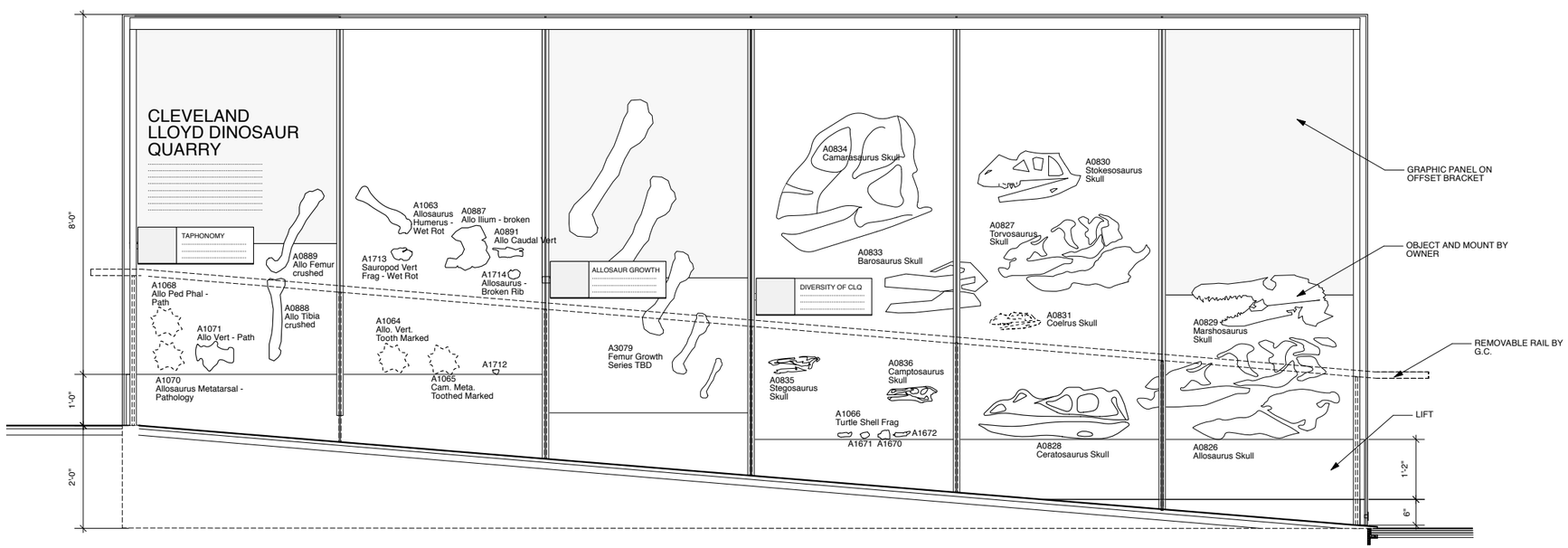
X2-PW-5.52

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 PLAN

SCALE: 3/4"= 1'-0"



2 ELEVATION

SCALE: 3/4"= 1'-0"

ARTIFACT MOUNTING SCHEDULE

Artifact #	Partition	Graphic Panel	Becker Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A0826				x				
A0827								x
A0828				x				
A0829					x			
A0830								x
A0831					x			
A0833					x			
A0834								x
A0835					x			
A0836					x			
A0887					x			
A0888					x			
A0889					x			
A0891					x			
A1063					x			
A1064				x				
A1065				x				
A1066				x				
A1068				x				
A1070				x				
A1071				x				
A1670				x				
A1671				x				
A1672				x				
A1712				x				
A1713					x			
A1714					x			
A3079								x

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner
UMNH
1390 East President's Circle
Salt Lake City, Utah 84112
801.581.6927 tel.

Design Architect
Polshek Partnership Architects LLP
320 West 13th Street
New York, New York
212.807.7171 tel.

Architect of Record
Gillies Stransky Brems Smith
375 West 200 South
Salt Lake City, Utah
801.521.8600 tel.

Exhibit Structural Engineer
Leslie E. Robertson Associates
30 Broad Street
New York, New York 10004
212.750.9000 tel.

Building Engineer
Dunn Associates
380 West 800 South, Suite 100
Salt Lake City, Utah 84101
801.575.8877 tel.

Mechanical/Plumbing/FP Engineer
Colvin Engineering Associates, Inc.
244 West 300 North
Salt Lake City, Utah 84103
801.322.2400 tel

Electrical/AV Engineer
Spectrum Engineers
175 South Main Street
Salt Lake City, Utah 84111
800.678.7077 tel

Lighting
Branston Partnership
122 West 26th Street
New York, NY 10001
212.924.4050 tel.

Audio Visual
BBI Engineering, Inc.
241 Quint Street
San Francisco, CA 94124
415 685 9555 tel.

Exhibition Planner and Designer
Ralph Appelbaum Associates
88 Pine Street
New York, New York 10005
212.334.8200 tel.

Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

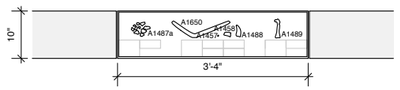
Sheet Title
Exhibit Case Layouts:
Past Worlds, PW5.E03.ca06

Date
April 2, 2009

Scale*
3/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X2-PW-5.60

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



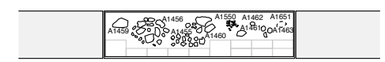
1 DEVELOPED PLAN: PW4.EO3.rc01 (Dino Eggshells, Teeth & Skeletal Material)

SCALE: 3/4"= 1'-0"

NO INFO IN DATABASE:
A1652-3
Mammal jaws
A1654-5
Mammal teeth
A1656-58
Lizard jaws

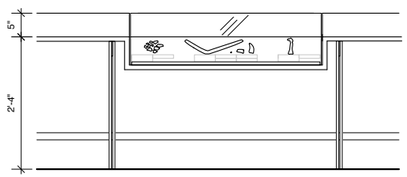
4 DEVELOPED PLAN: PW4.EO3.rc02 (Leaves and Non-Dinos)

SCALE: 3/4"= 1'-0"



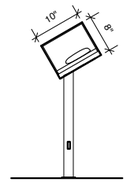
7 DEVELOPED PLAN: PW4.EO3.rc03 (Stream Dwellers)

SCALE: 3/4"= 1'-0"



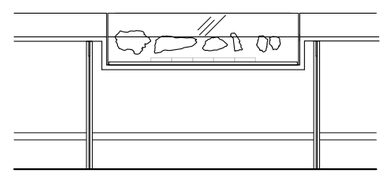
2 ELEVATION

SCALE: 3/4"= 1'-0"



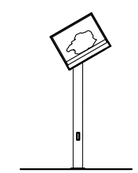
3 SECTION

SCALE: 3/4"= 1'-0"



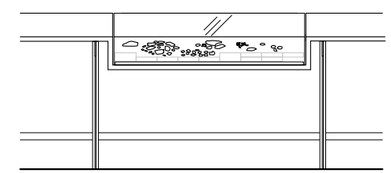
5 ELEVATION

SCALE: 3/4"= 1'-0"



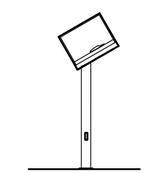
6 SECTION

SCALE: 3/4"= 1'-0"



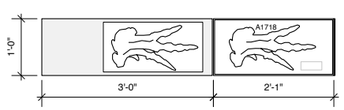
8 ELEVATION

SCALE: 3/4"= 1'-0"



9 SECTION

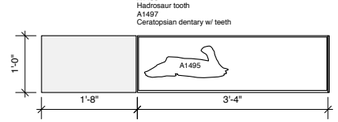
SCALE: 3/4"= 1'-0"



10 DEVELOPED PLAN: PW5.EO2.rc01/in01 (Allosaurus Foot)

SCALE: 3/4"= 1'-0"

NO INFO IN DATABASE:
A1499
Ceratopsian tooth
A1498
Hadrosaur tooth
A1497
Ceratopsian dentary w/ teeth

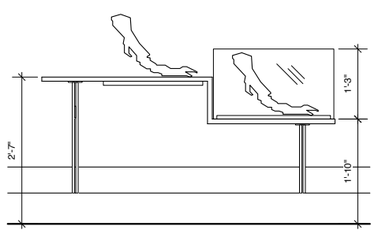


13 DEVELOPED PLAN: PW4.EO2.rc01 (Plant Eaters)

SCALE: 3/4"= 1'-0"

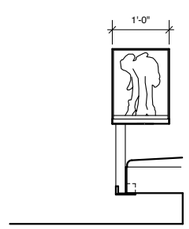
16 DEVELOPED PLAN: PW4.EO2.rc02 (Hypsilophodontid and Pachysephalosaur)

SCALE: 3/4"= 1'-0"



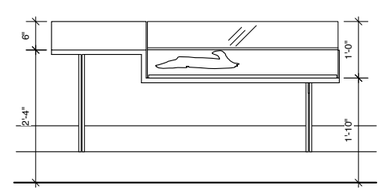
11 ELEVATION

SCALE: 3/4"= 1'-0"



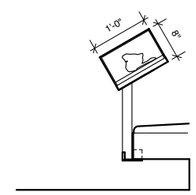
12 SECTION

SCALE: 3/4"= 1'-0"



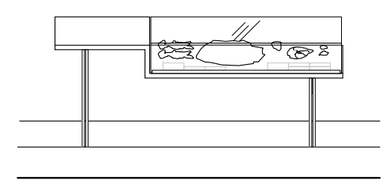
14 ELEVATION

SCALE: 3/4"= 1'-0"



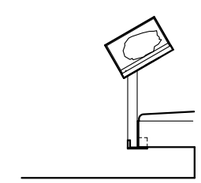
15 SECTION

SCALE: 3/4"= 1'-0"



17 ELEVATION

SCALE: 3/4"= 1'-0"



18 SECTION

SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-2.00/3.00 FOR INSET AND RAIL CASE DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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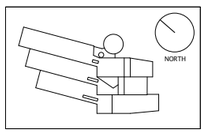


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Rail Case Layouts: Past Worlds, PW4.E03.rc01-03, PW4.E02.rc01-02, PW5.E02.rc01/in01

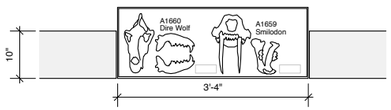
Date
April 2, 2009

Scale*
3/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750

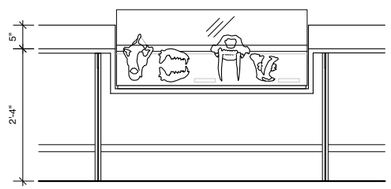
Sheet No.
X2-PW-6.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



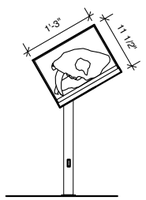
1 DEVELOPED PLAN: PW2.EO2.rc01 (Predator Techniques)

SCALE: 3/4"= 1'-0"



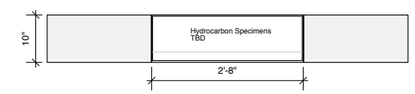
2 DEVELOPED ELEVATION

SCALE: 3/4"= 1'-0"



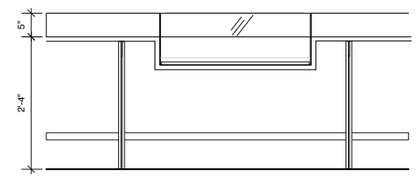
3 SECTION

SCALE: 3/4"= 1'-0"



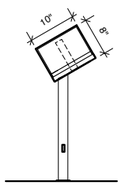
4 DEVELOPED PLAN: PW3.EO2.rc01(Hydrocarbons)

SCALE: 3/4"= 1'-0"



5 DEVELOPED ELEVATION

SCALE: 3/4"= 1'-0"



5 SECTION

SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-2.00/3.00 FOR INSET AND RAIL CASE DTLS

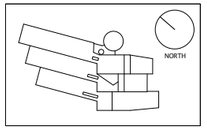
2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Rail Case Layouts: Past Worlds, PW2.E02.rc01,PW3.E02.rc01

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3/4"=1'-0"	X2-PW-6.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

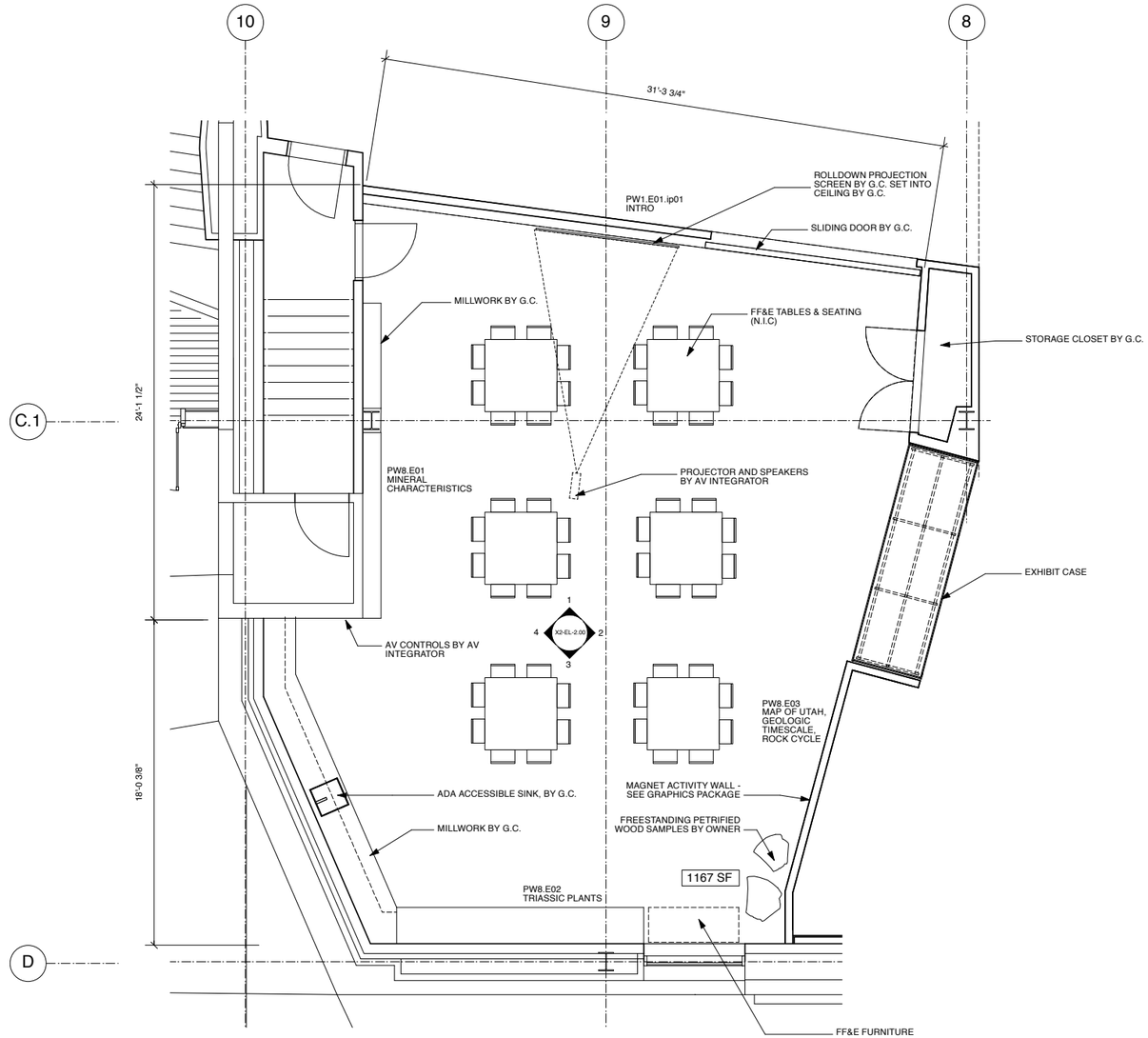


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Exhibit Construction

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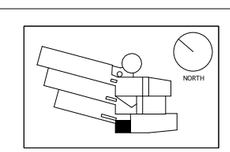


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

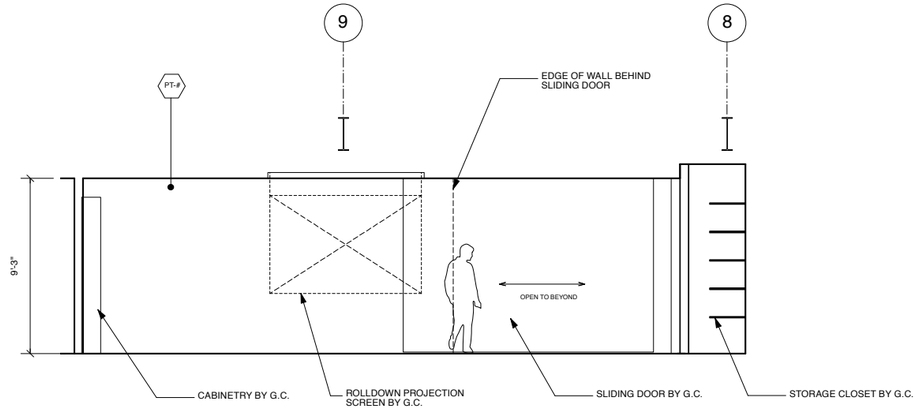
Sheet Title
Partial Plan:
Earth Lab

Date
Feb. 6, 2008

Scale*
1/4"=1'-0"

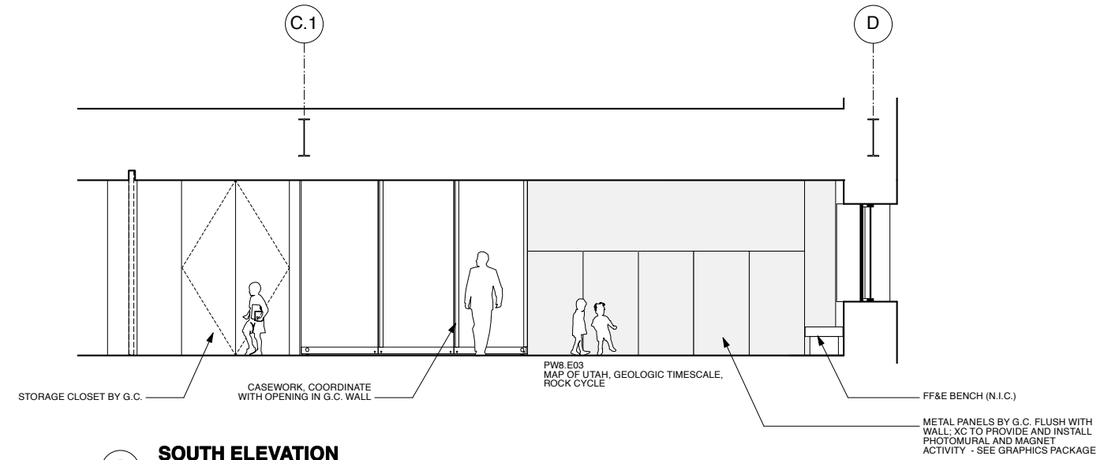
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X2-EL-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



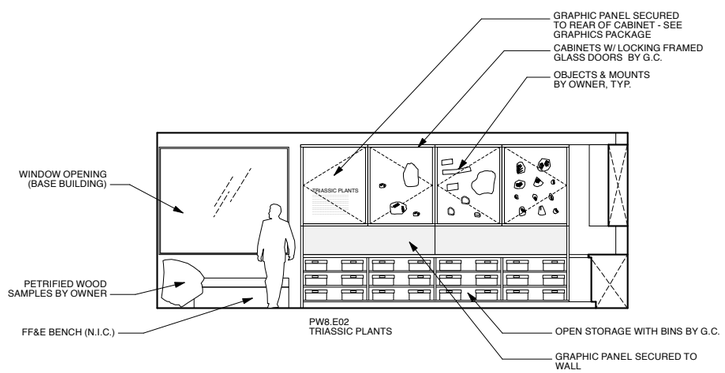
1 EAST ELEVATION

SCALE: 1/4"= 1'-0"



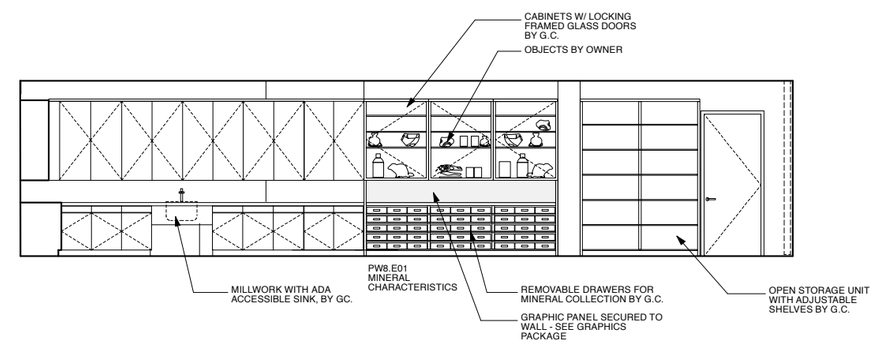
2 SOUTH ELEVATION

SCALE: 1/4"= 1'-0"



3 WEST ELEVATION

SCALE: 1/4"= 1'-0"



4 NORTH ELEVATION

SCALE: 1/4"= 1'-0"

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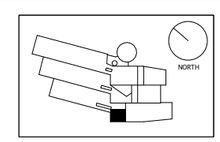


Key Plan

No. / Issue Name / Date

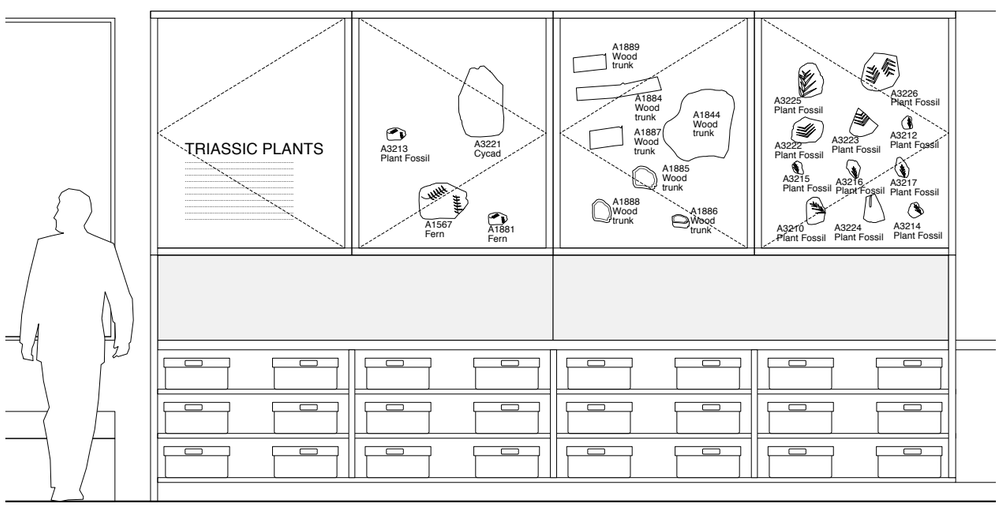
100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Elevations & Sections:
Earth Lab

Date	RAA Project No. 0275
Feb. 6, 2008	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X2-EL-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 TRIASSIC PLANTS ELEVATION

SCALE: 1/2"= 1'-0"

ARTIFACT MOUNTING SCHEDULE

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A1567			x					
A1844			x					
A1881			x					
A1884			x					
A1885			x					
A1886			x					
A1887			x					
A1888			x					
A1889			x					
A3210			x					
A3212			x					
A3213			x					
A3214			x					
A3215			x					
A3216			x					
A3217			x					
A3221			x					
A3222			x					
A3223			x					
A3224			x					
A3225			x					
A3226			x					

NOTE:

1. CABINETS BY G.C., OBJECTS & MOUNTS BY OWNER.

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner
UMNH
1390 East President's Circle
Salt Lake City, Utah 84112
801.581.6927 tel.

Design Architect
Polshek Partnership Architects LLP
320 West 13th Street
New York, New York
212.807.7171 tel.

Architect of Record
Gillies Stransky Brems Smith
375 West 200 South
Salt Lake City, Utah
801.521.8600 tel.

Exhibit Structural Engineer
Leslie E. Robertson Associates
30 Broad Street
New York, New York 10004
212.750.9000 tel.

Building Engineer
Dunn Associates
380 West 800 South, Suite 100
Salt Lake City, Utah 84101
801.575.8877 tel.

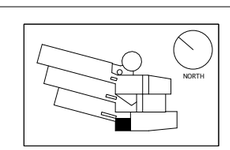
Mechanical/Plumbing/FP Engineer
Colvin Engineering Associates, Inc.
244 West 300 North
Salt Lake City, Utah 84103
801.322.2400 tel

Electrical/AV Engineer
Spectrum Engineers
175 South Main Street
Salt Lake City, Utah 84111
800.678.7077 tel

Lighting
Branston Partnership
122 West 26th Street
New York, NY 10001
212.924.4050 tel.

Audio Visual
BBI Engineering, Inc.
241 Quint Street
San Francisco, CA 94124
415 685 9555 tel.

Exhibition Planner and Designer
Ralph Appelbaum Associates
88 Pine Street
New York, New York 10005
212.334.8200 tel.



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

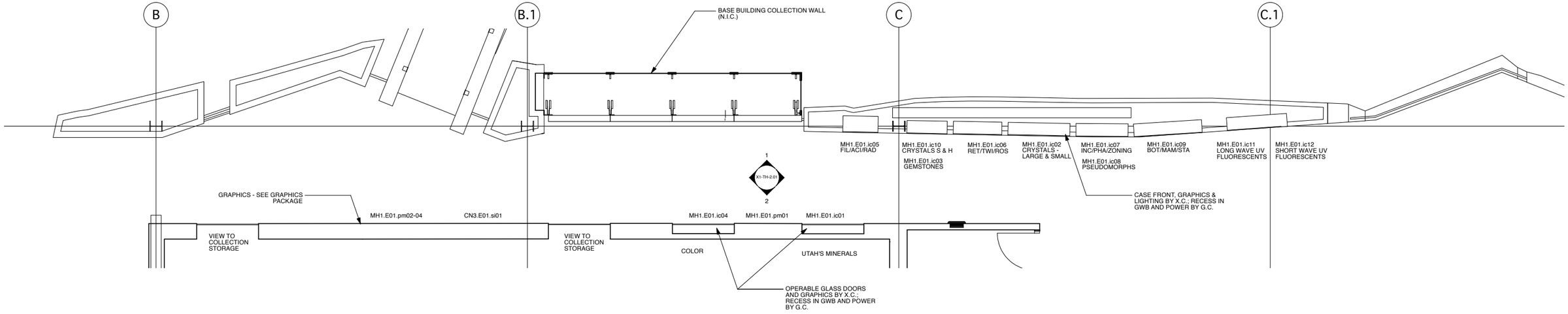
Sheet Title
Case Layout:
Earth Lab, Triassic Plants

Date
Feb. 6, 2008

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X2-EL-6.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **MINERAL HALL PLAN**

SCALE: 1/8" = 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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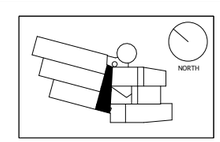


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Level 3 Partial Plan:
Mineral Hall

Date

April 2, 2009

Scale*

As Noted

RAA Project No. 0275

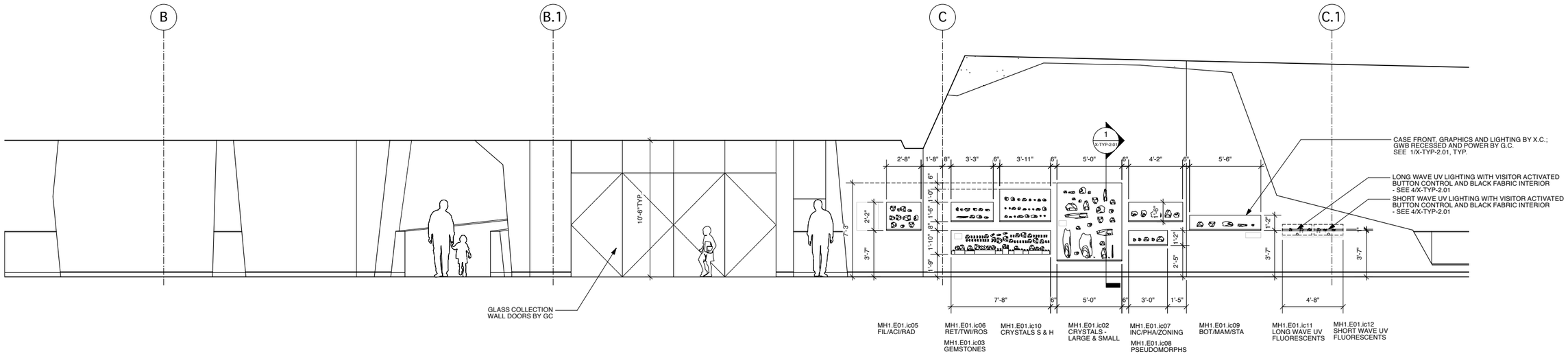
U. of U. Project No. 0872-9630

DFCM Project No. 0224375 0

Sheet No.

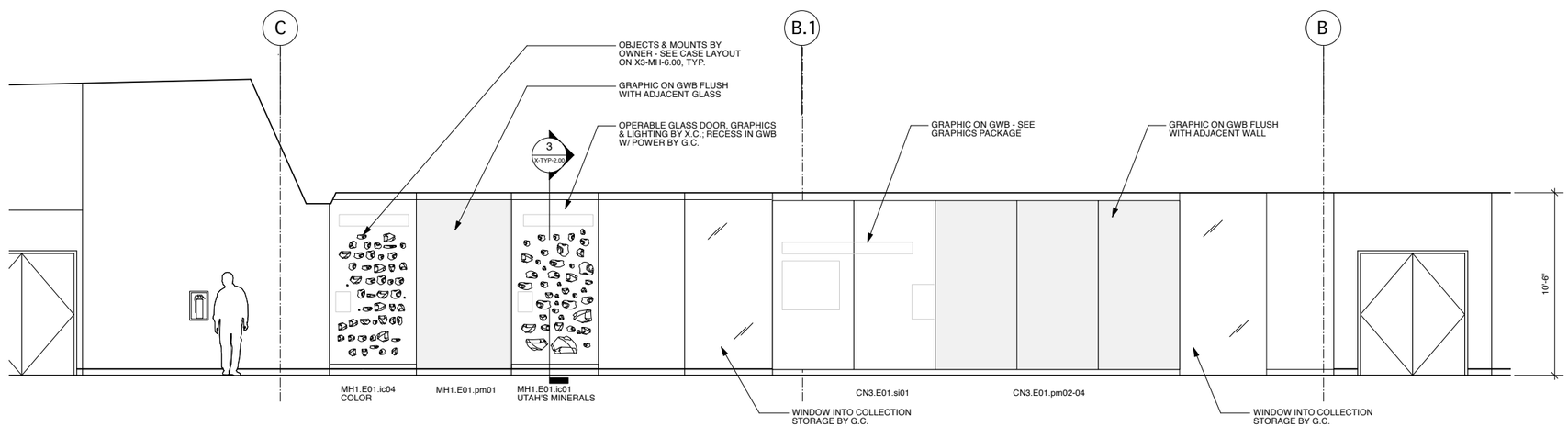
X3-MH-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 MINERAL HALL ELEVATION LOOKING SOUTH

SCALE: 1/8" = 1'-0"



2 MINERAL HALL ELEVATION LOOKING NORTH

SCALE: 1/8" = 1'-0"

NOTES:

1. CASE LIGHTING, GRAPHICS + ACRYLIC FRONT BY X.C.
2. RECESS IN GWB + POWER BY G.C.

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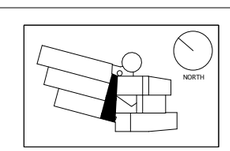


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

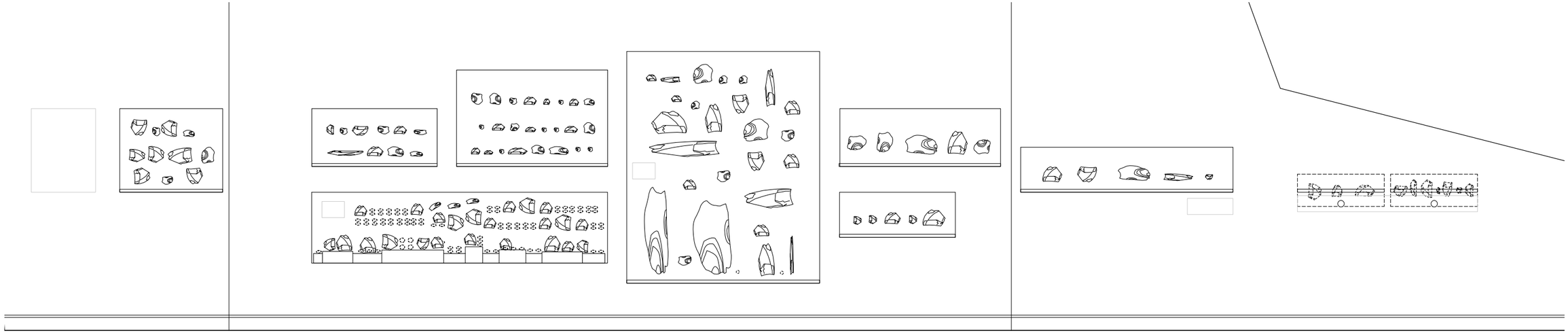
No. / Issue Name / Date

Sheet Title

Level 3 Sections & Elevations: Mineral Hall

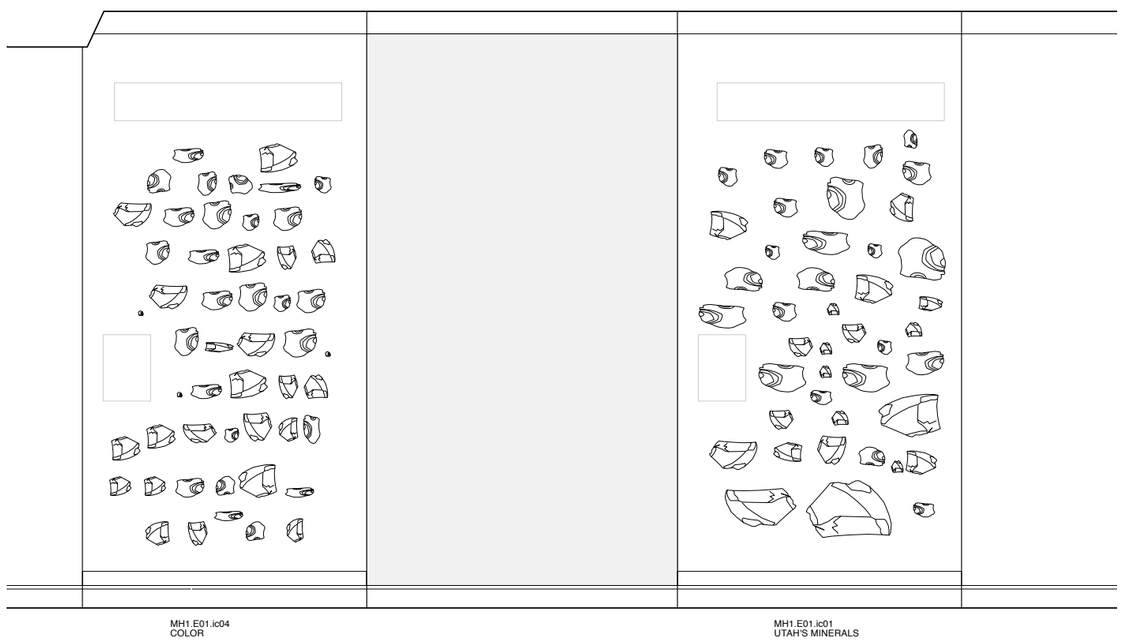
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X3-MH-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 MINERAL HALL ELEVATION LOOKING SOUTH

SCALE: 3/4" = 1'-0"



2 MINERAL HALL ELEVATION LOOKING NORTH

SCALE: 3/4" = 1'-0"

ARTIFACT MOUNTING SCHEDULES

MH1.E01.ic02
CRYSTALS - LG & SM

Artifact #	Backer Board
A1223	x
A2559	x
A2561	x
A2562	x
A2563	x
A2564	x
A2565	x
A2566	x
A2567	x
A2568	x
A2569	x
A2571	x
A2693	x
A2838	x
A2841	x
A2965	x
A2966	x
A2967	x
A2968	x
A2969	x
A2980	x
A2999	x
A3003	x
A3008	x
A3026	x
A3051	x
A3052	x
A3053	x

MH1.E01.ic06
RET / TWI / ROS

Artifact #	Backer Board
A2697	x
A2699	x
A2700	x
A2701	x
A2702	x
A2800	x
A2991	x
A3007	x
A3009	x
A3022	x

MH1.E01.ic09
BOT / MAM / STA

Artifact #	Backer Board
A2703	x
A2705	x
A2706	x
A3010	x
A3011	x

MH1.E01.ic10
CRYSTALS S & H

Artifact #	Backer Board
A2660	x
A2682	x
A2805	x
A2981	x
A2983	x
A2985	x
A2986	x
A2987	x
A2988	x
A2989	x
A2990	x
A2994	x
A2995	x
A2996	x
A2997	x
A2998	x
A3006	x
A3014	x
A3015	x
A3016	x
A3017	x
A3018	x
A3020	x
A3021	x
A3023	x

MH1.E01.ic03
GEMSTONES

Artifact #	Backer Board	Lift/ Deck
A2780	x	
A2781	x	
A2873		x
A2875		x
A2876		x
A2877		x
A2878		x
A2879		x
A2880		x
A2881		x
A2882		x
A2883		x
A2884		x
A2885		x
A2886		x
A2887		x
A2888		x
A2889		x
A2890		x
A2891	x	
A2892	x	
A2893	x	
A2894	x	
A2895	x	
A2896	x	
A2897	x	
A2898	x	
A2899	x	
A2900	x	
A2901	x	
A2902	x	
A2903	x	
A2904	x	
A2905	x	
A2906	x	
A2907	x	
A2908	x	
A2909	x	
A2910		x
A2911		x
A2912		x
A2913	x	
A2914	x	
A2916		x
A2917		x
A2918		x
A2919		x
A2920		x
A2921		x
A2922	x	
A2924	x	
A2925	x	
A2926	x	
A2927		x
A2928		x
A2929		x
A2930		x
A2931		x
A2932		x

Artifact #	Backer Board	Lift/ Deck
A2933		x
A2934		x
A2935		x
A2936	x	
A2937		x
A2938		x
A2939		x
A2940		x
A2941		x
A2942		x
A2943		x
A2944		x
A2945		x
A2946		x
A2947		x
A2948		x
A2949		x
A2950		x
A2951		x
A2952		x
A2953		x
A2954		x
A2955		x
A2956	x	
A2957	x	
A2958	x	
A2959	x	
A2960	x	
A2961	x	
A2977	x	
A2978	x	
A3000	x	
A3001	x	
A3012	x	
A3013	x	
A3027		x
A3028		x
A3029		x
A3030		x
A3031		x
A3032		x
A3033		x
A3034		x
A3035		x
A3036		x
A3037		x
A3038		x
A3039	x	
A3040	x	
A3041	x	
A3042	x	
A3043	x	
A3044	x	
A3046	x	
A3047	x	
A3048	x	
A3049	x	
A3050	x	
A3119	x	

MH1.E01.ic05
FIL / ACI / RAD

Artifact #	Backer Board
A2669	x
A2688	x
A2690	x
A2691	x
A2692	x
A2694	x
A2796	x
A2797	x
A3005	x
A3019	x
A3025	x

MH1.E01.ic07
INC / PHA / ZONING

Artifact #	Backer Board
A2708	x
A2709	x
A2711	x
A2979	x
A3024	x

MH1.E01.ic08
PSEUDOMORPHS

Artifact #	Backer Board
A2713	x
A2763	x
A2806	x
A2992	x
A2993	x

MH1.E01.ic04
COLOR

Artifact #	Backer Board
A2570	x
A2631	x
A2634	x
A2635	x
A2638	x
A2639	x
A2640	x
A2641	x
A2645	x
A2646	x
A2647	x
A2648	x
A2649	x
A2651	x
A2652	x
A2653	x
A2655	x
A2656	x
A2661	x
A2662	x
A2663	x
A2664	x
A2665	x
A2666	x
A2667	x
A2668	x
A2670	x
A2671	x
A2672	x
A2673	x
A2674	x
A2675	x
A2676	x
A2678	x
A2680	x
A2683	x
A2684	x
A2685	x
A2686	x
A2704	x
A2712	x
A2962	x
A2963	x
A2964	x
A2970	x
A2971	x
A2972	x
A2973	x
A2975	x
A2976	x
A3004	x

MH1.E01.ic11
LONG WAVE UV
FLUORESCENTS

Artifact #	Backer Board
A3159	x
A3163	x
A3165	x

MH1.E01.ic12
SHORT WAVE UV
FLUORESCENTS

Artifact #	Backer Board
A3155	x
A3156	x
A3157	x
A3158	x
A3160	x
A3161	x
A3162	x

MH1.E01.ic01
UTAH'S MINERALS

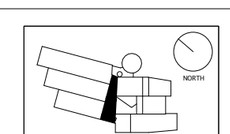
Artifact #	Backer Board
A2572	x
A2573	x
A2574	x
A2576	x
A2579	x
A2580	x
A2582	x
A2585	x
A2586	x
A2587	x
A2589	x
A2591	x
A2593	x
A2594	x
A2595	x
A2596	x
A2598	x
A2599	x
A2600	x
A2601	x
A2602	x
A2603	x
A2604	x
A2605	x
A2608	x
A2609	x
A2610	x
A2611	x
A2612	x
A2617	x
A2618	x
A2776	x
A2777	x
A2782	x
A2794	x
A2799	x
A2802	x
A2803	x
A2823	x
A2826	x
A2982	x
A2984	x
A3002	x

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

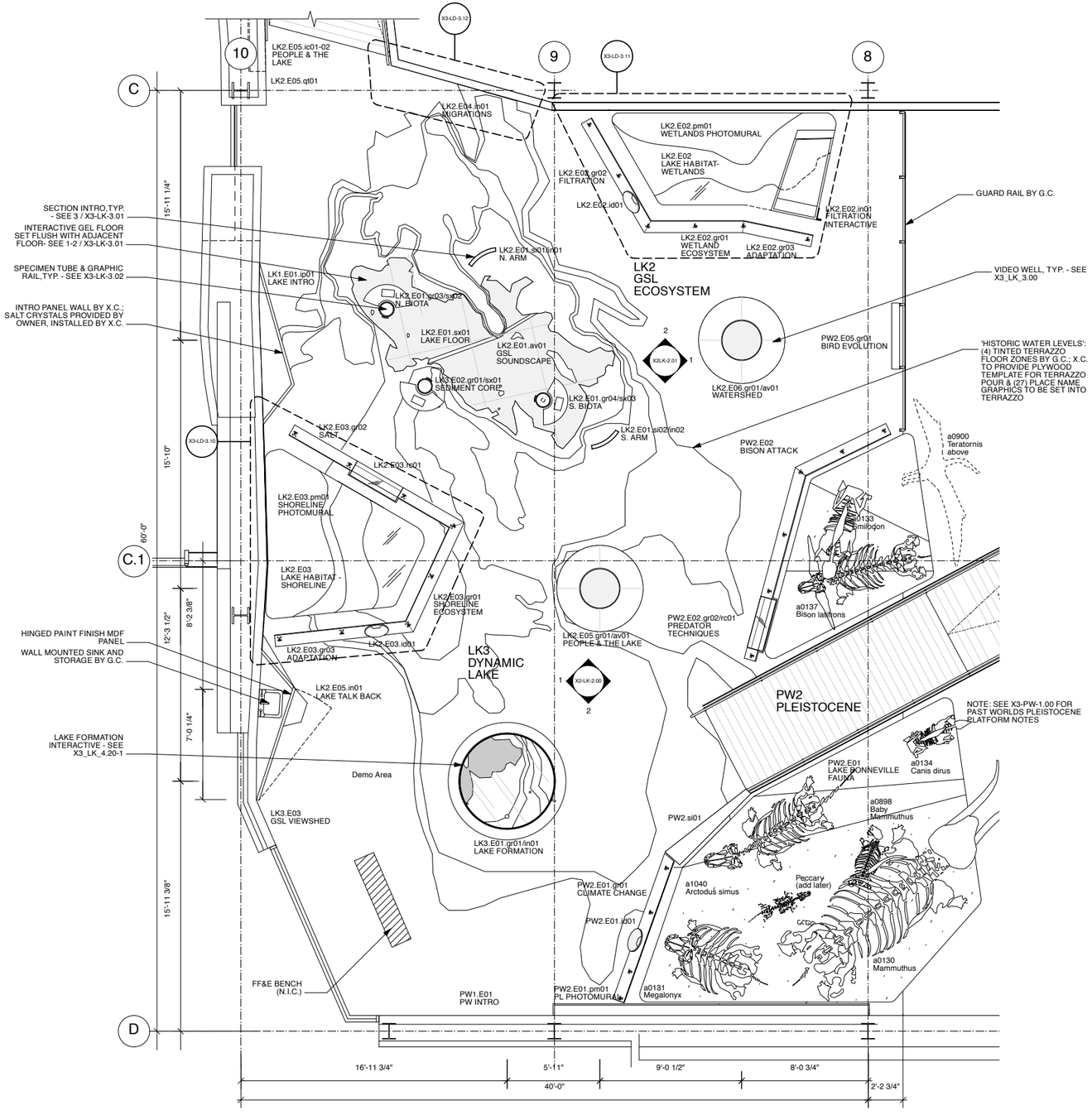
Sheet Title
Mineral Hall Case Layouts

Date
April 2, 2009

Scale*
As Noted

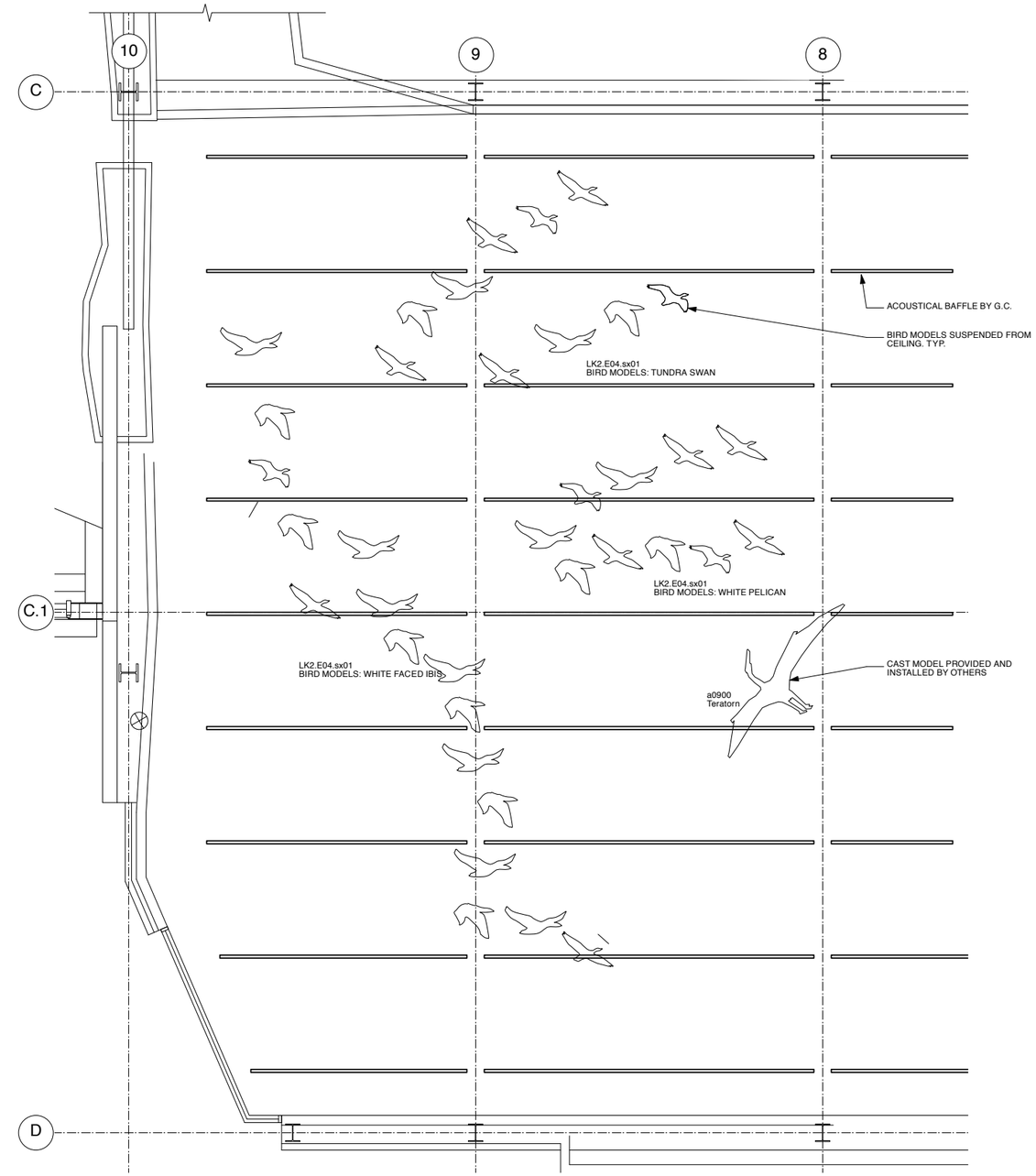
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X3-MH-6.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **PLAN**

SCALE: 1/4"= 1'-0"



2 **REFLECTED CEILING PLAN**

SCALE: 1/4"= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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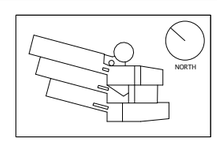
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Partial Plan & RCP:
Lake

Date

April 2, 2009

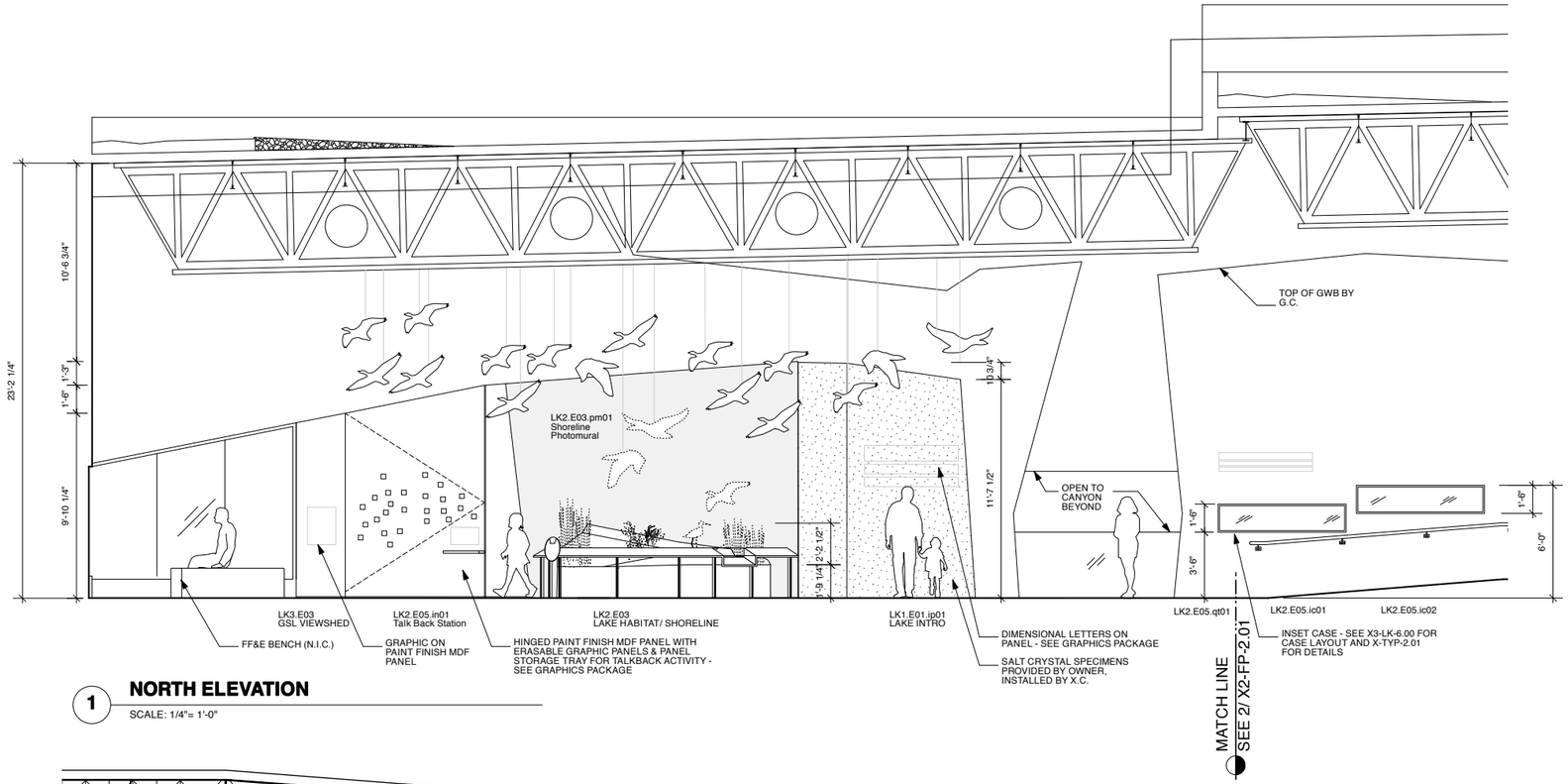
Scale*

1/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

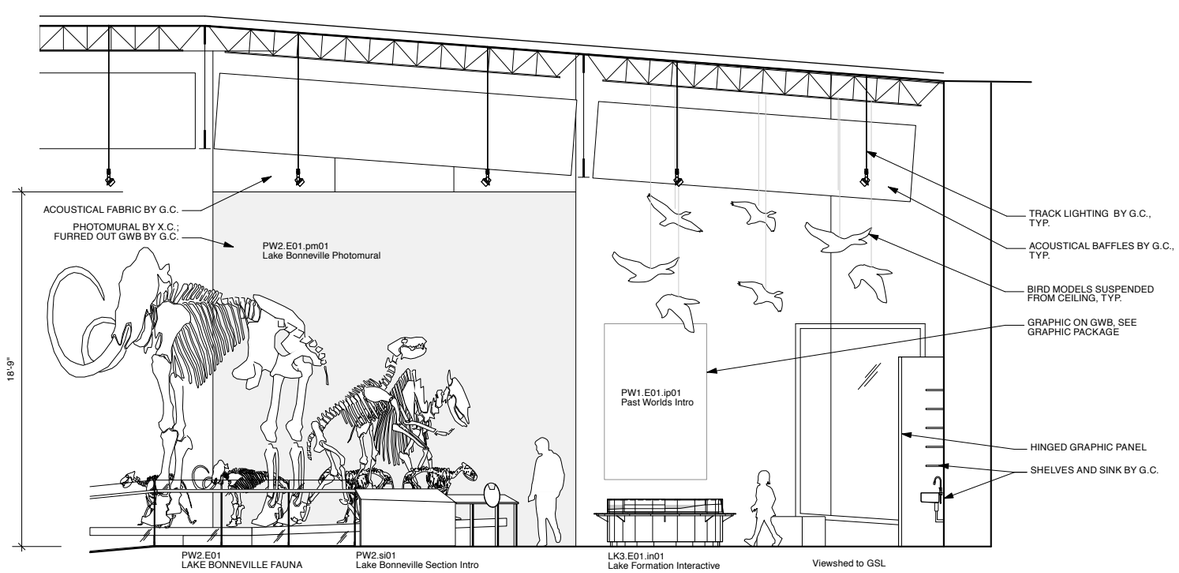
X3-LK-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 NORTH ELEVATION

SCALE: 1/4"= 1'-0"



2 WEST ELEVATION

SCALE: 1/4"= 1'-0"

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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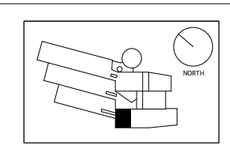


Key Plan

No. / Issue Name / Date

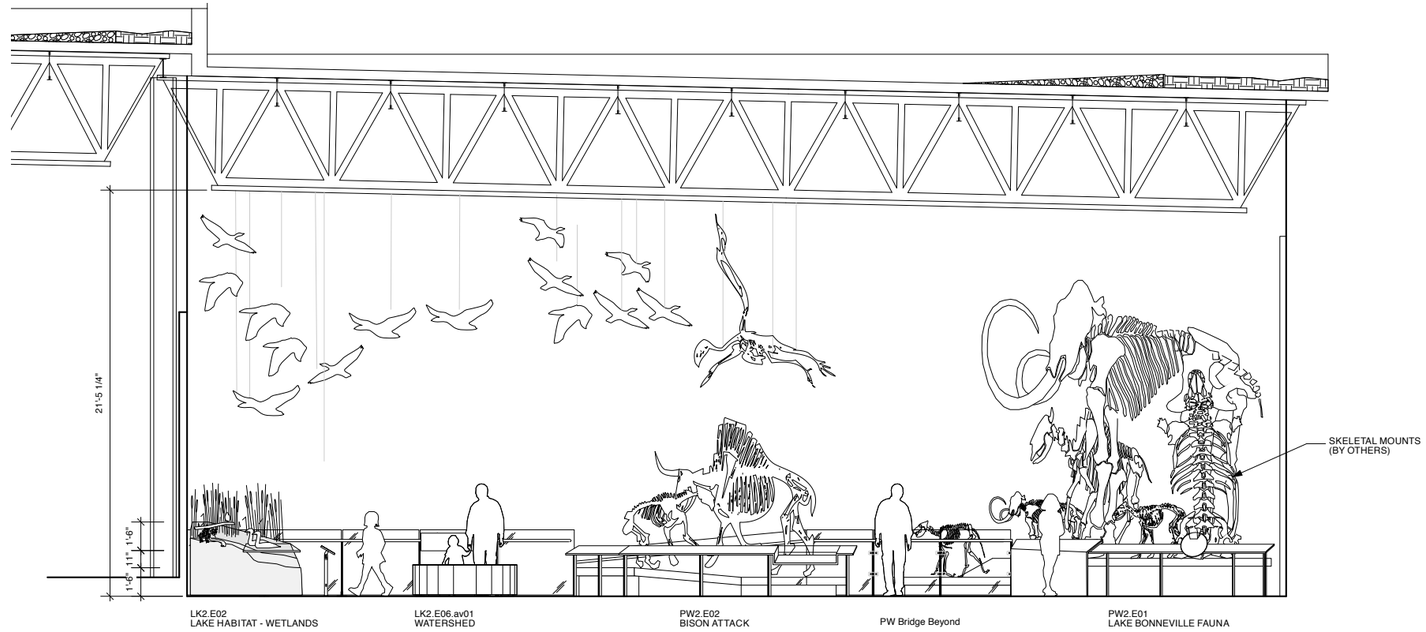
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Elevations & Sections:
Lake

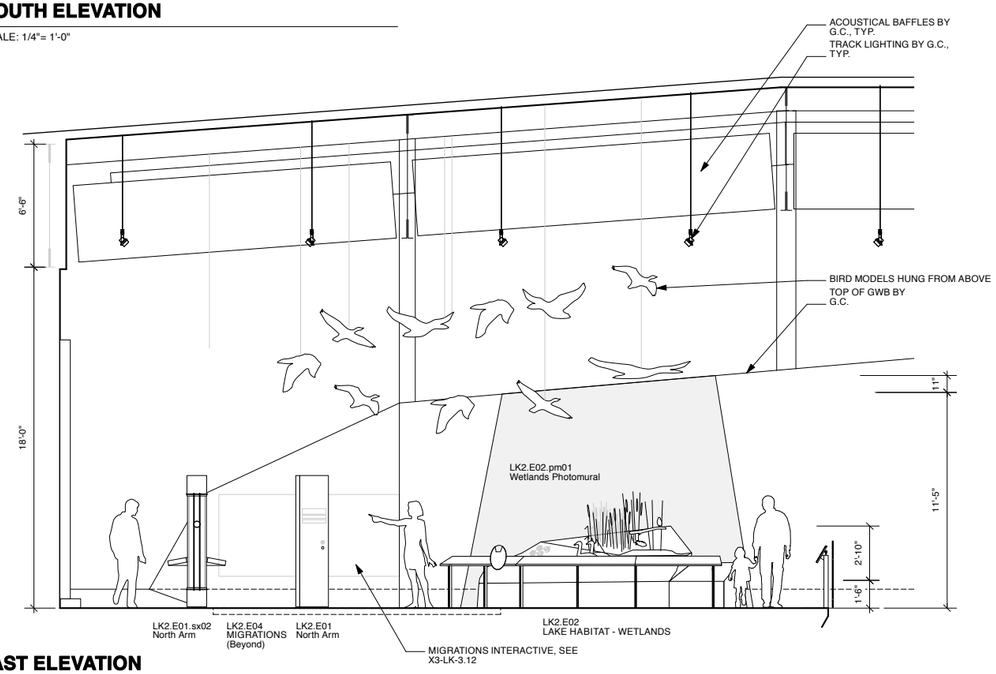
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 0224375 0
Scale*	Sheet No.
1/4"=1'-0"	X3-LK-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 SOUTH ELEVATION

SCALE: 1/4"= 1'-0"



2 EAST ELEVATION

SCALE: 1/4"= 1'-0"

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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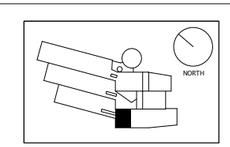
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

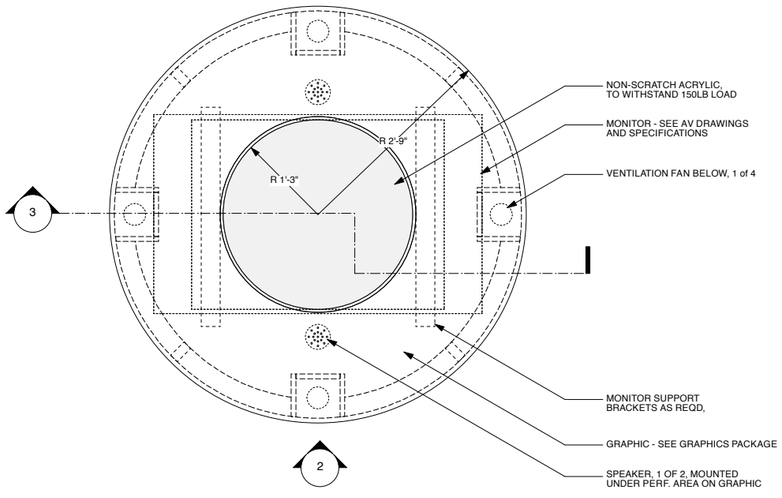
100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Elevations & Sections:
Lake

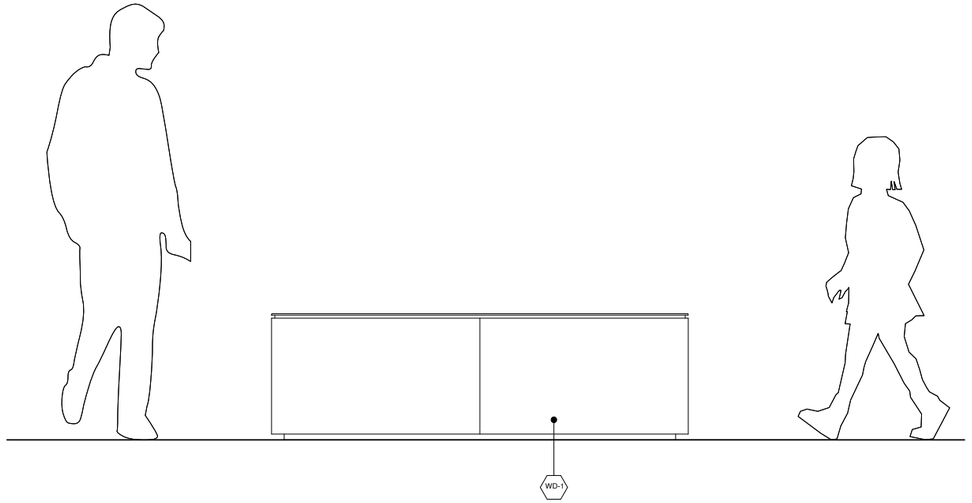
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X3-LK-2.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 PLAN: VIDEO WELL

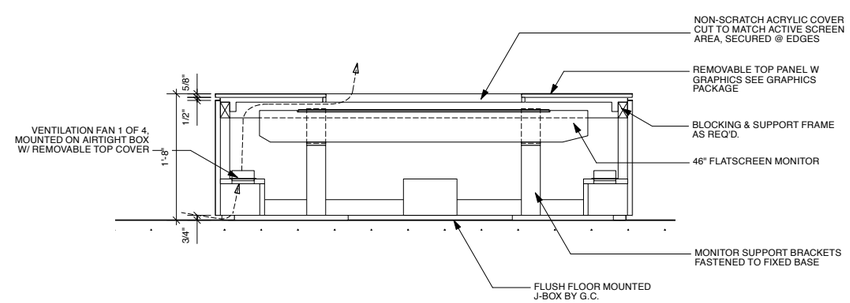
SCALE: 1"= 1'-0"



2 ELEVATION: VIDEO WELL

SCALE: 1"= 1'-0"

NOTES:
1. ALL AV EQUIPMENT BY AV INTEGRATOR; X.C. TO COORDINATE INTEGRATION OF AV EQUIPMENT INTO EXHIBITS
2. SEE AV DRAWINGS AND SPECIFICATIONS



3 SECTION: VIDEO WELL

SCALE: 1"= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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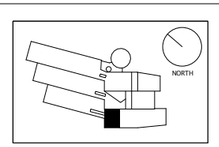


Key Plan

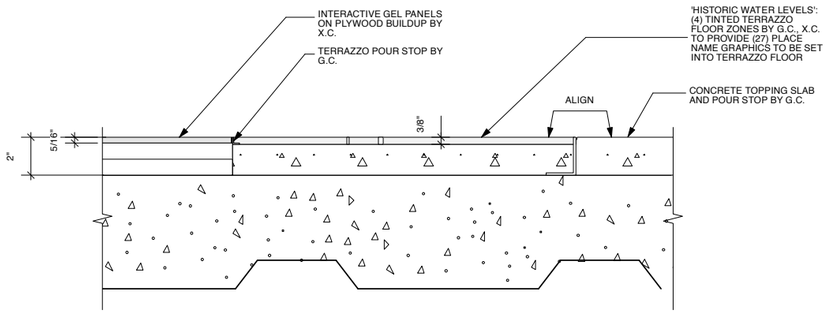
No. / Issue Name / Date	No. / Issue Name / Date
	100% Final Design April 2, 2009

Sheet Title
Details:
Lake, Video Well

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 0224375 0
Scale*	Sheet No.
As Noted	X3-LK-3.00

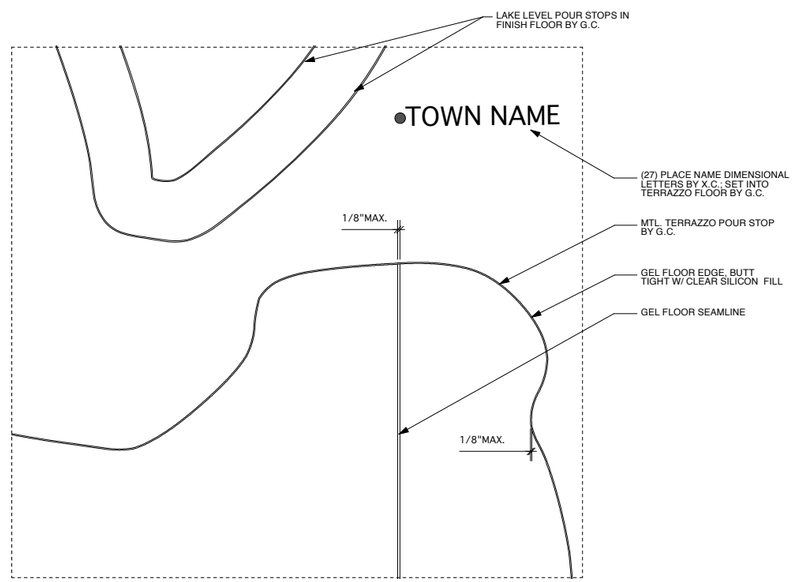
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

NOTES:
1. X.C. TO SURVEY SITE CONDITIONS PRIOR TO SHOP DRAWINGS AND FABRICATION OF GEL FLOOR PANELS
2. PROVIDE CONTINUOUS CLEAR SILICON BEAD AT TERRAZZO EDGE AND BETWEEN PANELS
3. ADHERE GEL PANELS TO SUBFLOOR WITH MPEI G-19 ADHESIVE OR EQ.
4. SEE SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFORMATION



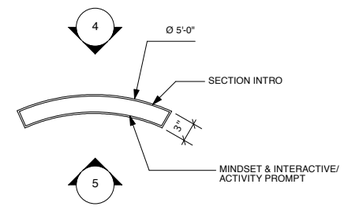
1 TYP. SECTION DETAIL: LAKE FLOOR

SCALE: 3"= 1'-0"



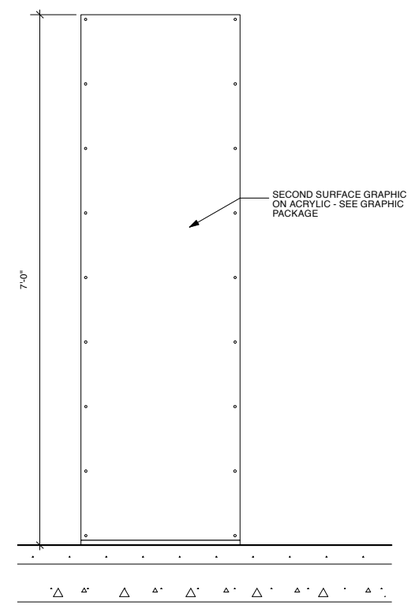
2 PLAN DETAIL: LAKE FLOOR

SCALE: 3"= 1'-0"



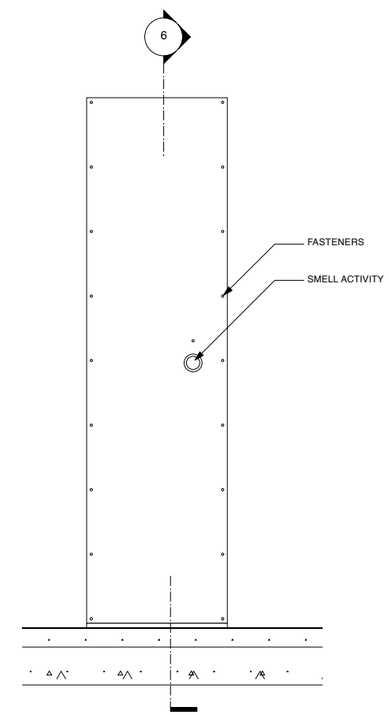
3 PLAN: GRAPHIC PANEL

SCALE: 1"= 1'-0"



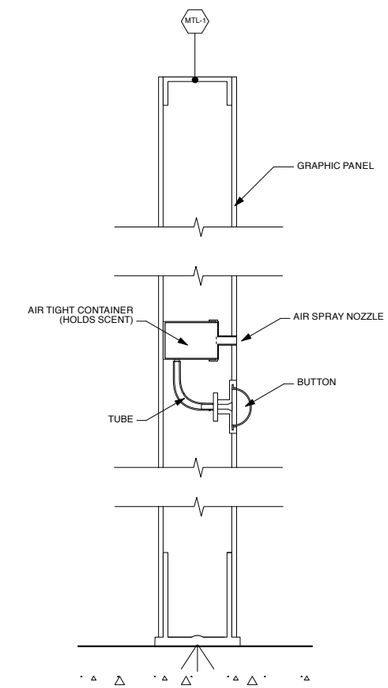
4 DEVELOPED ELEVATION: FRONT

SCALE: 1"= 1'-0"



5 DEVELOPED ELEVATION: BACK

SCALE: 1"= 1'-0"



6 DETAIL: GRAPHIC PANEL

SCALE: 3"= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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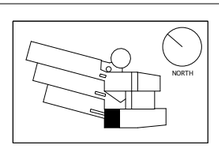


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Details:
Lake, Lake Floor / Panels

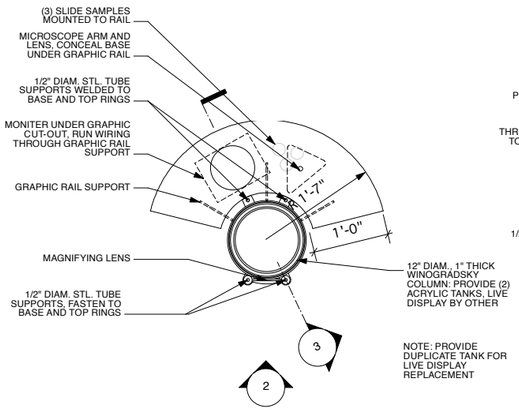
Date
April 2, 2009

Scale*
As Noted

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 0224375O

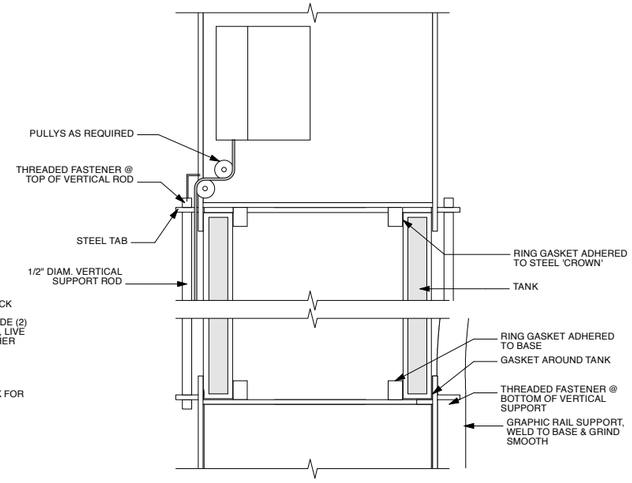
Sheet No.
X3-LK-3.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



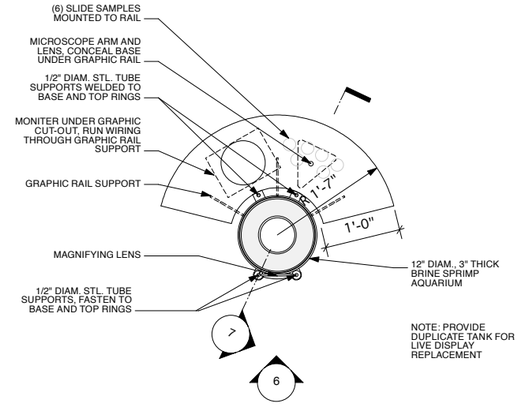
1 PLAN: NORTH BIOTA TUBE LK2.E01.gr03/sx02

SCALE: 1"= 1'-0"



4 SECTION DTL.: BIOTA TUBE

SCALE: 3"= 1'-0"



5 PLAN: SOUTH BIOTA TUBE LK2.E01.gr01/sx03

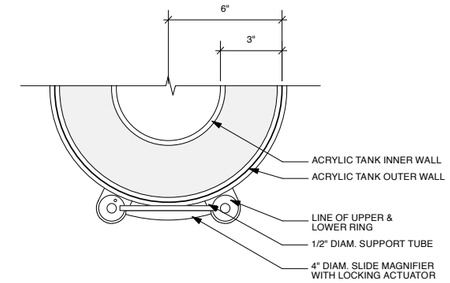
SCALE: 1"= 1'-0"

NOTES:

1. SEE SPECIFICATIONS FOR LIVE DISPLAY NOTES.

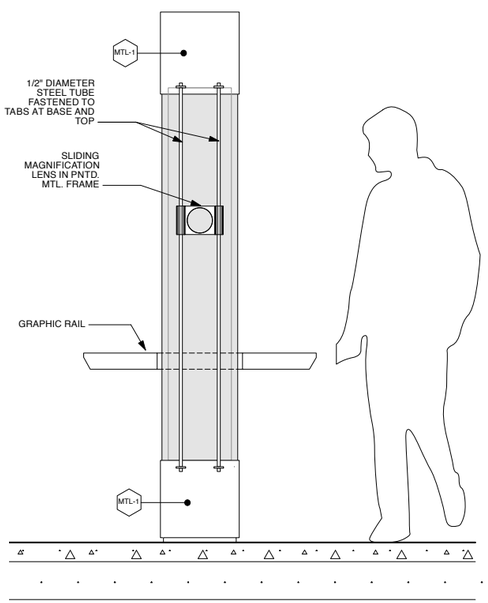
2. LK3.E02.sx01 SEDIMENT CORE TO HAVE SIMILAR DETAILS AS SOUTH BIOTA TUBE FOR RAIL, MICROSCOPE AND SLIDE MAGNIFIER. SEDIMENT CORE PROVIDED BY OWNER & INSTALLED BY X.C.

3. SEE GRAPHICS PACKAGE AND SPECIFICATIONS FOR ADDITIONAL INFO ON GRAPHIC RAILS



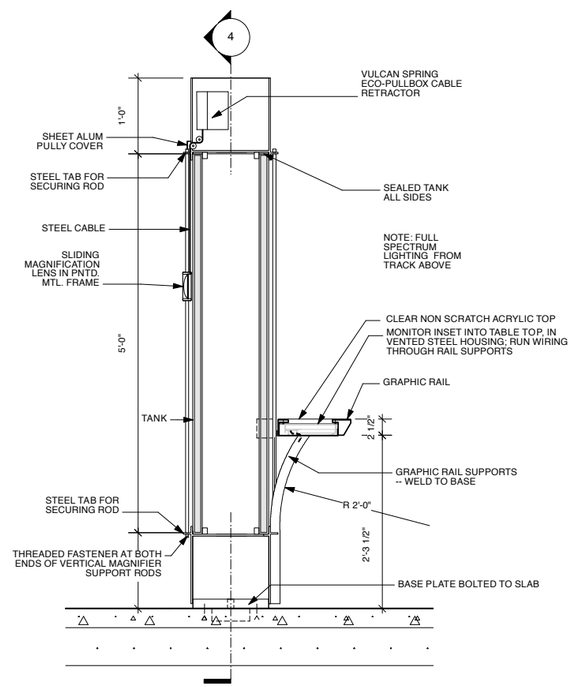
8 PLAN DTL.: SLIDE MAGNIFIER

SCALE: 3"= 1'-0"



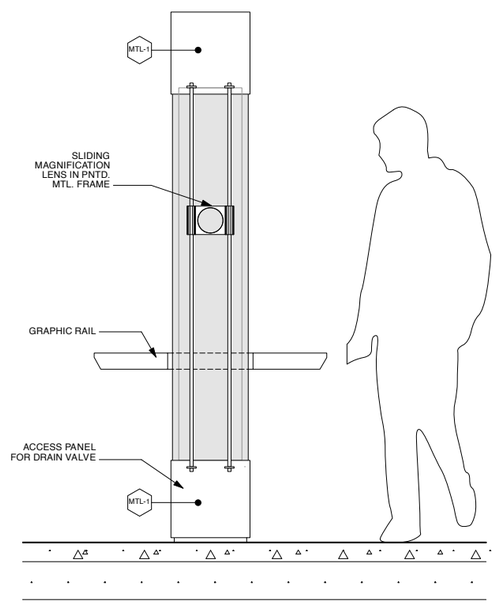
2 ELEVATION: NORTH BIOTA TUBE

SCALE: 1"= 1'-0"



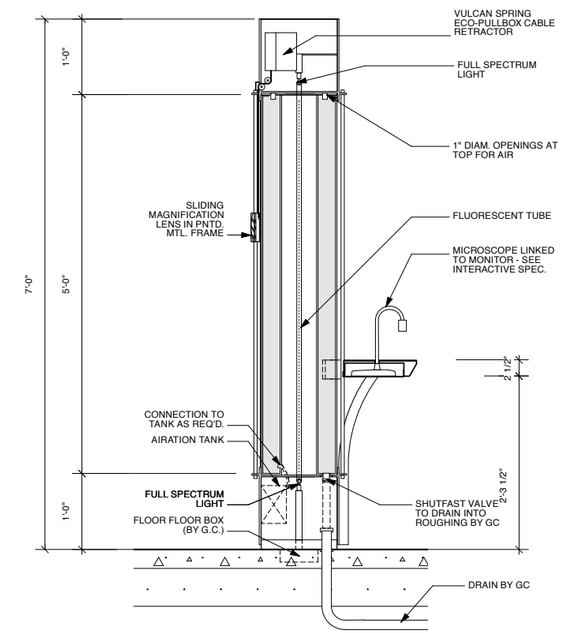
3 SECTION: NORTH BIOTA TUBE

SCALE: 1"= 1'-0"



6 ELEVATION: SOUTH BIOTA TUBE

SCALE: 1"= 1'-0"



7 SECTION: SOUTH BIOTA TUBE

SCALE: 1"= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**

Key Plan

No. / Issue Name / Date

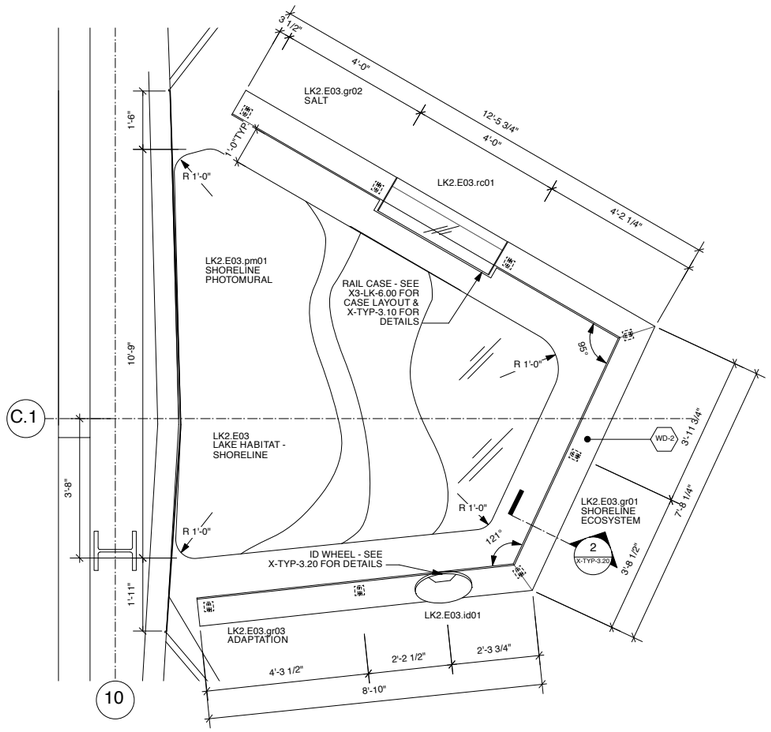
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Details:
Lake, Biota Display

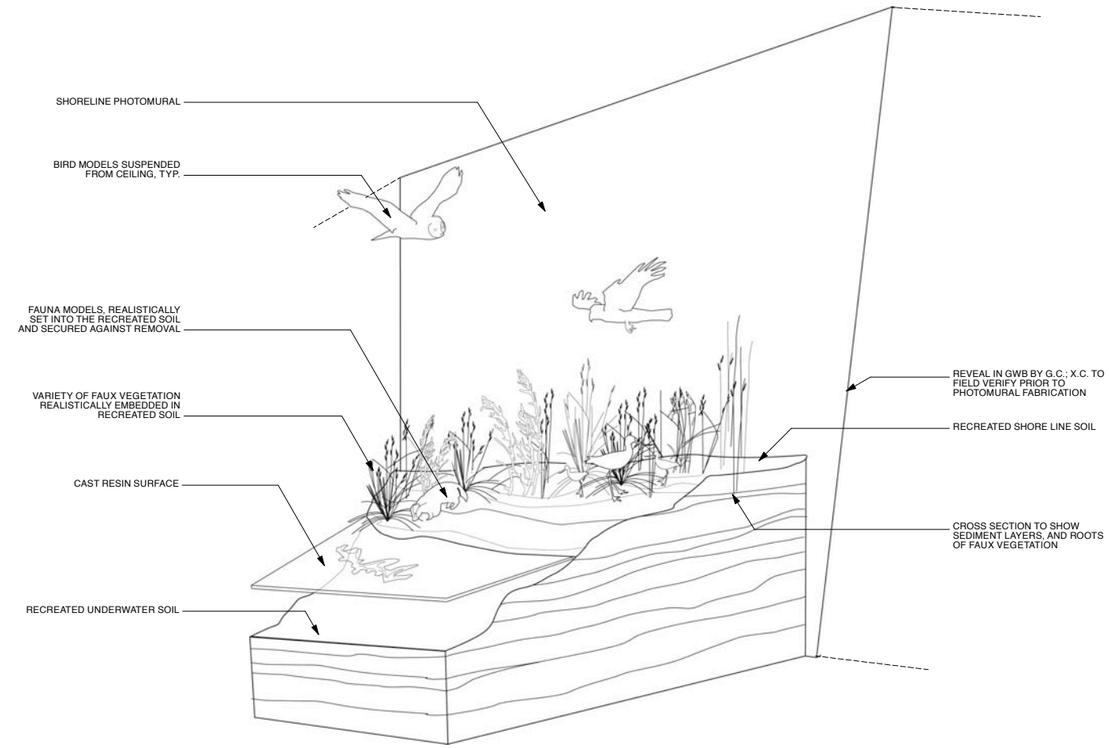
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X3-LK-3.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 SHORELINE DIORAMA PLAN: LK2.E03

SCALE: 1/2"= 1'-0"



2 SHORELINE DIORAMA VIEW: LK2.E03

NOT TO SCALE

NOTES:

1. SEE SPECIFICATIONS FOR DIORAMA NOTES.
2. XC TO PROVIDE SAMPLES OF ALL SURFACES PRIOR TO FABRICATION
3. SEE X-TYP-3.10 & 3.20 FOR TYPICAL RAIL DETAILS
4. SEE GRAPHICS PACKAGE AND SPECIFICATIONS FOR ADDITIONAL INFO ON GRAPHIC RAILS

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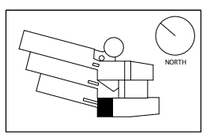


Key Plan

No. / Issue Name / Date

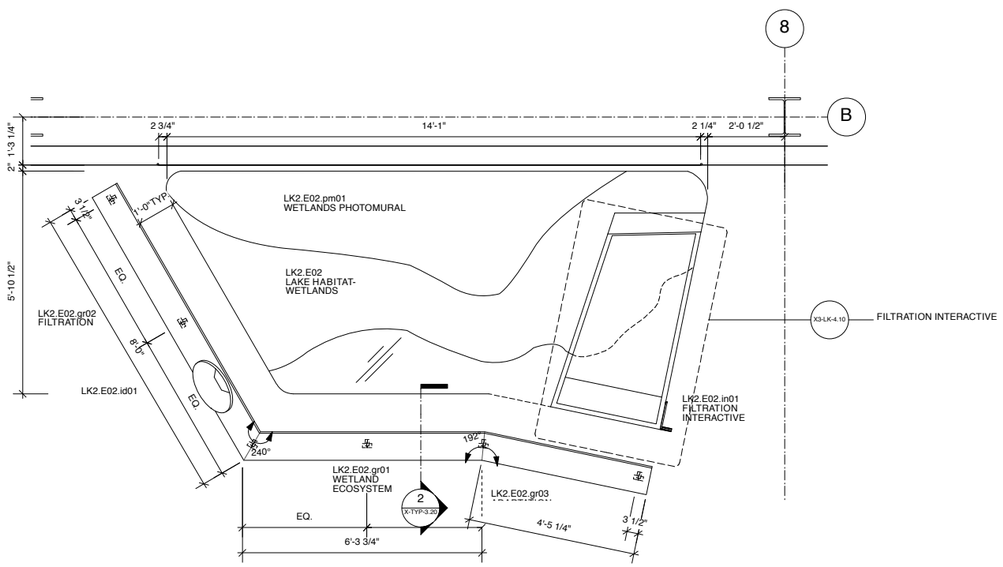
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Details:
Lake, Shoreline Diorama

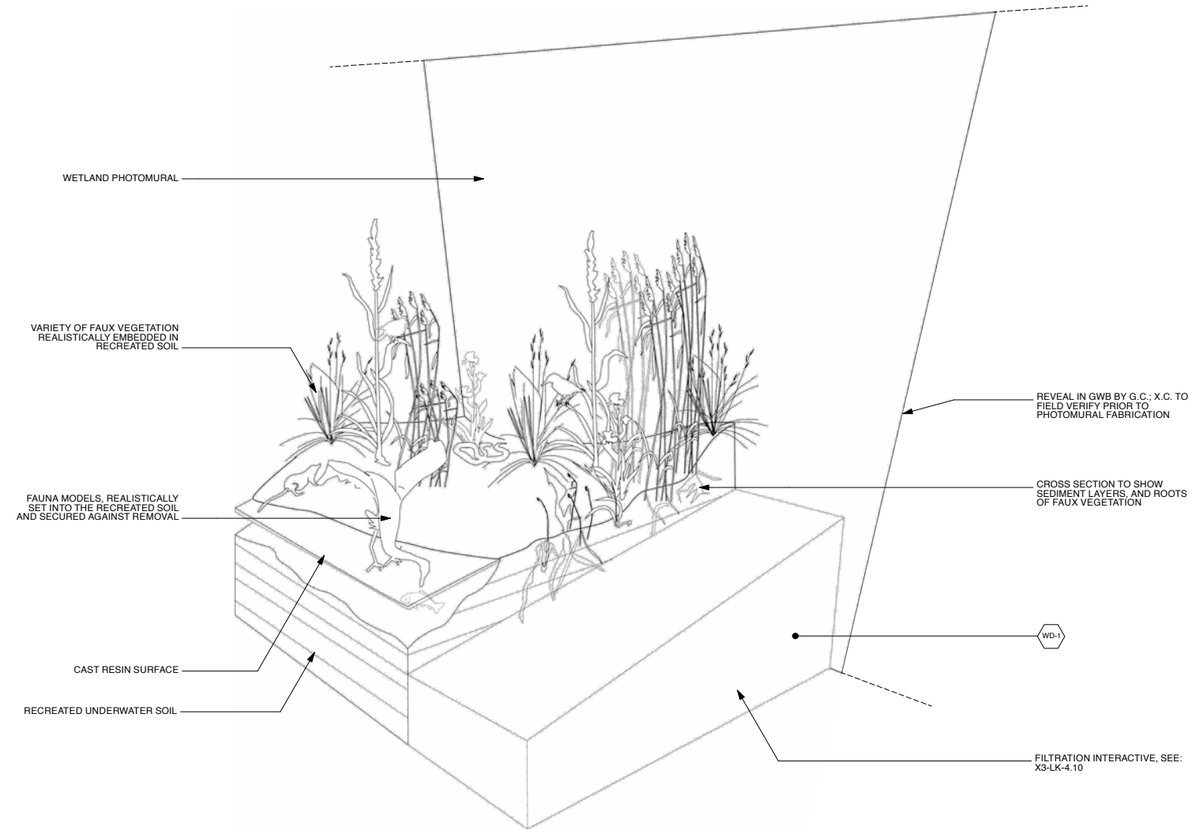
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X3-LK-3.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 WETLANDS DIORAMA PLAN: LK.2.E02

SCALE: 1/2"= 1'-0"



2 WETLANDS DIORAMA VIEW: LK2.E02

NOT TO SCALE

NOTES:

1. SEE SPECIFICATIONS FOR DIORAMA NOTES.
2. X.C. TO PROVIDE SAMPLES OF ALL SURFACES PRIOR TO FABRICATION
3. SEE X-TYP-3.10 & 3.20 FOR TYPICAL RAIL DETAILS
4. SEE GRAPHICS PACKAGE AND SPECIFICATIONS FOR ADDITIONAL INFO ON GRAPHIC RAILS

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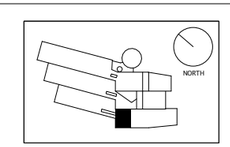


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Details:
Lake, Wetlands / Filtration

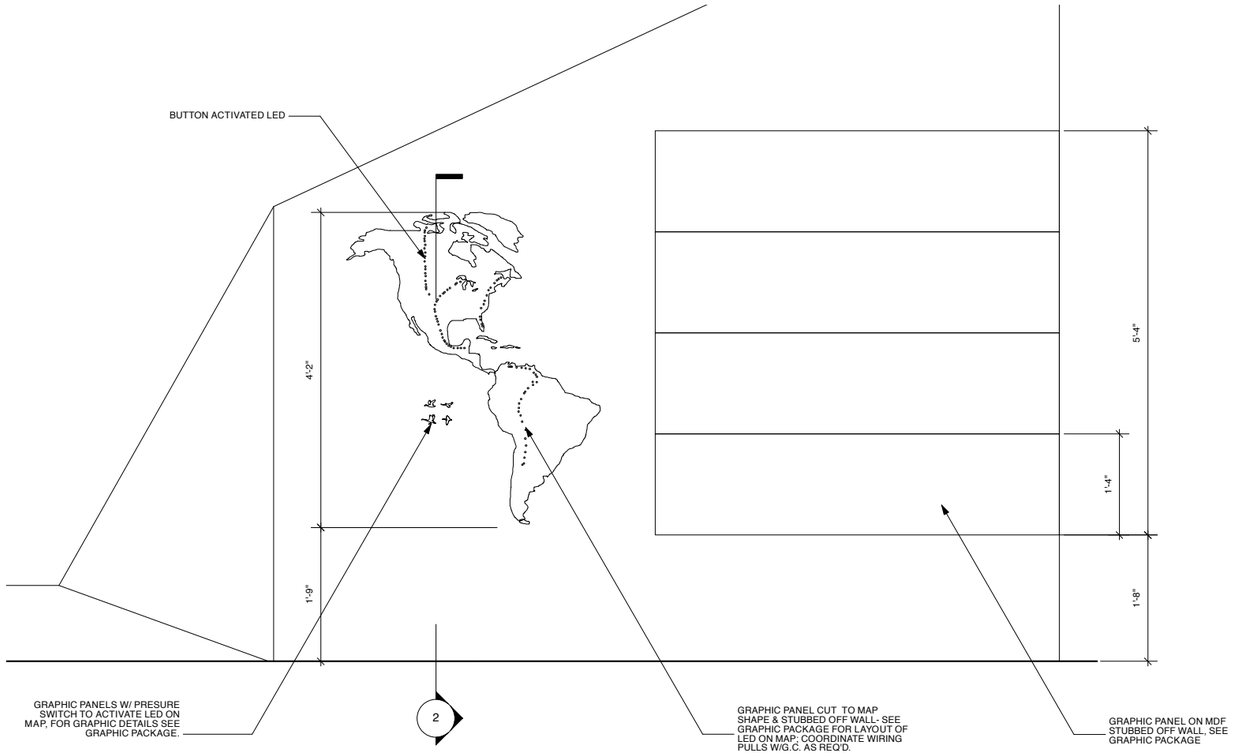
Date
April 2, 2009

Scale*
As Noted

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750

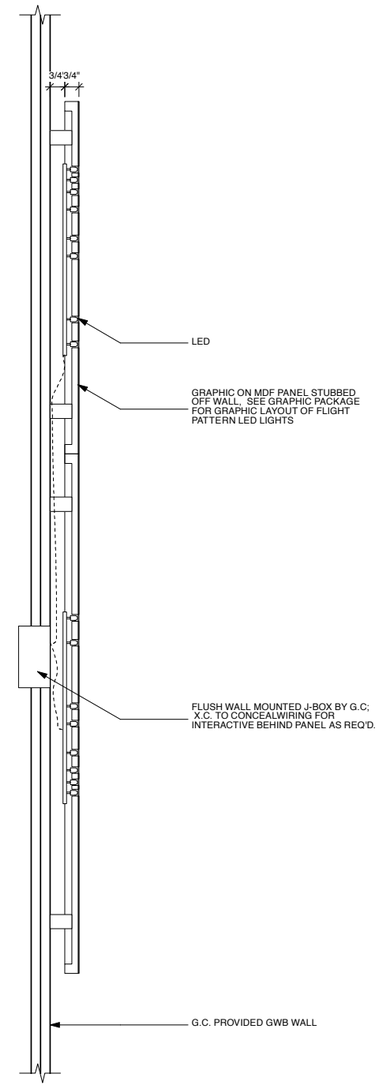
Sheet No.
X3-LK-3.11

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **ELEVATION: LK2.E04.in01 MIGRATIONS**

SCALE: 1/2"= 1'-0"



2 **DETAIL**

SCALE: 3"= 1'-0"

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Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
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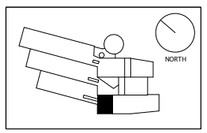


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Details:
Lake, Migrations

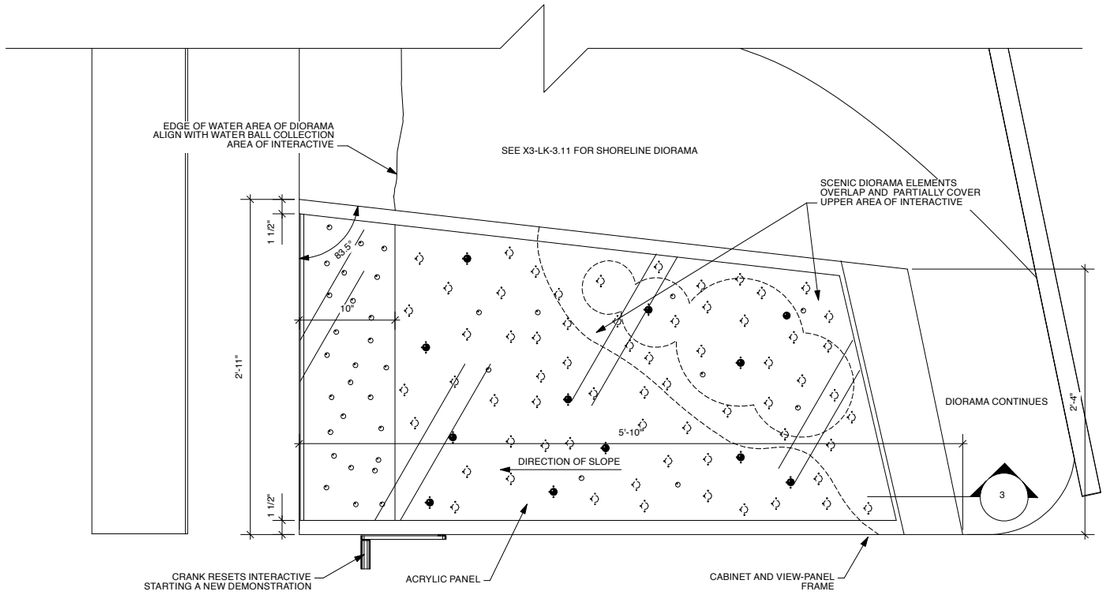
Date
April 2, 2009

Scale*
As Noted

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

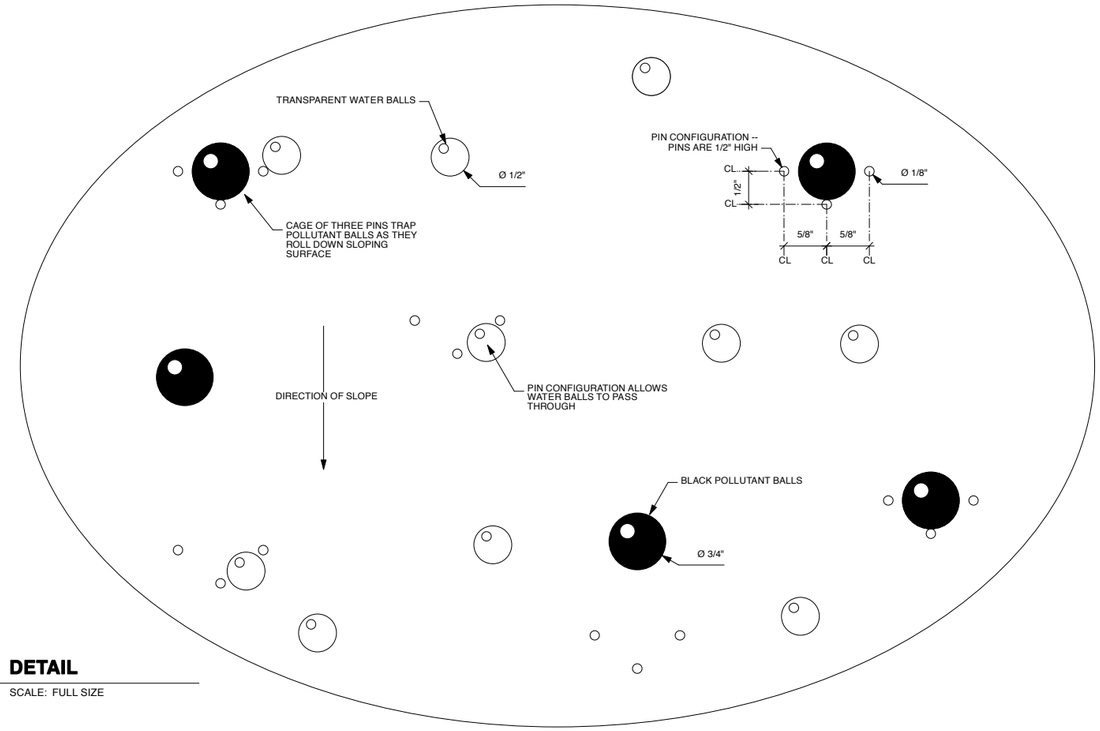
X3-LK-3.12

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



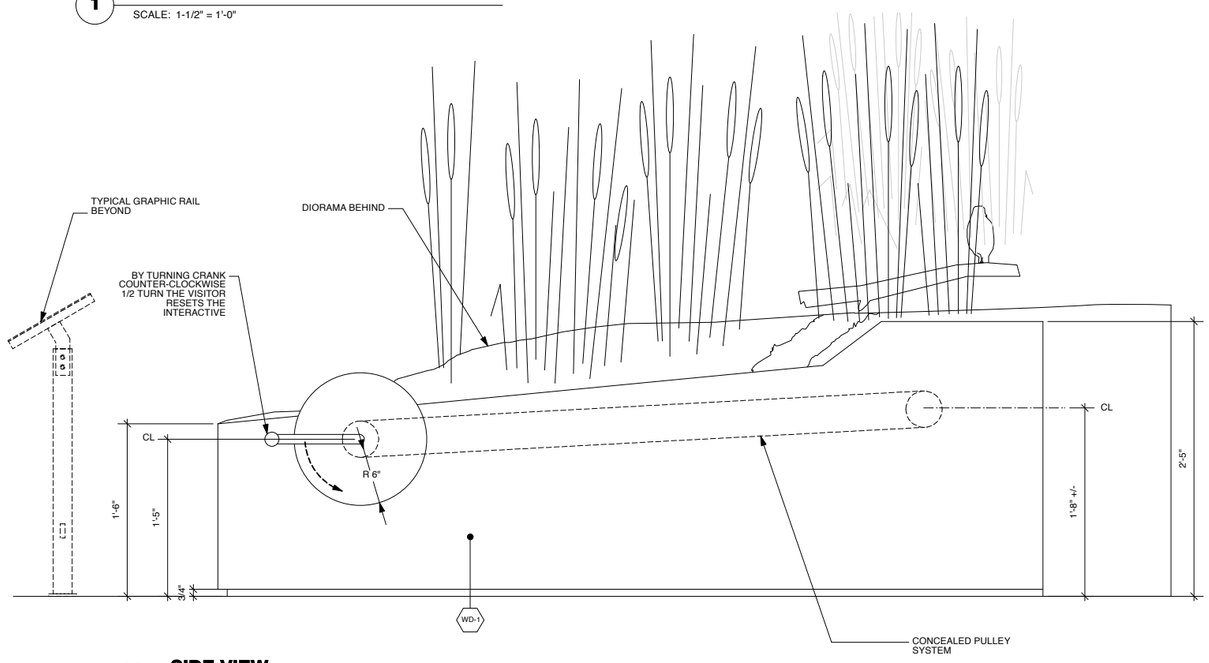
1 PLAN LK2.EO2.in01

SCALE: 1-1/2" = 1'-0"



4 DETAIL

SCALE: FULL SIZE

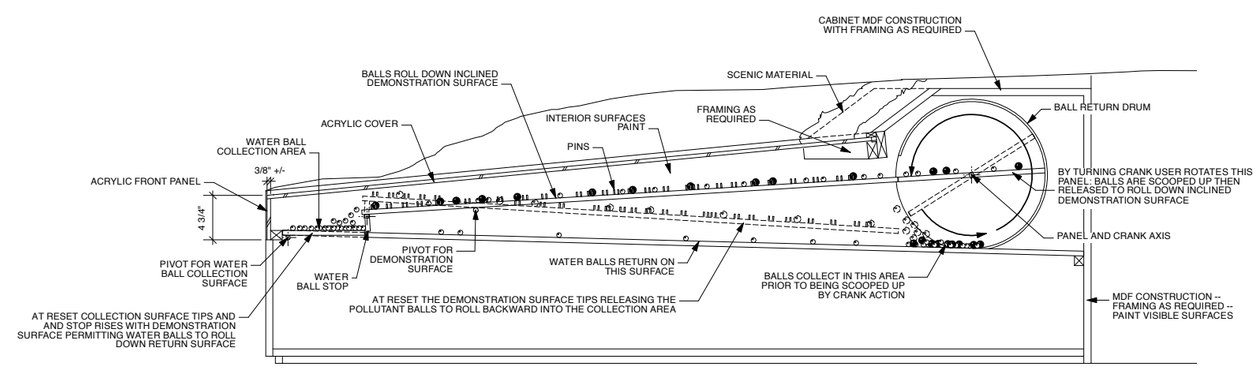


2 SIDE VIEW

SCALE: 1-1/2" = 1'-0"

NOTES:

1. MECHANICAL IDEAS SHOWN INDICATE DESIGN INTENT ONLY -- EXHIBIT FABRICATOR TO ENGINEER INTERACTIVE FOR SMOOTH OPERATION AND FOR A FUNCTIONAL LIFE SPAN OF 15 YEARS



3 SECTION

SCALE: 1-1/2" = 1'-0"

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Exhibit Construction

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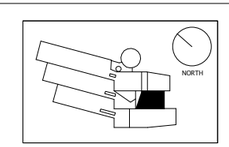


Key Plan

No. / Issue Name / Date

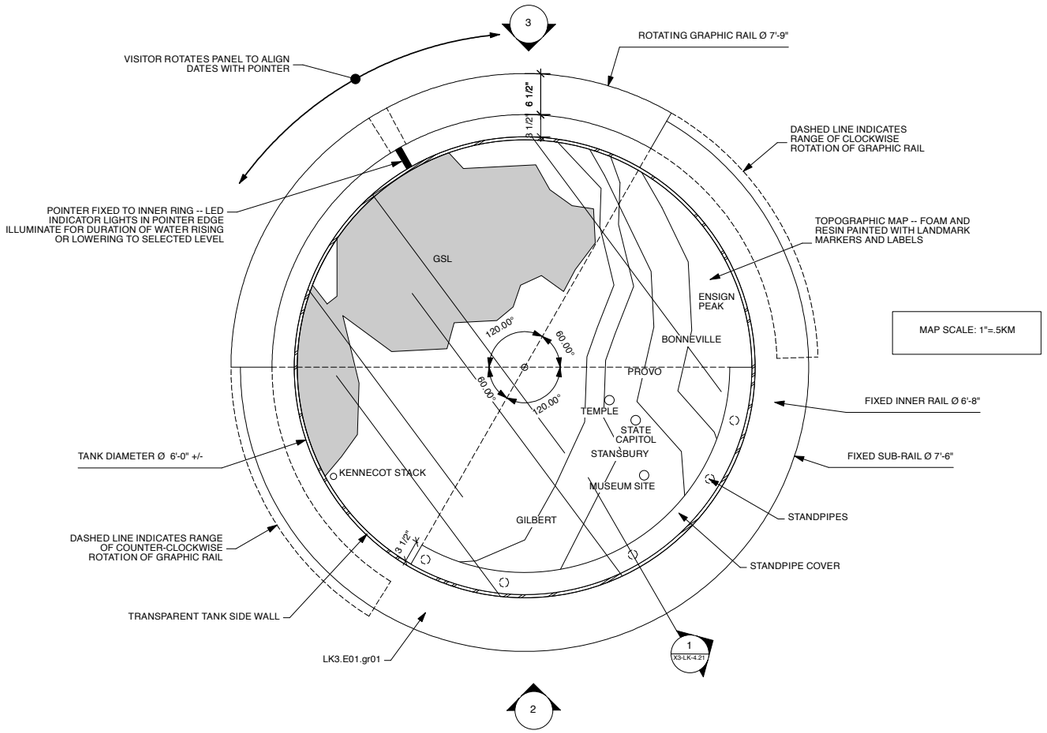
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Interactives:
Lake, Wetland Filtration

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X3-LK-4.10

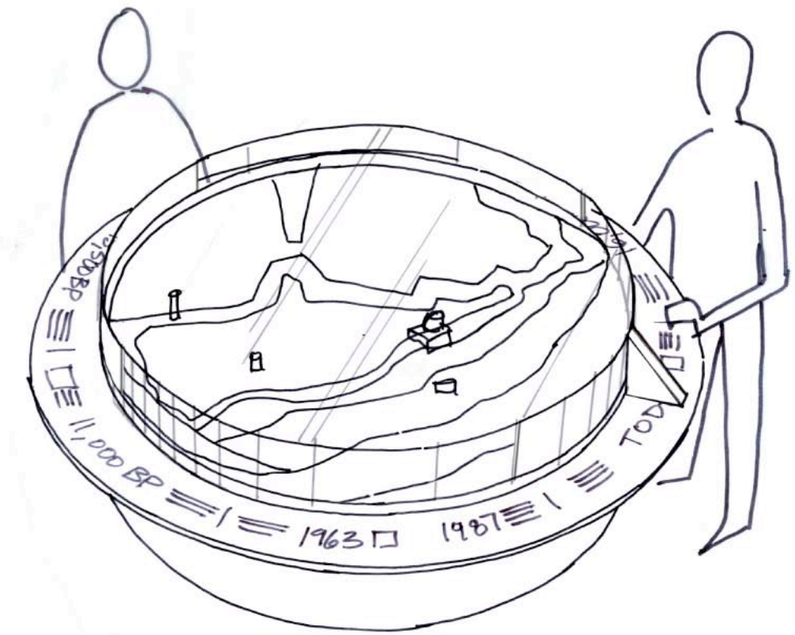
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



MAP SCALE: 1"=.5KM

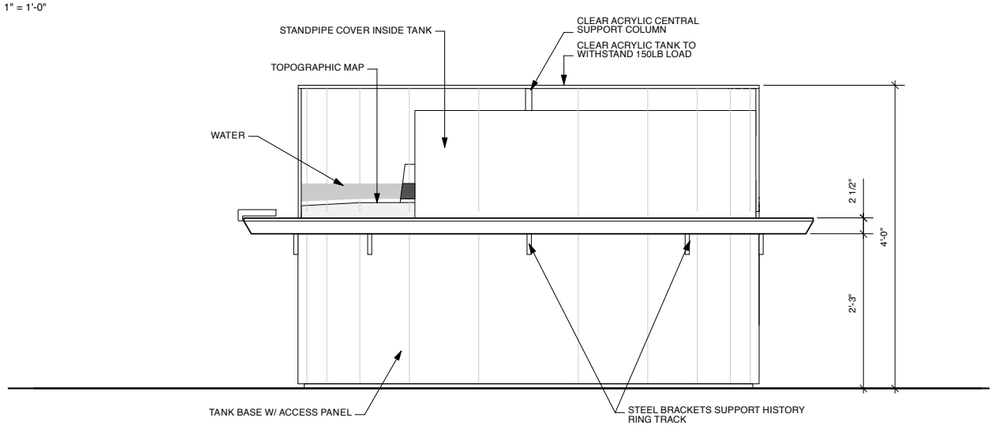
1 PLAN LK3.EO1.in01

SCALE: 1" = 1'-0"



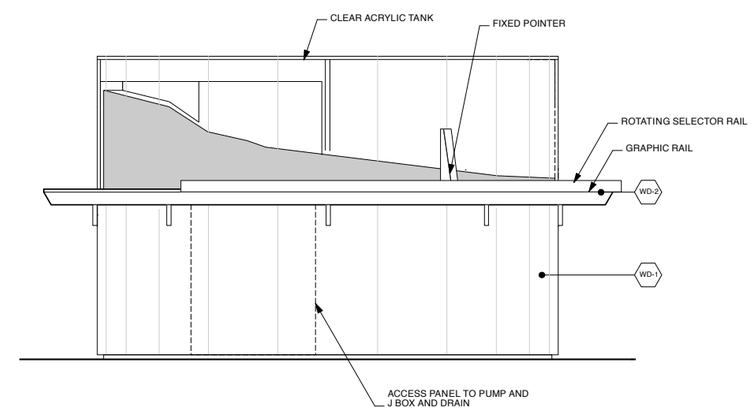
4 SKETCH

SCALE: NTS



2 ELEVATION

SCALE: 1" = 1'-0"



3 ELEVATION

SCALE: 1" = 1'-0"

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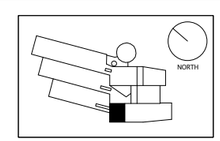


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Interactives:
Lake, Lake Formation

Date
April 2, 2009

Scale*
As Noted

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X3-LK-4.20

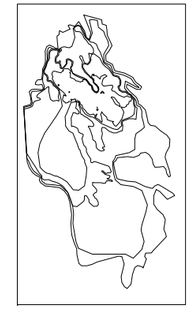
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

TOPO MAP/LAKE LEVEL INFORMATION

ELEVATIONS:

• GSL HISTORIC LOW	4191'	(1963)
• GSL HISTORIC HIGH	4212.2'	(1986)
	4220'	(AIRPORT)
• GILBERT	4250'	(GILBERT MALL)
	4320'	(SL TEMPLE)
• STANSBURY	4500'	
	4530'	(STATE CAPITOL)
• PROVO	4860'	(MARRIOT LIBRARY, STUDENT UNION)
	TBD	(NEW UMNH SITE)
• BONNEVILLE	5230'	
	TBD	("BLOCK U")
	5410'	(ENSIGN PEAK)
	5555'	(KENNECOT STACK)

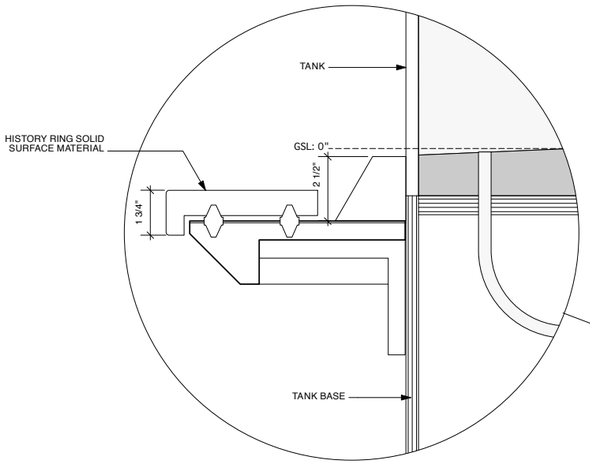
SOURCE: EMAIL FROM HOLLEY GODSEY TO HANA ELWELL
JAN 31, 2008 -- INCLUDED ILLUSTRATOR SHORELINE MAP



APPROXIMATE AGE IN CALENDAR YEARS BEFORE PRESENT

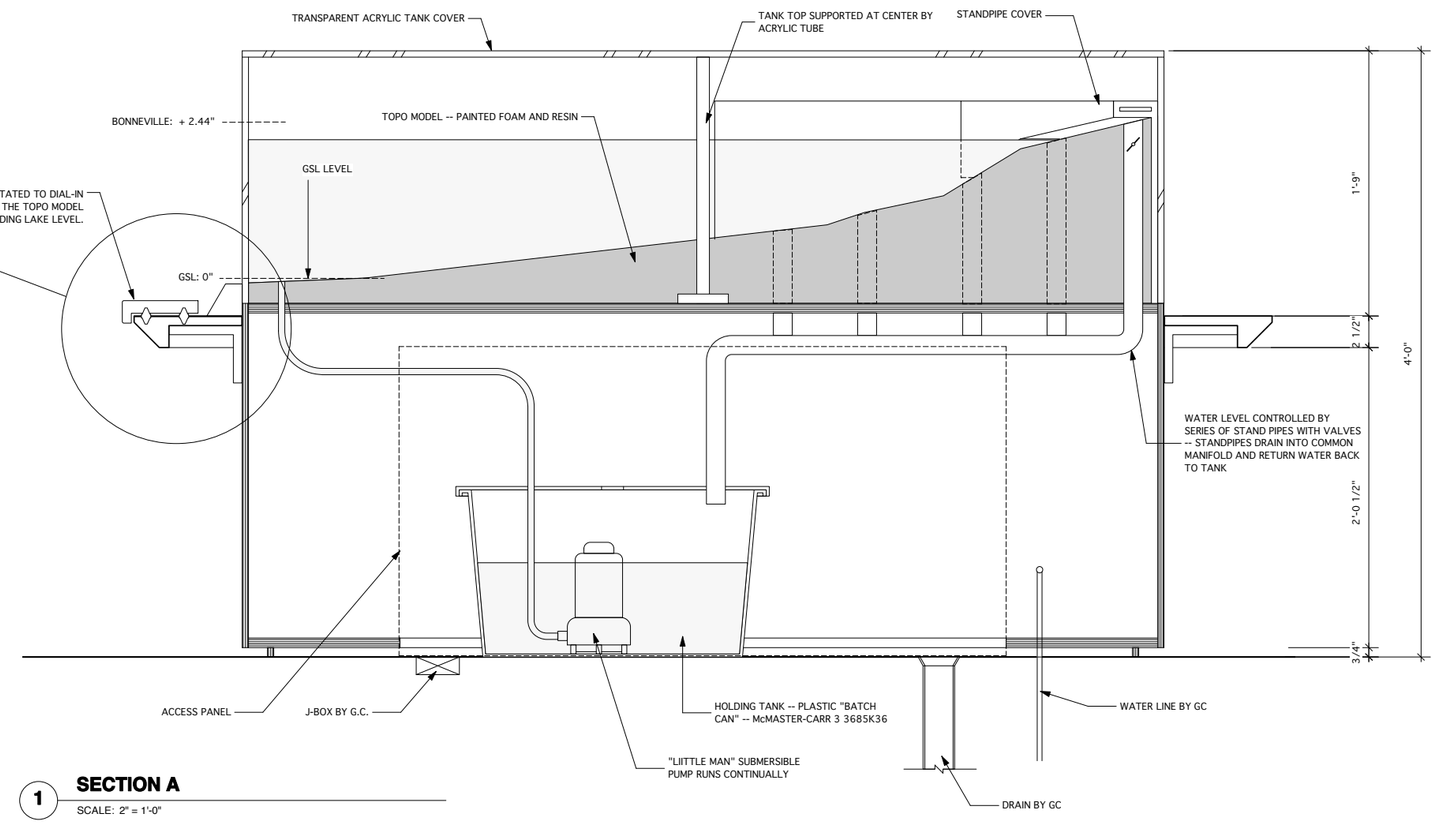
• GILBERT	4,275	12,800 - 11,600
• PROVO	4,840	16,800 - 16,200
• BONNEVILLE	5,220	18,000 - 16,800
• STANSBURY	4,445	24,400 - 23,200

INTERNET SOURCE: GEOLOGY.UTAH.GOV



2 HISTORY RING SUPPORT DETAIL

SCALE: NTS



1 SECTION A

SCALE: 2" = 1'-0"

NOTES:
1. MECHANICAL IDEAS SHOWN ARE INTENDED AS CONCEPTUAL ONLY -- EXHIBIT FABRICATOR TO ENGINEER INTERACTIVE FOR SMOOTH OPERATION AS INTENDED AND FOR A FUNCTIONAL LIFE SPAN OF 15 YEARS.
2. TOPOMODEL SHOWN @12X EXAGGERATION IN HEIGHT (THIS MAY NEED TO BE UP TO 10X) TO BE CONFIRMED W/ PROTOTYPING + SPEC. OF PUMP.

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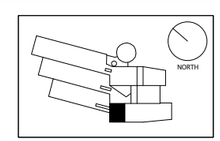
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

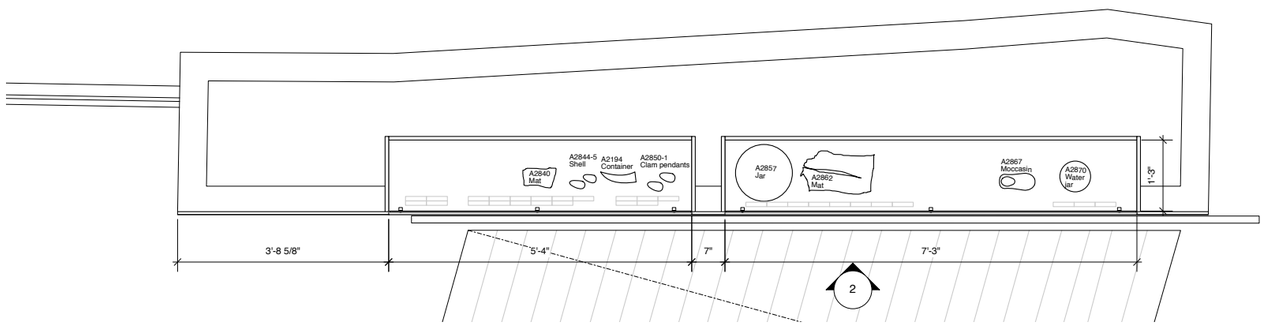
Sheet Title
Interactives:
Lake, Formation

Date
April 2, 2009

Scale*
varies

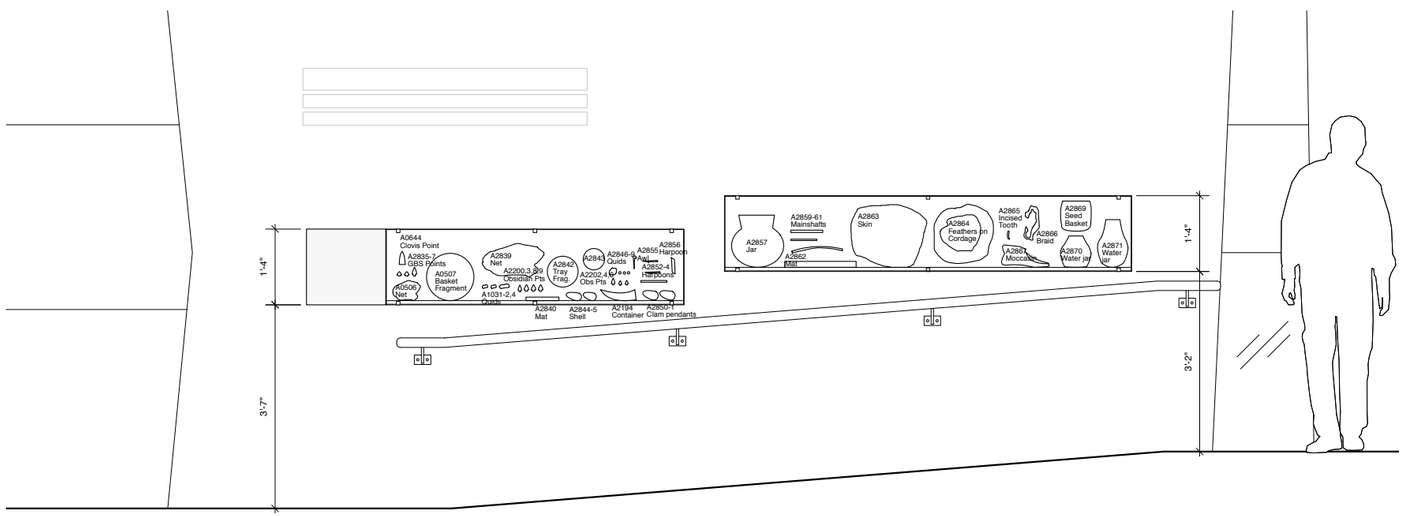
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X3-LK-4.21

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

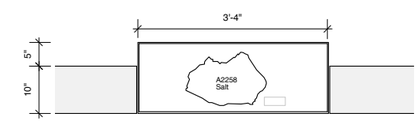


1 **PLAN: LK2.EO5.ic01 (People and the lake)**
SCALE: 3/4"= 1'-0"

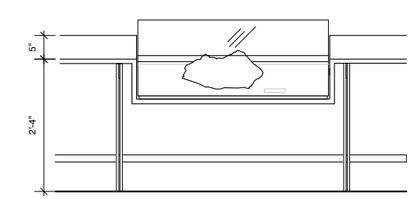
2 **PLAN: LK2.EO5.ic02 (People and the lake)**
SCALE: 3/4"= 1'-0"



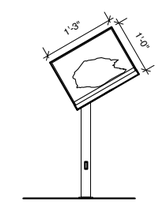
3 **ELEVATION**
SCALE: 3/4"= 1'-0"



4 **DEVELOPED PLAN: LK2.EO3.rc01 (Salt Crystal)**
SCALE: 3/4"= 1'-0"



5 **DEVELOPED ELEVATION**
SCALE: 3/4"= 1'-0"



6 **SECTION**
SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-2.00/3.00 FOR INSET AND RAIL CASE DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

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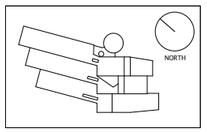


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Inset Case Layouts: Lake
LK2.EO5.ic01/ic02, LK2.EO3.rc01

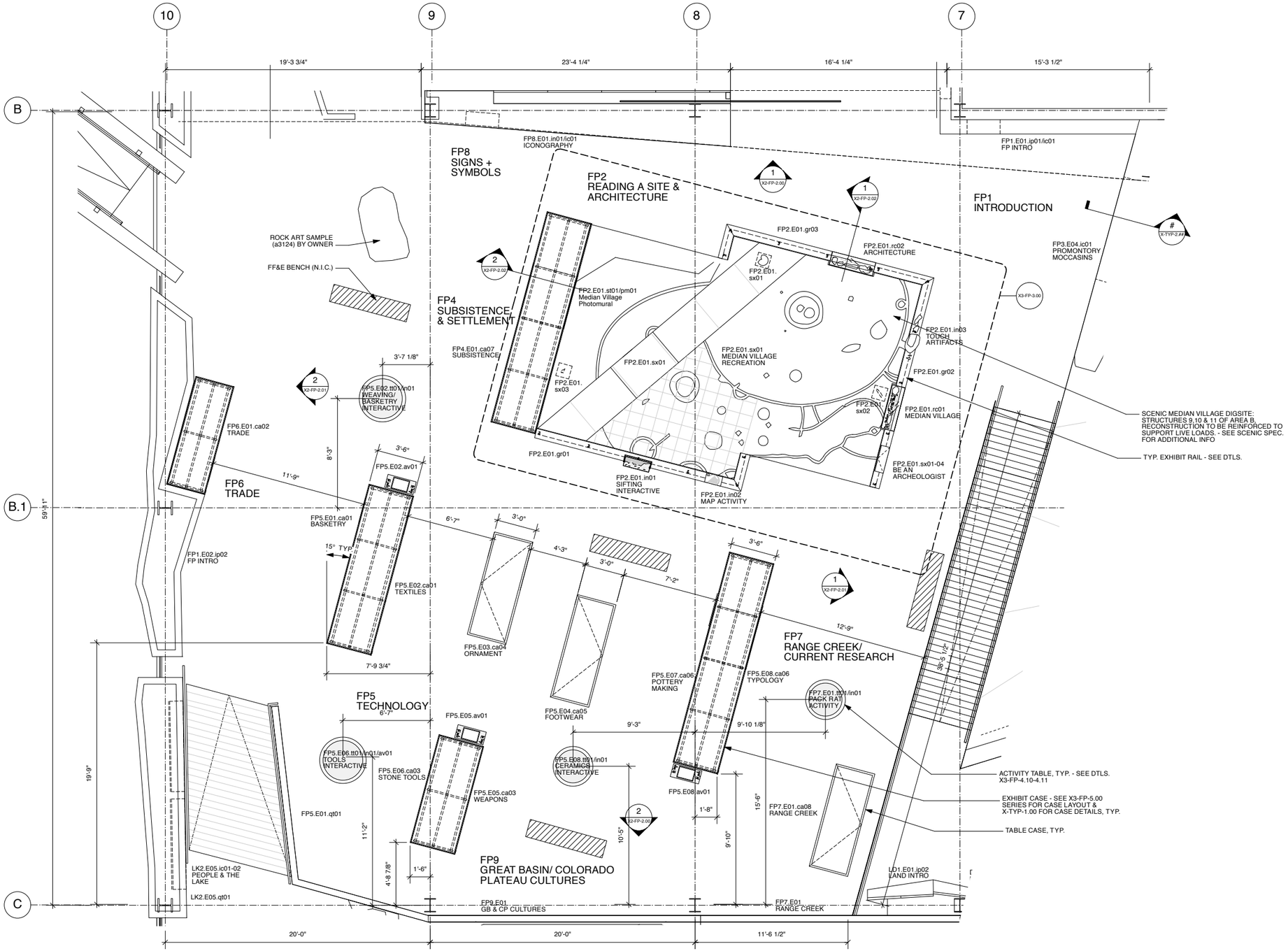
Date
April 2, 2009

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750

Scale*
3/4"=1'-0"

Sheet No.
X3-LK-6.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



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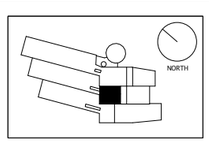


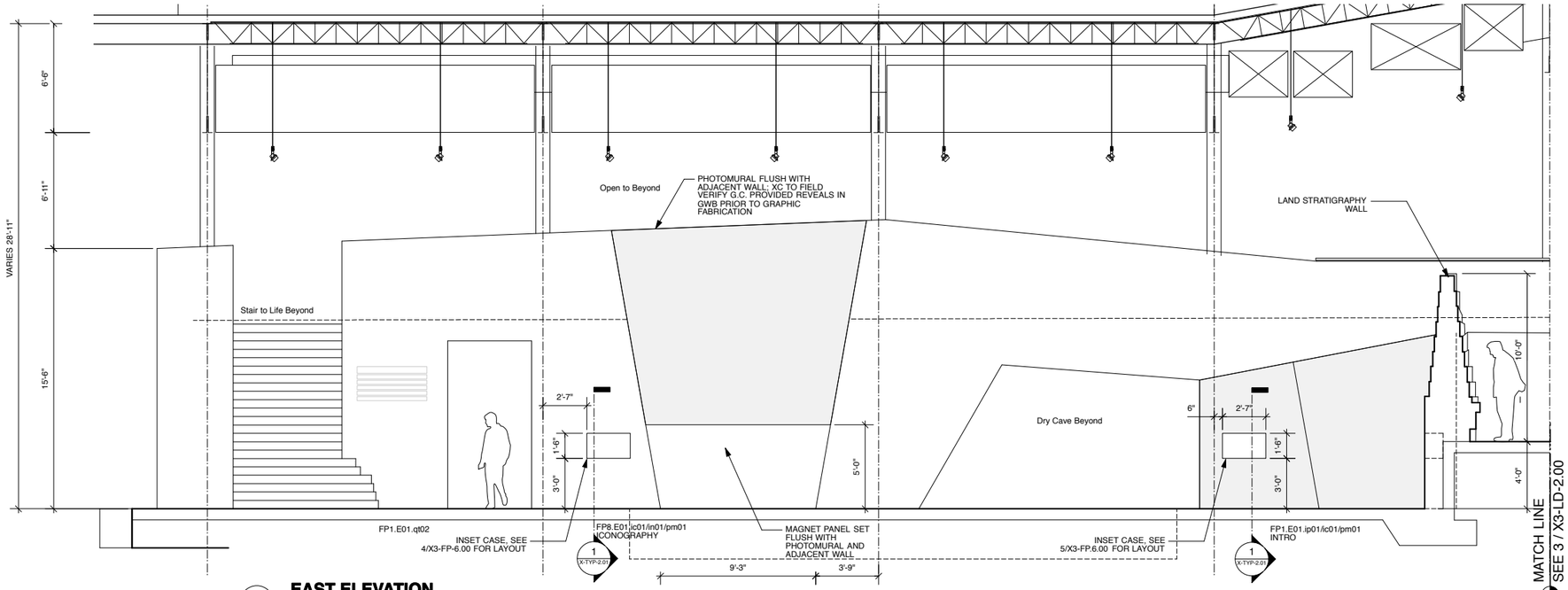
Key Plan

No. / Issue Name / Date	No. / Issue Name / Date
June 22, 2007	100% Final Design April 2, 2009

Sheet Title
Partial Plan:
First Peoples

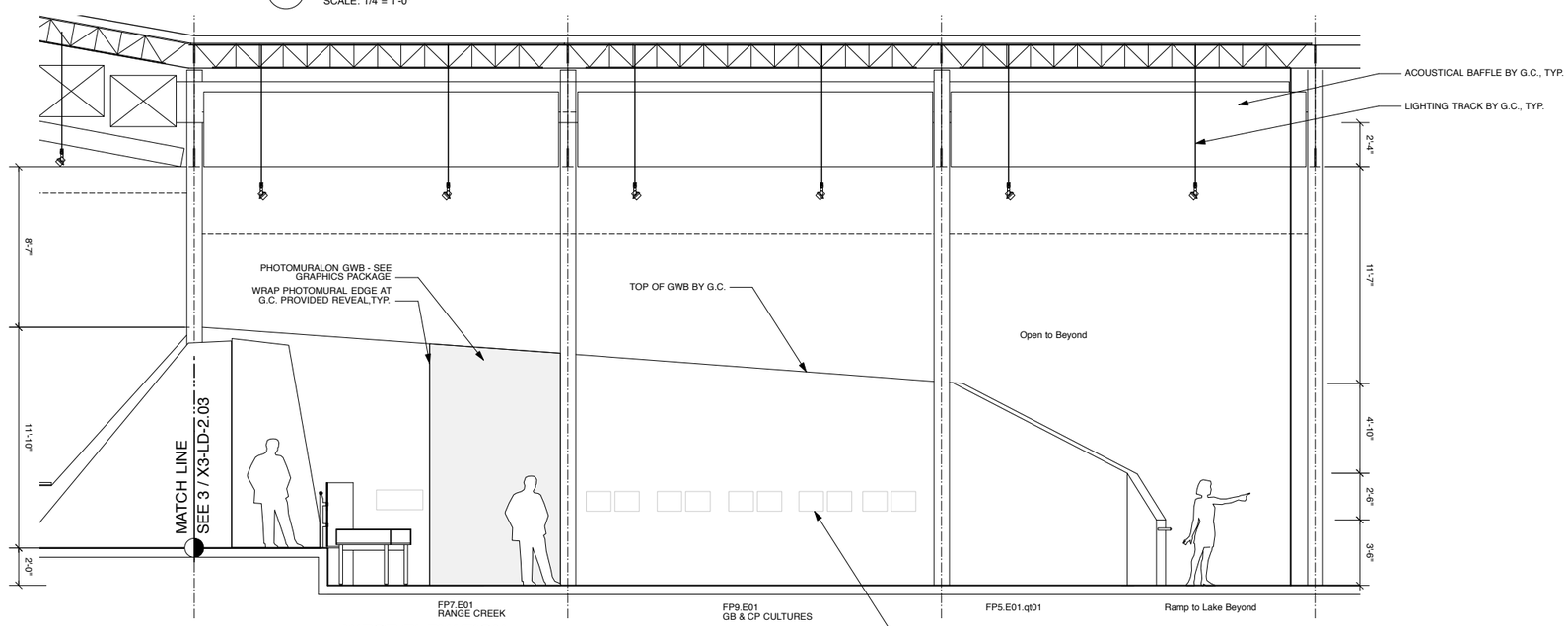
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 0224375 0
Scale*	Sheet No.
1/4"=1'-0"	X3-FP-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 EAST ELEVATION

SCALE: 1/4"= 1'-0"



2 WEST ELEVATION

SCALE: 1/4"= 1'-0"

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Exhibit Construction

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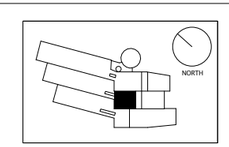


Key Plan

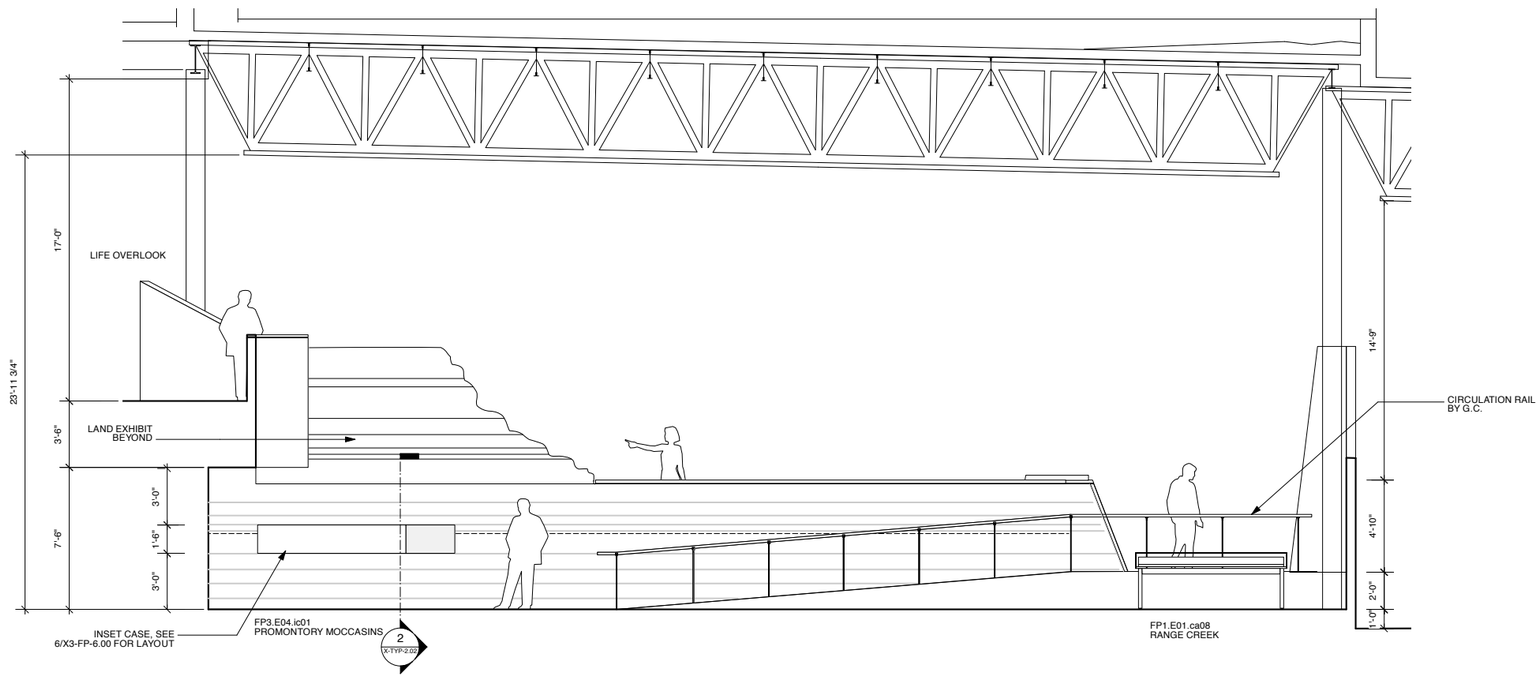
No. / Issue Name / Date	No. / Issue Name / Date
June 22, 2007	100% Final Design April 2, 2009

Sheet Title

Elevations & Sections: First Peoples

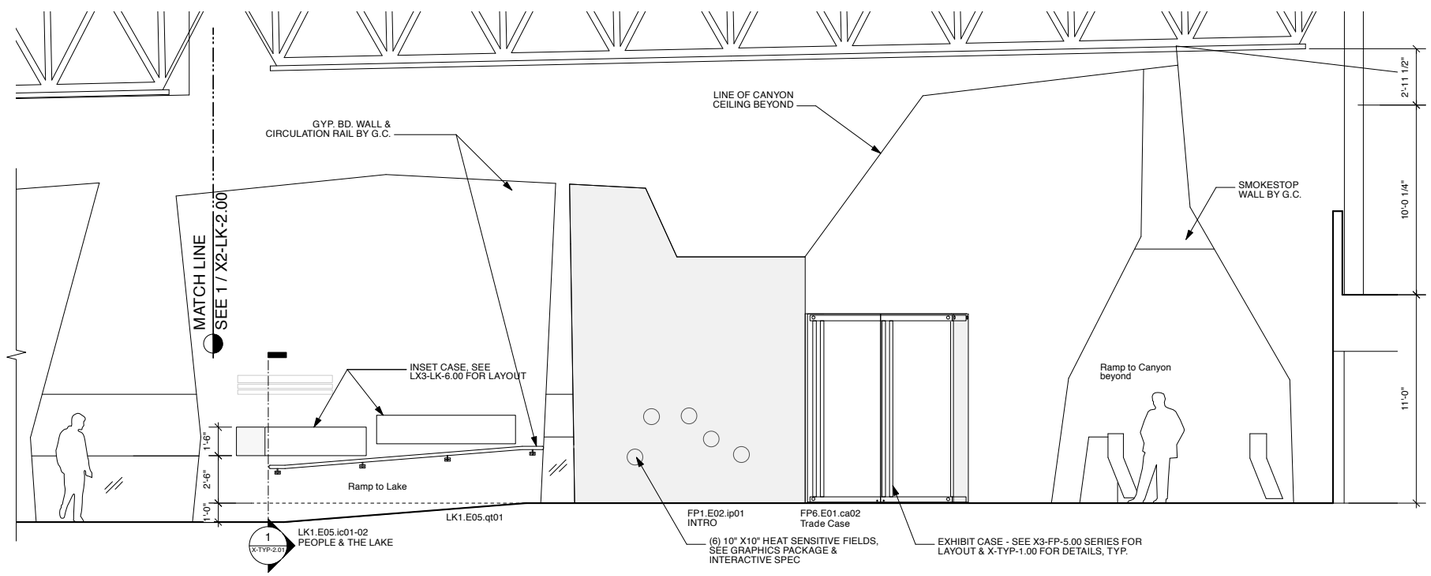
Date April 2, 2009	RAA Project No. 0275 U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale* 1/4"=1'-0"	Sheet No. X2-FP-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 ELEVATION LOOKING SOUTH

SCALE: 1/4"= 1'-0"



2 ELEVATION LOOKING NORTH

SCALE: 1/4"= 1'-0"

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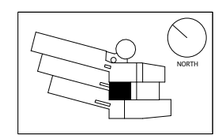


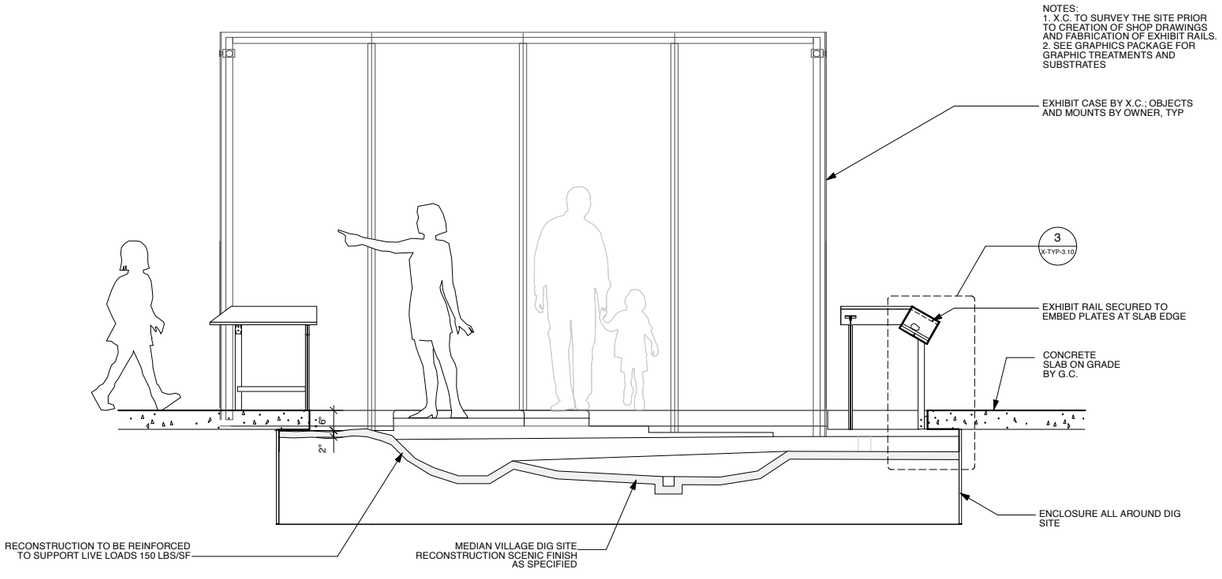
Key Plan

No. / Issue Name / Date	No. / Issue Name / Date
June 22, 2007	100% Final Design April 2, 2009

Sheet Title
Elevations & Sections:
First Peoples

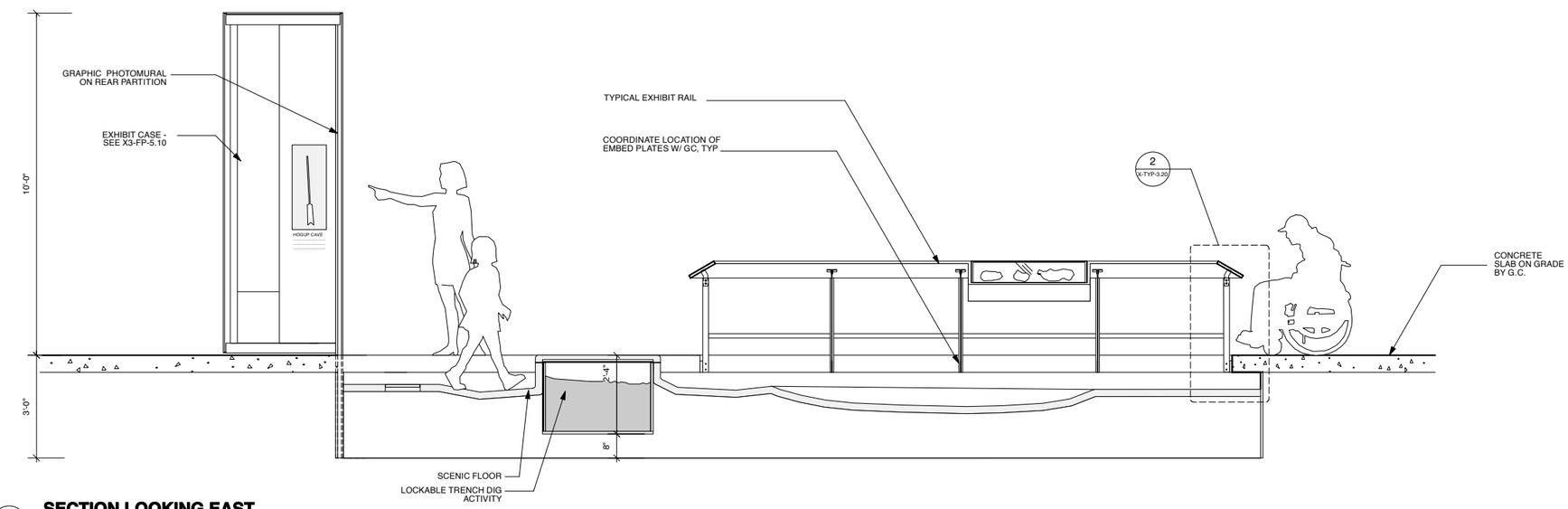
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X3-FP-2.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 SECTION LOOKING NORTH

SCALE: 1/2"= 1'-0"



2 SECTION LOOKING EAST

SCALE: 1/2"= 1'-0"

NOTES:

1. X.C. TO SURVEY THE SITE PRIOR TO CREATION OF SHOP DRAWINGS AND FABRICATION OF EXHIBIT RAILS.
2. SEE GRAPHICS PACKAGE FOR GRAPHIC TREATMENTS AND SUBSTRATES

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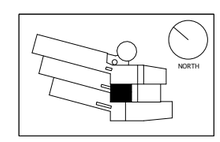


Key Plan

No. / Issue Name / Date

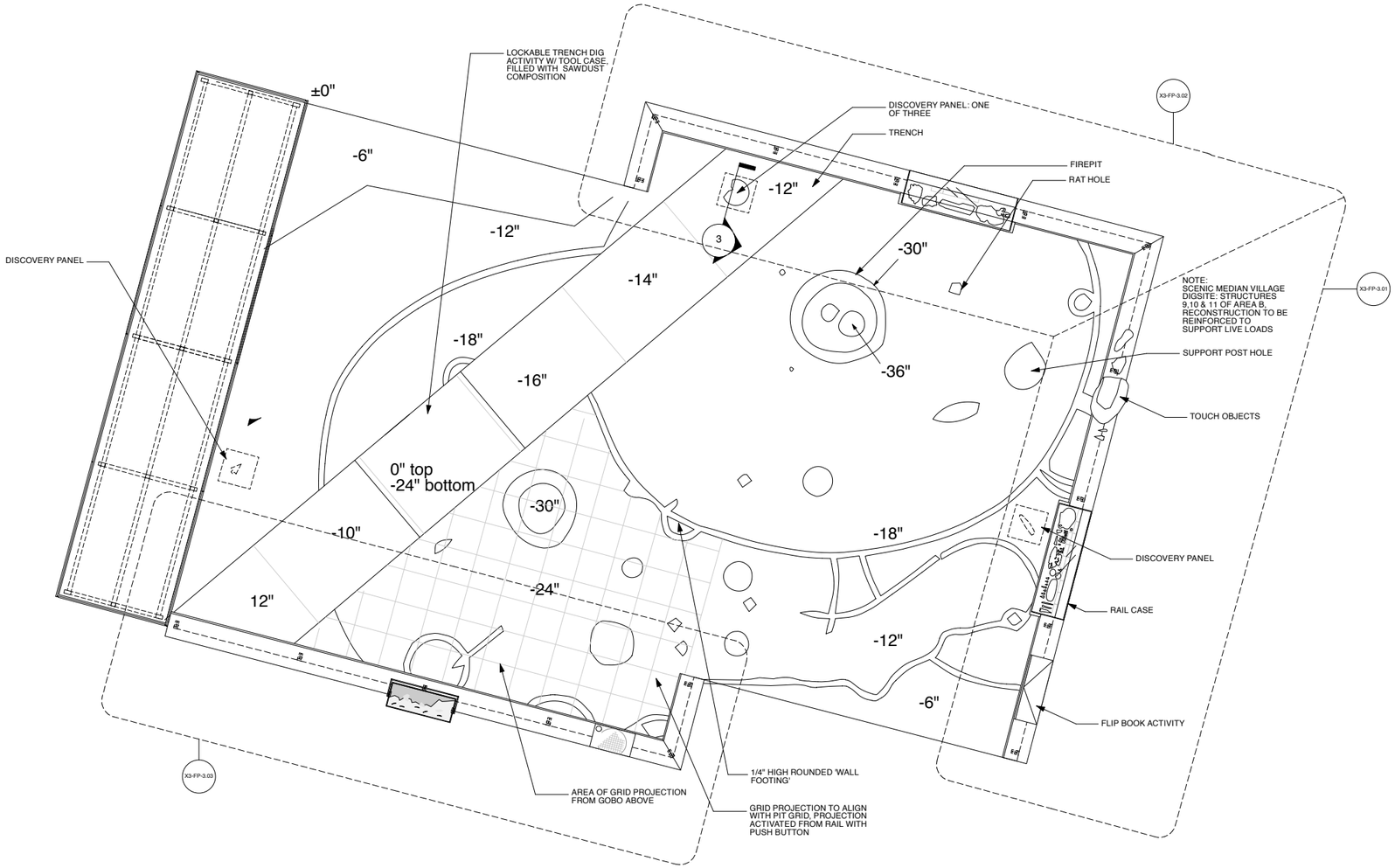
100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Elevations & Sections:
First Peoples

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/2"=1'-0"	X2-FP-2.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



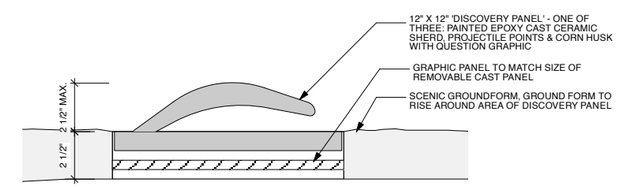
1 **PLAN MEDIAN VILLAGE RAIL DTL. - FP2.E01.gr03**

SCALE: 1/2"= 1'-0"

NOTE: MODEL SHOWS DESIGN INTENT FOR MODULATION OF SCENIC GROUND FORM, SEE PLAN FOR TRENCH LOCATION AND SPECIFICATION FOR AREA B REFERENCE IMAGES

2 **MEDIAN VILLAGE REFERENCE IMAGE**

SCALE: NTS



3 **MV DISCOVERY PANEL**

SCALE: 3" = 1'-0"

NOTES:

1. X.C. TO SURVEY THE SITE PRIOR TO CREATION OF SHOP DRAWINGS AND FABRICATION OF EXHIBIT RAILS.

2. SEE GRAPHICS PACKAGE FOR GRAPHIC TREATMENTS AND SUBSTRATES.

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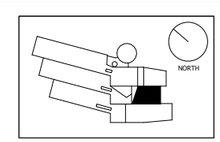


Key Plan

No. / Issue Name / Date

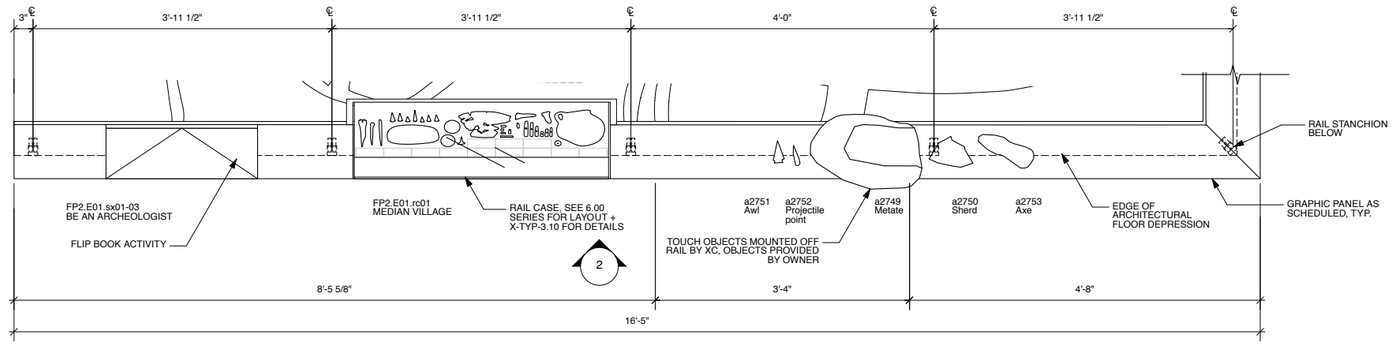
100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Details:
First Peoples, Median Village

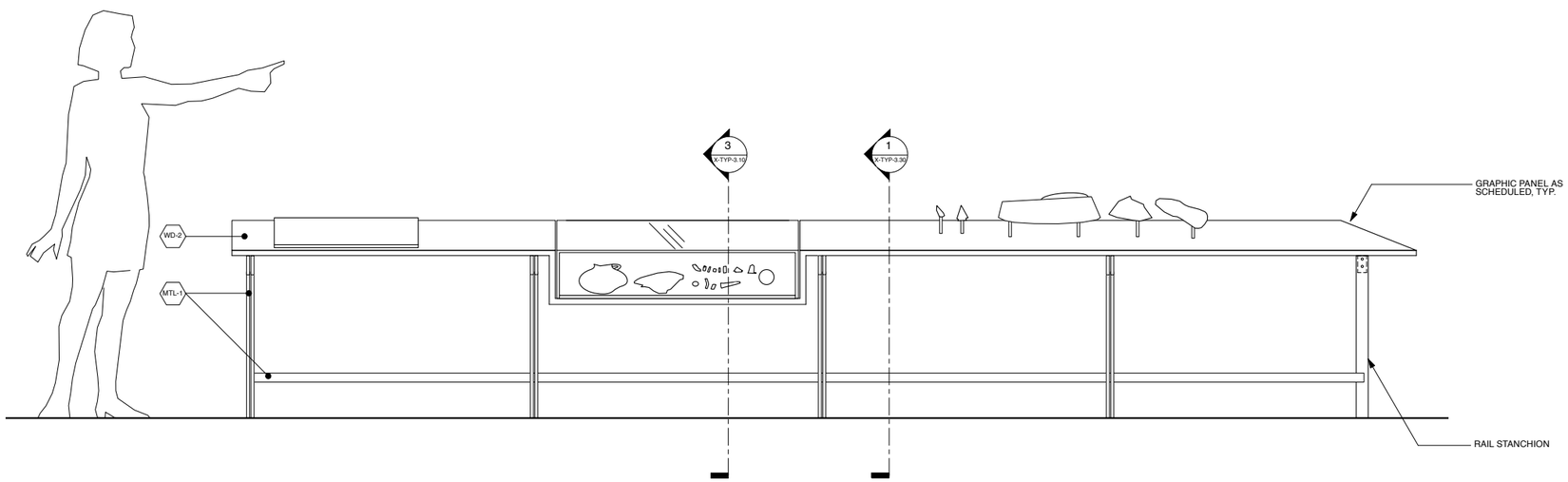
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X3-FP-3.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 PLAN MEDIAN VILLAGE RAIL DTL. - FP2.E01.gr02

SCALE: 1"= 1'-0"



2 ELEVATION MEDIAN VILLAGE RAIL - FP2.E01.gr02

SCALE: 1"= 1'-0"

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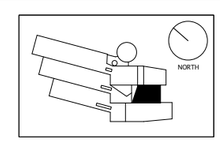


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

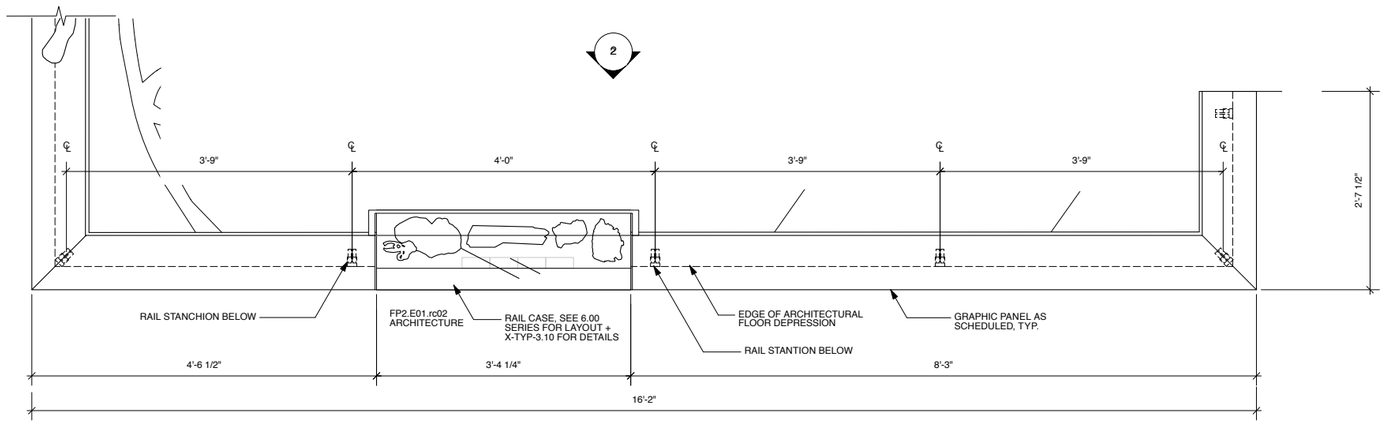
Sheet Title
Details:
First Peoples, Median Village Rails

Date
April 2, 2009

Scale*
1"= 1'-0"

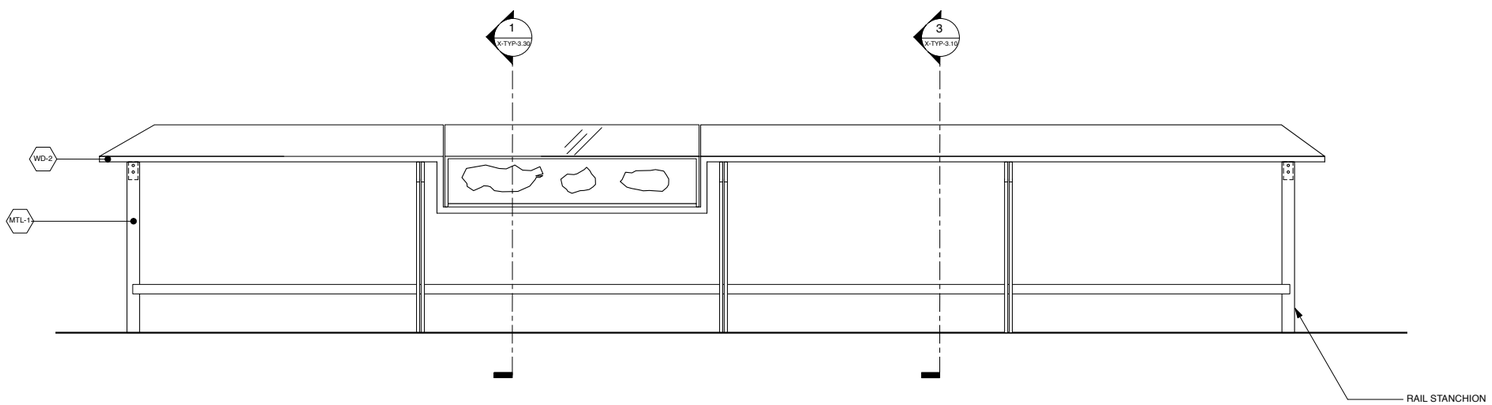
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X3-FP-3.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 PLAN MEDIAN VILLAGE RAIL DTL. - FP2.E01.gr03

SCALE: 1"= 1'-0"



2 ELEVATION MEDIAN VILLAGE RAIL DTL. - FP2.E01.gr03

SCALE: 1"= 1'-0"

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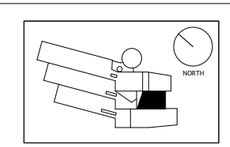
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

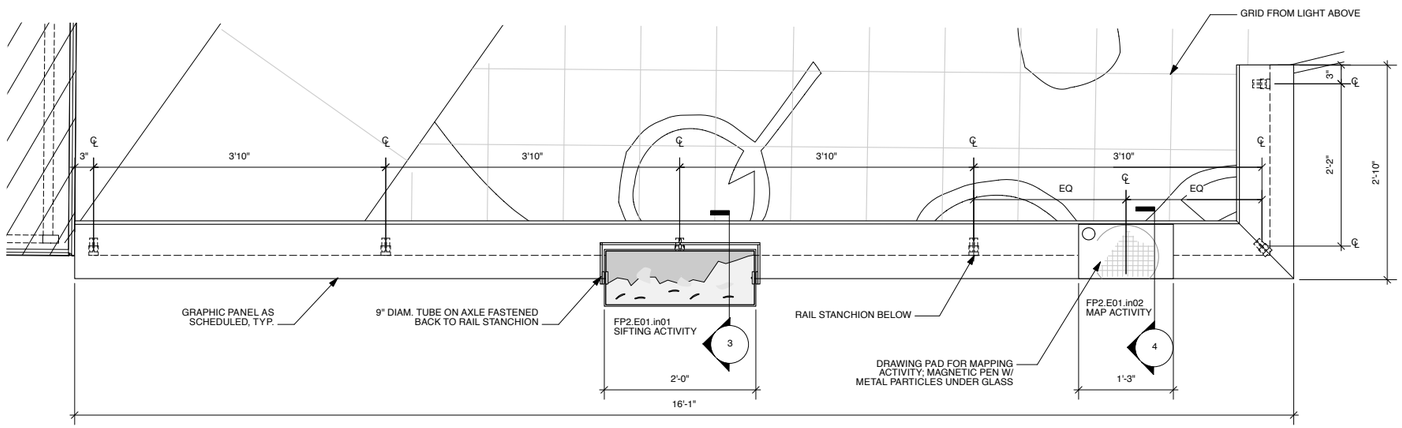
Sheet Title
Details:
First Peoples, Median Village Rails

Date
April 2, 2009

Scale*
1"= 1'-0"

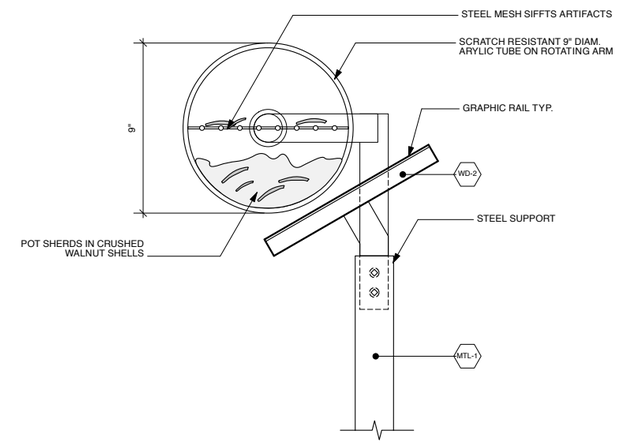
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X3-FP-3.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



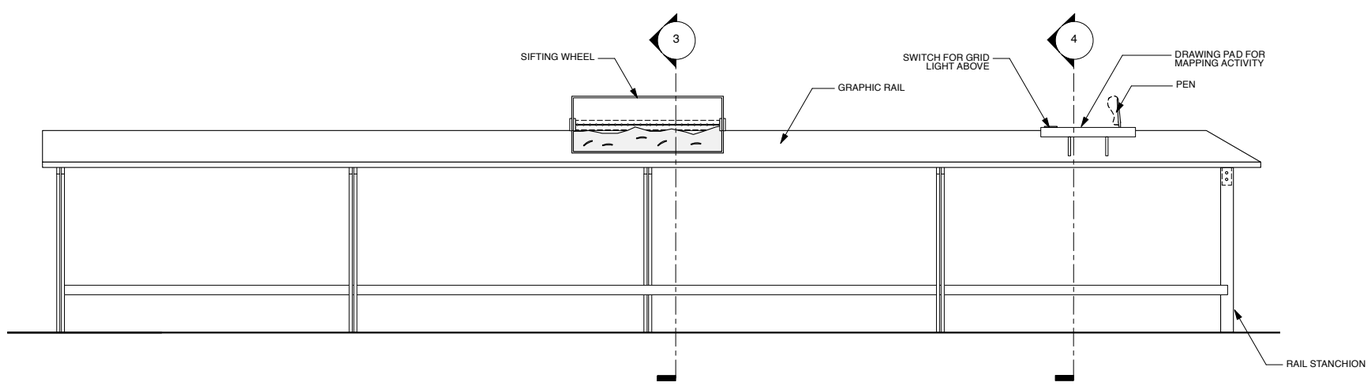
1 PLAN MEDIAN VILLAGE RAIL DTL. - FP2.E01.gr01

SCALE: 1"= 1'-0"



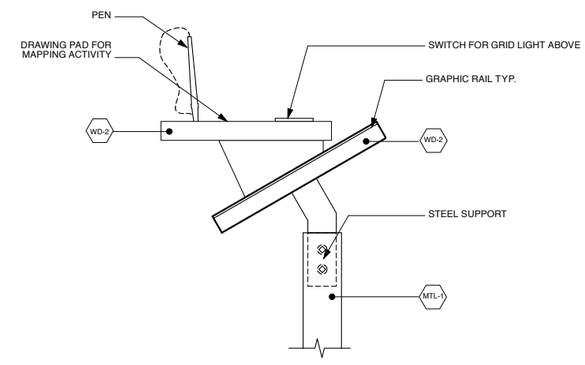
3 SECTION DTL. SIFTING ACTIVITY

SCALE: 3"= 1'-0"



2 ELEVATION MEDIAN VILLAGE RAIL - FP2.E01.gr01

SCALE: 1"= 1'-0"



4 SECTION DTL. MAPPING ACTIVITY

SCALE: 3"= 1'-0"

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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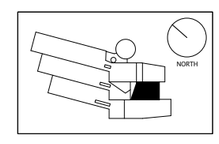


Key Plan

No. / Issue Name / Date

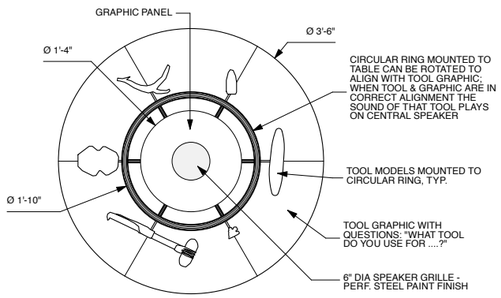
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Details:
First Peoples, Median Village Rails

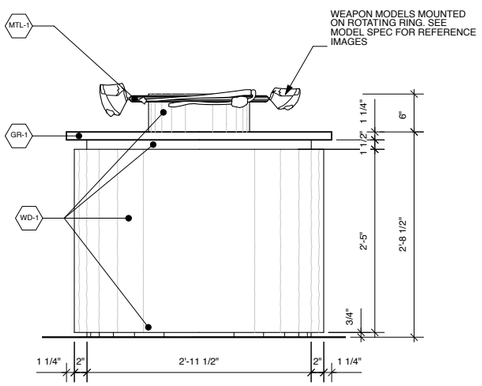
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X3-FP-3.03

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



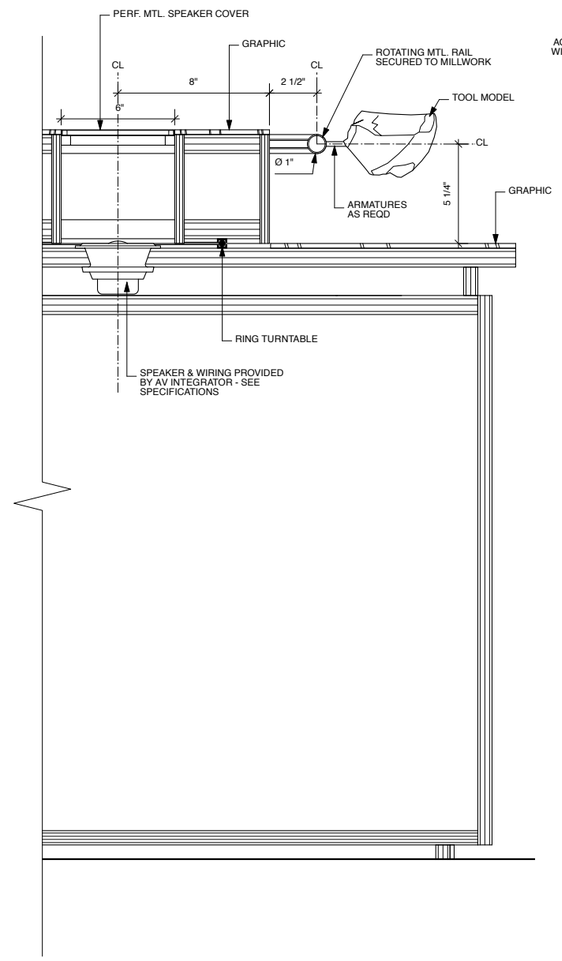
1 FP5.E06.in01 PLAN TOOLS INTERACTIVE

SCALE: 1"= 1'-0"



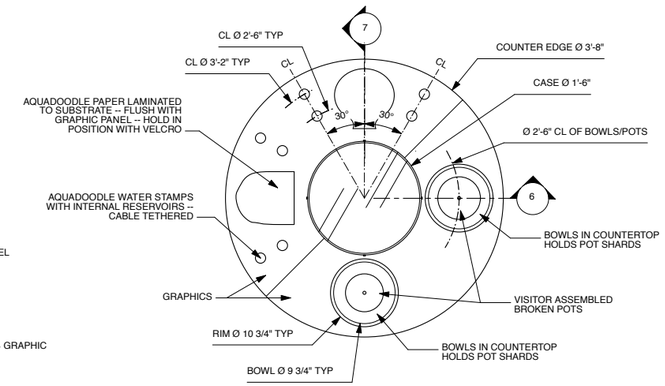
2 ELEVATION: TOOLS

SCALE: 1"= 1'-0"



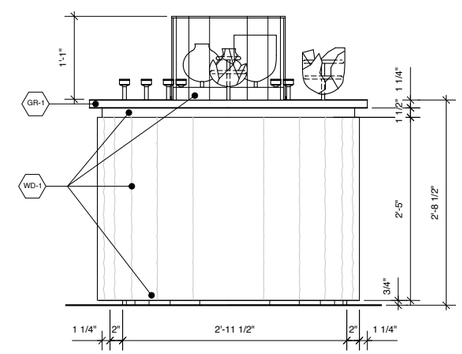
3 TOOLS SECTION DETAIL

SCALE: 3"= 1'-0"



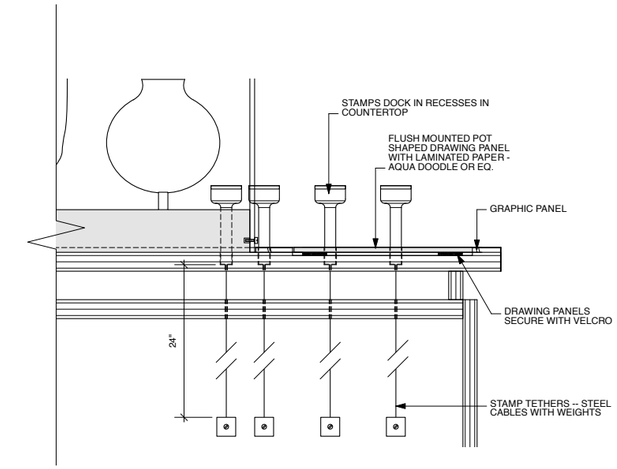
4 FP5.E08.in01 PLAN CERAMICS INTERACTIVE

SCALE: 1"= 1'-0"



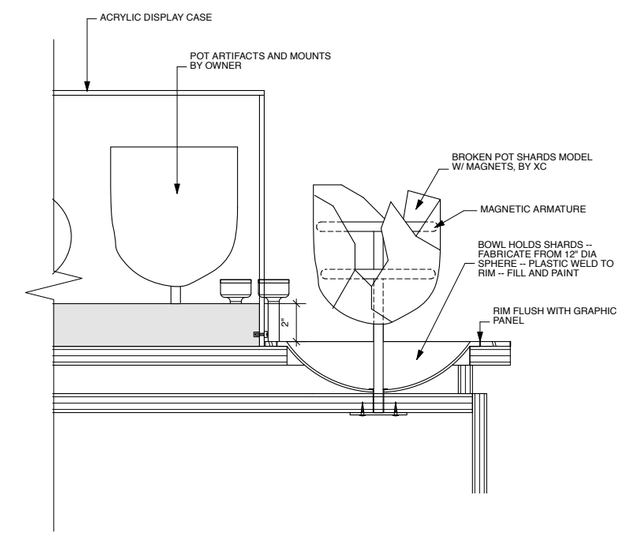
5 ELEVATION: CERAMICS

SCALE: 1"= 1'-0"



7 CERAMICS SECTION DETAIL 2

SCALE: 3"= 1'-0"



6 CERAMICS SECTION DETAIL 1

SCALE: 3"= 1'-0"

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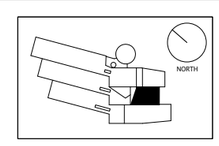


Key Plan

No. / Issue Name / Date

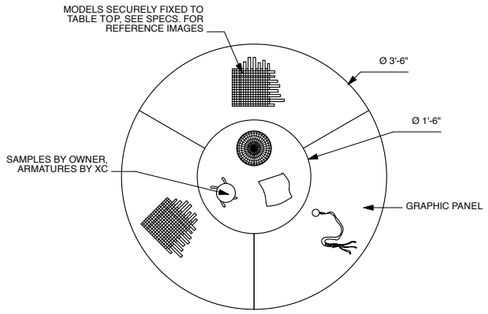
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Level 3 Details:
Activity Tables

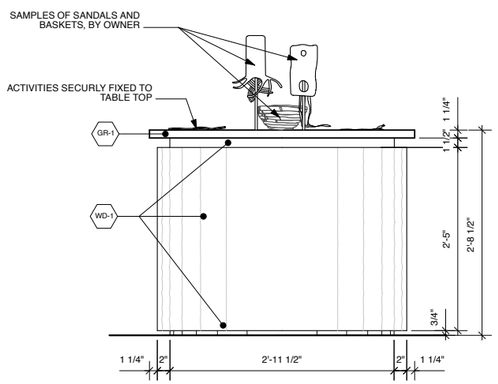
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
varies	X3-FP-4.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



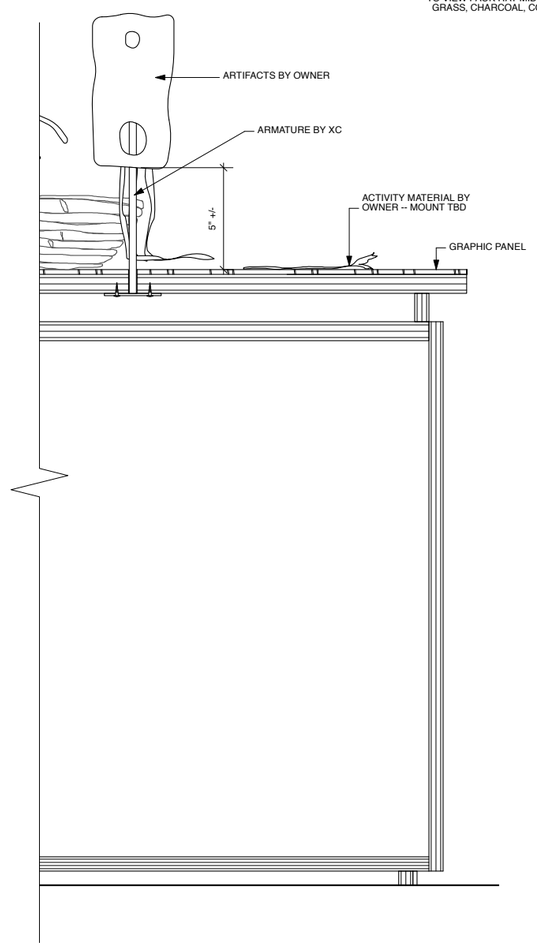
1 FP5.E02.in01 PLAN WEAVING /PLAITING

SCALE: 1"= 1'-0"



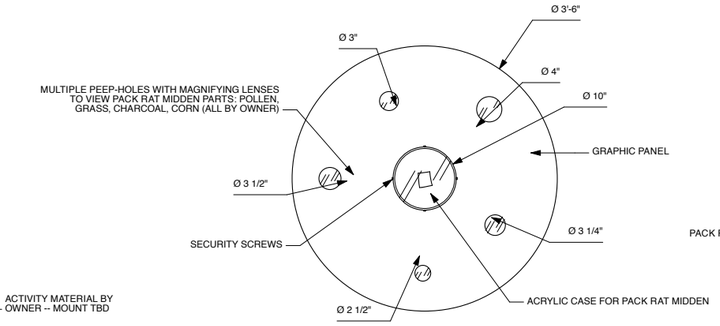
2 ELEVATION: WEAVING/PLAITING

SCALE: 1"= 1'-0"



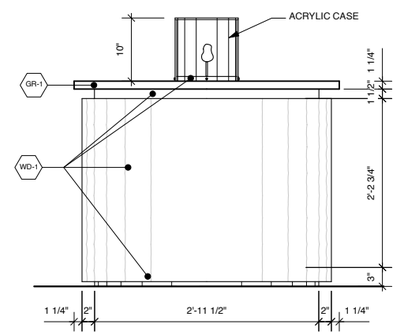
3 WEAVING/PLAITING SECTION DETAIL

SCALE: 3"= 1'-0"



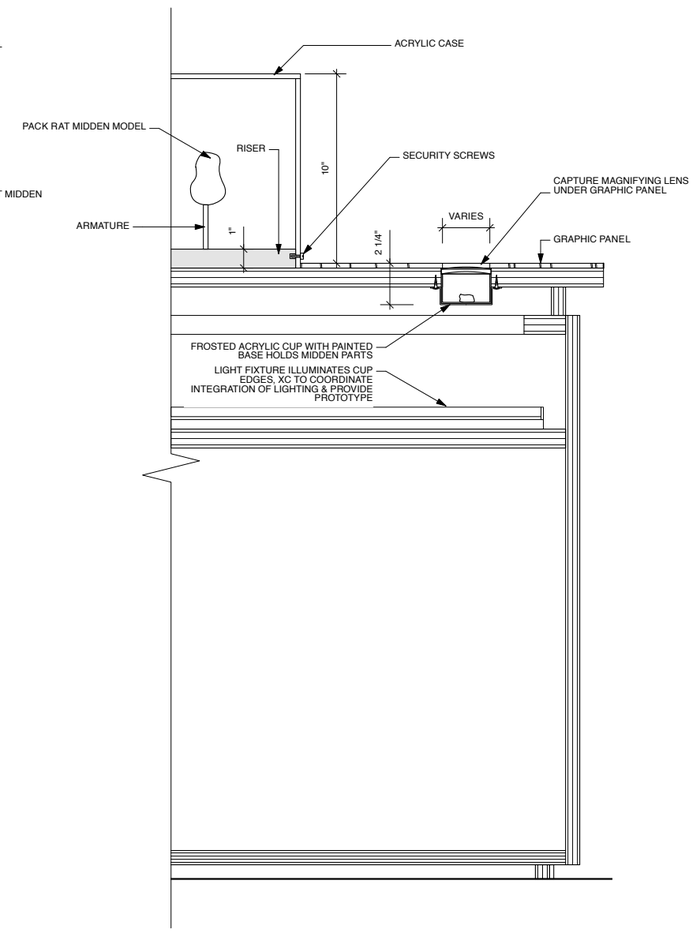
4 FP7.E01.in01 PLAN PACK RAT MIDDEN

SCALE: 1"= 1'-0"



5 ELEVATION:PACK RAT MIDDEN

SCALE: 1"= 1'-0"



6 PACK RAT SECTION DETAIL

SCALE: 3"= 1'-0"

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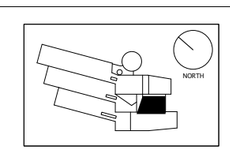


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

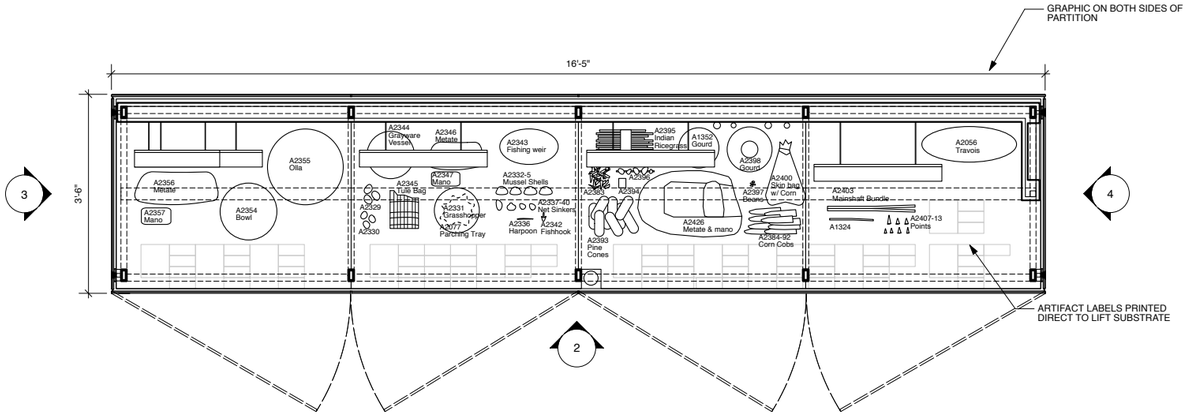
No. / Issue Name / Date

Sheet Title

Interactives:
First Peoples, Activity Tables

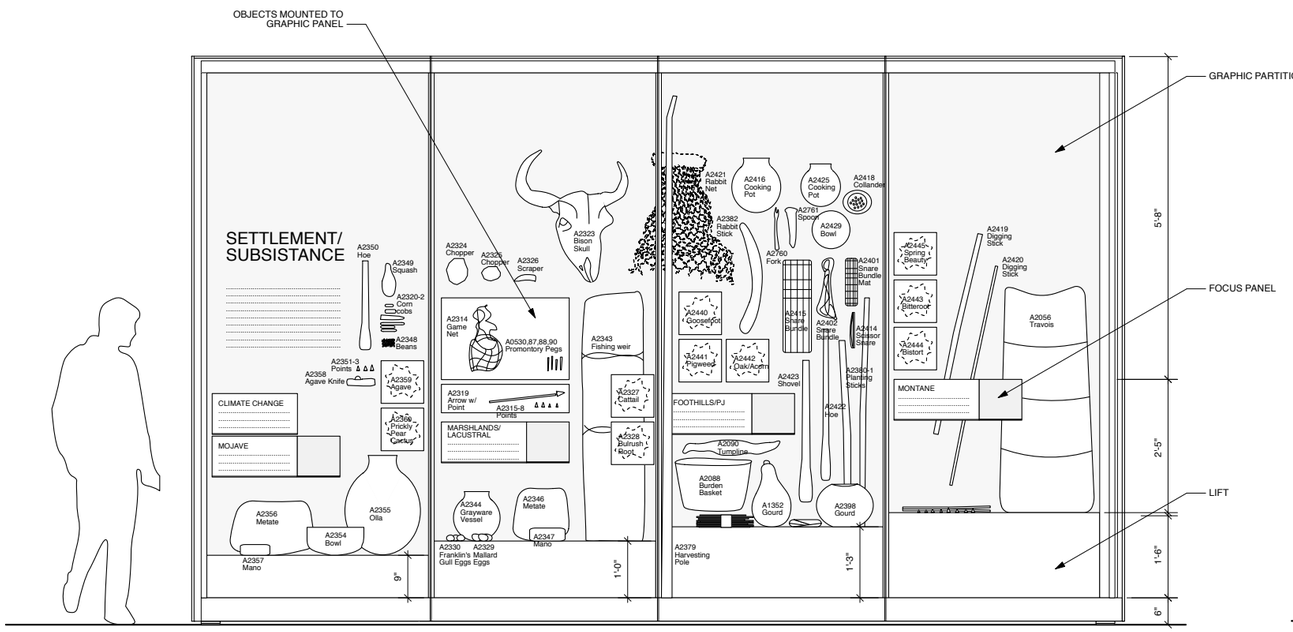
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
varies	X3-FP-4.11

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



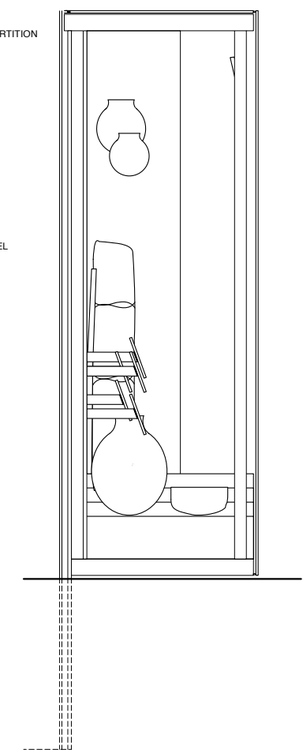
1 PLAN

SCALE: 3/4"= 1'-0"



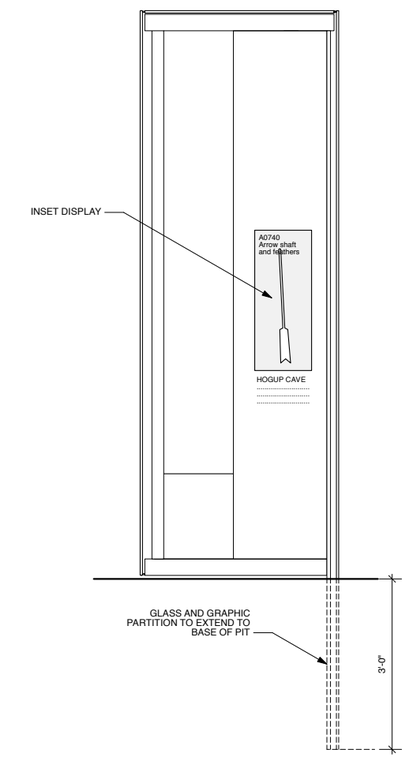
2 NORTH ELEVATION

SCALE: 3/4"= 1'-0"



3 EAST ELEVATION

SCALE: 3/4"= 1'-0"



4 WEST ELEVATION

SCALE: 3/4"= 1'-0"

ARTIFACT MOUNTING SCHEDULE

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A0530		x						
A0587		x						
A0588		x						
A0590		x						
A0740	x							
A1324				x				
A1352				x				
A2056				x				
A2077				x				
A2088	x							
A2090	x							
A2314	x							
A2315		x						
A2316		x						
A2317		x						
A2318		x						
A2319		x						
A2320	x							
A2321	x							
A2322	x							
A2323	x							
A2324	x							
A2325	x							
A2326	x							
A2327	x							
A2328	x							

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A2329				x				
A2330				x				
A2331				x				
A2332				x				
A2333				x				
A2334				x				
A2335				x				
A2336				x				
A2337				x				
A2338				x				
A2339				x				
A2340				x				
A2342				x				
A2343				x				
A2344				x				
A2345				x				
A2346				x				
A2347				x				
A2348	x							
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A2350	x							
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A2422	x							
A2423	x							
A2425	x							
A2426				x				
A2429	x							
A2440	x							
A2441	x							
A2442	x							
A2443	x							
A2444	x							
A2445	x							
A2760	x							
A2761	x							

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

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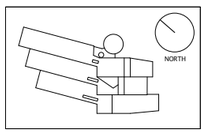


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

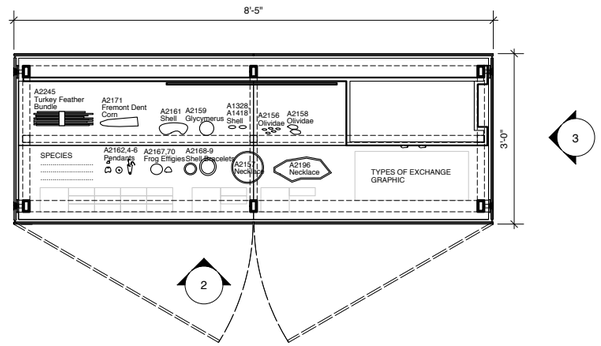
No. / Issue Name / Date

Sheet Title

Exhibit Case Layouts:
First Peoples, FP4.E01.ca07

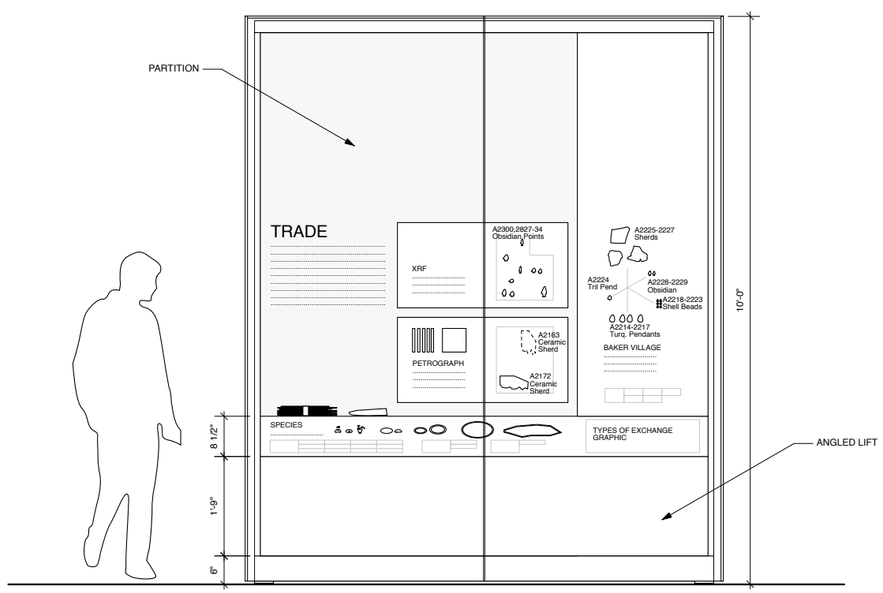
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3/4"=1'-0"	X3-FP-5.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



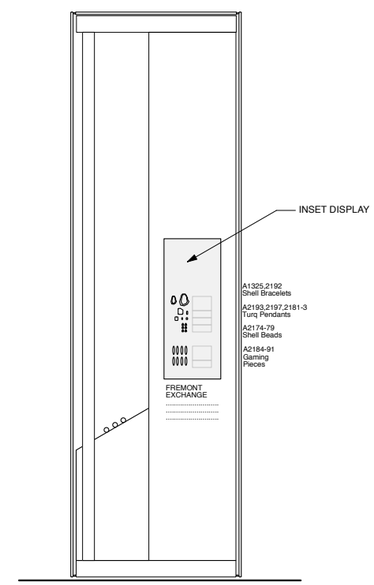
1 PLAN

SCALE: 3/4"= 1'-0"



2 ELEVATION

SCALE: 3/4"= 1'-0"



3 ELEVATION

SCALE: 3/4"= 1'-0"

ARTIFACT MOUNTING SCHEDULE

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck
A1325	x			
A1328				x
A1418				x
A2156				x
A2157				x
A2158				x
A2159				x
A2161				x
A2162				x
A2163		x		
A2164				x
A2165				x
A2166				x
A2167				x
A2168				x
A2169				x
A2170				x
A2171				x
A2172		x		
A2174	x			
A2175	x			
A2176	x			
A2177	x			
A2178	x			
A2179	x			
A2181	x			
A2182	x			
A2183	x			
A2184	x			
A2185	x			
A2186	x			
A2187	x			
A2188	x			
A2189	x			
A2190	x			
A2191	x			
A2192	x			
A2193	x			
A2196				x
A2197	x			
A2214	x			
A2215	x			
A2216	x			
A2217	x			
A2218	x			
A2219	x			
A2220	x			
A2221	x			
A2222	x			
A2223	x			
A2224	x			
A2225	x			
A2226	x			
A2227	x			
A2228	x			
A2229	x			
A2245				x
A2300		x		
A2827		x		
A2828		x		
A2829		x		
A2830		x		
A2831		x		
A2832		x		
A2833		x		
A2834		x		

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner
UMNH
1390 East President's Circle
Salt Lake City, Utah 84112
801.581.6927 tel.

Design Architect
Polshek Partnership Architects LLP
320 West 13th Street
New York, New York
212.807.7171 tel.

Architect of Record
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375 West 200 South
Salt Lake City, Utah
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Building Engineer
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Salt Lake City, Utah 84101
801.575.8877 tel.

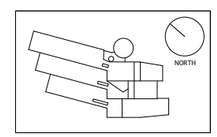
Mechanical/Plumbing/FP Engineer
Colvin Engineering Associates, Inc.
244 West 300 North
Salt Lake City, Utah 84103
801.322.2400 tel

Electrical/AV Engineer
Spectrum Engineers
175 South Main Street
Salt Lake City, Utah 84111
800.678.7077 tel

Lighting
Branston Partnership
122 West 26th Street
New York, NY 10001
212.924.4050 tel.

Audio Visual
BBI Engineering, Inc.
241 Quint Street
San Francisco, CA 94124
415 685 9555 tel.

Exhibition Planner and Designer
Ralph Appelbaum Associates
88 Pine Street
New York, New York 10005
212.334.8200 tel.



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

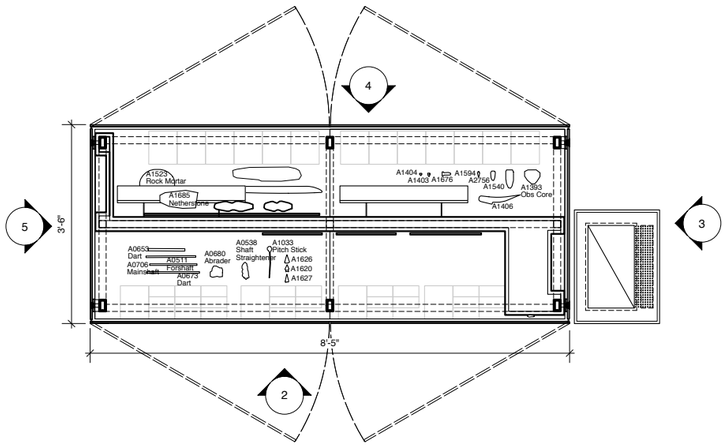
Sheet Title
Exhibit Case Layouts:
First Peoples, FP6.E01.ca02

Date
April 2, 2009

Scale*
3/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X3-FP-5.20

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 PLAN

SCALE: 3/4"= 1'-0"

ARTIFACT MOUNTING SCHEDULE

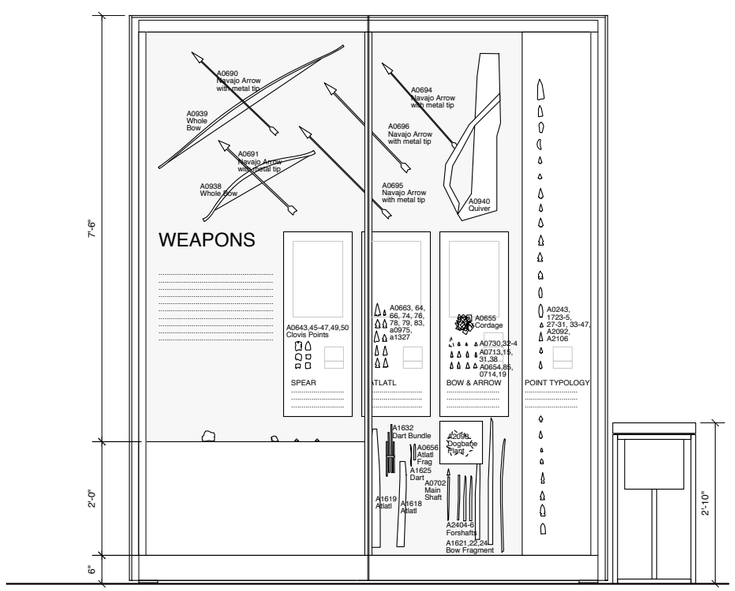
Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck
A0243	x			
A0511				x
A0538				x
A0643		x		
A0645		x		
A0646		x		
A0647		x		
A0649		x		
A0650		x		
A0651	x			
A0653				x
A0654		x		
A0655		x		
A0656	x			
A0663		x		
A0664		x		
A0666		x		
A0673				x
A0674		x		
A0676		x		
A0678		x		
A0679		x		
A0680				x
A0683		x		
A0685				x
A0690	x			
A0691	x			
A0694	x			
A0695	x			
A0696	x			
A0702	x			
A0706				x
A0713		x		
A0714		x		
A0715		x		
A0719		x		
A0730		x		
A0731		x		
A0732		x		
A0733		x		
A0734		x		
A0738		x		
A0938	x			
A0939	x			

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck
A0940	x			
A0975		x		
A1033				x
A1125			x	
A1126			x	
A1127			x	
A1327		x		
A1338			x	
A1339			x	
A1358			x	
A1369			x	
A1377	x			
A1378	x			
A1379	x			
A1381	x			
A1382	x			
A1384	x			
A1385	x			
A1386	x			
A1387	x			
A1388				x
A1389				x
A1392	x			
A1393				x
A1394			x	
A1395			x	
A1396	x			
A1397	x			
A1398	x			
A1399			x	
A1400			x	
A1401			x	
A1403				x
A1404				x
A1405			x	
A1406				x
A1407			x	
A1408			x	
A1409	x			
A1410	x			
A1411	x			
A1412	x			
A1413	x			
A1416	x			

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck
A1500			x	
A1501			x	
A1502			x	
A1503			x	
A1506			x	
A1507			x	
A1508			x	
A1509			x	
A1510			x	
A1511			x	
A1512			x	
A1513			x	
A1514			x	
A1515			x	
A1516	x			
A1517			x	
A1521	x			
A1522	x			
A1523	x			
A1524	x			
A1538	x			
A1539	x			
A1540				x
A1542			x	
A1543			x	
A1546			x	
A1570			x	
A1571	x			
A1573			x	
A1574		x		
A1576			x	
A1577			x	
A1578			x	
A1590			x	
A1591			x	
A1592			x	
A1594				x
A1596			x	
A1597		x		
A1598	x			
A1599			x	
A1602			x	
A1604		x		
A1606			x	

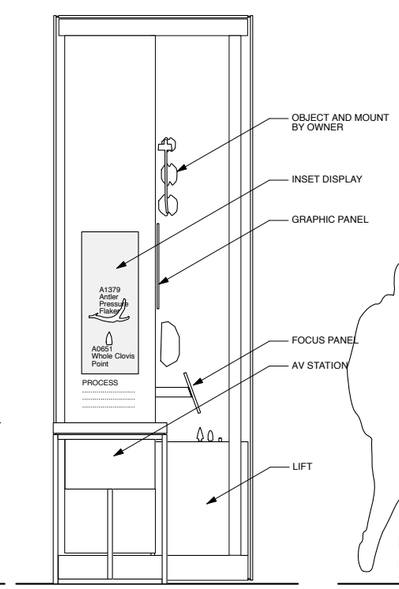
Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck
A1607	x			
A1608			x	
A1609	x			
A1610			x	
A1612			x	
A1613	x			
A1614			x	
A1615			x	
A1618	x			
A1619	x			
A1620				x
A1621	x			
A1622	x			
A1624	x			
A1625	x			
A1626				x
A1627				x
A1632	x			
A1673			x	
A1674			x	
A1675			x	
A1676				x
A1677				x
A1678				x
A1679				x
A1680	x			
A1681	x			
A1682	x			
A1683	x			
A1684	x			
A1685	x			
A1686	x			
A1687	x			
A1688	x			
A1689	x			
A1690	x			
A1691			x	
A1692			x	
A1693			x	
A1694			x	
A1695			x	
A1696			x	
A1697			x	
A1698			x	

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck
A1699			x	
A1700			x	
A1701			x	
A1702			x	
A1703			x	
A1704			x	
A1705			x	
A1706			x	
A1707			x	
A1708			x	
A1709			x	
A1723	x			
A1724	x			
A1725	x			
A1727	x			
A1728	x			
A1729	x			
A1730	x			
A1731	x			
A1733	x			
A1734	x			
A1735	x			
A1736	x			
A1737	x			
A1738	x			
A1739	x			
A1740	x			
A1741	x			
A1742	x			
A1743	x			
A1744	x			
A1745	x			
A1746	x			
A1747	x			
A1875	x			
A2092	x			
A2098		x		
A2106	x			
A2138			x	
A2195			x	
A2756				x
A2757			x	
A2758			x	
A2759			x	



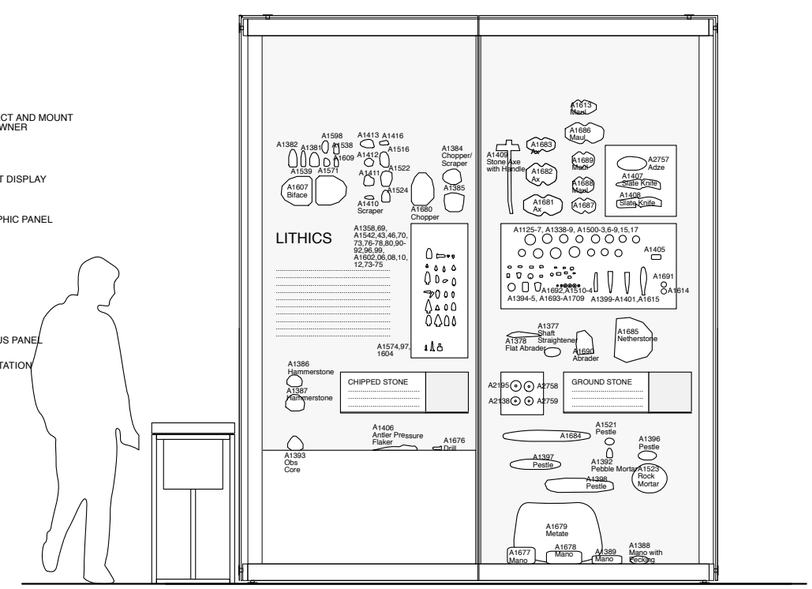
2 ELEVATION

SCALE: 3/4"= 1'-0"



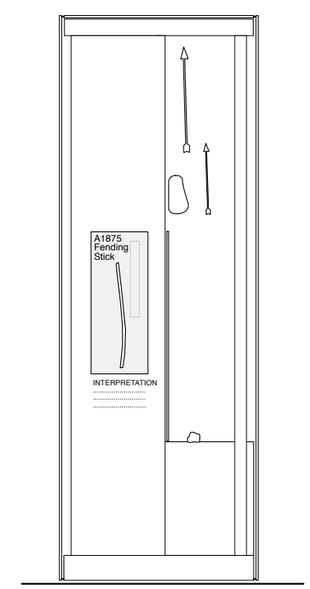
3 ELEVATION

SCALE: 3/4"= 1'-0"



4 ELEVATION

SCALE: 3/4"= 1'-0"



5 ELEVATION

SCALE: 3/4"= 1'-0"

NOTE:

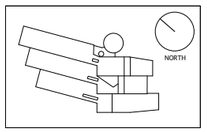
1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS
2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Exhibit Case Layouts: First Peoples, FP5.EO5.ca03, FP5.EO6.ca03

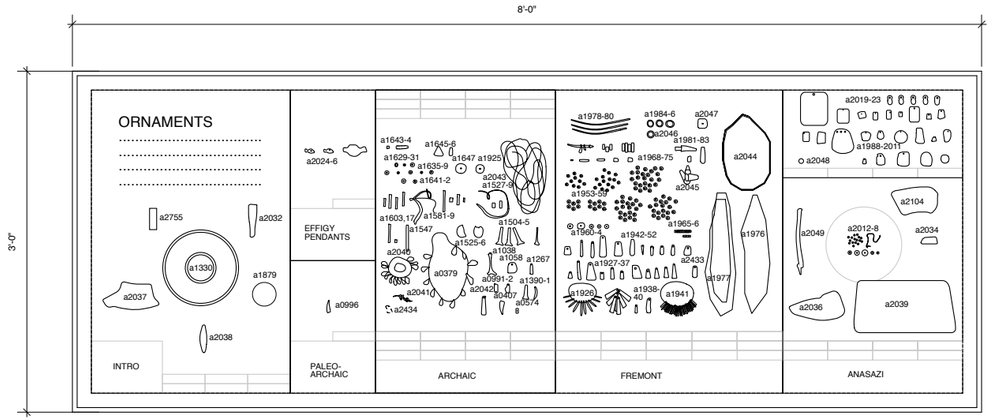
Date: April 2, 2009

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750

Scale*: 3/4"=1'-0"

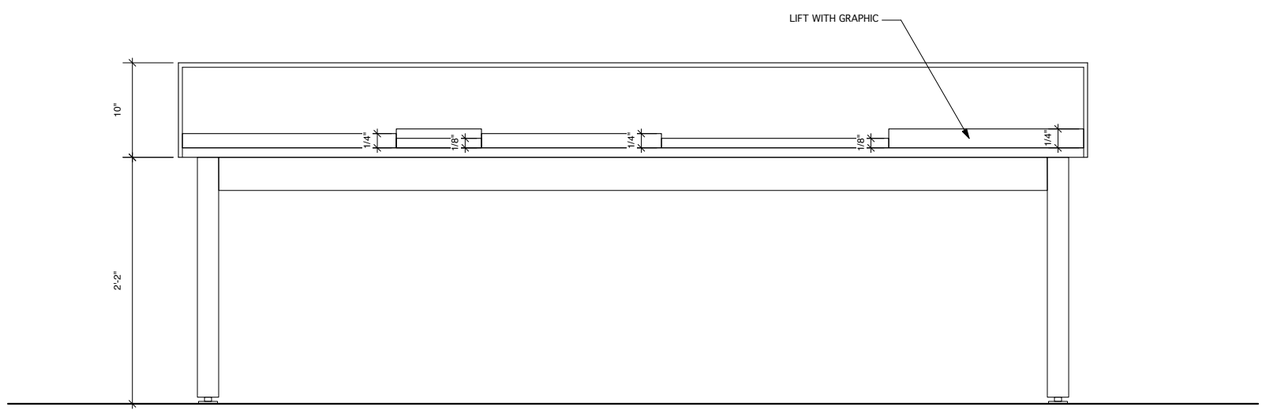
Sheet No. X3-FP-5.30

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 PLAN

SCALE: 1 1/2"= 1'-0"



2 ELEVATION

SCALE: 1 1/2"= 1'-0"

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

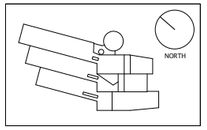
2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

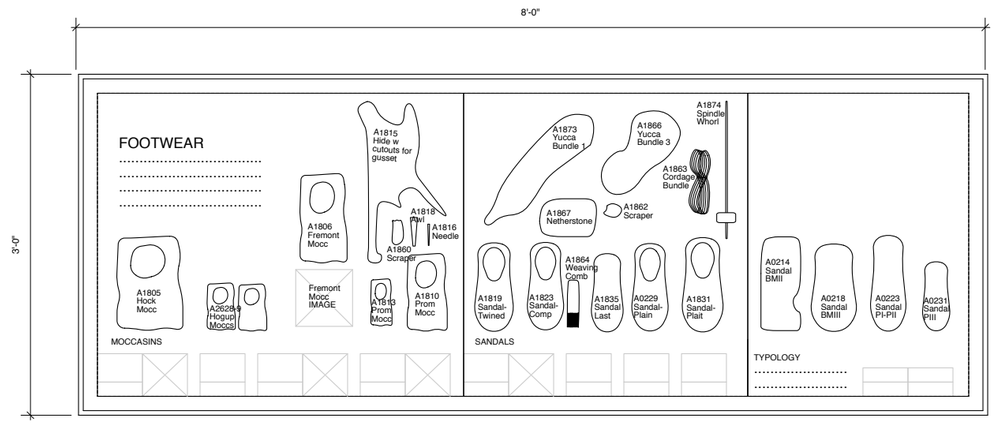
100% Final Design April 2, 2009

Sheet Title

Exhibit Case Layouts:
First Peoples, FP5.EO3.ca04

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1 1/2"=1'-0"	X3-FP-5.40

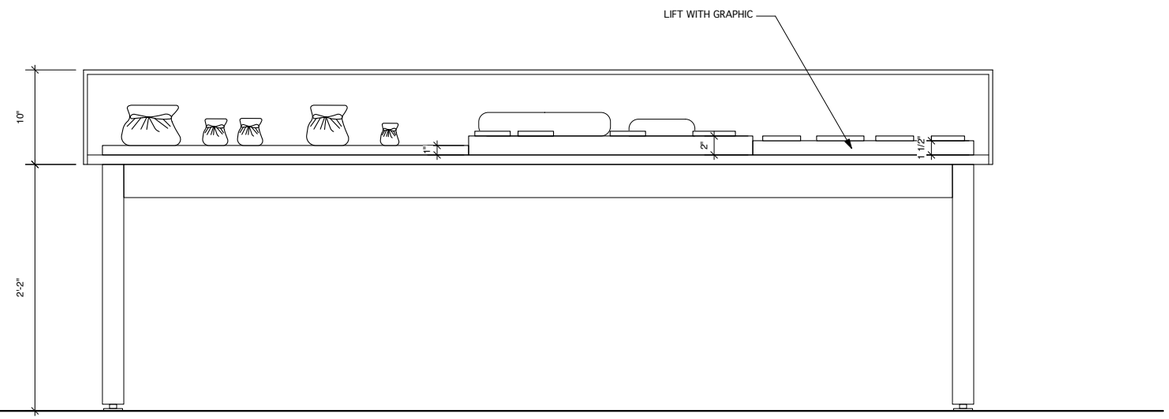
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



2

1 PLAN

SCALE: 1 1/2"= 1'-0"



2 ELEVATION

SCALE: 1 1/2"= 1'-0"

NOTE:

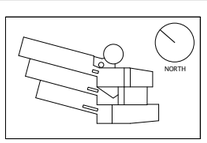
1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS
2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

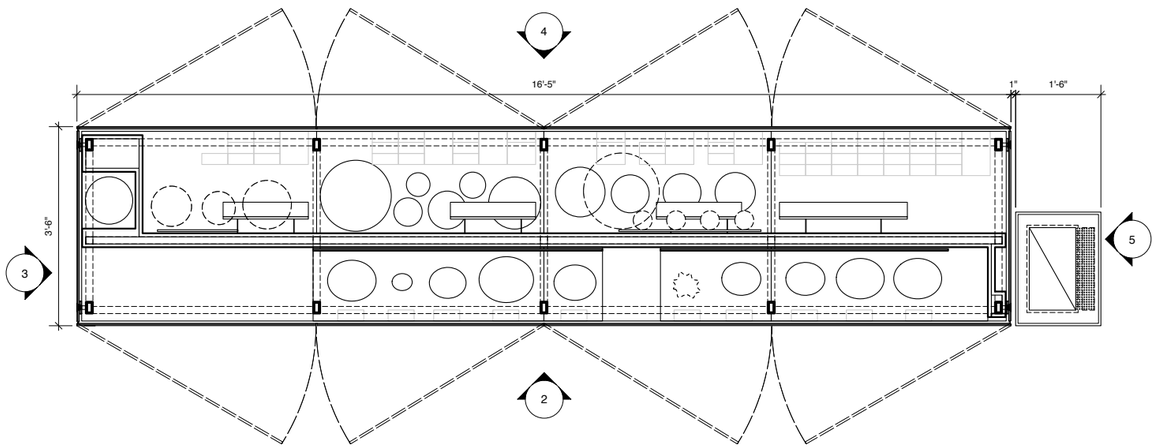
100% Final Design April 2, 2009

Sheet Title

Exhibit Case Layouts:
First Peoples, FP5.EO4.ca05

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1 1/2"=1'-0"	X3-FP-5.50

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



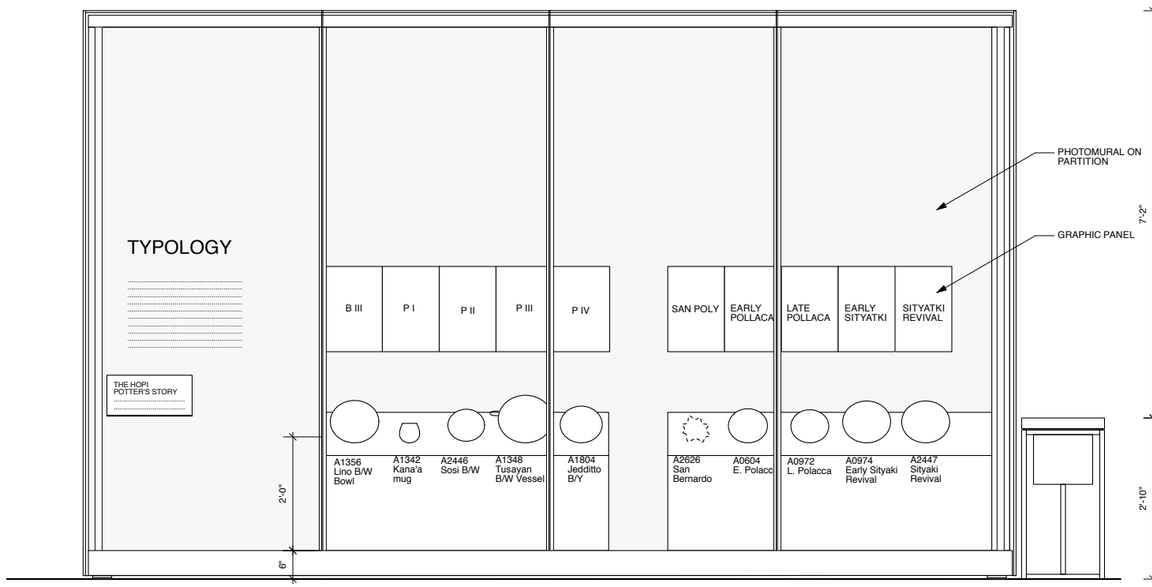
1 PLAN
SCALE: 3/4"= 1'-0"

5 ELEVATION
SCALE: 3/4"= 1'-0"

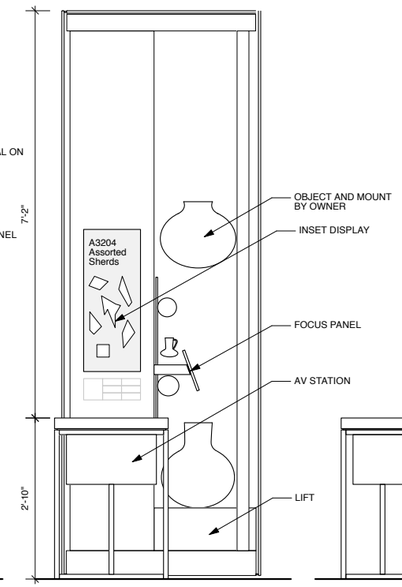
ARTIFACT MOUNTING SCHEDULE

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A0604				x				
A0607	x							
A0610	x							
A0620	x							
A0621	x							
A0622	x							
A0624	x							
A0628	x							
A0629	x							
A0631	x							
A0634				x				
A0636	x							
A0637	x							
A0638	x							
A0640	x							
A0642	x							
A0972				x				
A0974				x				
A1157				x				
A1280		x						
A1281		x						
A1284		x						
A1285		x						
A1286		x						
A1287		x						
A1288	x							
A1289	x							
A1290	x							
A1291		x						
A1292		x						
A1293		x						
A1294				x				
A1295				x				
A1296	x							
A1297	x							
A1298	x							
A1299	x							
A1300	x							
A1301				x				
A1302	x							
A1303	x							
A1304	x							
A1305	x							

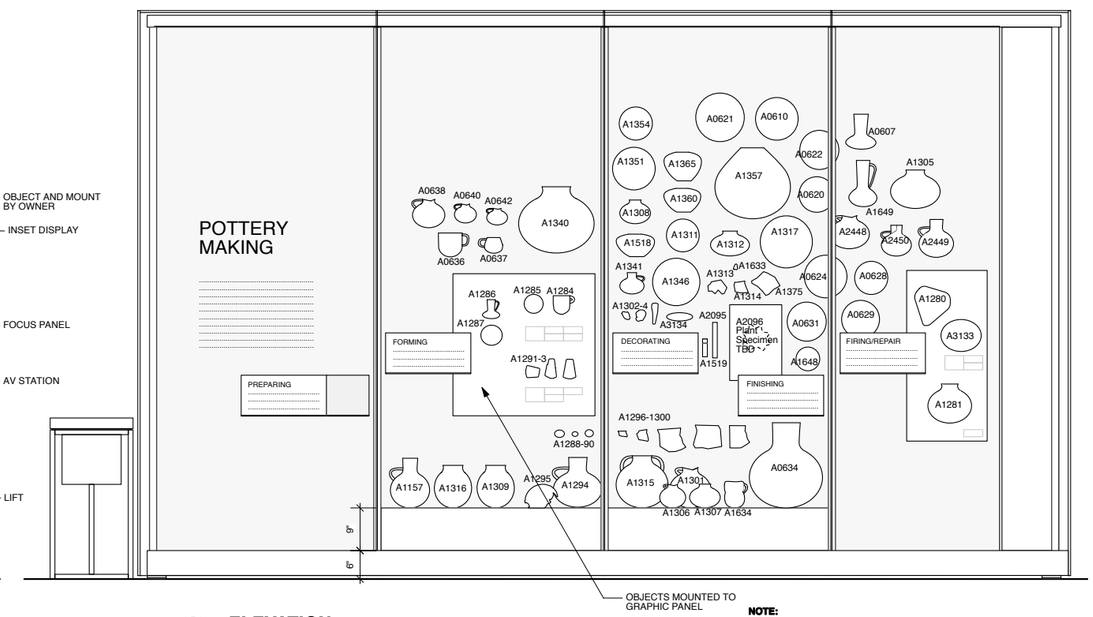
Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A1306				x				
A1307				x				
A1308	x							
A1309				x				
A1311	x							
A1312	x							
A1313	x							
A1314	x							
A1315				x				
A1316				x				
A1317	x							
A1340	x							
A1341	x							
A1342				x				
A1346	x							
A1348				x				
A1351	x							
A1354	x							
A1356				x				
A1357	x							
A1360	x							
A1365	x							
A1375	x							
A1518	x							
A1519	x							
A1633	x							
A1634				x				
A1648	x							
A1649	x							
A1804				x				
A2095	x							
A2096	x							
A2446				x				
A2447				x				
A2448	x							
A2449	x							
A2450	x							
A2626				x				
A3133		x						
A3134	x							
A3135	x							
A3136	x							
A3204	x							



2 ELEVATION
SCALE: 3/4"= 1'-0"



3 ELEVATION
SCALE: 3/4"= 1'-0"



4 ELEVATION
SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

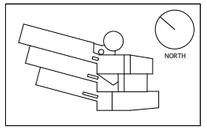
2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

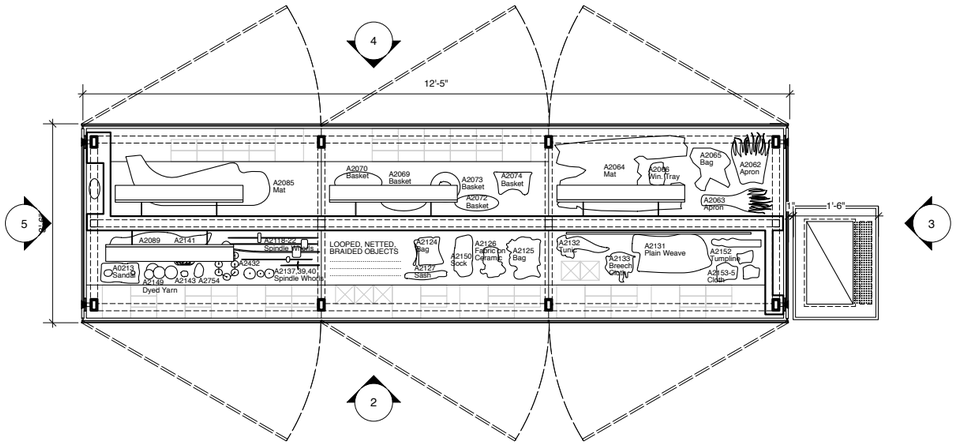
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Exhibit Case Layouts:
First Peoples, FP5.E07.ca06

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3/4"=1'-0"	X3-FP-5.60

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 PLAN

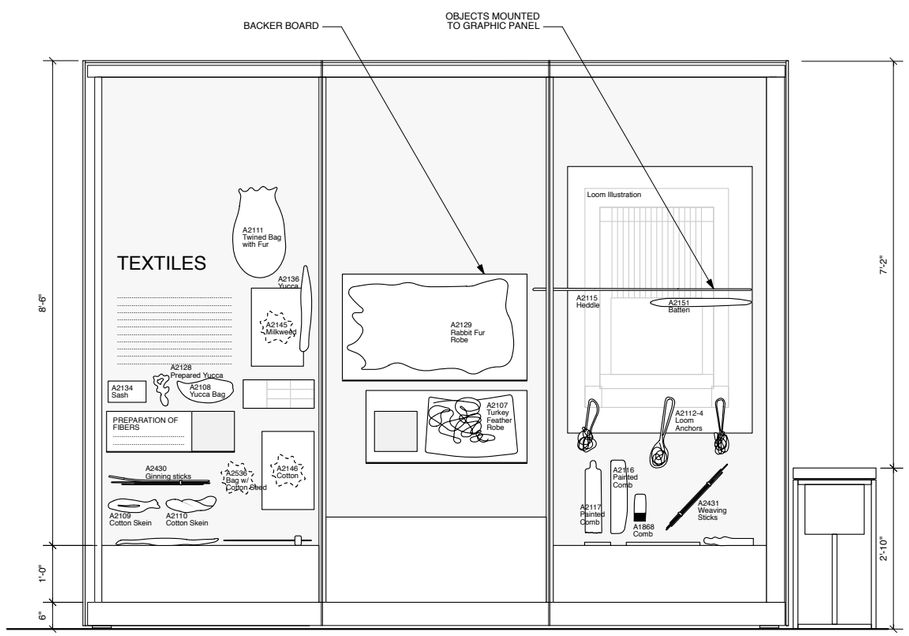
SCALE: 3/4"= 1'-0"

ARTIFACT MOUNTING SCHEDULE

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck
A0213				x
A0404	x			
A1868	x			
A2052			x	
A2054	x			
A2055	x			
A2057	x			
A2059	x			
A2060	x			
A2061	x			
A2062				x
A2063				x
A2064				x
A2065				x
A2066				x
A2067	x			
A2068			x	
A2069				x
A2070				x
A2071	x			
A2072				x
A2073				x
A2074				x
A2075	x			
A2076	x			
A2078	x			
A2080			x	
A2081	x			
A2082	x			

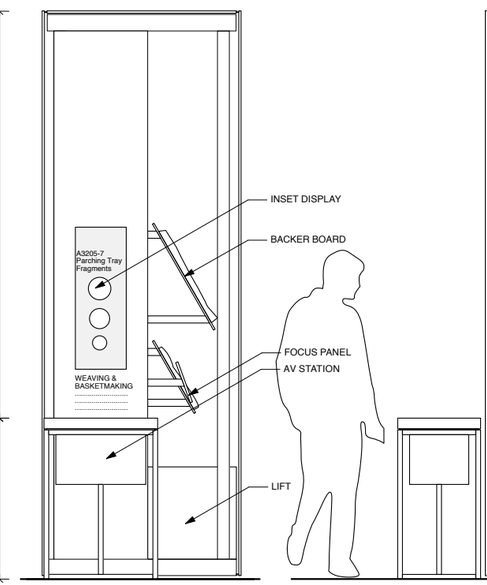
Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck
A2083	x			
A2084	x			
A2085				x
A2087	x			
A2089				x
A2099	x			
A2107			x	
A2108	x			
A2109	x			
A2110	x			
A2111	x			
A2112		x		
A2113		x		
A2114		x		x
A2115		x		
A2116	x			
A2117	x			
A2118				x
A2119				x
A2120				x
A2121				x
A2122				x
A2124				x
A2125				x
A2126				x
A2127				x
A2128	x			
A2129			x	
A2131				x

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck
A2132				x
A2133				x
A2134	x			
A2136	x			
A2137				x
A2139				x
A2140				x
A2141				x
A2143				x
A2145	x			
A2146	x			
A2149				x
A2150				x
A2151		x		
A2152				x
A2153				x
A2154				x
A2155				x
A2399	x			
A2430	x			
A2431	x			
A2432				x
A2536	x			
A2754				x
A3205	x			
A3206	x			
A3207	x			



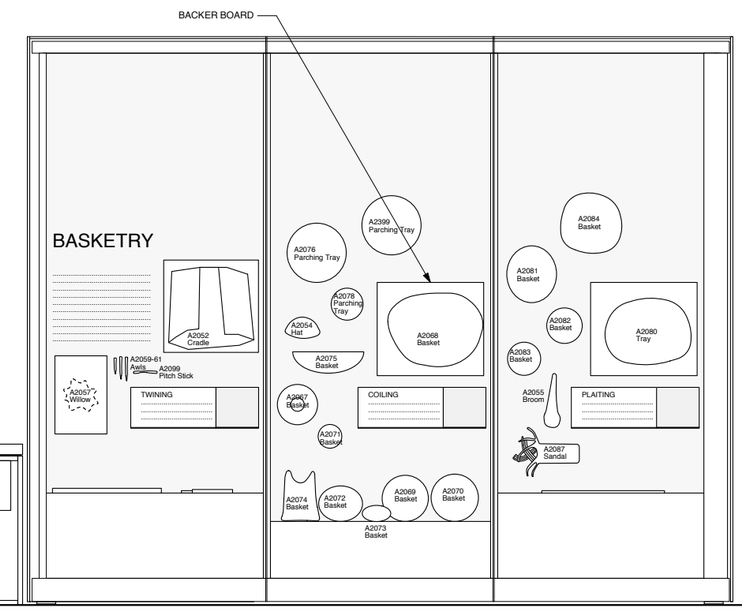
2 ELEVATION

SCALE: 3/4"= 1'-0"



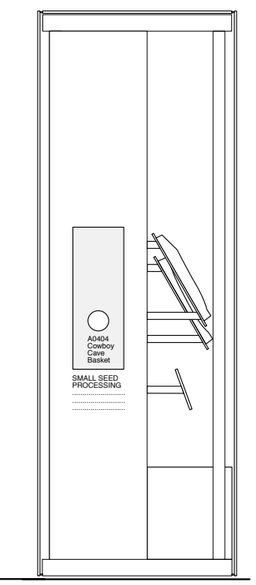
3 ELEVATION

SCALE: 3/4"= 1'-0"



4 ELEVATION

SCALE: 3/4"= 1'-0"



5 ELEVATION

SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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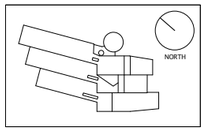


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

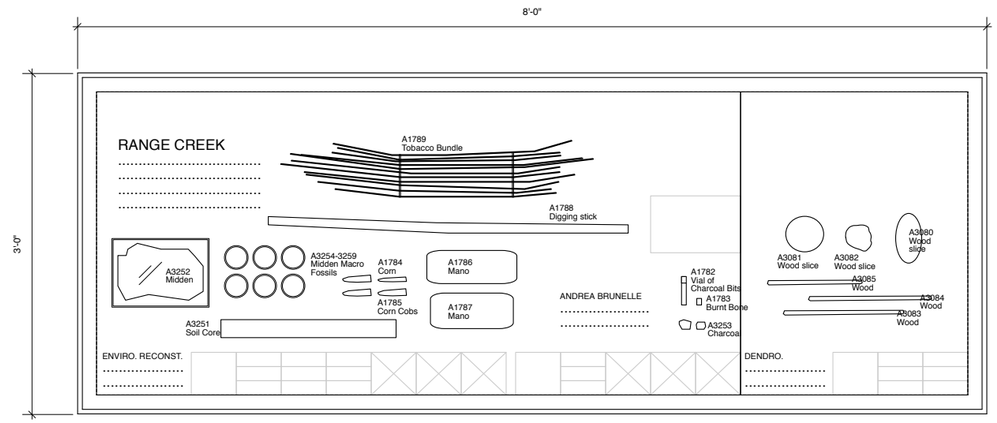
No. / Issue Name / Date

Sheet Title

Exhibit Case Layouts: First Peoples, FP5.E02.ca07, FP5.E01.ca07

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3/4"=1'-0"	X3-FP-5.70

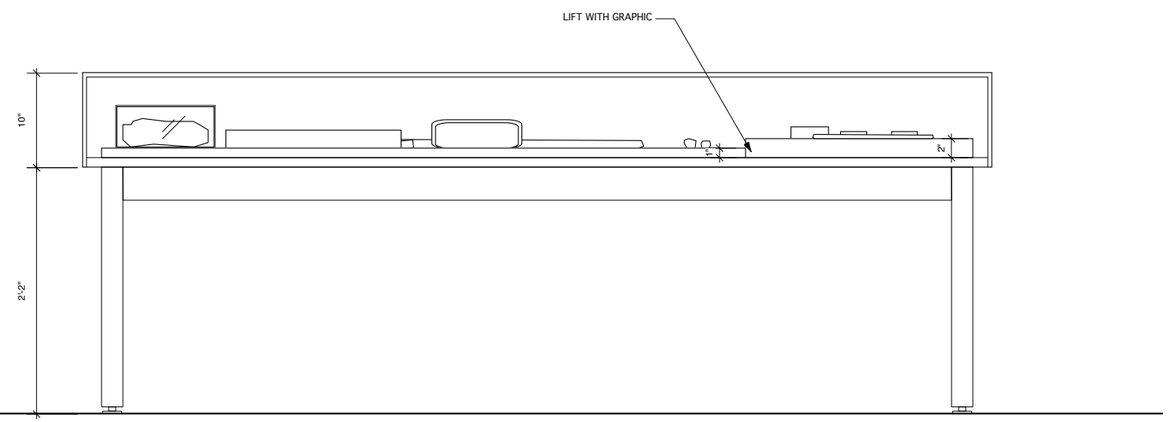
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



2

1 PLAN

SCALE: 1 1/2"= 1'-0"



2 ELEVATION

SCALE: 1 1/2"= 1'-0"

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

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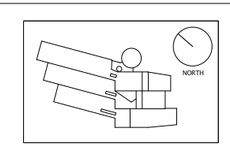


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

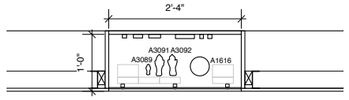
100% Final Design April 2, 2009

Sheet Title

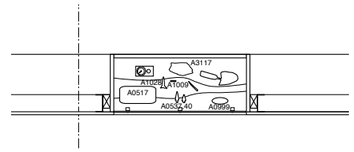
Exhibit Case Layouts:
First Peoples, FP7.EO1.ca08

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1 1/2"=1'-0"	X3-FP-5.80

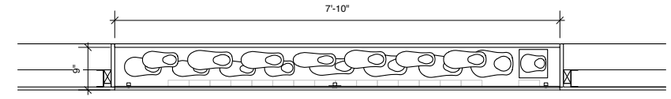
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



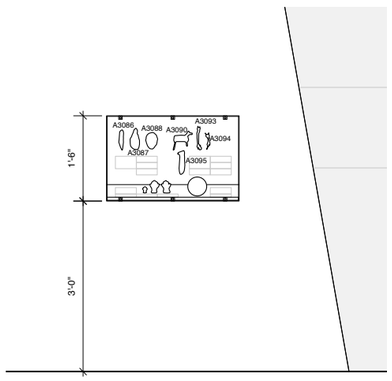
1 **PLAN: FP8.EO1.ic01 (Iconography and Identity)**
SCALE: 3/4"= 1'-0"



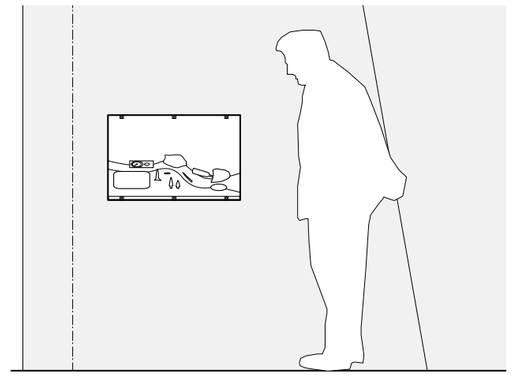
2 **PLAN: FP1.EO1.ic01 (Intro)**
SCALE: 3/4"= 1'-0"



3 **PLAN: FP3.EO4.ic01 (Promontory moccasins)**
SCALE: 3/4"= 1'-0"

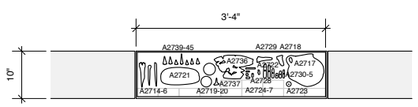


4 **ELEVATION**
SCALE: 3/4"= 1'-0"



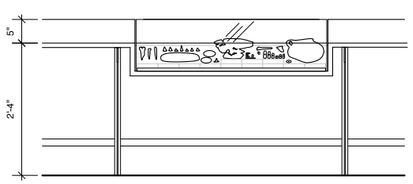
5 **ELEVATION**
SCALE: 3/4"= 1'-0"

6 **ELEVATION**
SCALE: 3/4"= 1'-0"

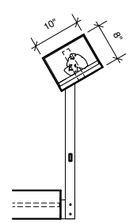


7 **DEVELOPED PLAN: FP2.EO1.rc01 (Median Village)**
SCALE: 3/4"= 1'-0"

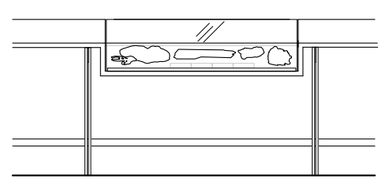
10 **DEVELOPED PLAN: FP2.EO1.rc02 (Architecture)**
SCALE: 3/4"= 1'-0"



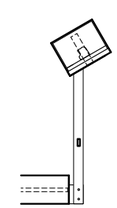
8 **ELEVATION**
SCALE: 3/4"= 1'-0"



9 **SECTION**
SCALE: 3/4"= 1'-0"



11 **ELEVATION**
SCALE: 3/4"= 1'-0"



12 **SECTION**
SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-2.00/3.00 FOR INSET AND RAIL CASE DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

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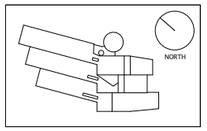


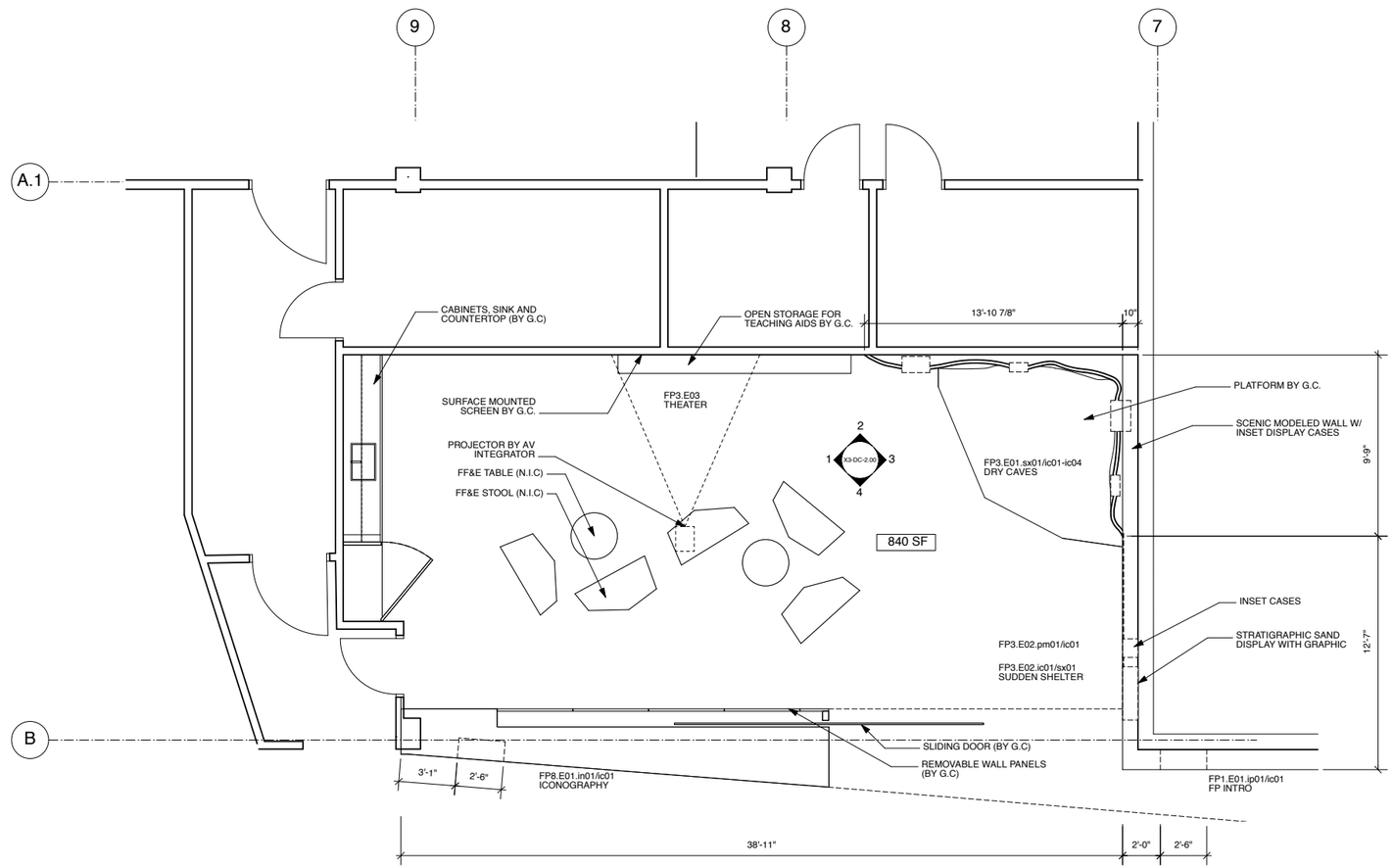
Key Plan

No. / Issue Name / Date	No. / Issue Name / Date
	100% Final Design April 2, 2009

Sheet Title
Inset & Rail Case Layouts:
First Peoples, First Peoples

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3/4"=1'-0"	X3-FP-6.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



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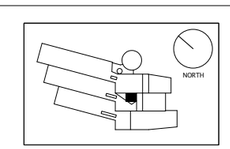


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

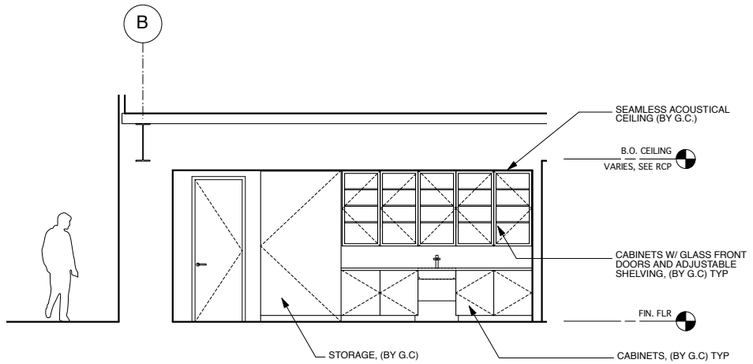
Sheet Title
Partial Plan:
Dry Caves

Date
Feb. 6, 2008

Scale*
1/4"=1'-0"

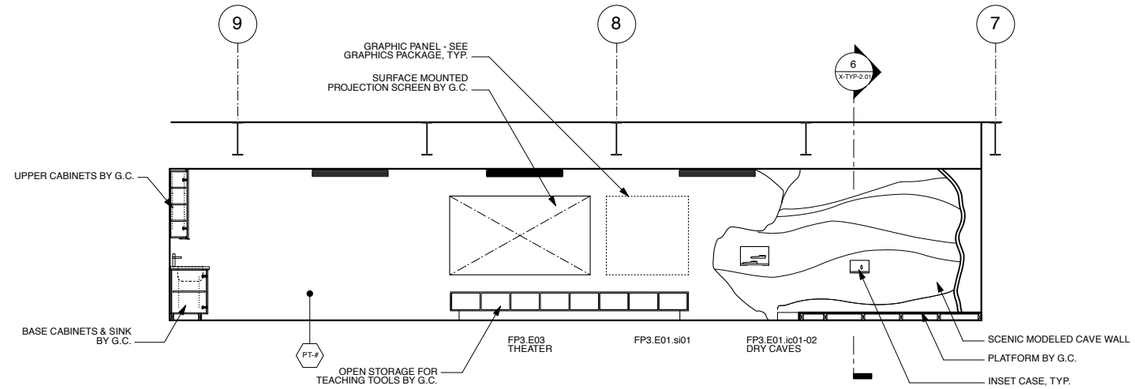
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 0224375O
Sheet No.
X3-DC-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



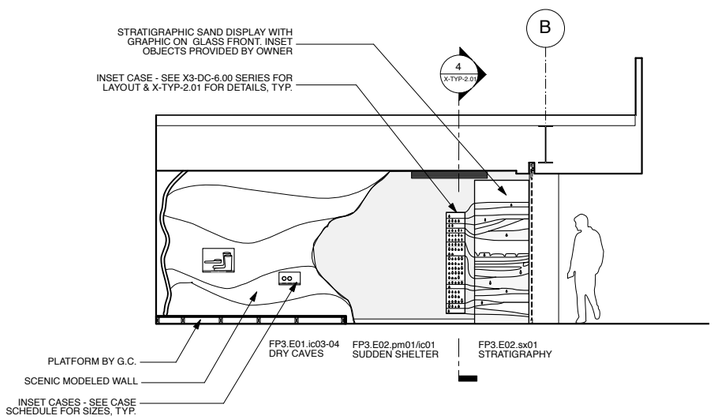
1 NORTH ELEVATION

SCALE: 1/4"= 1'-0"



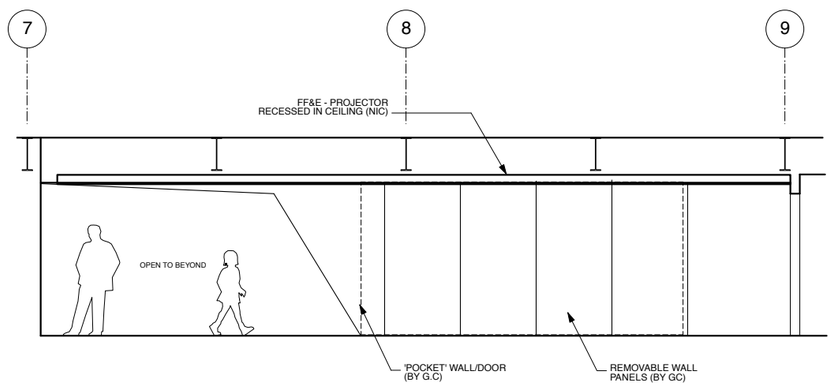
2 EAST ELEVATION

SCALE: 1/4"= 1'-0"



3 SOUTH ELEVATION

SCALE: 1/4"= 1'-0"



4 WEST ELEVATION

SCALE: 1/4"= 1'-0"

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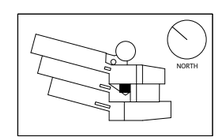


Key Plan

No. / Issue Name / Date

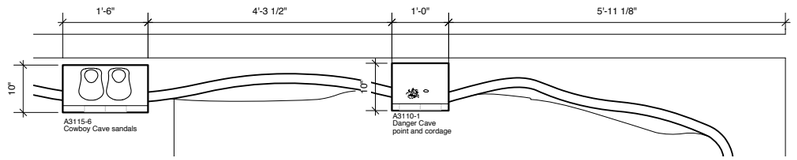
100% Final Design April 2, 2009

No. / Issue Name / Date

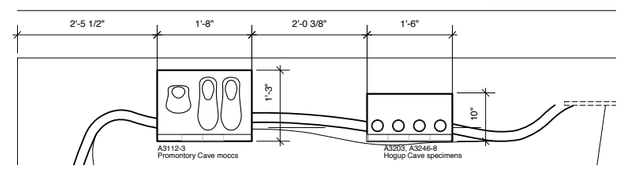
Sheet Title
Elevations & Sections:
Dry Cave

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750 Sheet No.
Scale* 1/4"=1'-0"	X3-DC-2.00

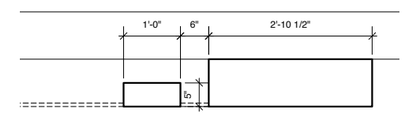
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **PLAN: FP3.EO1.ic01**
SCALE: 3/4"= 1'-0"



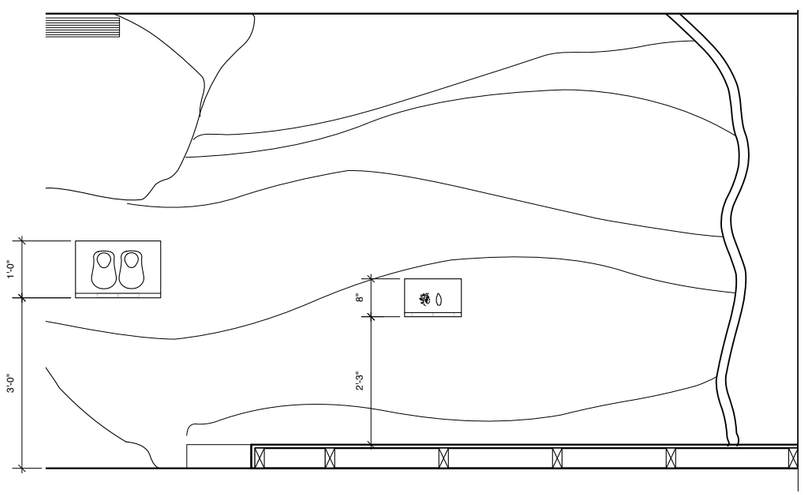
2 **PLAN: FP3.EO1.ic02**
SCALE: 3/4"= 1'-0"



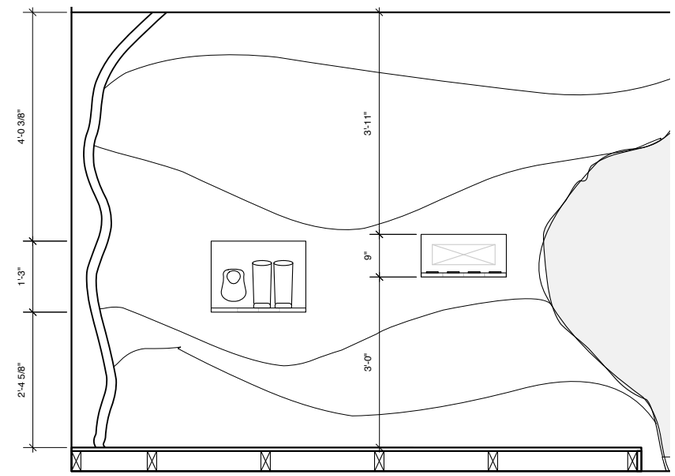
3 **PLAN: FP3.EO1.ic03**
SCALE: 3/4"= 1'-0"

4 **PLAN: FP3.EO1.ic04**
SCALE: 3/4"= 1'-0"

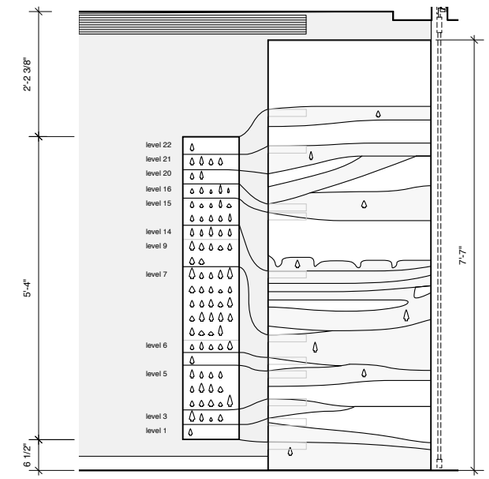
5 **PLAN: FP3.EO2.ic01**
SCALE: 3/4"= 1'-0"



6 **ELEVATION**
SCALE: 3/4"= 1'-0"



7 **ELEVATION**
SCALE: 3/4"= 1'-0"



8 **ELEVATION**
SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-2.00/3.00 FOR INSET AND RAIL CASE DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

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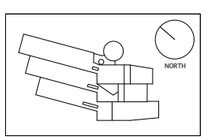


Key Plan

No. / Issue Name / Date

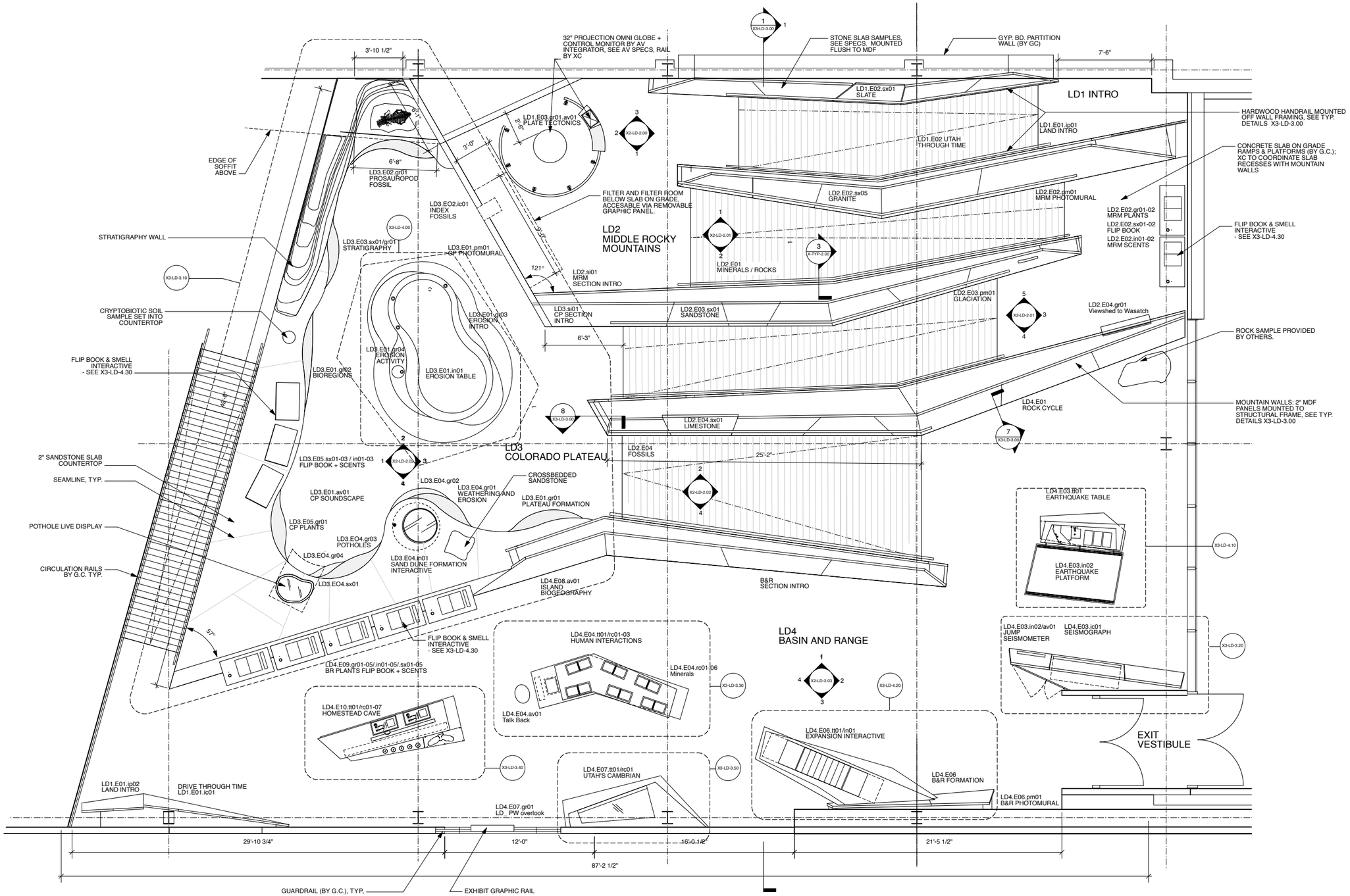
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Inset Case Layouts:
Dry Caves

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3/4"=1'-0"	X3-DC-6.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



NOTES:

1. PLACEMENT OF EXHIBIT ELEMENTS TO BE COORDINATED WITH CONTROL JOINTS AT CONCRETE SLAB.

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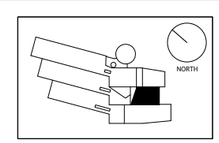


Key Plan

No. / Issue Name / Date

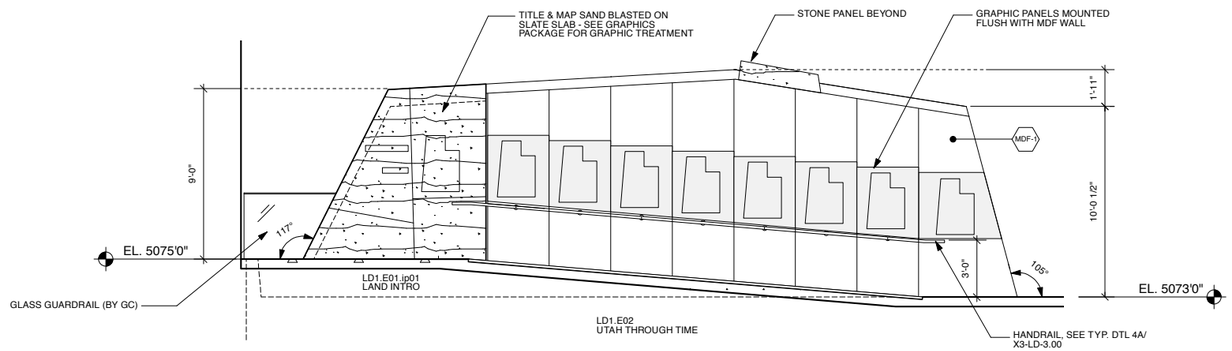
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Partial Plan:
Land

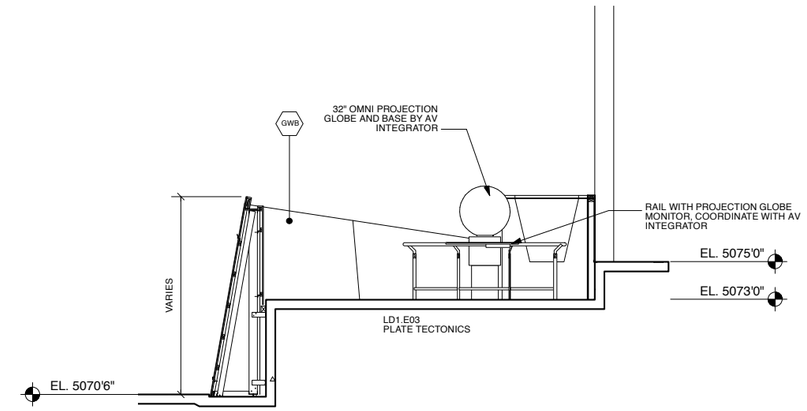
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X3-LD-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



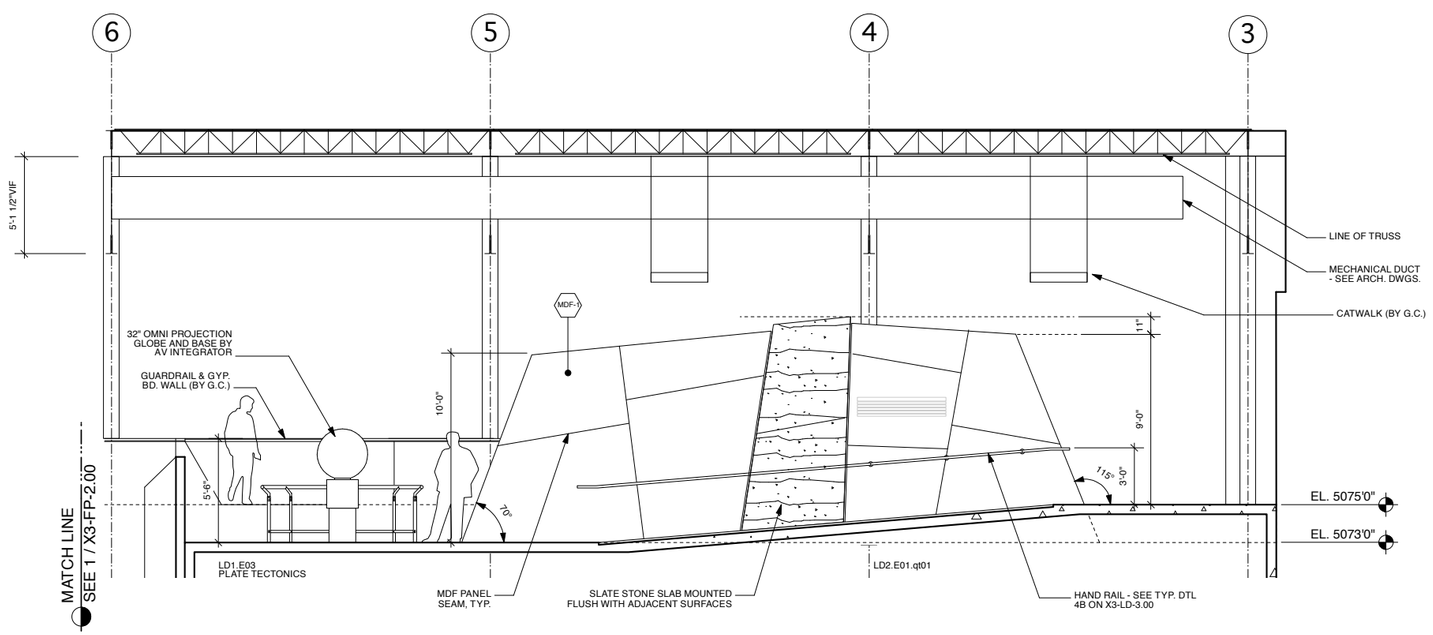
1 WEST ELEVATION MID. ROCKY MOUNTAINS

SCALE: 1/4"= 1'-0"



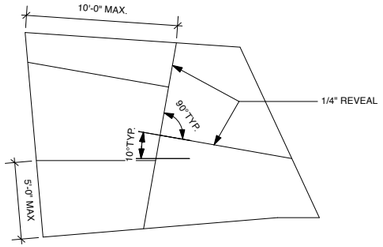
2 NORTH ELEVATION MID.ROCKY MOUNTAINS

SCALE: 1/4"= 1'-0"



3 EAST ELEVATION MID. ROCKY MOUNTAINS

SCALE: 1/4"= 1'-0"



TYPICAL SEAMING DIAGRAM

NOTES:

1. SEE GRAPHIC PACKAGE FOR GRAPHIC PANEL SIZES AND TREATMENTS
2. SEE STONE CLADDING SPECIFICATIONS FOR ADDITIONAL INFO
3. X.C. TO SURVEY SITE PRIOR TO SHOP DRAWINGS & FABRICATION

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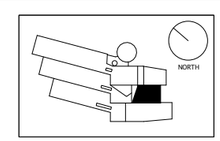


Key Plan

No. / Issue Name / Date

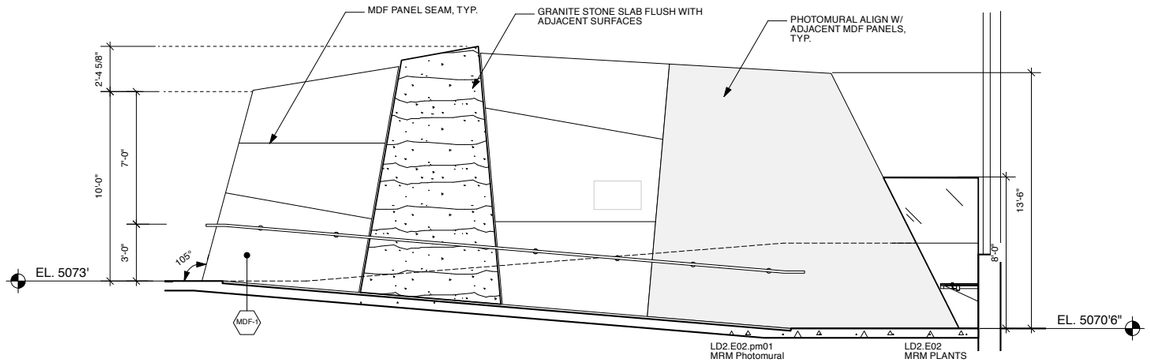
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Elevations & Sections:
Land, MRM

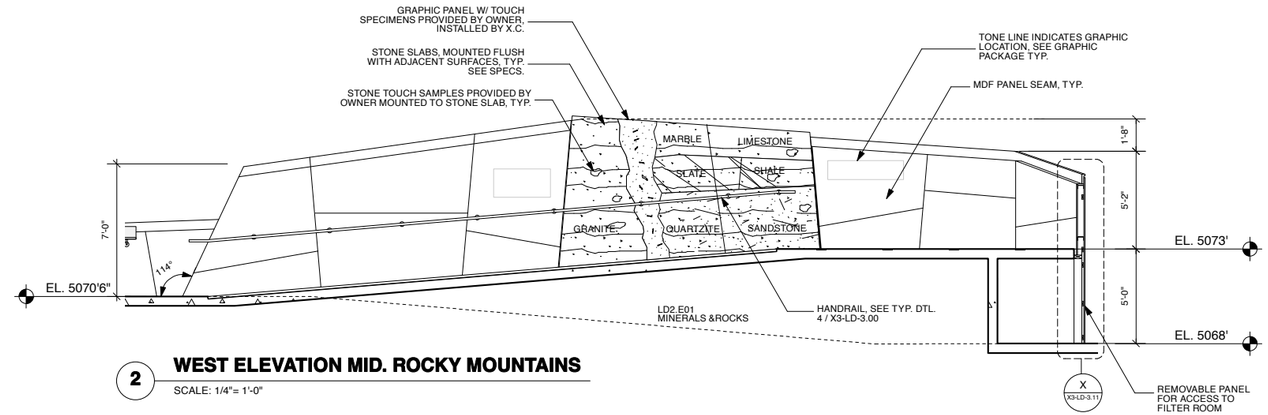
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X3-LD-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



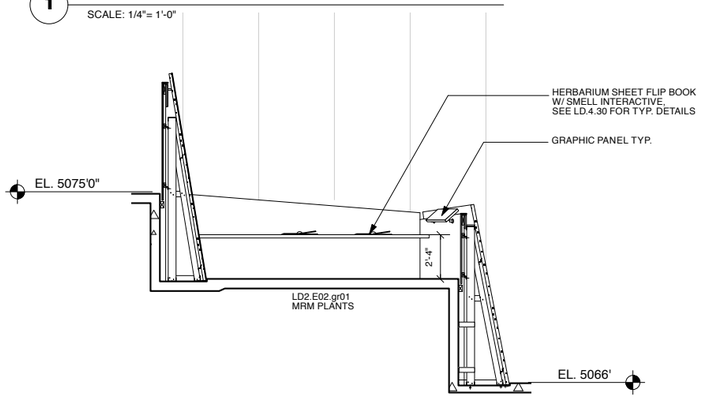
1 EAST ELEVATION MID. ROCKY MOUNTAINS

SCALE: 1/4"= 1'-0"



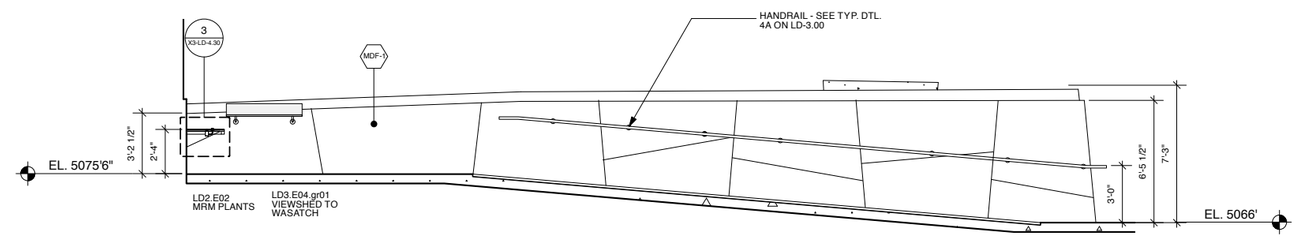
2 WEST ELEVATION MID. ROCKY MOUNTAINS

SCALE: 1/4"= 1'-0"



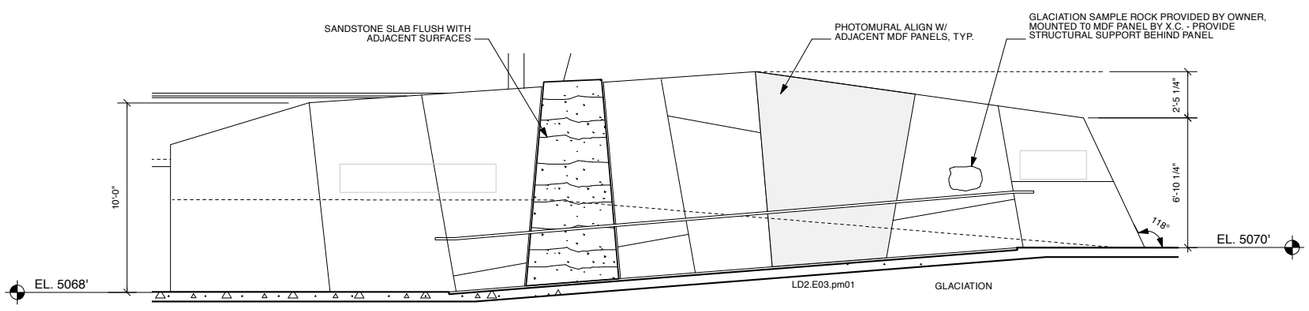
3 SOUTH ELEVATION MID. ROCKY MOUNTAINS

SCALE: 1/4"= 1'-0"



4 WEST ELEVATION MID. ROCKY MOUNTAINS

SCALE: 1/4"= 1'-0"



5 EAST ELEVATION MID. ROCKY MOUNTAINS

SCALE: 1/4"= 1'-0"

NOTES:

1. SEE GRAPHIC PACKAGE FOR GRAPHIC PANEL SIZES AND TREATMENTS
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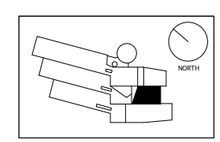


Key Plan

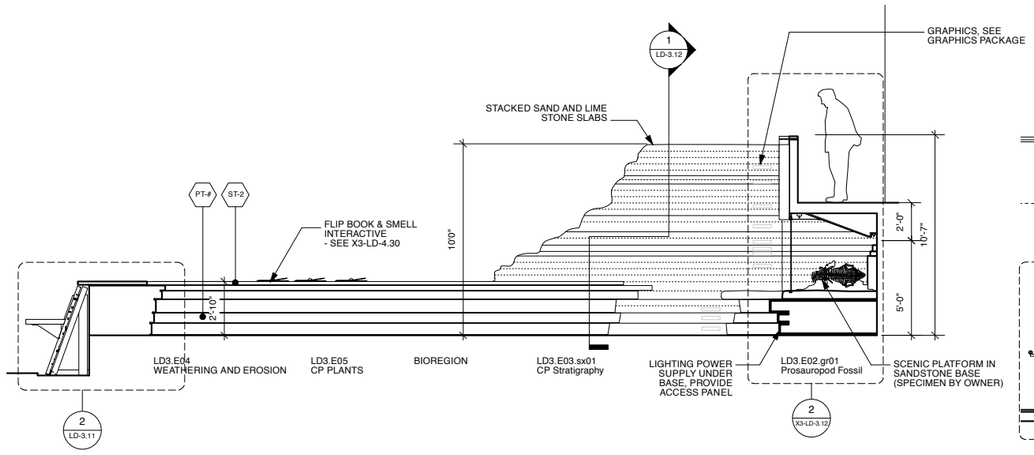
No. / Issue Name / Date	No. / Issue Name / Date
	100% Final Design April 2, 2009

Sheet Title

Elevations & Sections: Land, MRM

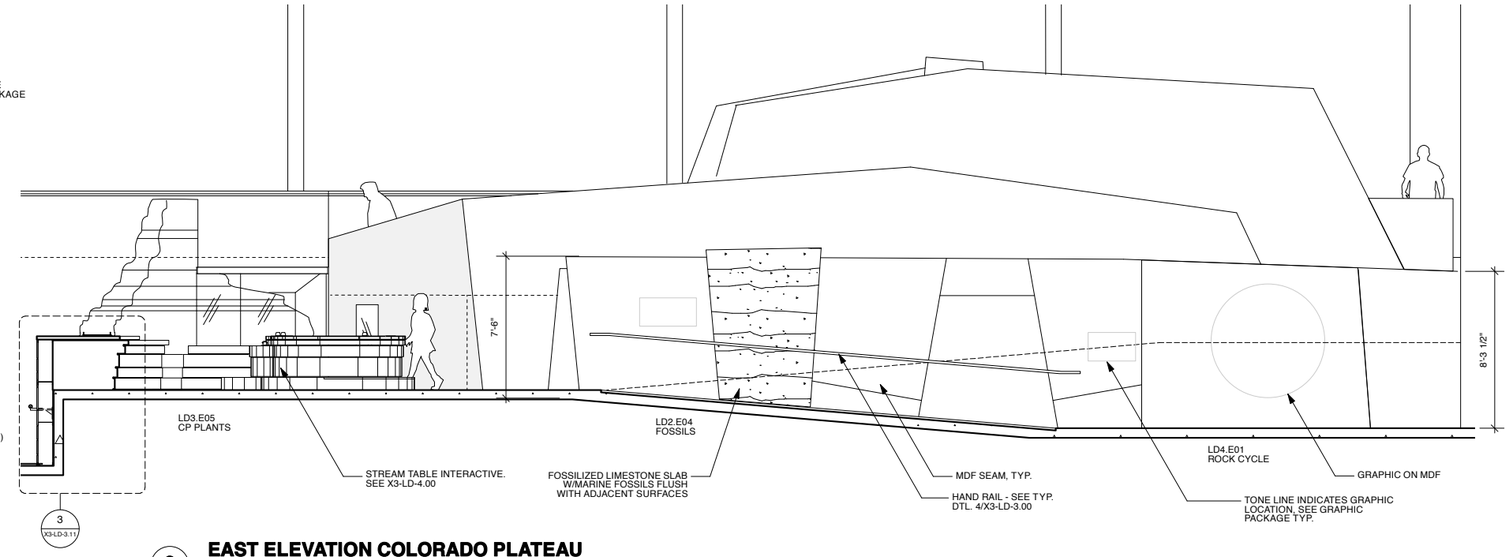
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X3-LD-2.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



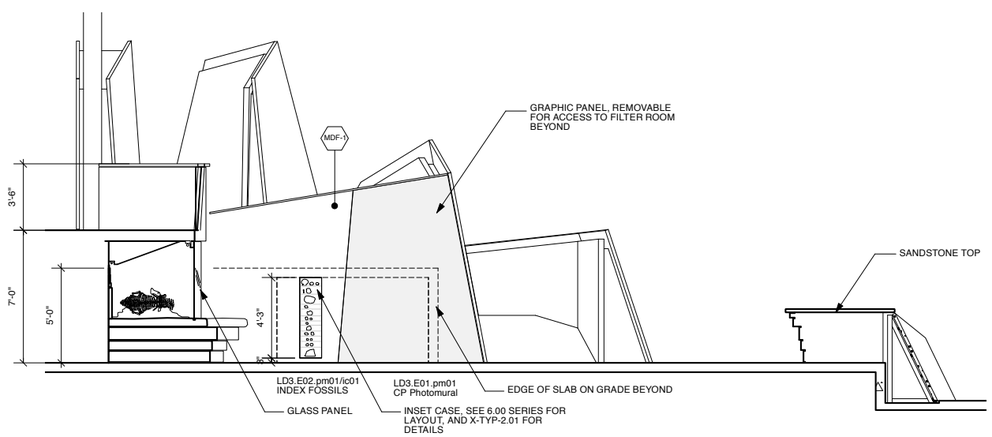
1 NORTH ELEVATION COLORADO PLATEAU

SCALE: 1/4"= 1'-0"



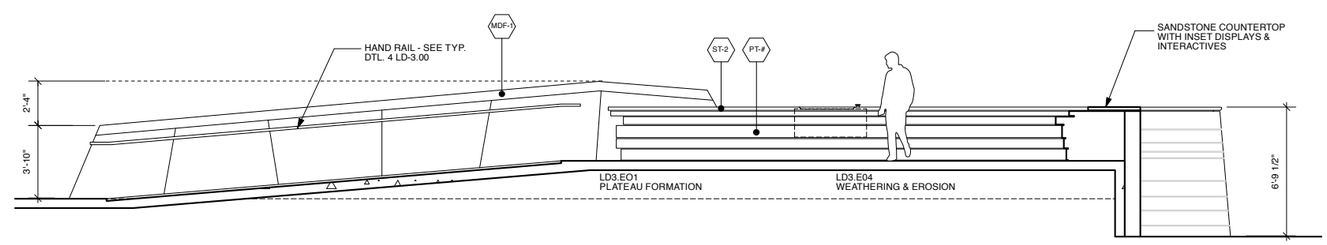
2 EAST ELEVATION COLORADO PLATEAU

SCALE: 1/4"= 1'-0"



3 SOUTH ELEVATION COLORADO PLATEAU

SCALE: 1/4"= 1'-0"



4 WEST ELEVATION COLORADO PLATEAU

SCALE: 1/4"= 1'-0"

NOTES:

1. SEE GRAPHIC PACKAGE FOR GRAPHIC PANEL SIZES AND TREATMENTS
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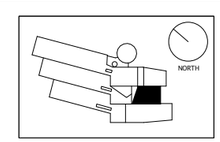


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

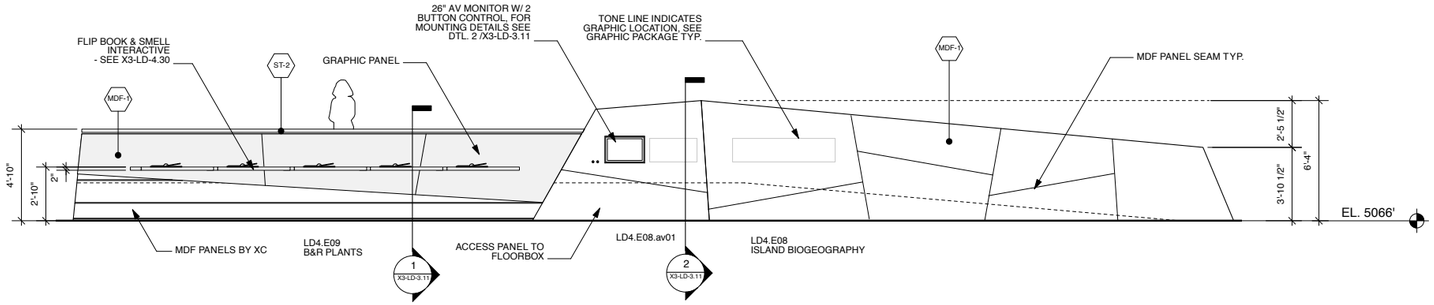
100% Final Design April 2, 2009

Sheet Title

Elevations & Sections: Land, CP

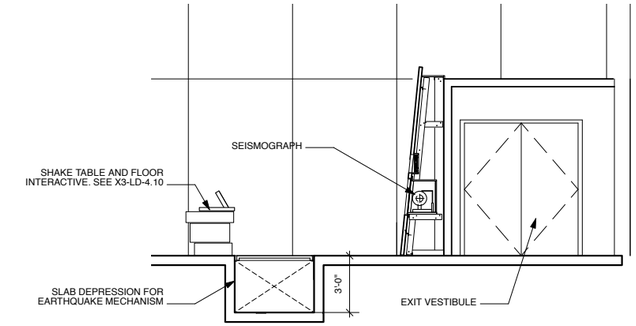
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 0224375 0
Scale*	Sheet No.
1/4"=1'-0"	X3-LD-2.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



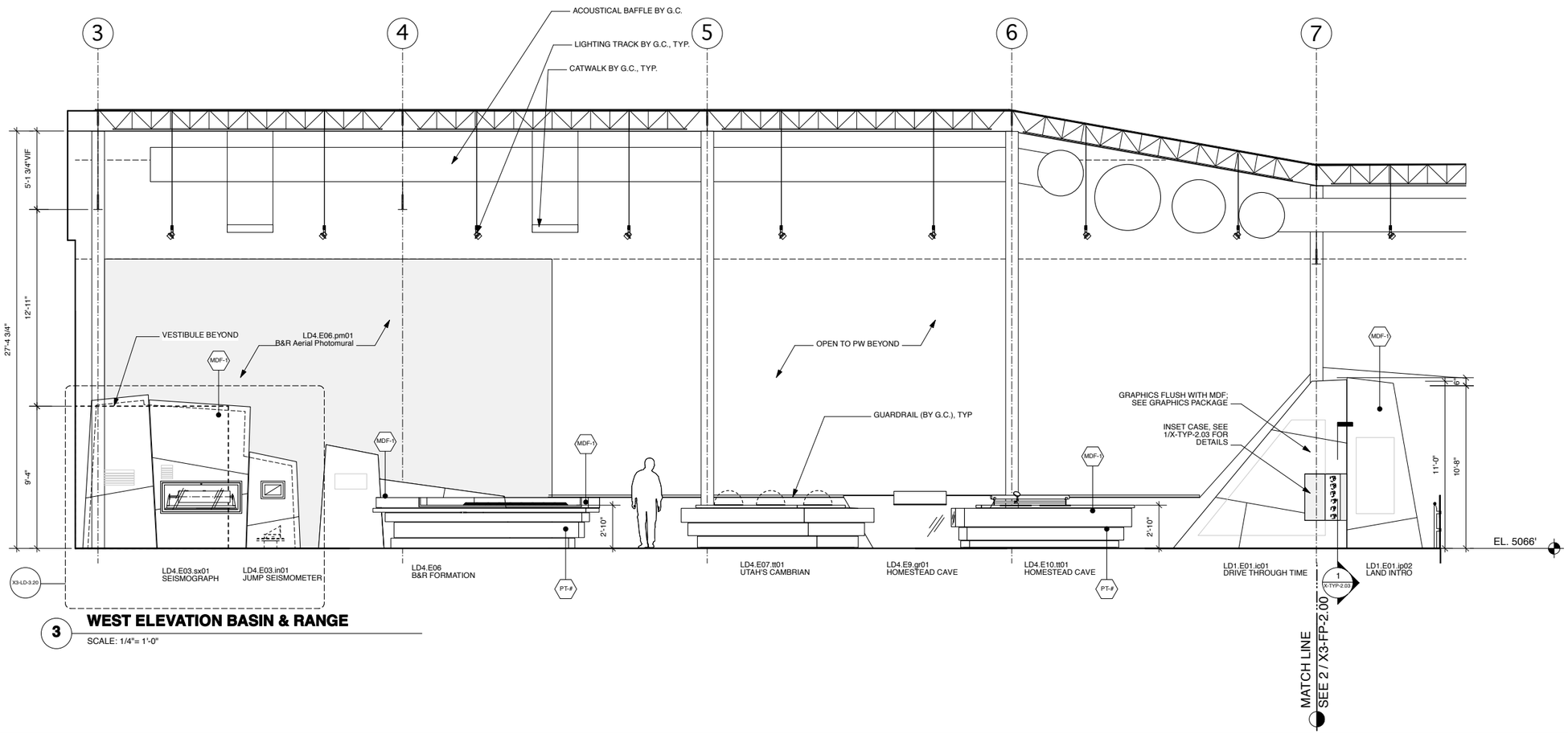
1 EAST ELEVATION BASIN & RANGE

SCALE: 1/4"= 1'-0"



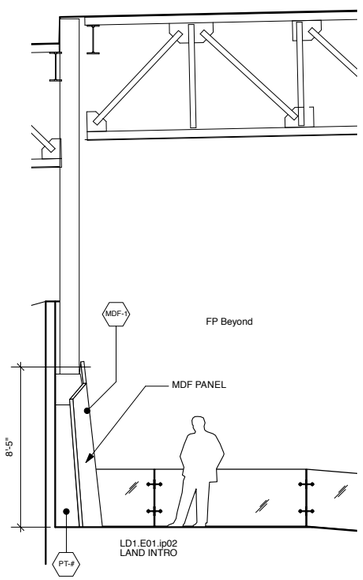
2 SOUTH ELEVATION BASIN & RANGE

SCALE: 1/4"= 1'-0"



3 WEST ELEVATION BASIN & RANGE

SCALE: 1/4"= 1'-0"



4 NORTH ELEVATION B&R

SCALE: 1/4"= 1'-0"

NOTES:

1. SEE GRAPHIC PACKAGE FOR GRAPHIC PANEL SIZES AND TREATMENTS
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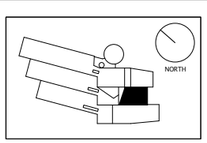


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

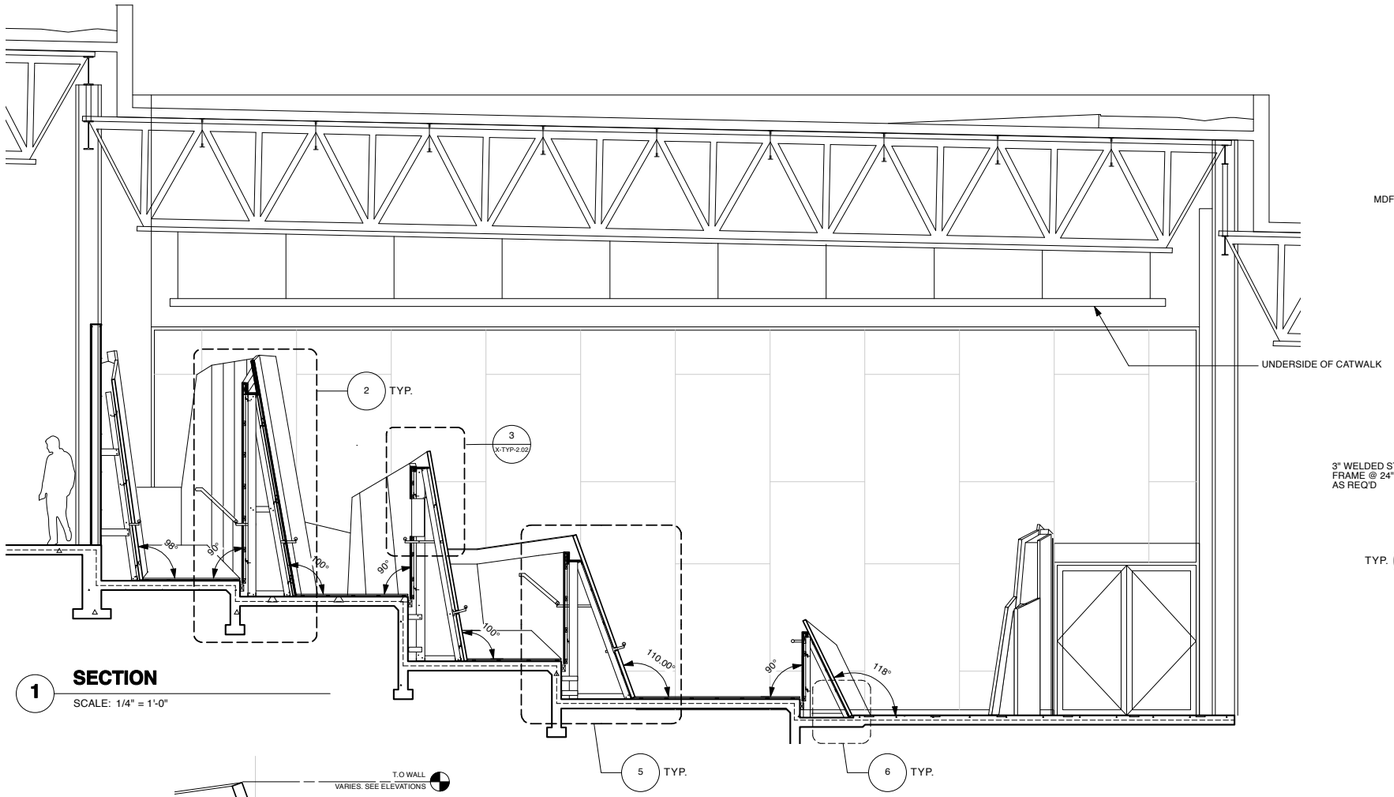
No. / Issue Name / Date

Sheet Title

Elevations & Sections: Land, B&R

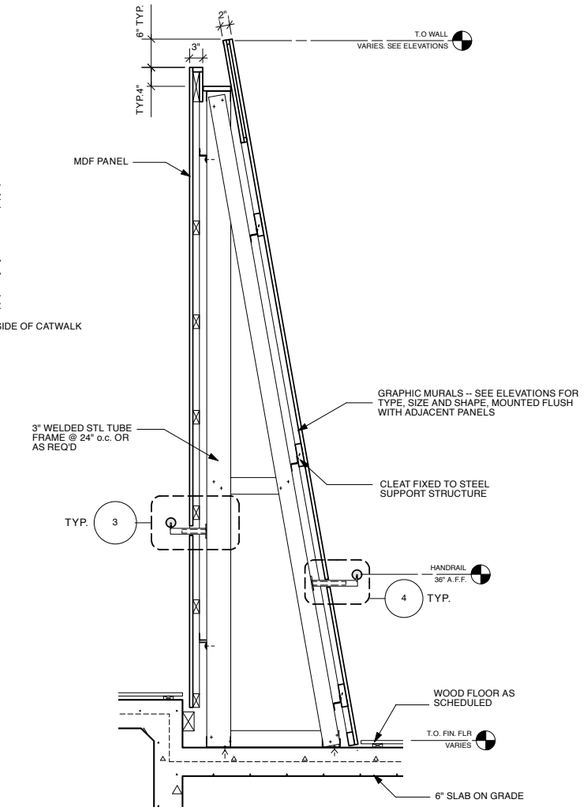
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X3-LD-2.03

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



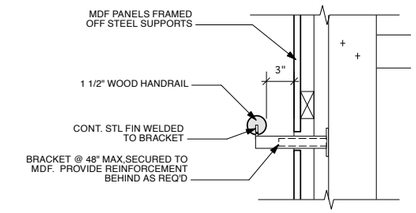
1 SECTION

SCALE: 1/4" = 1'-0"



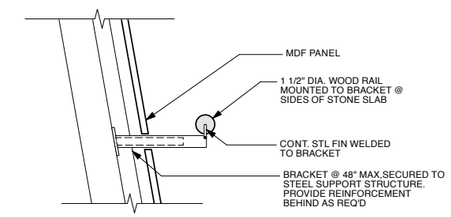
2 SECTION: GRAPHIC STRUCTURE, TYP.

SCALE: 3/4" = 1'-0"



3 SECTION DETAIL AT RAIL TYP.

SCALE: 1" = 1'-0"



4 SECTION DETAIL AT RAIL, TYP.

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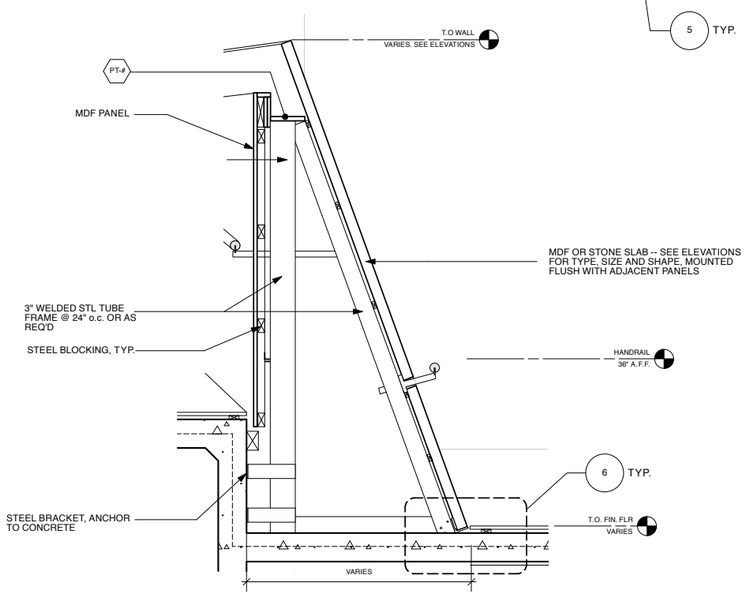
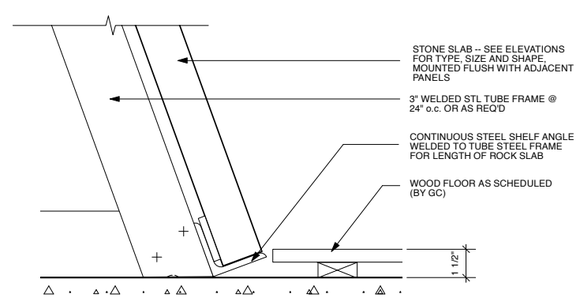


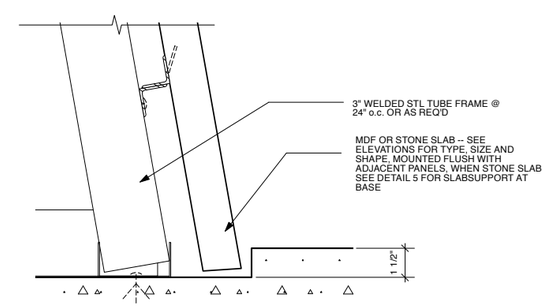
5 SECTION: STONE SLAB STRUCTURE, TYP.

SCALE: 3/4" = 1'-0"



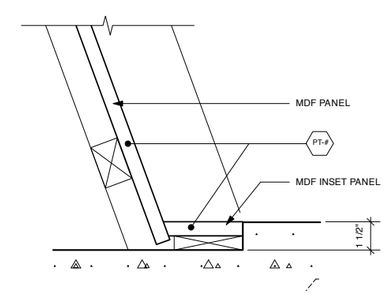
6 SECTION DETAIL AT PANEL EDGE, TYP

SCALE: 3" = 1'-0"



7 SECTION DETAIL, TYP

SCALE: 3" = 1'-0"



8 SECTION DETAIL, TYP

SCALE: 3" = 1'-0"

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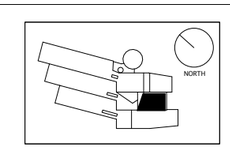


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

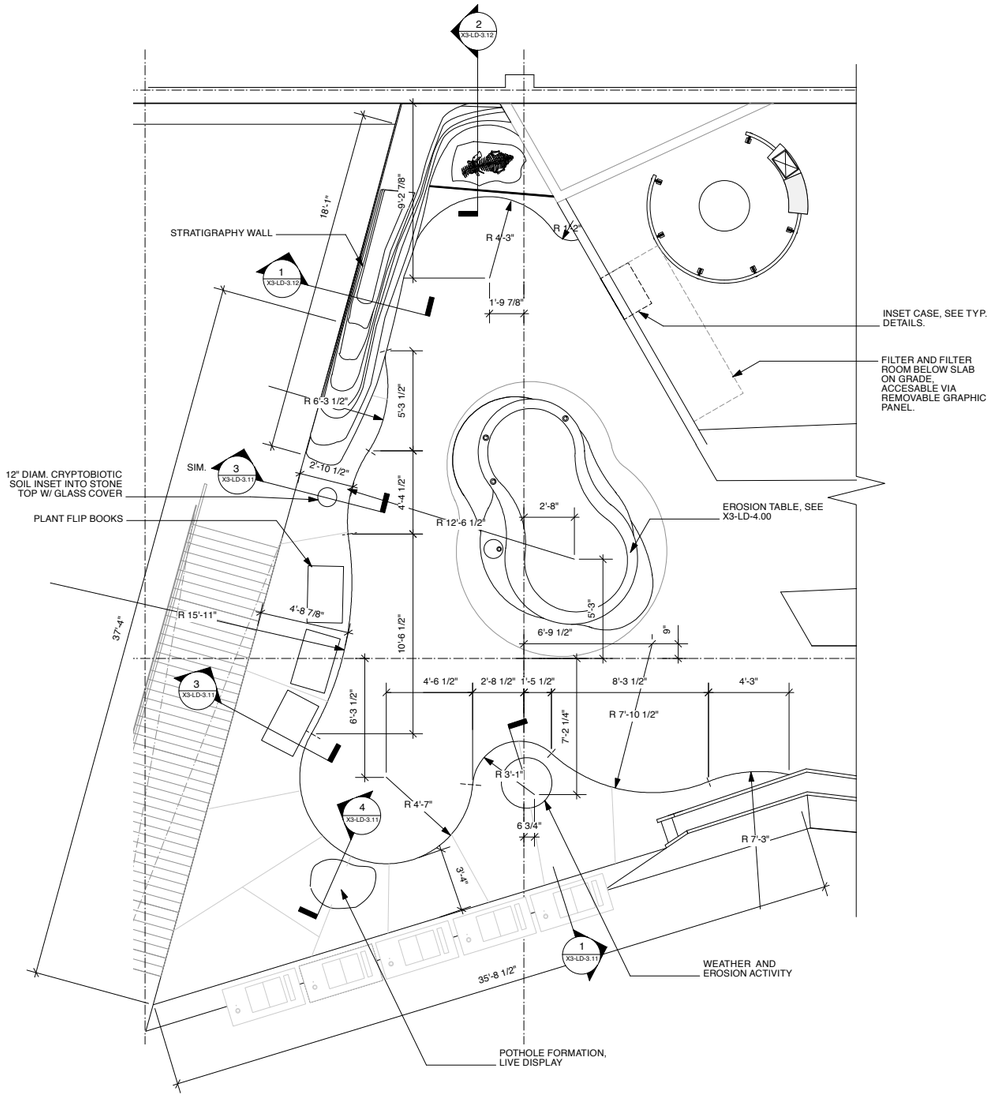
Details:
Land, Typ. Details

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X3-LD-3.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

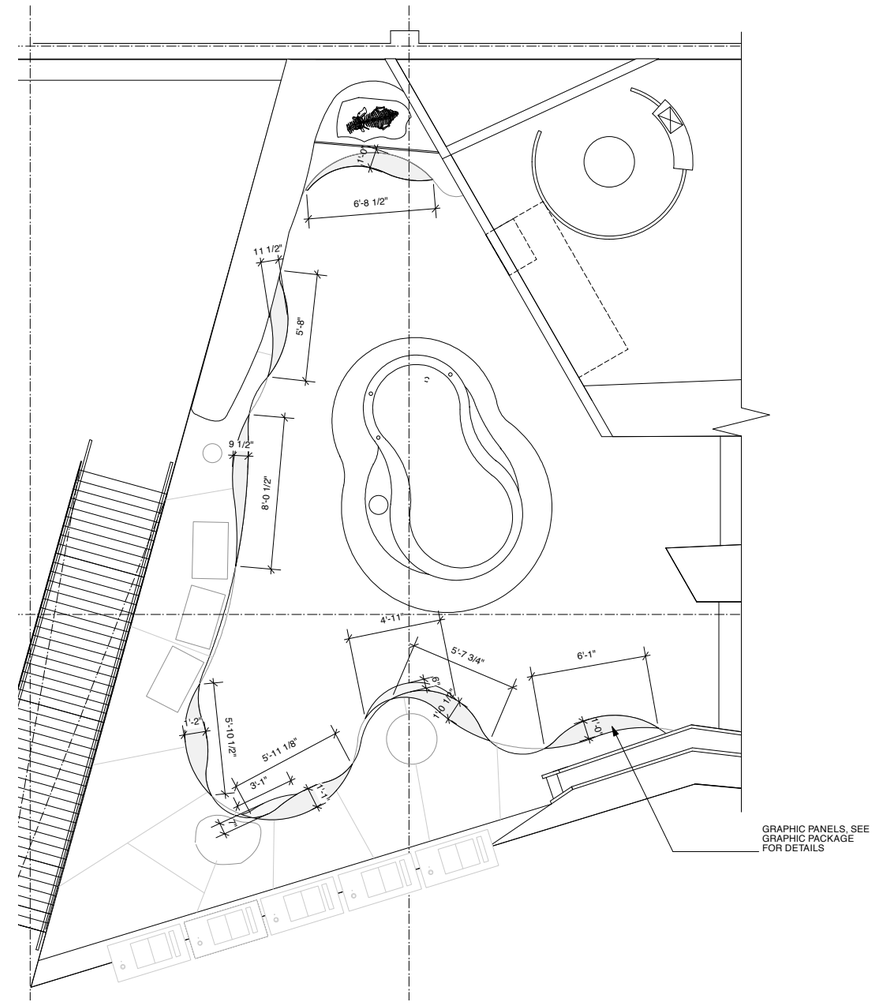
NOTES:

1. X.C. TO SURVEY SITE CONDITIONS PRIOR TO SHOP DRAWINGS AND FABRICATION
2. SEE STONE SPEC. FOR COUNTERTOP NOTES
3. SHOP DRAWINGS FOR MILLWORK TO DEFINE ALL MILLWORK LAYERS AND TYPICAL SECTIONS



1 CP DETAIL PLAN: SANDSTONE COUNTERTOP

SCALE: 1/4"= 1'-0"



2 CP DETAIL PLAN : MILLWORK

SCALE: 1/4"= 1'-0"

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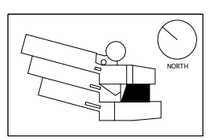


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

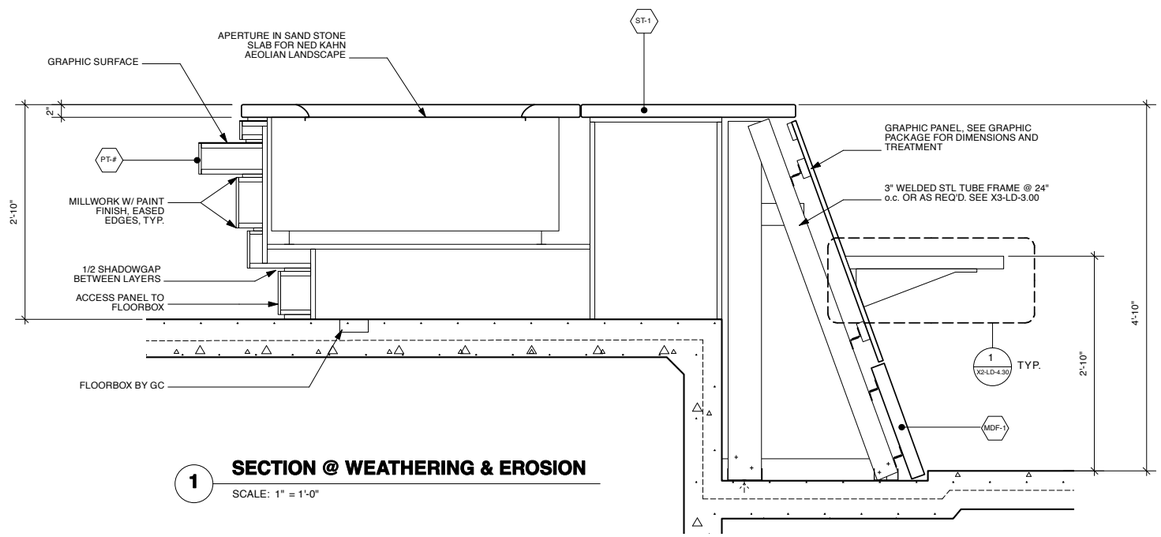
No. / Issue Name / Date

Sheet Title

Details:
Land, Typ. CP Dtl. Plan

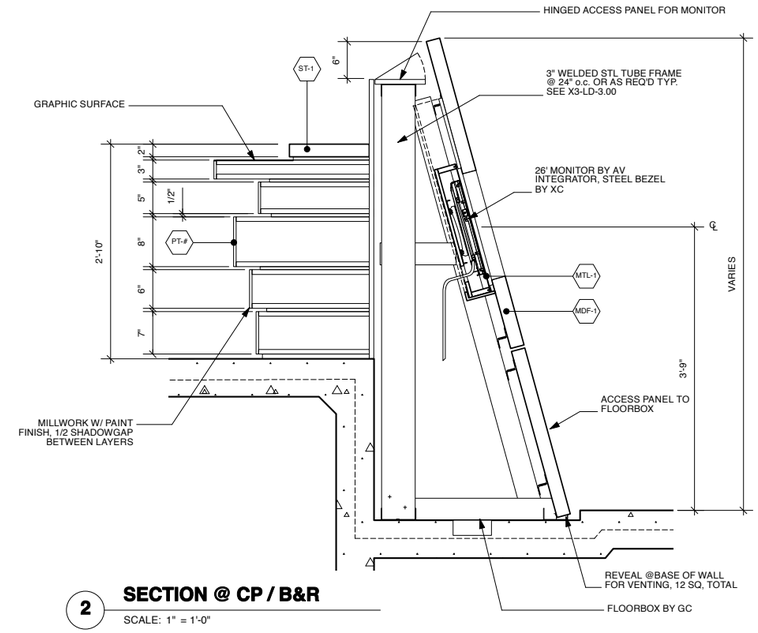
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 0243750
Scale*	Sheet No.
1/4"=1'-0"	X3-LD-3.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 SECTION @ WEATHERING & EROSION

SCALE: 1" = 1'-0"



2 SECTION @ CP / B&R

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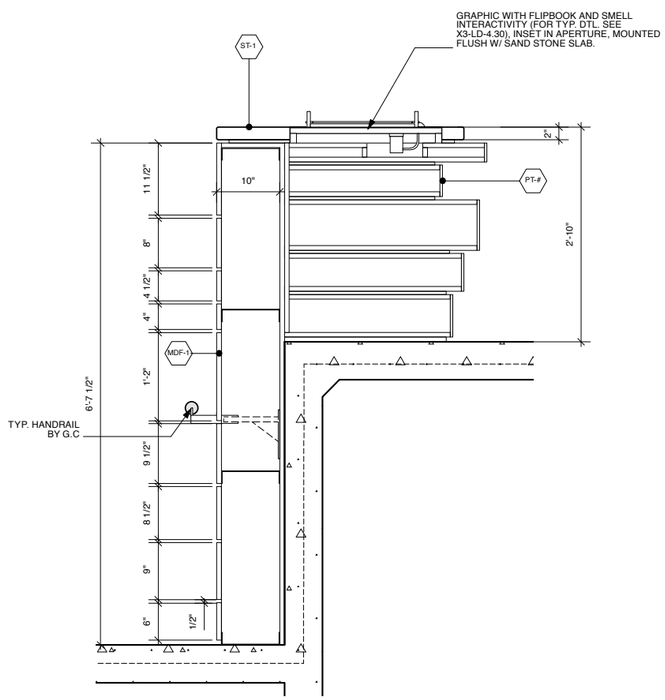
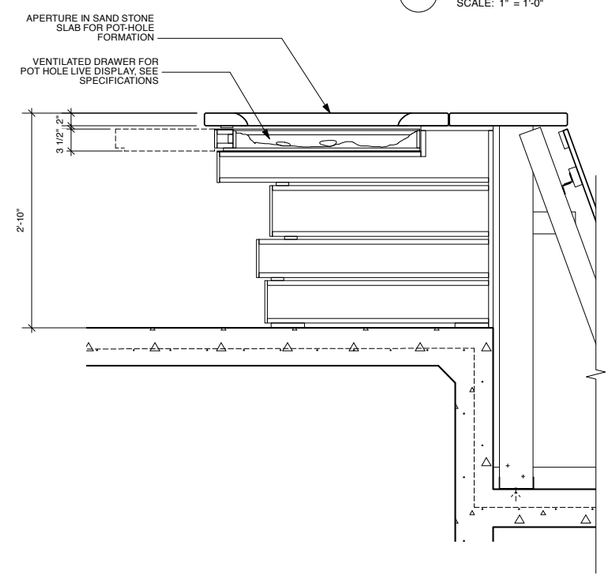


3 SECTION @ CP PLANTS

SCALE: 1" = 1'-0"



4 SECTION @ POTHOLE

SCALE: 1" = 1'-0"

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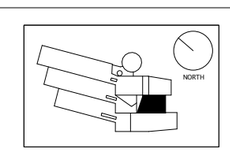


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Details:
Land, Typ. CP/B&R Sections

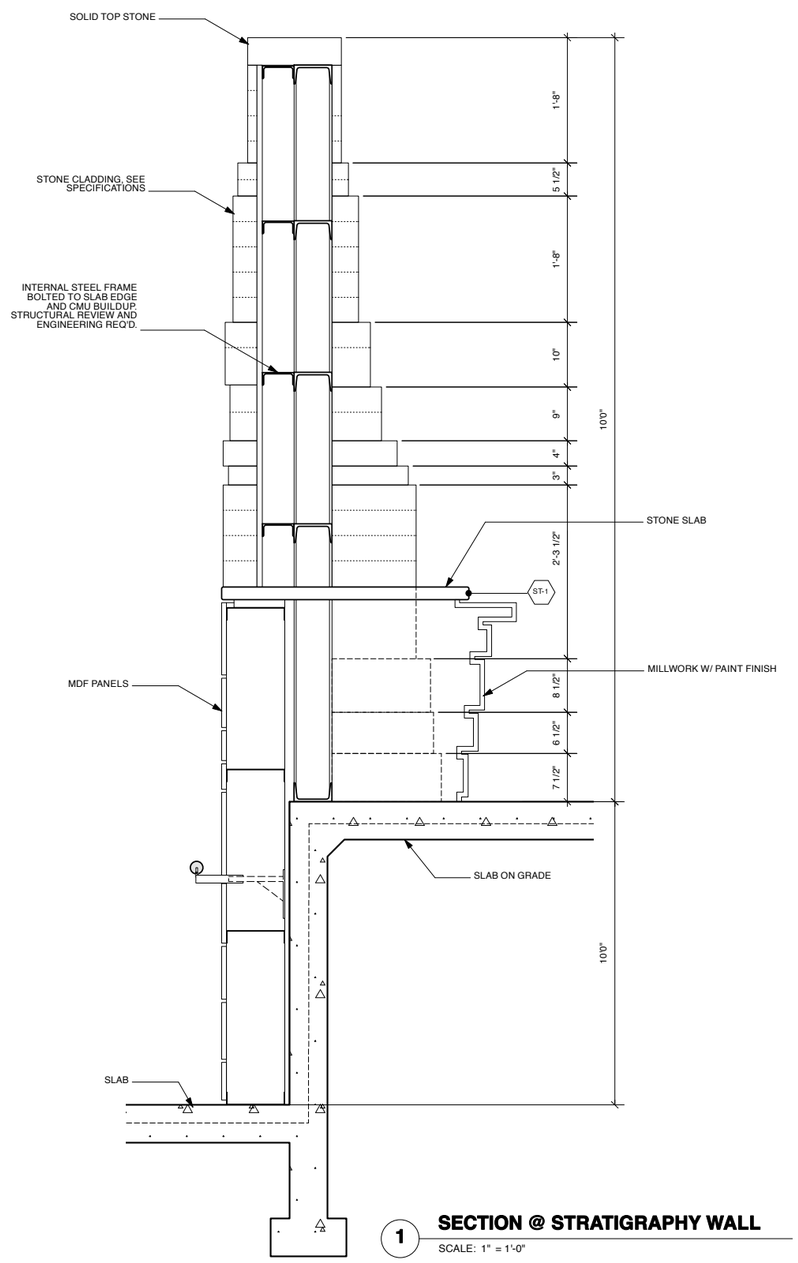
Date
April 2, 2009

Scale*
1"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

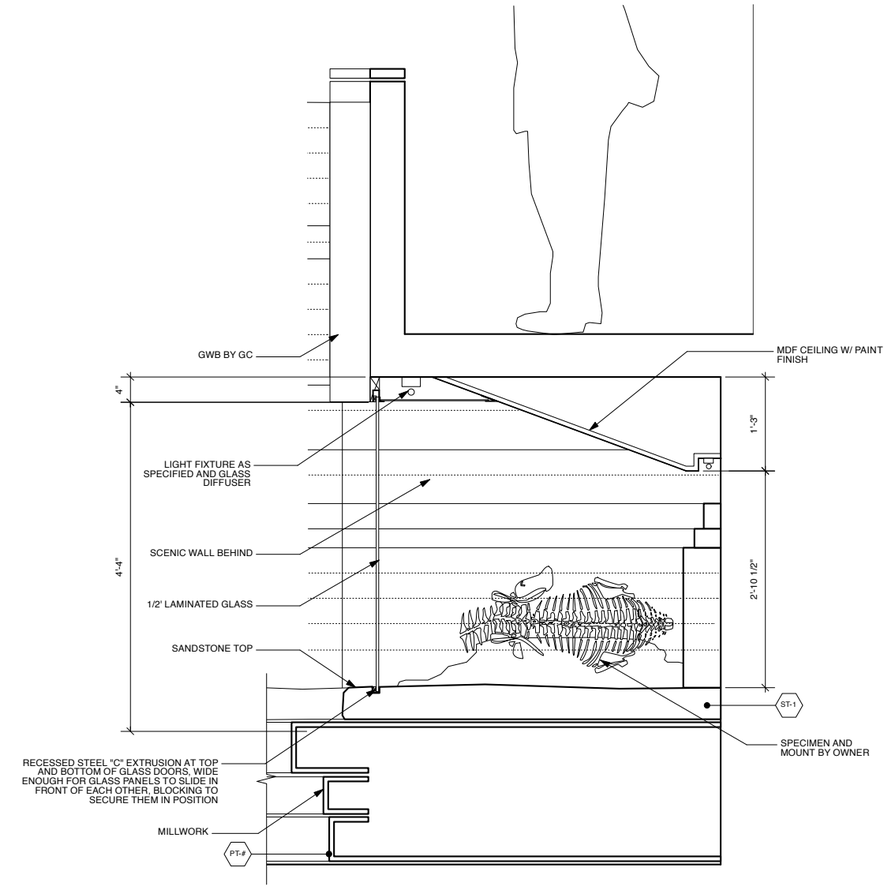
X3-LD-3.11

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **SECTION @ STRATIGRAPHY WALL**

SCALE: 1" = 1'-0"



2 **SECTION @ PROSAUROPOD**

SCALE: 1" = 1'-0"

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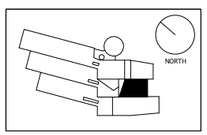


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Details:
Land, Typ. CP/B&R Sections

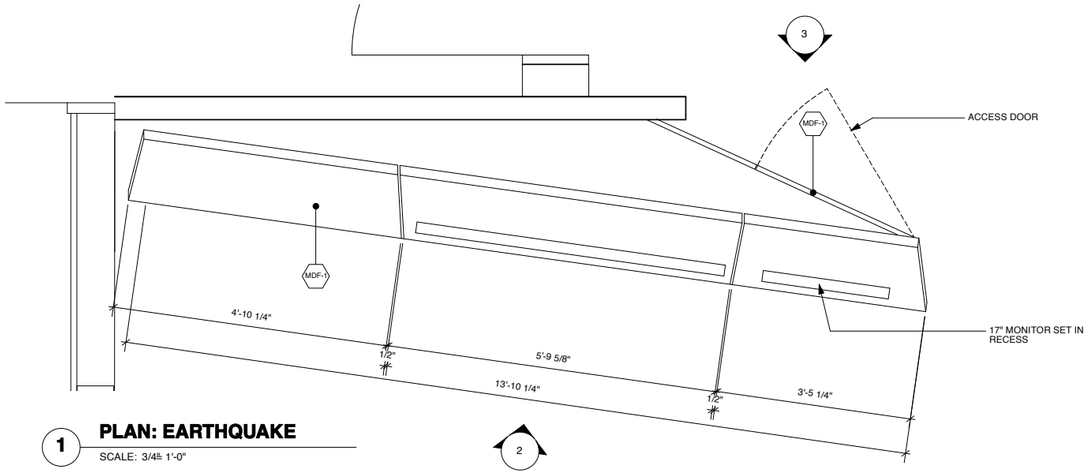
Date: April 2, 2009

Scale*: 1"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

X3-LD-3.12

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

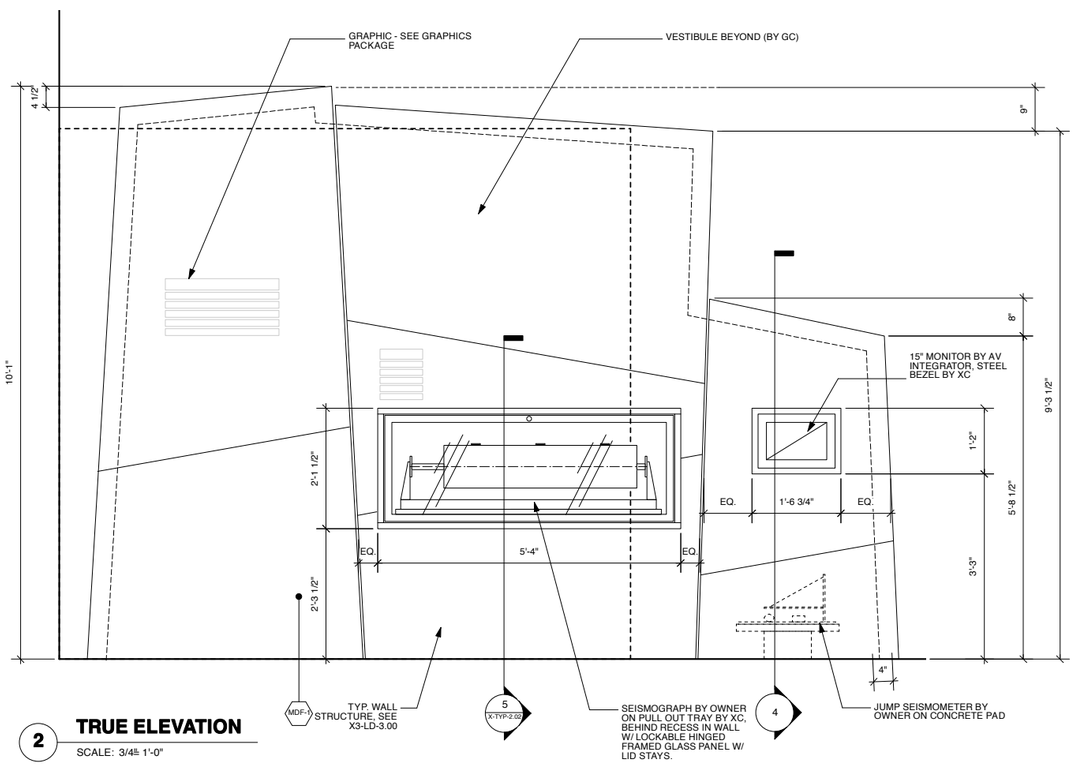


1 **PLAN: EARTHQUAKE**

SCALE: 3/4= 1'-0"

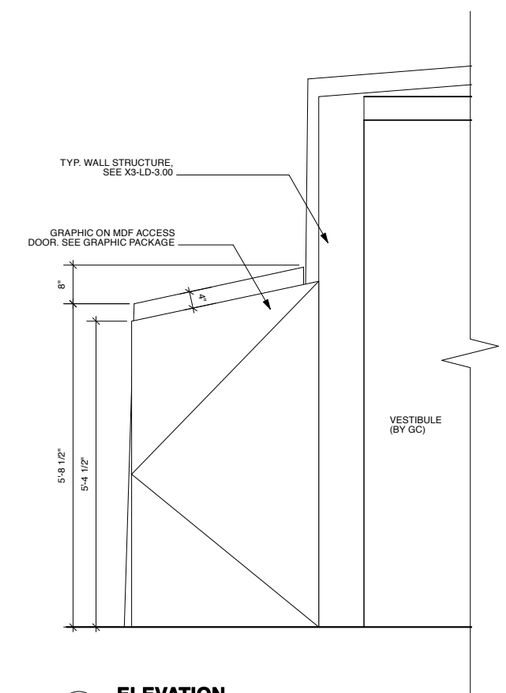
NOTES:

1. GRAPHIC TREATMENT ON FLOOR TO INDICATE JUMP LOCATION FOR SEISMOMETER - SEE GRAPHIC PACKAGE



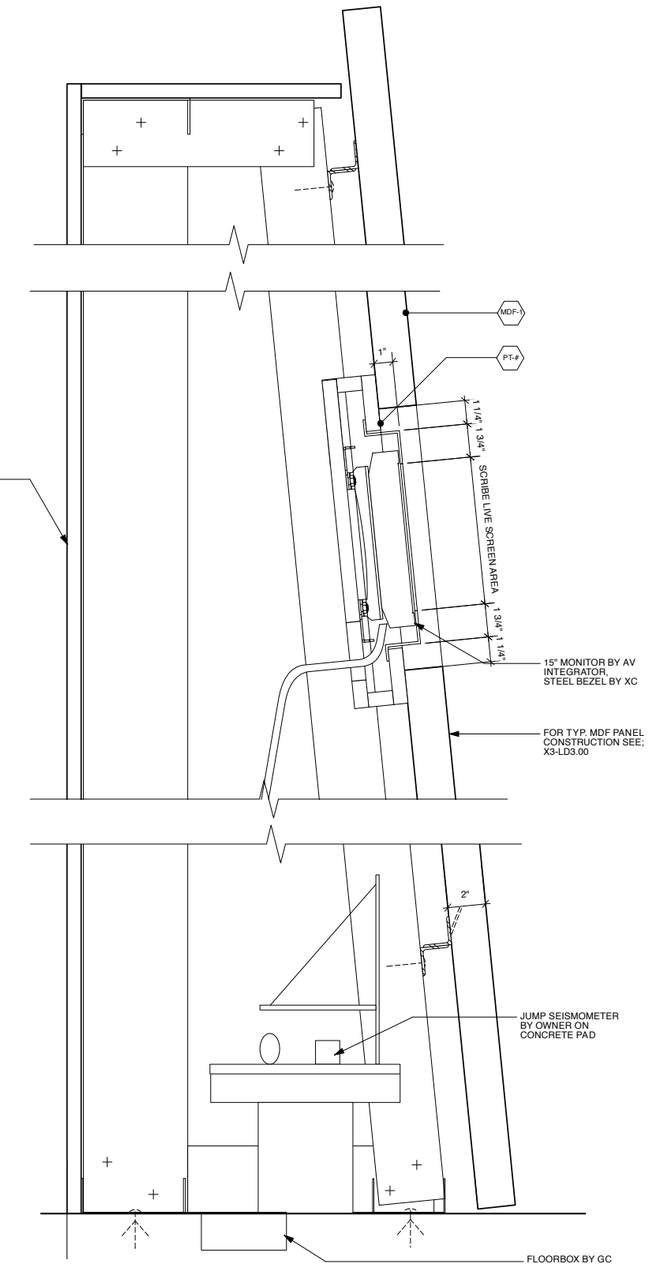
2 **TRUE ELEVATION**

SCALE: 3/4= 1'-0"



3 **ELEVATION**

SCALE: 3/4= 1'-0"



4 **DETAIL SECTION**

SCALE: 3" = 1'-0"

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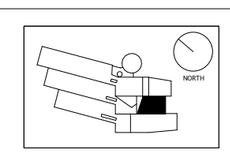


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

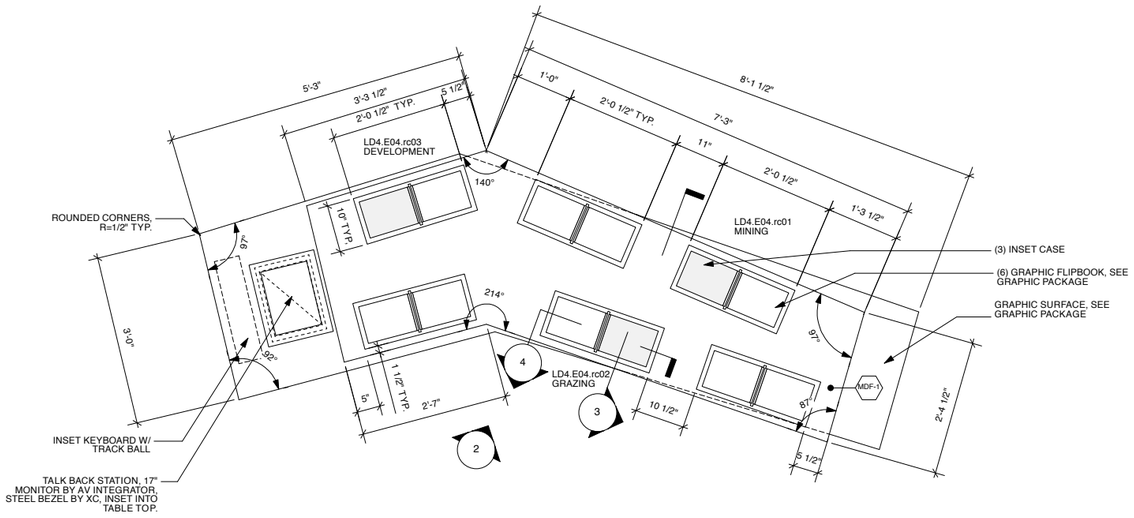
100% Final Design April 2, 2009

Sheet Title

Details:
Land, Seismic Wall, LD4.EO3

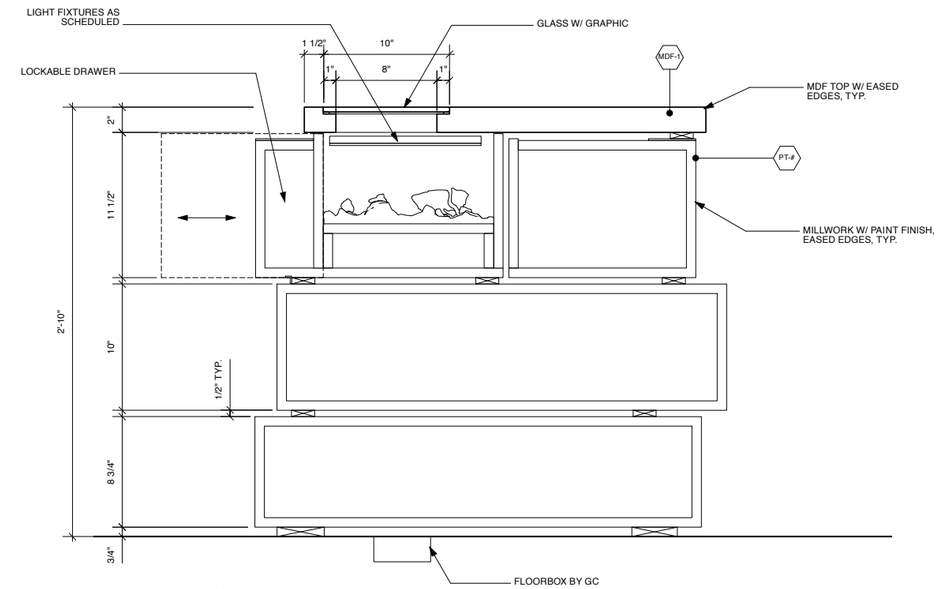
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
Scale*	DFCM Project No. 02243750
As Noted	Sheet No. X3-LD-3.20

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



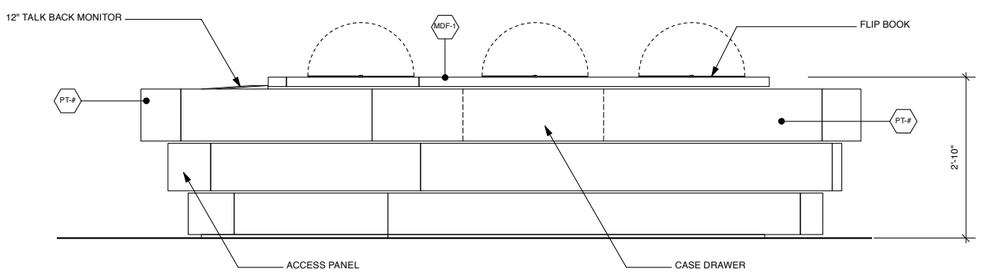
1 PLAN: HUMAN INTERACTIONS

SCALE: 3/4≦ 1'-0"



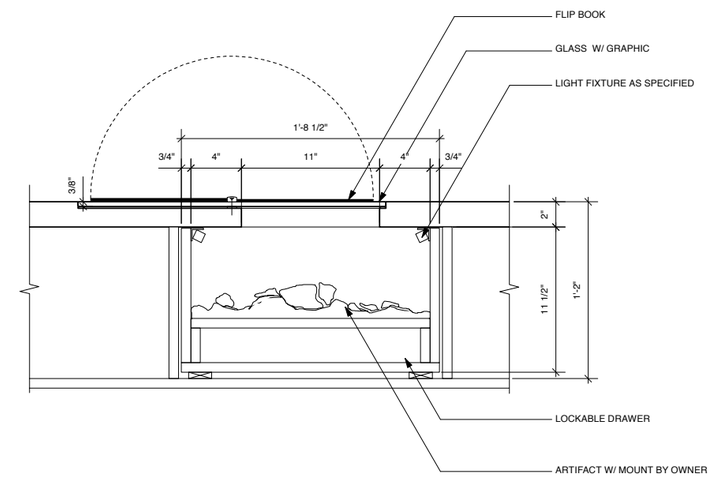
3 DETAIL SECTION

SCALE: 2" = 1'-0"



2 ELEVATION

SCALE: 3/4≦ 1'-0"



4 DETAIL SECTION

SCALE: 2" = 1'-0"

NOTES:

1. ALL CORNERS ON TABLE TOP AND BASE TO HAVE 1/2 MITERED EDGE

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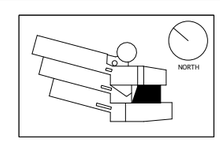


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

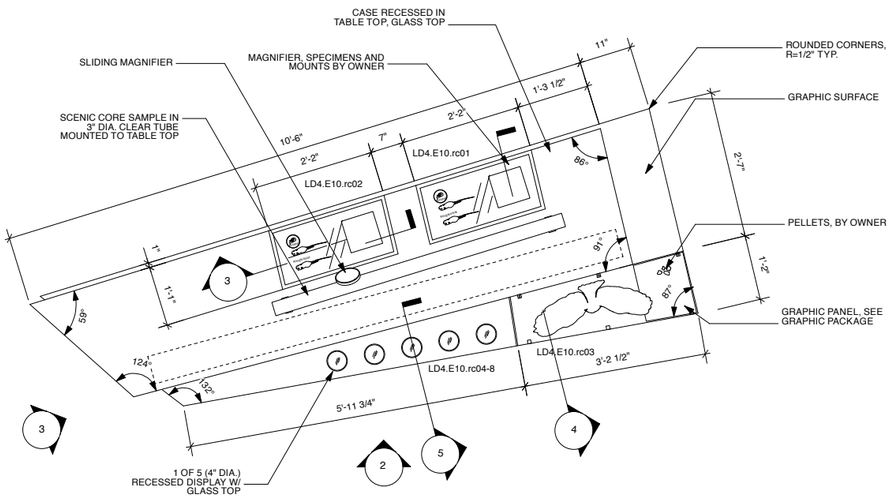
100% Final Design April 2, 2009

Sheet Title

Details:
Land, Human Interactions LD4.E04.tt01

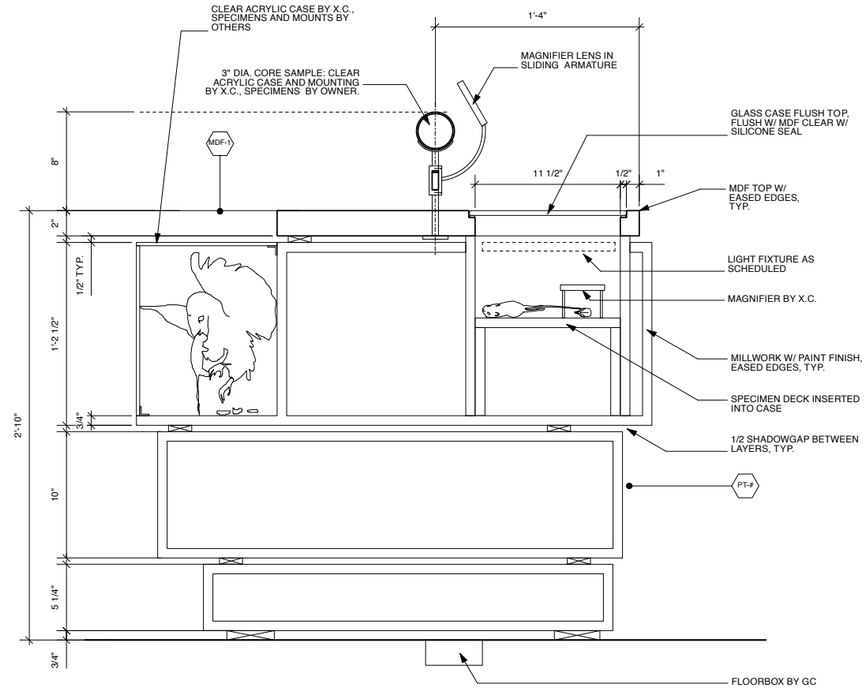
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X3-LD-3.30

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



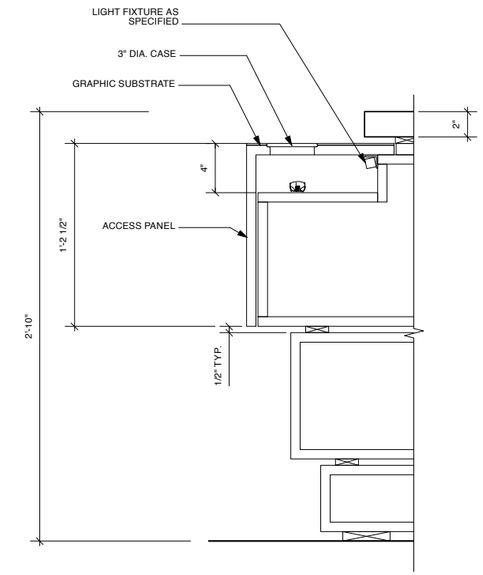
1 PLAN: HOMESTEAD CAVE

SCALE: 3/4= 1'-0"



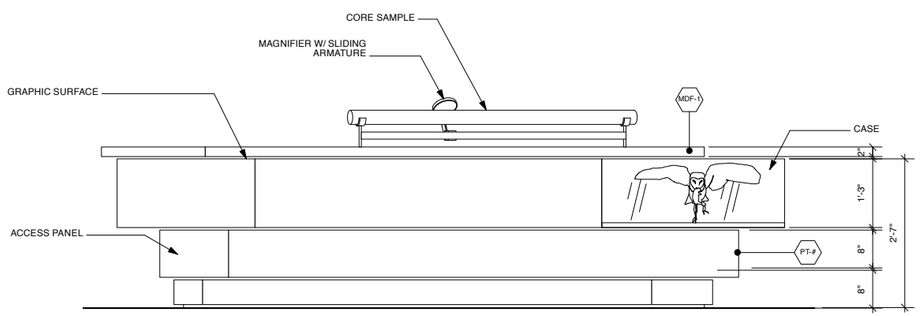
4 DETAIL SECTION

SCALE: 2"= 1'-0"



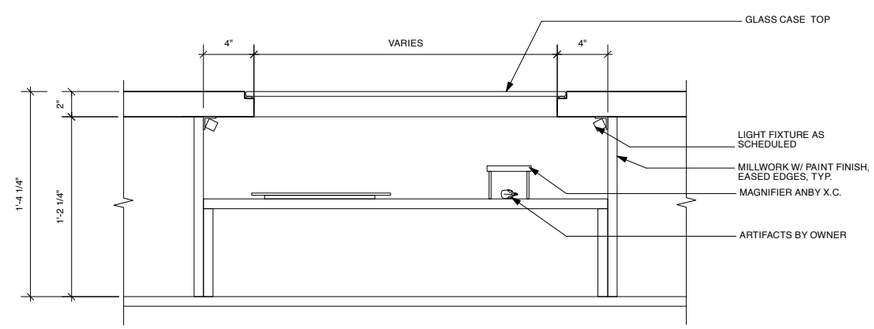
5 DETAIL SECTION

SCALE: 2"= 1'-0"



2 ELEVATION

SCALE: 3/4= 1'-0"



3 ELEVATION

SCALE: 3/4= 1'-0"

NOTES:

1. ALL CORNERS ON TABLE TOP AND BASE TO HAVE 1/2 MITERED EDGE

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Exhibit Construction

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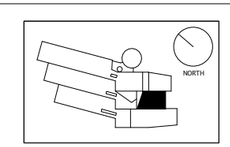


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Details:
Land, Homestead cave LD4.E10.tt01

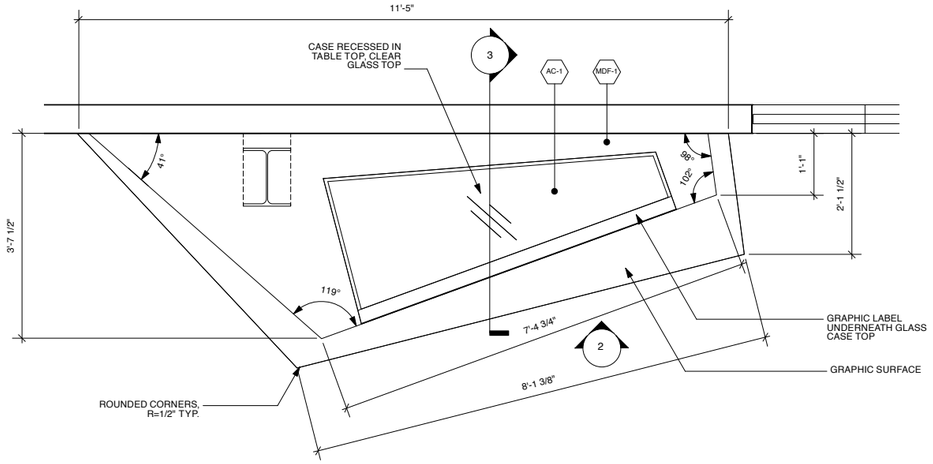
Date: April 2, 2009

Scale*: As Noted

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

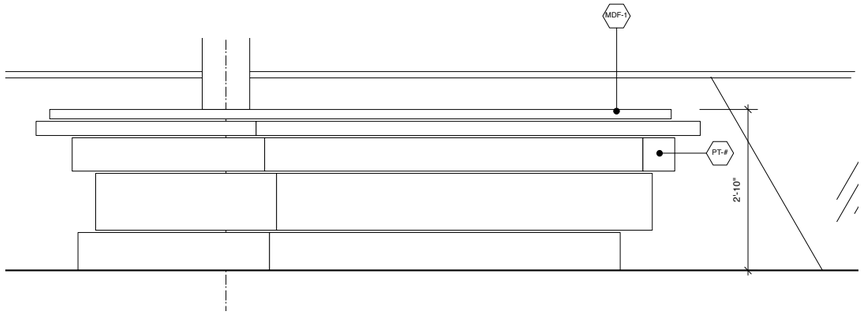
X3-LD-3.40

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



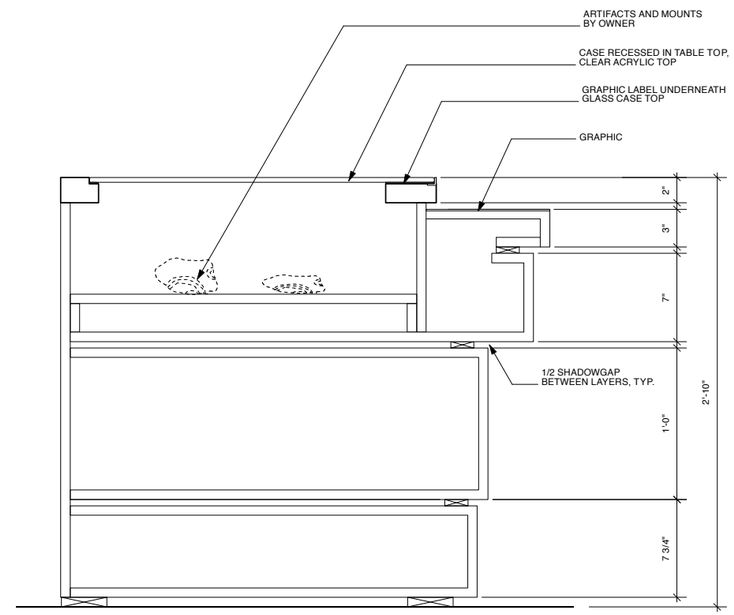
1 PLAN: UTAH'S CAMBRIAN

SCALE: 3/4≙ 1'-0"



2 ELEVATION

SCALE: 3/4≙ 1'-0"



3 DETAIL SECTION

SCALE: 3/4≙ 1'-0"

NOTES:

1. ALL CORNERS ON TABLE TOP AND BASE TO HAVE 1/2 MITERED EDGE

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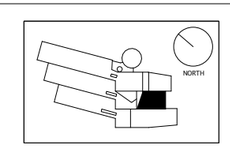


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

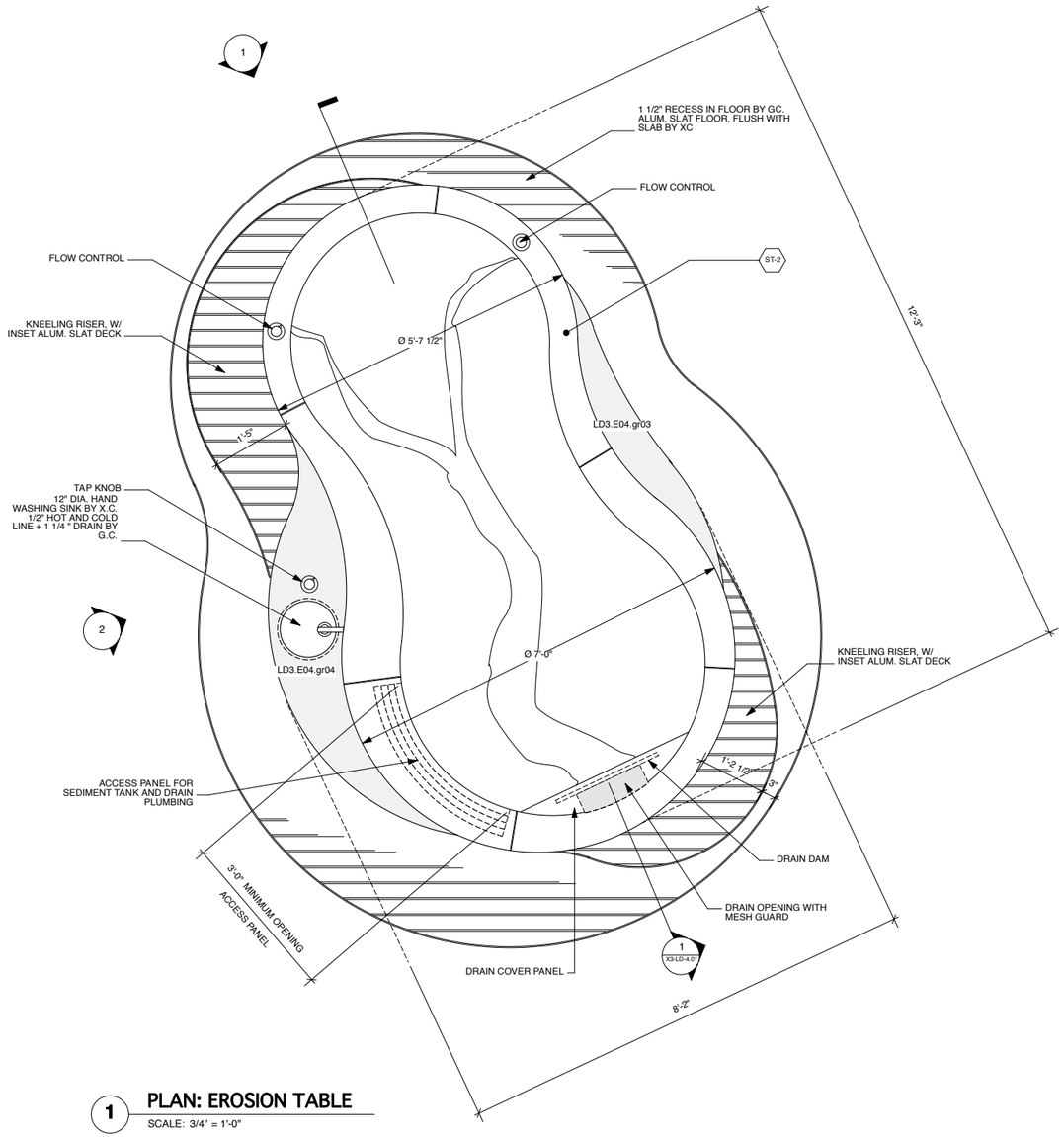
Details:
Land, Utah's Cambrian LD4.E07.tt01

Date
April 2, 2009

Scale*
As Noted"

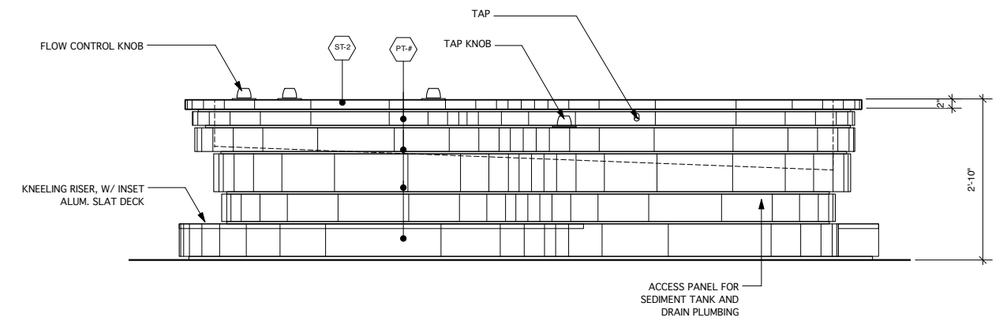
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 0243750
Sheet No.
X3-LD-3.50

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



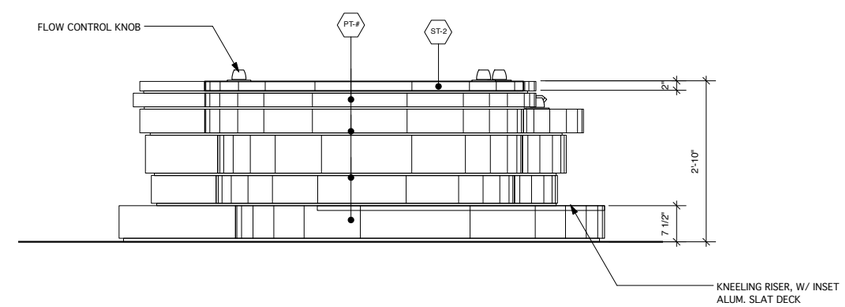
1 **PLAN: EROSION TABLE**

SCALE: 3/4" = 1'-0"



2 **ELEVATION**

SCALE: 3/4" = 1'-0"



3 **ELEVATION**

SCALE: 3/4" = 1'-0"

NOTES:

1. SEE INTERACTIVE SPEC. FOR ADDITIONAL INFO.
2. 1/2" COLD WATERLINE + 1" RETURN BY GC. XC TO FIELD VERIFY LOCATIONS PRIOR TO SHOP DWGS.
SYSTEM CRITERIA AND NOTES:
3. WATER SUPPLY AND RETURN ARE ROUTED UNDER PLATFORM FLOOR TO A ND FROM PUMP LOCATED IN A PUMP CLOSET
4. RETURN WATER TO BE COMPLETELY FREE OF GRIT -- EXHIBIT FABRICATOR TO ENGINEER DRAINAGE AND FILTER SYSTEM TO COMPLY
5. PUMP CLOSET: PUMP SHOULD BE SUFFICIENT TO PRODUCE 15-20 GPM -- SUPPLY LINE SHOULD HAVE UV TREATMENT DEVICE IN LINE
6. MECHANICAL AND WATER HANDLING IDEAS SHOWN ARE CONCEPTUAL ONLY -- EXHIBIT FABRICATOR TO ENGINEER PUMPING AND FILTRATION SYSTEM AND DETERMINE THE OPTIMUM EQUIPMENT FOR USE IN THE SYSTEM
7. INTERACTIVE TO BE ENGINEERED FOR RELIABLE OPERATION AS INTENDED AND FOR A FUNCTIONAL LIFE SPAN OF 15 YEARS

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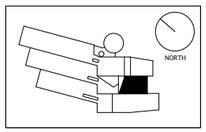


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

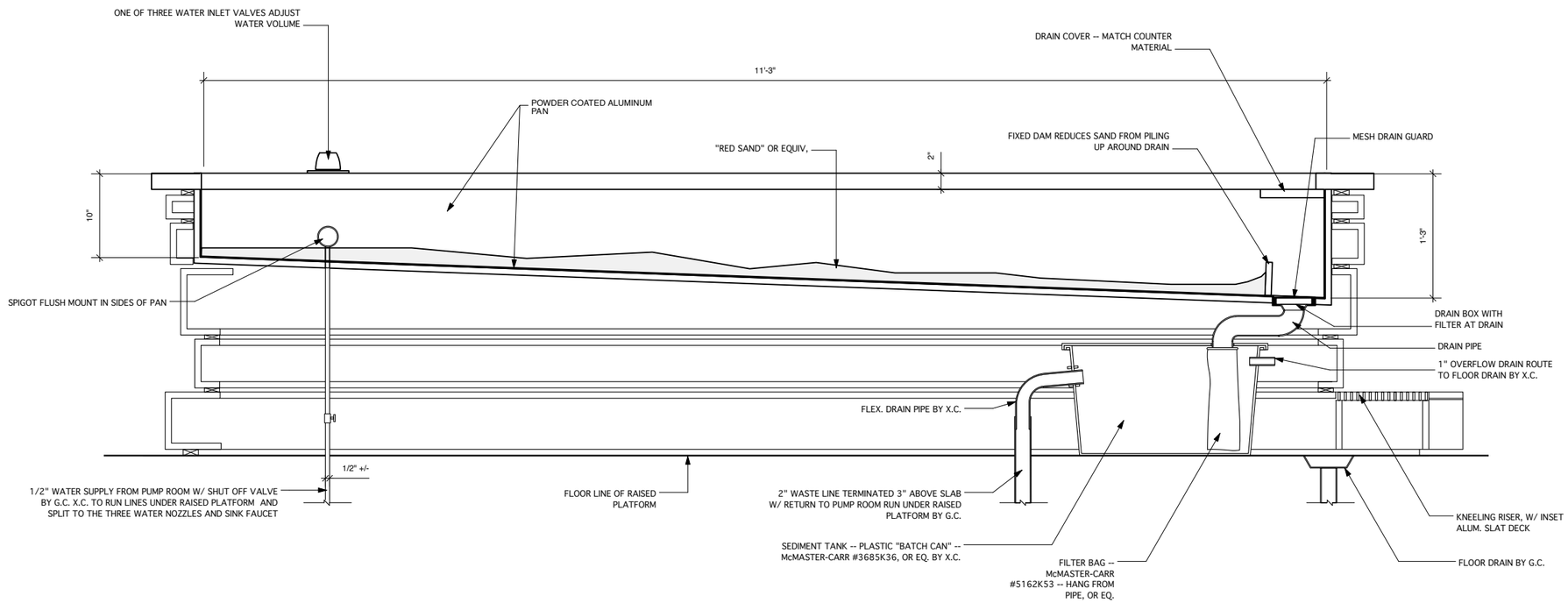
No. / Issue Name / Date

Sheet Title

Interactives:
Land, Erosion Table, LD3.E01.in01

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X3-LD-4.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



FOR PUMP CLOSET LOCATION SEE PLAN X3-LD-1.00 AND ELEVATION X3-LD-2.02

1 DETAIL SECTION

SCALE: 1-1/2" = 1'-0"

NOTES:

1. SEE INTERACTIVE SPEC. FOR ADDITIONAL INFO.
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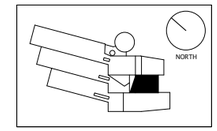


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Interactives:
Land, Erosion Table, LD3.E01.in01

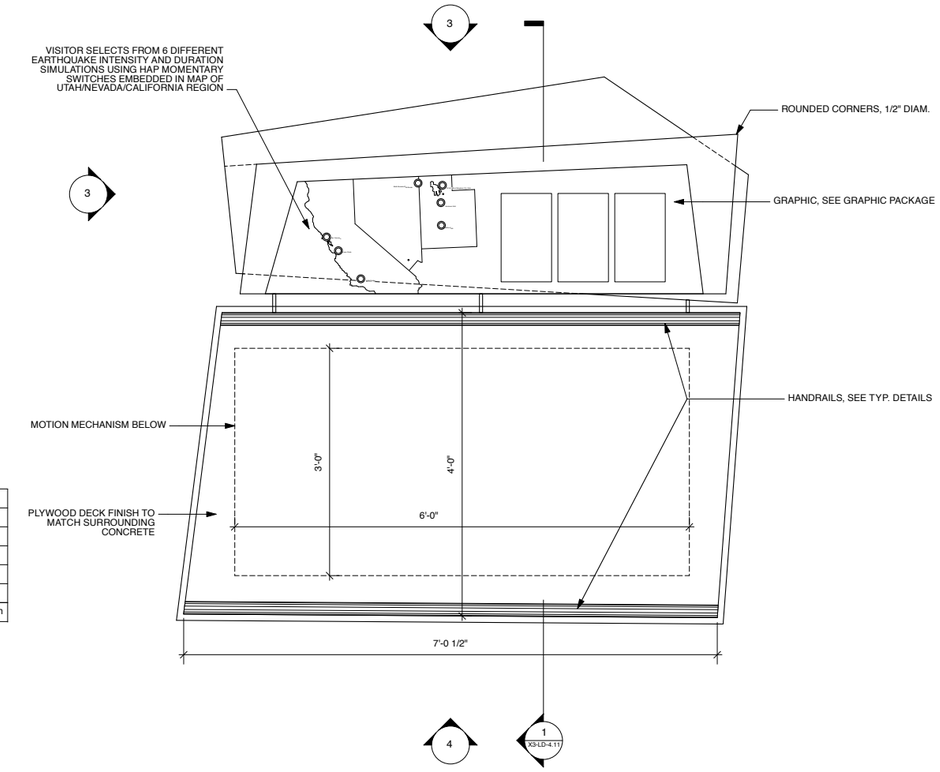
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
1-1/2" = 1'-0"	X3-LD-4.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

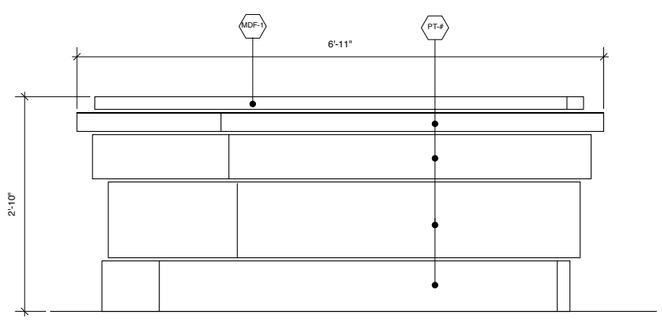
NOTES:

1. MECHANICAL IDEAS SHOWN ARE INTENDED AS CONCEPTUAL ONLY -- EXHIBIT FABRICATOR TO ENGINEER INTERACTIVE FOR SMOOTH OPERATION AS INTENDED AND FOR A FUNCTIONAL LIFE SPAN OF 15 YEARS
2. SEE INTERACTIVE SPECIFICATIONS
3. EARTHQUAKE SIMULATION TO REPLICATE EARTHQUAKE INTENSITY / DURATION AT SITES SHOWN BELOW

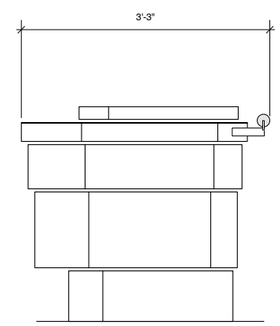
EARTHQUAKE	magnitude	intensity	duration mins	type
1906 San Francisco California	7.8	IX	-	strike slip
1934 Cosmo Utah	6.6	VIII	1	-
1964 Anchorage Alaska	9.2	X	3	-
1989 San Francisco California	6.9	IX	-	-
1994 Northridge California	6.7	IX	-	-
2004 Sumatra	7.3	IV	-	subduction



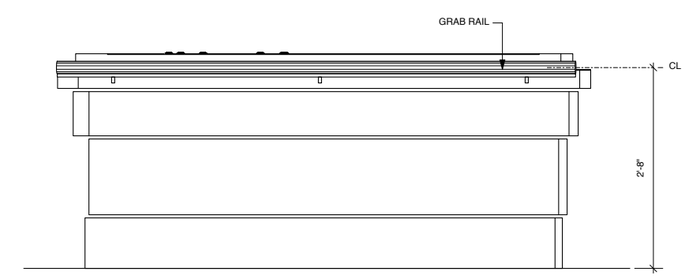
1 PLAN
SCALE: 1" = 1'-0"



2 ELEVATION
SCALE: 1" = 1'-0"



3 ELEVATION
SCALE: 1" = 1'-0"



4 ELEVATION
SCALE: 1" = 1'-0"

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Exhibit Construction

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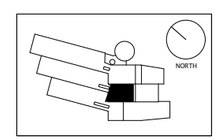


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009
No. / Issue Name / Date

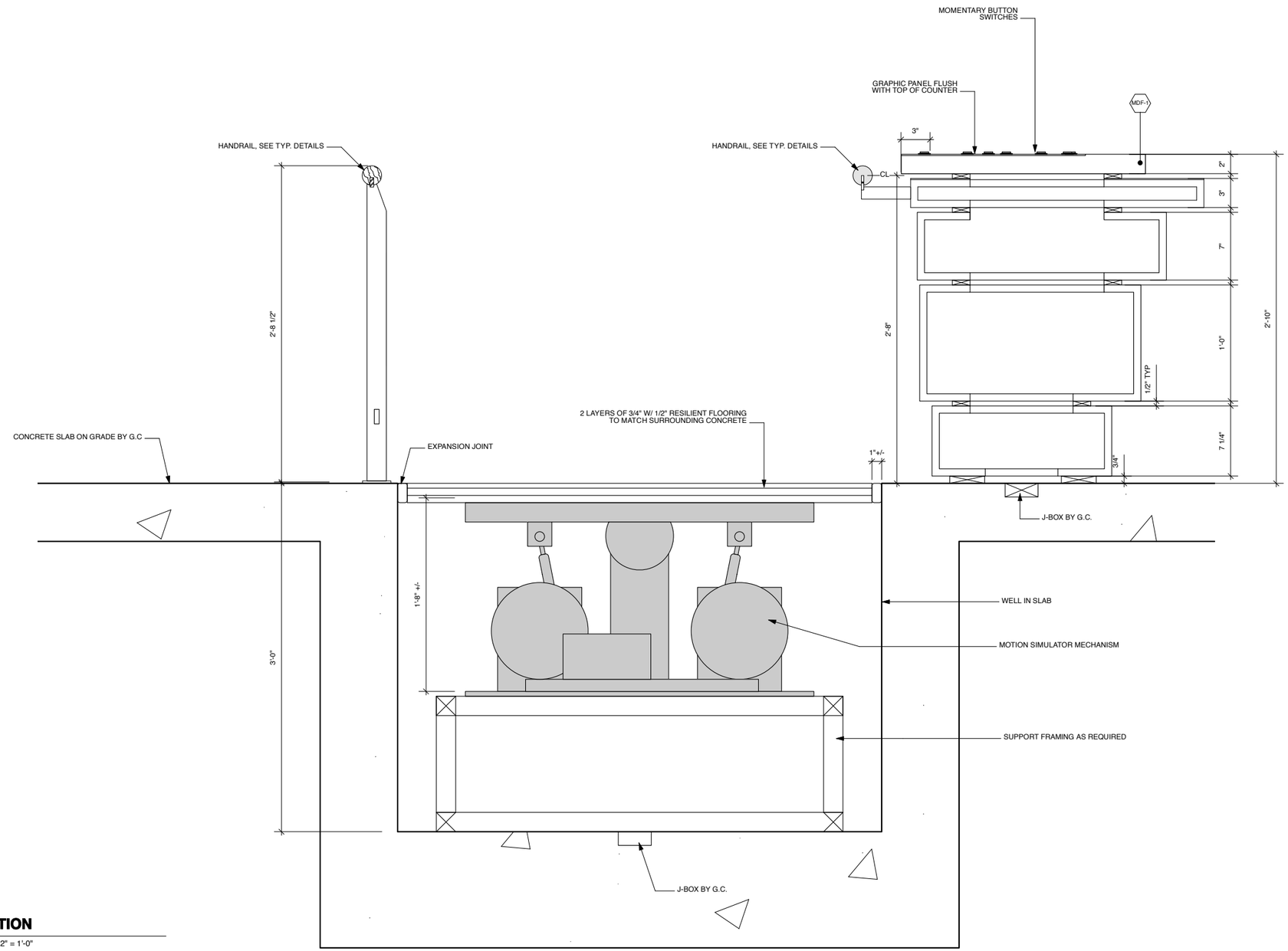
Sheet Title
Interactives:
Land, Shake Platform

Date
April 2, 2009

Scale*
1" = 1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X3-LD-4.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **SECTION**

SCALE: 2" = 1'-0"

NOTES:

1. MECHANICAL IDEAS SHOWN ARE INTENDED AS CONCEPTUAL ONLY -- EXHIBIT FABRICATOR TO ENGINEER INTERACTIVE FOR SMOOTH OPERATION AS INTENDED AND FOR A FUNCTIONAL LIFE SPAN OF 15 YEARS
2. SEE INTERACTIVE SPECIFICATIONS

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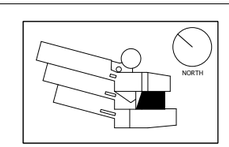


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Interactives:
Land, Shake Platform

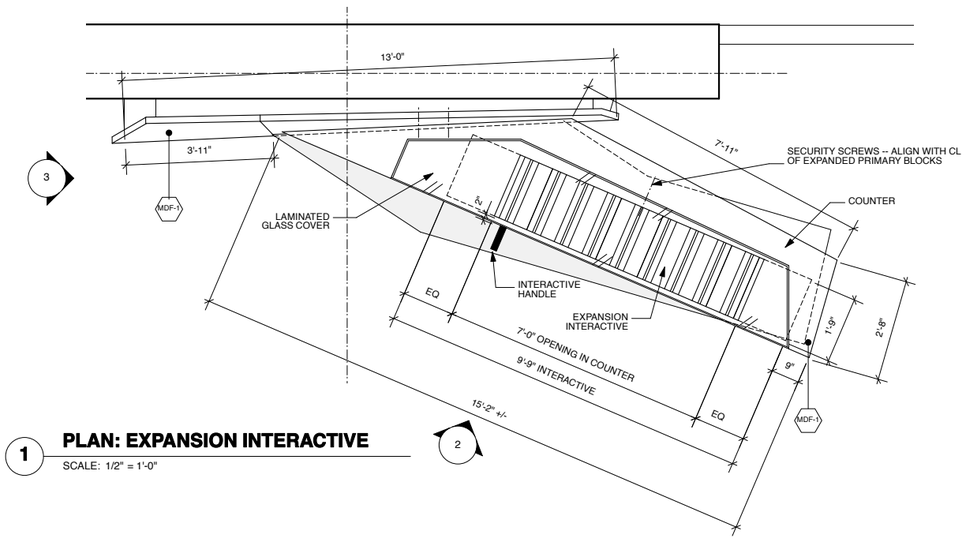
Date: April 2, 2009

Scale*: 2" = 1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

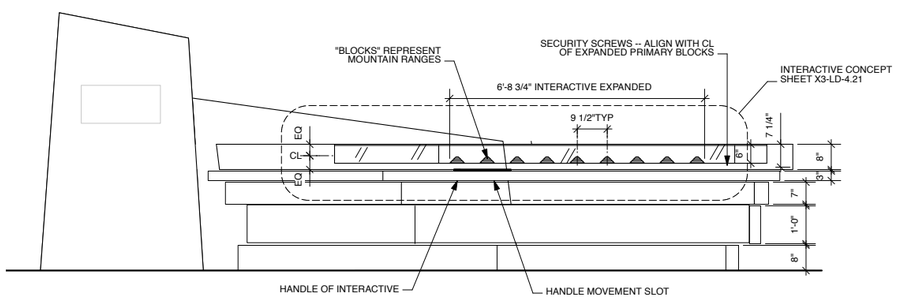
X3-LD-4.11

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



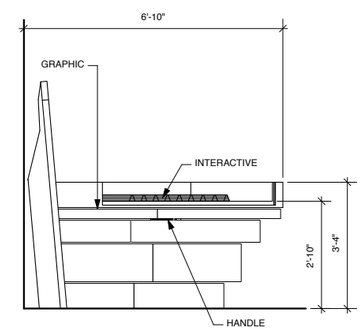
1 PLAN: EXPANSION INTERACTIVE

SCALE: 1/2" = 1'-0"



2 TRUE ELEVATION

SCALE: 1/2" = 1'-0"



3 ELEVATION

SCALE: 1/2" = 1'-0"

NOTES:

1. ALL CORNERS ON TABLE TOP AND BASE TO HAVE MITERED EDGES.

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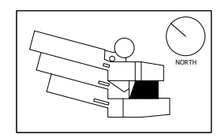


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Interactives:
Land, Expansion Table, LD4.E06

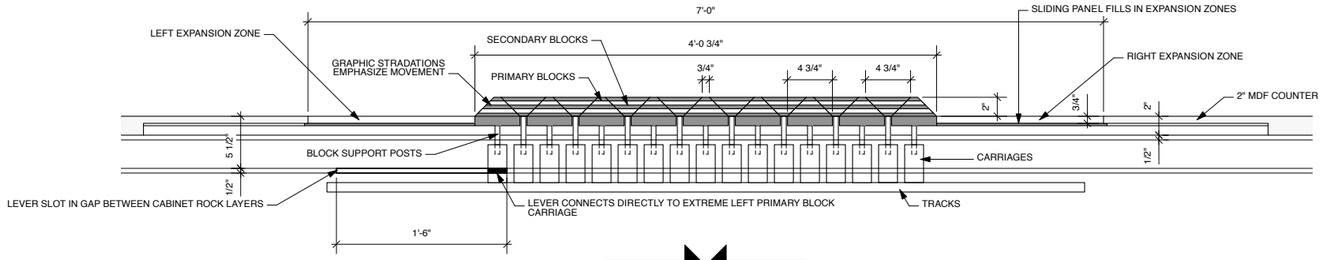
Date: April 2, 2009

Scale*: 1/2" = 1'-0"

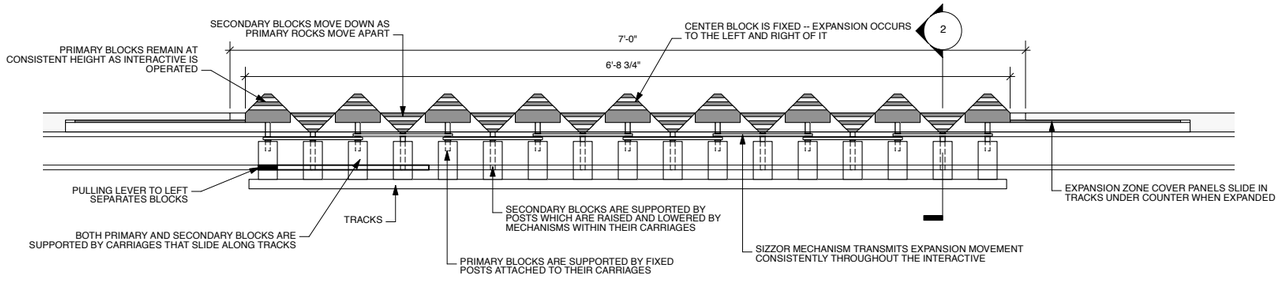
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

X3-LD-4.20

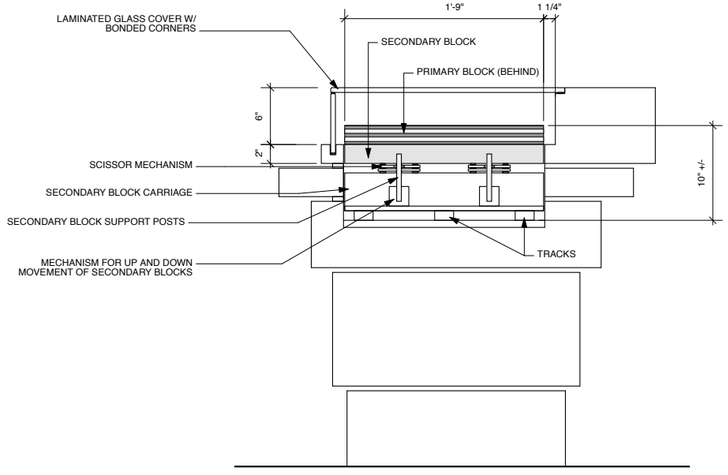
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1. START CONFIGURATION

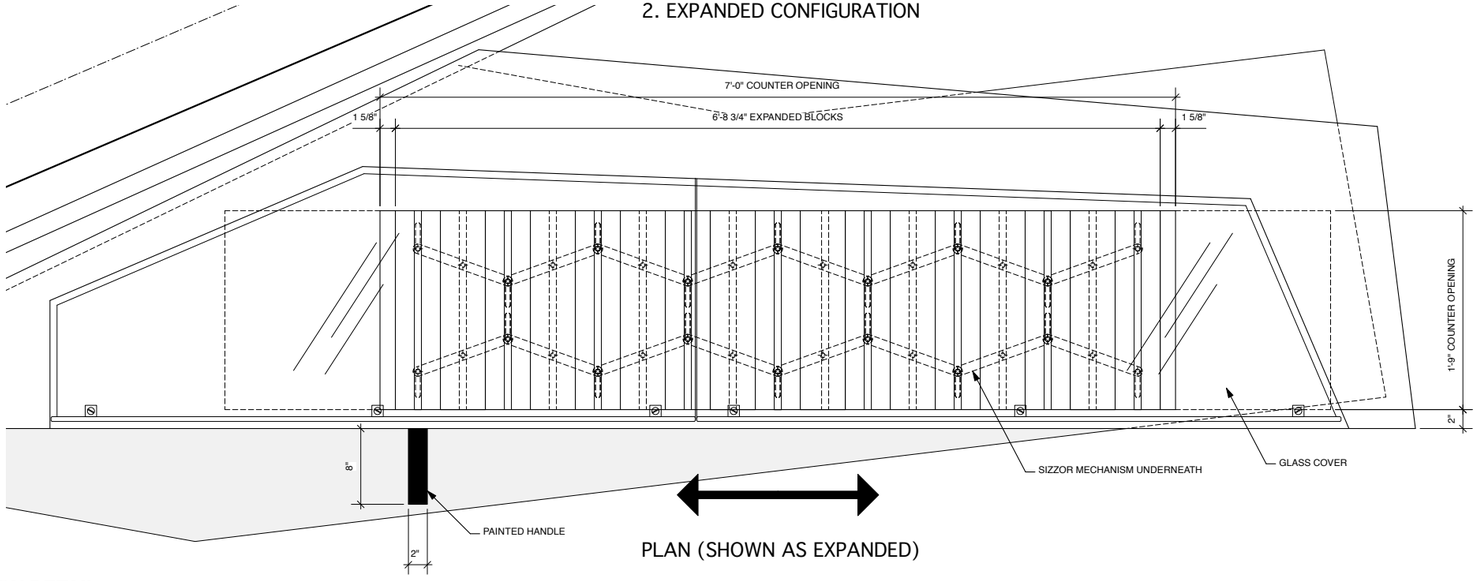


2. EXPANDED CONFIGURATION



2 SECTION

SCALE: 1-1/2" = 1'-0"



PLAN (SHOWN AS EXPANDED)

1 OPERATION DETAIL

SCALE: 1-1/2" = 1'-0"

NOTES:

1. WHEN THE INTERACTIVE IS IDLE IT IS IN THE CONTRACTED CONFIGURATION -- EXPANSION OCCURS WHEN A VISITOR MOVES THE HANDLE TO THE LEFT -- AFTER EXPANSION THE INTERACTIVE AUTOMATICALLY RESET TO THE CONTRACTED POSITION BY EITHER HYDRAULIC OR ELECTROMECHANICAL MEANS -- THE RESETS SHOULD OCCUR SLOWLY AND SMOOTHLY
2. MECHANICAL IDEAS SHOWN ARE INTENDED AS CONCEPTUAL ONLY -- EXHIBIT FABRICATOR TO ENGINEER INTERACTIVE FOR SMOOTH OPERATION AS INTENDED AND FOR A FUNCTIONAL LIFE SPAN OF 15 YEARS

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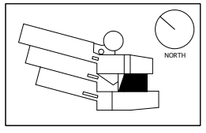


Key Plan

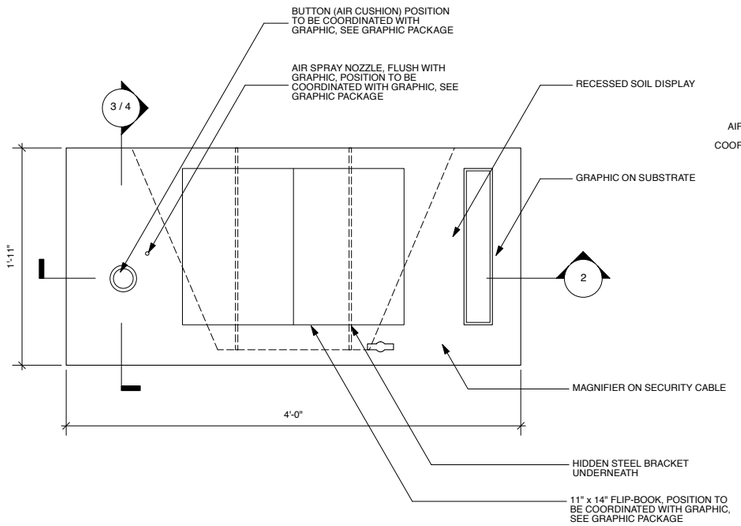
No. / Issue Name / Date	No. / Issue Name / Date
	100% Final Design April 2, 2009

Sheet Title

Interactives:
Land, Expansion Table, LD4.E06

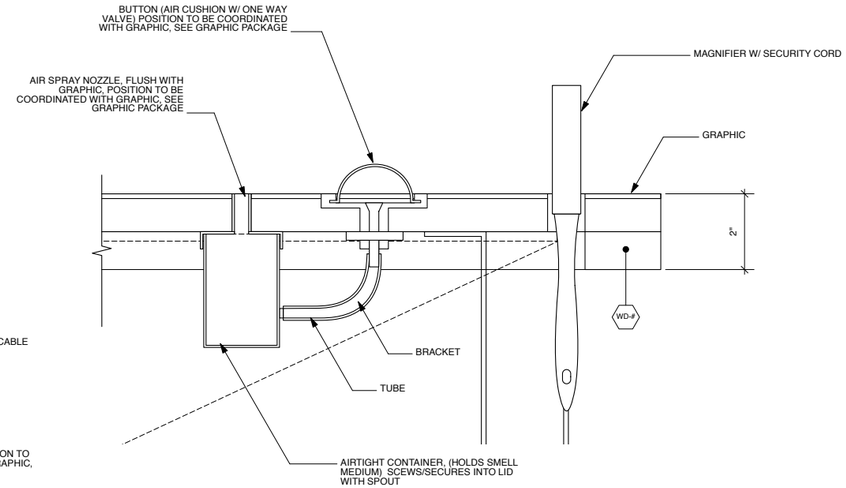
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1-1/2" = 1'-0"	X3-LD-4.21

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



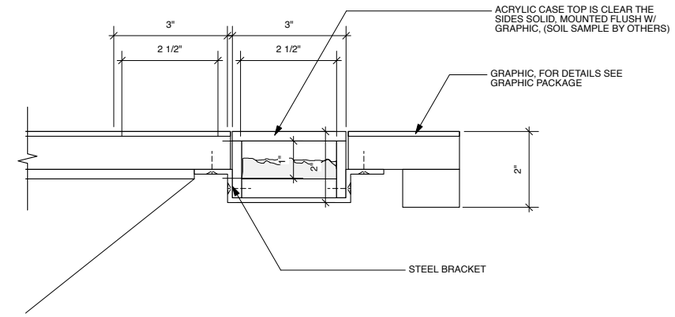
1 DETAIL PLAN

SCALE: 1 1/2" = 1'-0"



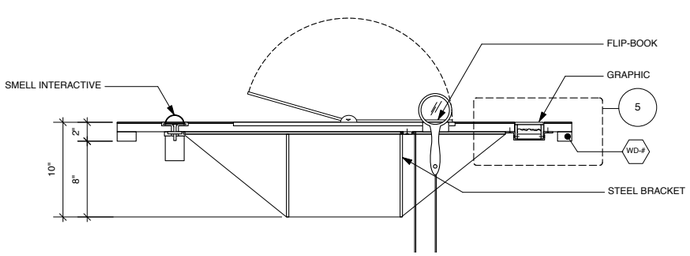
4 DETAIL

SCALE: 1:2



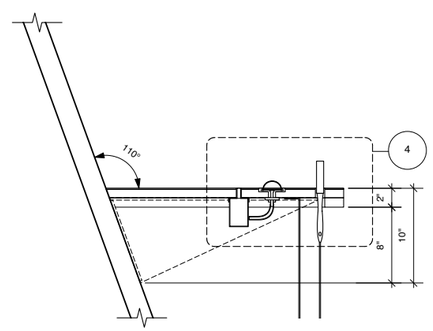
5 DETAIL

SCALE: 1:2



2 DETAIL ELEVATION

SCALE: 1 1/2" = 1'-0"



3 DETAIL SECTION

SCALE: 1 1/2" = 1'-0"

NOTES:
1. FLIPBOOK HAS PLANT VOUCHERS LAMINATED BETWEEN RESIN PNLS. (3 FORM OR EQ.)
2. PLANT VOUCHERS PROVIDED BY OWNER
3. SAMPLES TO BE PROVIDED PRIOR TO FABRICATION OF ALL PNLS.

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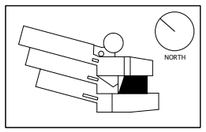


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

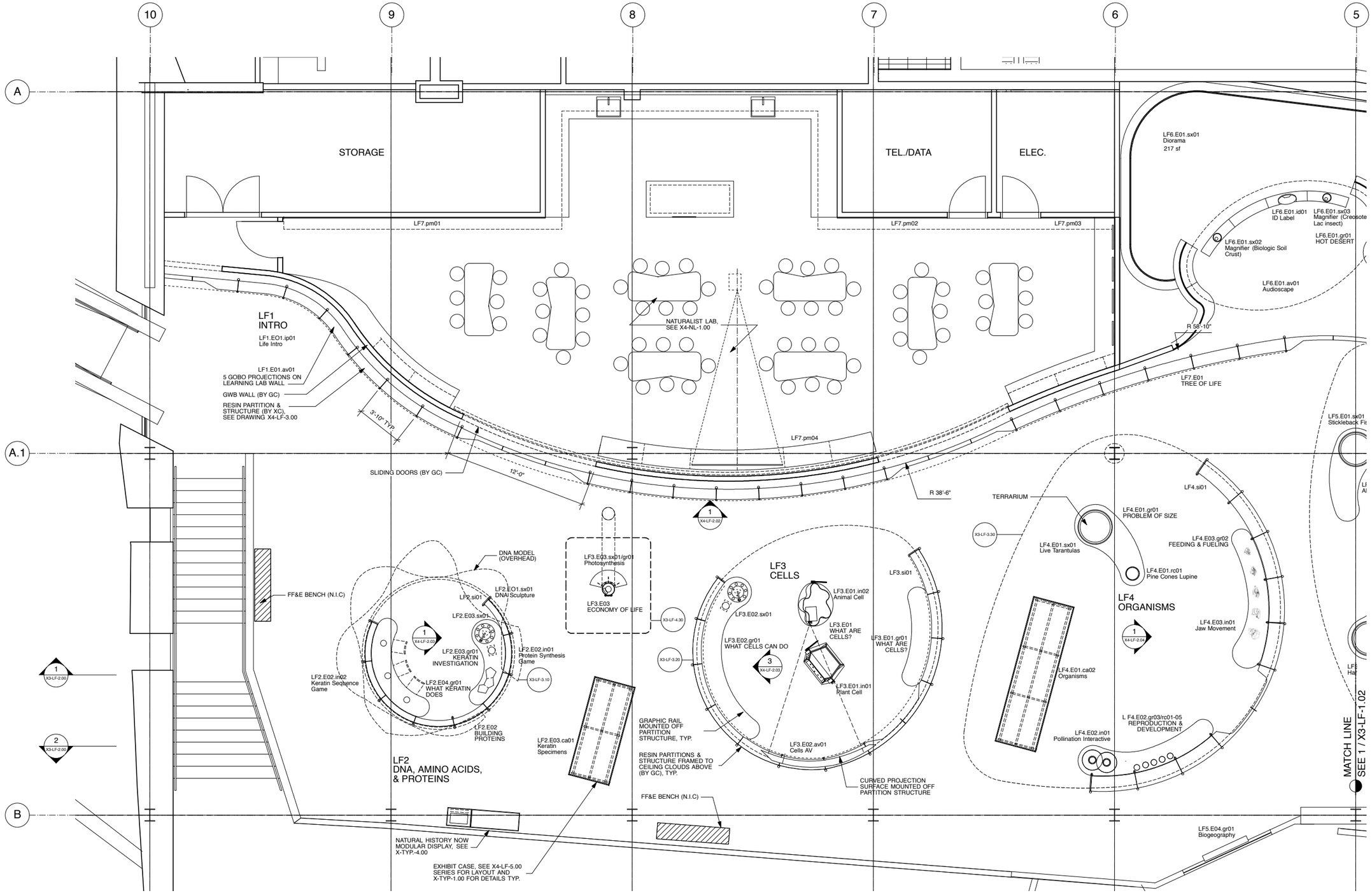
100% Final Design April 2, 2009

Sheet Title

Interactives: Land
Plant Smell Interactive / Flip-books

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X3-LD-4.30

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



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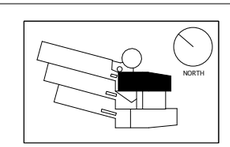

Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Partial Plan: Life
Intro - Organisms

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 0224375 0

Sheet No.
X4-LF-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

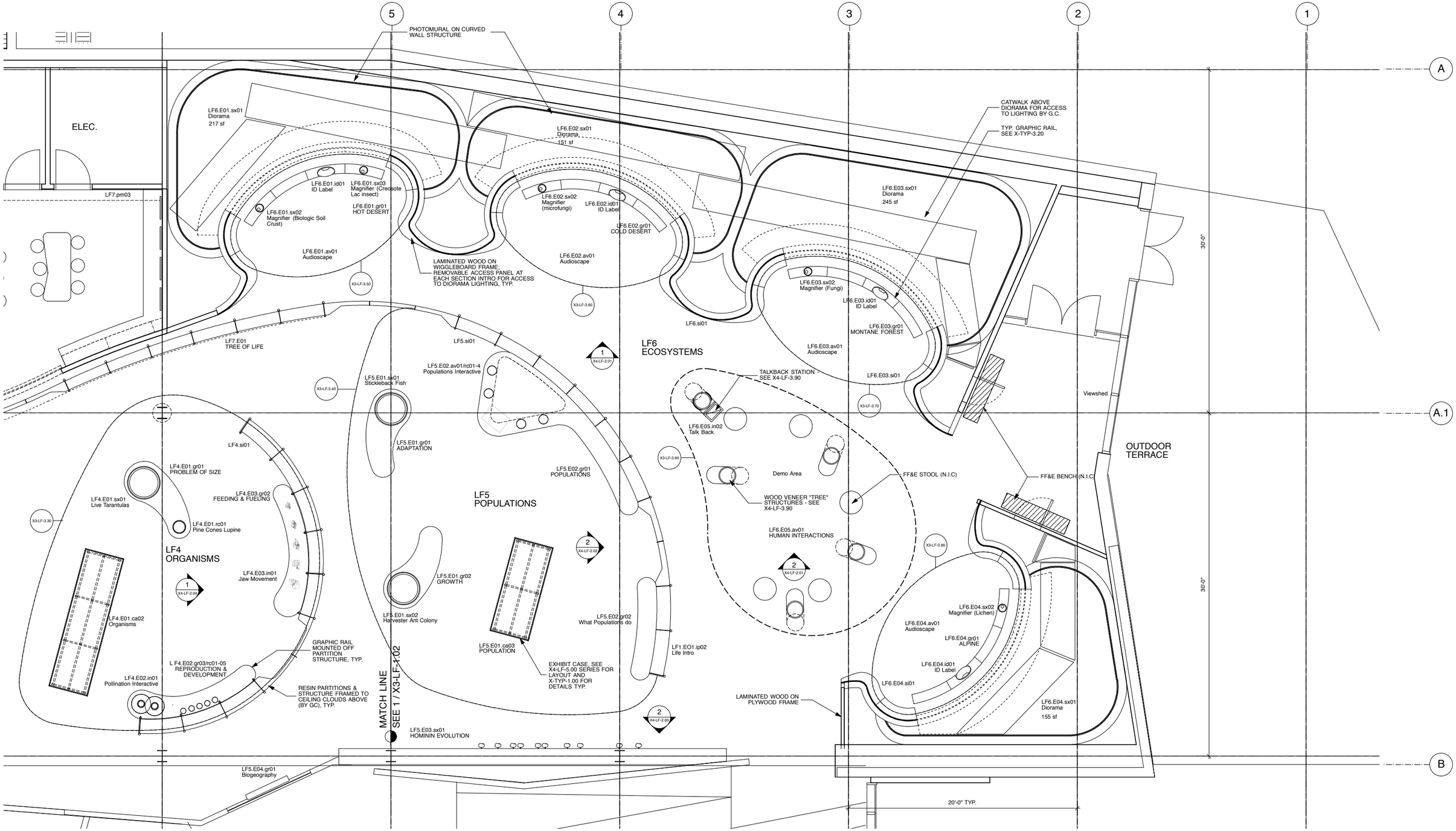

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Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
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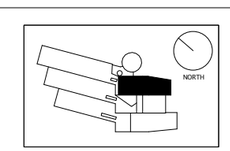


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

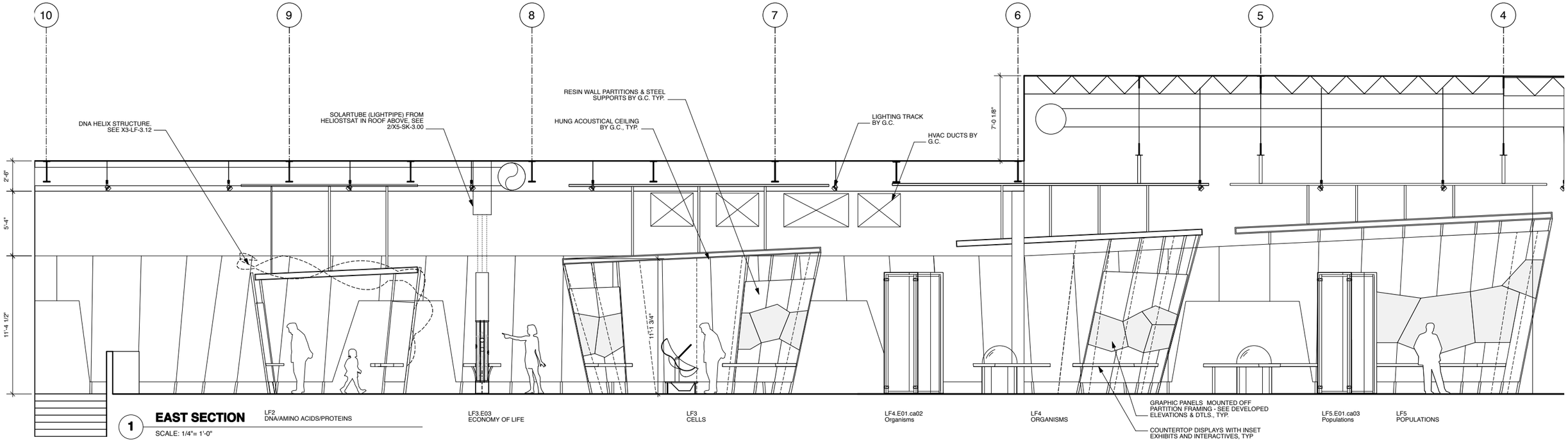
No. / Issue Name / Date

Sheet Title

Partial Plan: Life
Organisms - Ecosystems

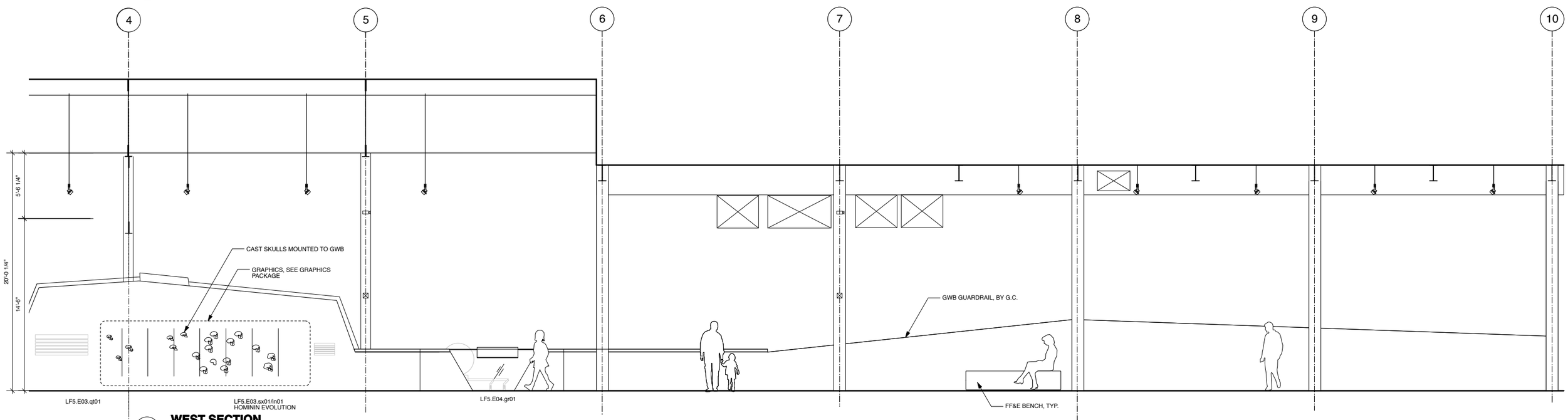
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X4-LF-1.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **EAST SECTION**

SCALE: 1/4"= 1'-0"



2 **WEST SECTION**

SCALE: 1/4"= 1'-0"

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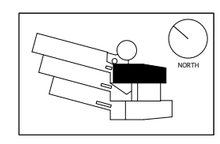


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

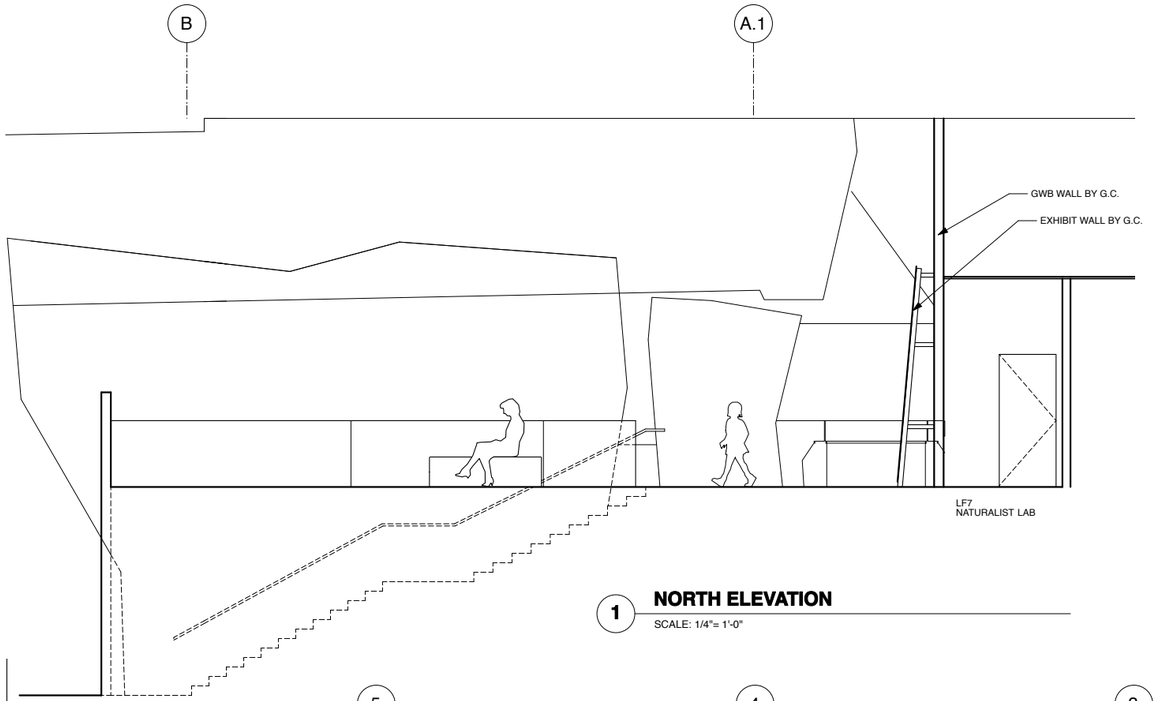
No. / Issue Name / Date

Sheet Title

Elevations & Sections: Life

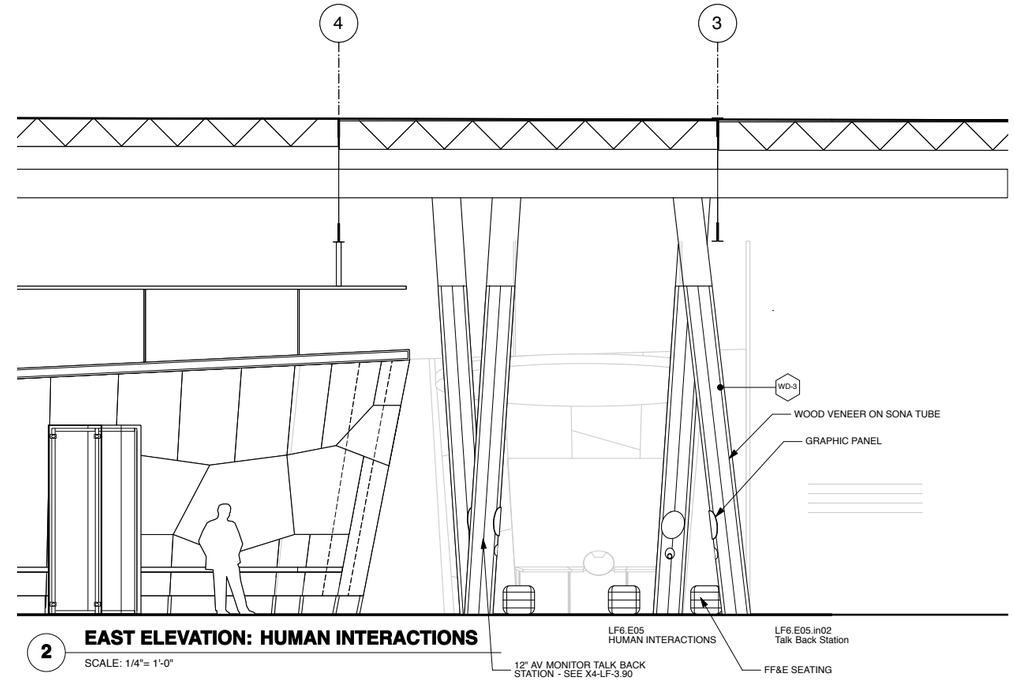
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X4-LF-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



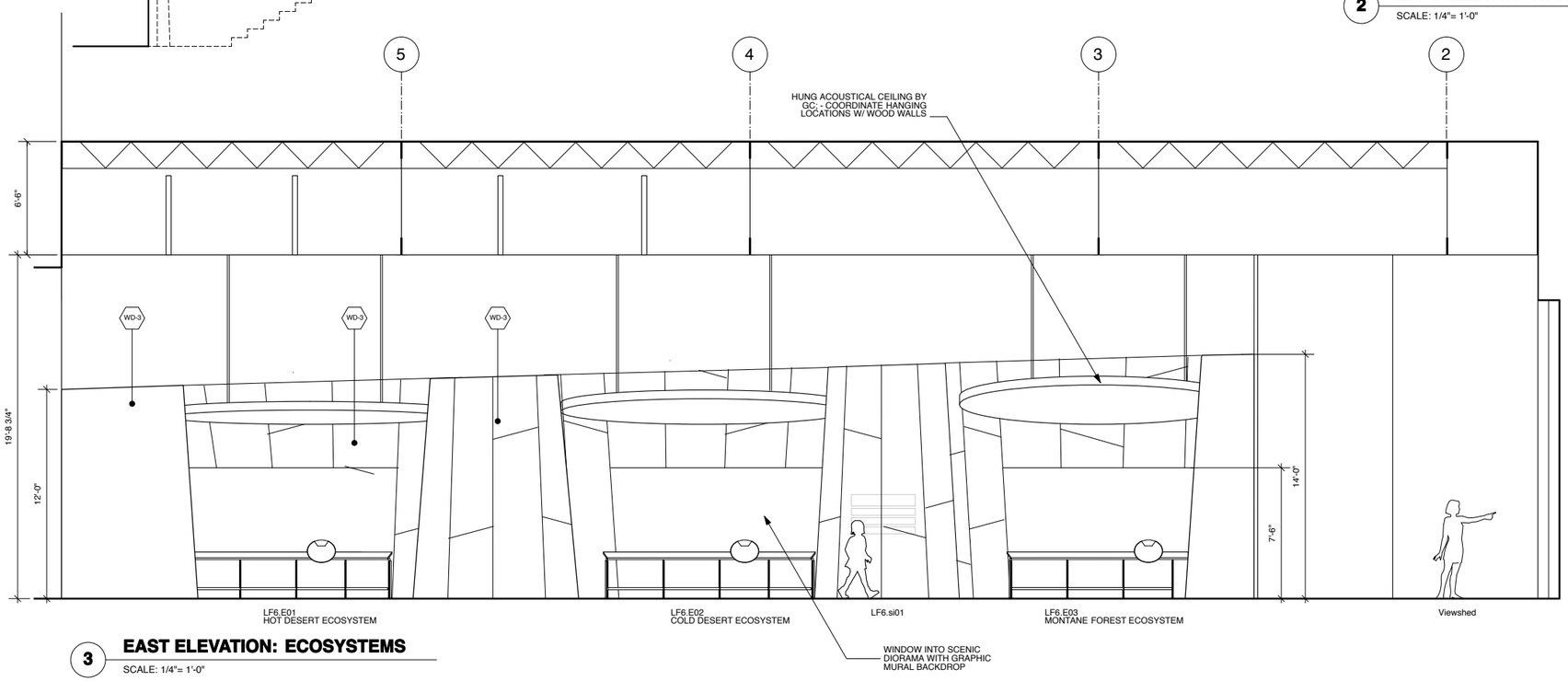
1 NORTH ELEVATION

SCALE: 1/4"= 1'-0"



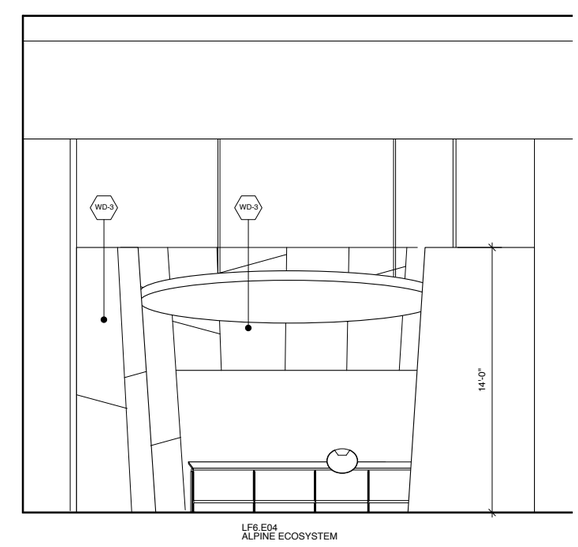
2 EAST ELEVATION: HUMAN INTERACTIONS

SCALE: 1/4"= 1'-0"



3 EAST ELEVATION: ECOSYSTEMS

SCALE: 1/4"= 1'-0"



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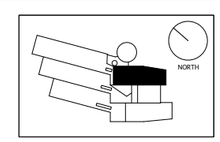


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

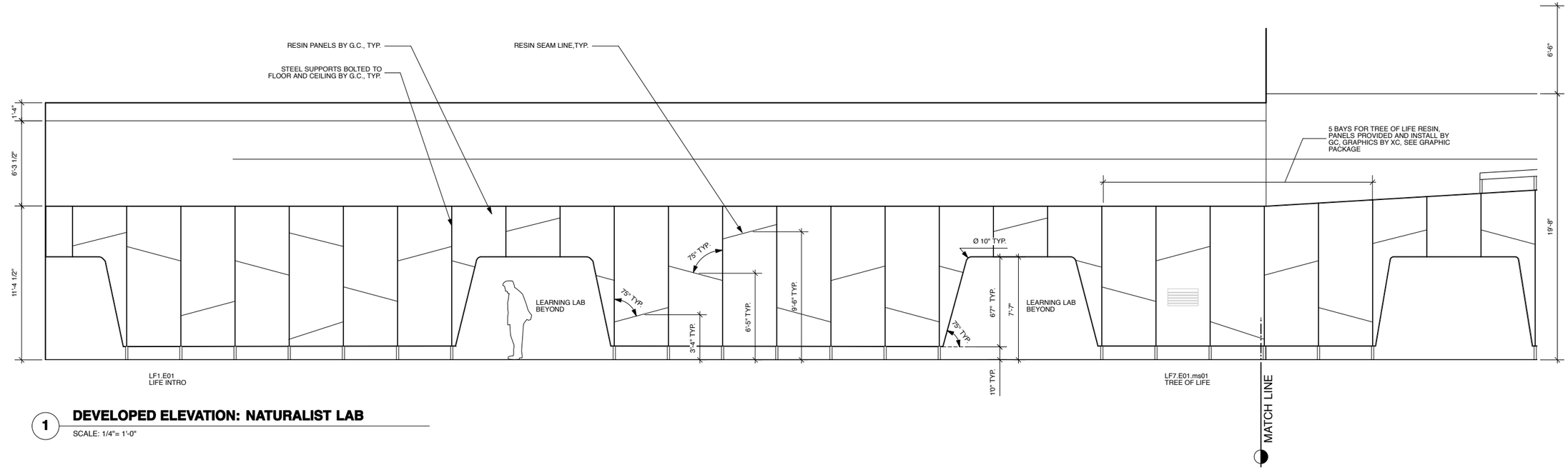
No. / Issue Name / Date

Sheet Title

Elevations & Sections: Life

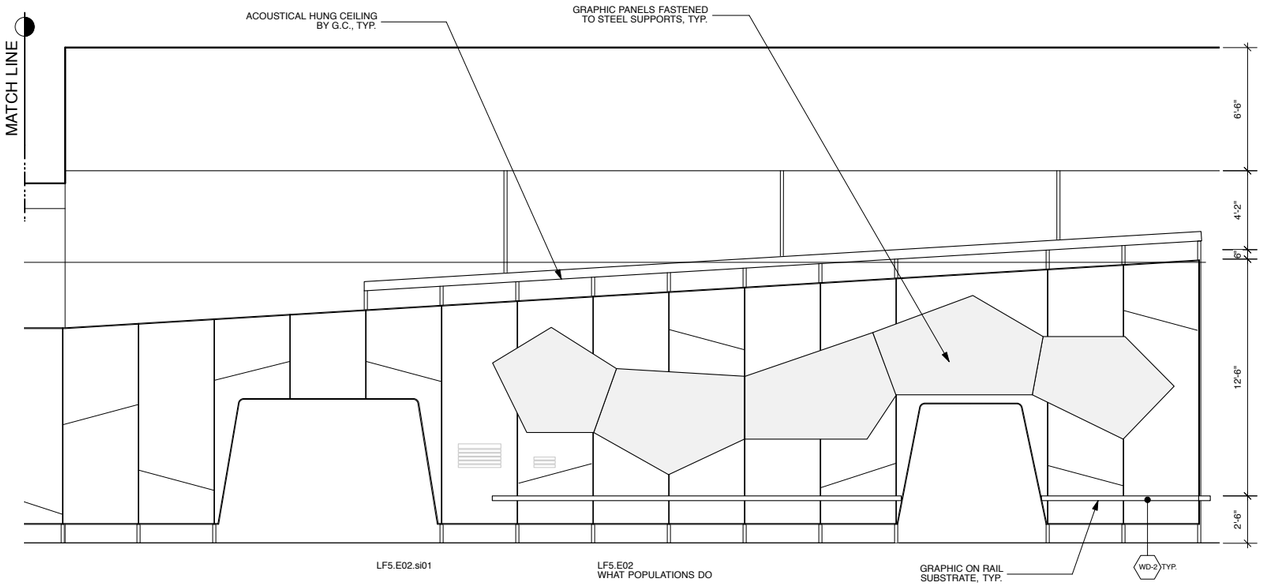
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X4-LF-2.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



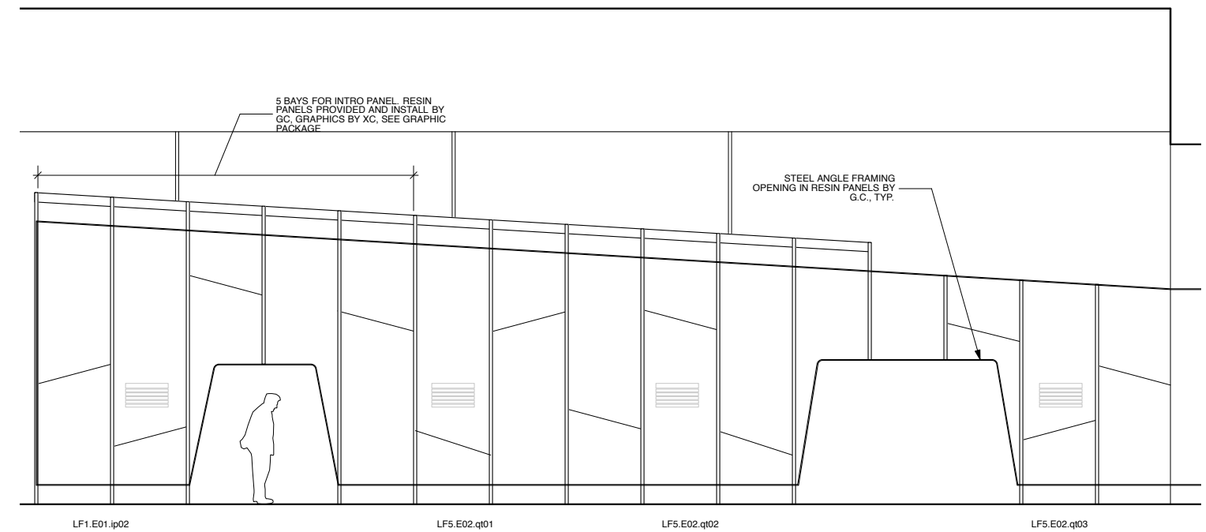
1 DEVELOPED ELEVATION: NATURALIST LAB

SCALE: 1/4"= 1'-0"



2 DEVELOPED ELEVATION: SPECIES & POPULATIONS (FRONT)

SCALE: 1/4"= 1'-0"



3 DEVELOPED ELEVATION: SPECIES & POPULATIONS (REAR)

SCALE: 1/4"= 1'-0"

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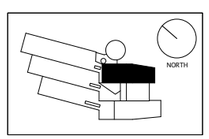


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

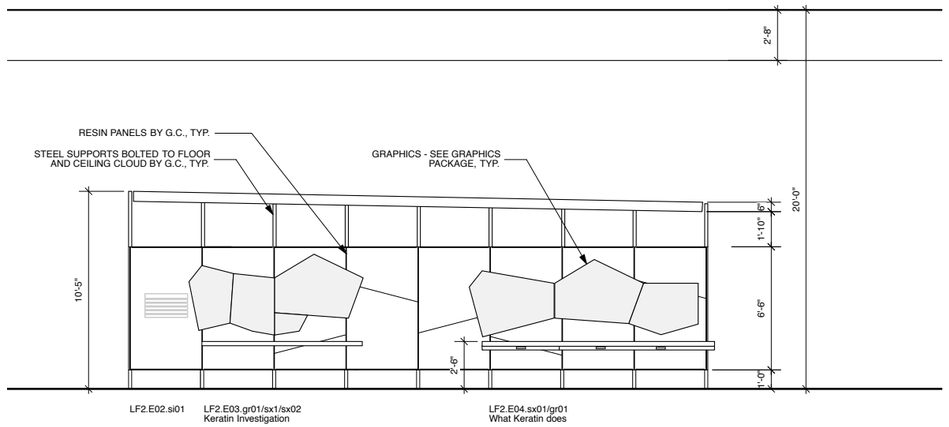
Sheet Title
Developed Elevations: Life

Date
April 2, 2009

Scale*
1/4"=1'-0"

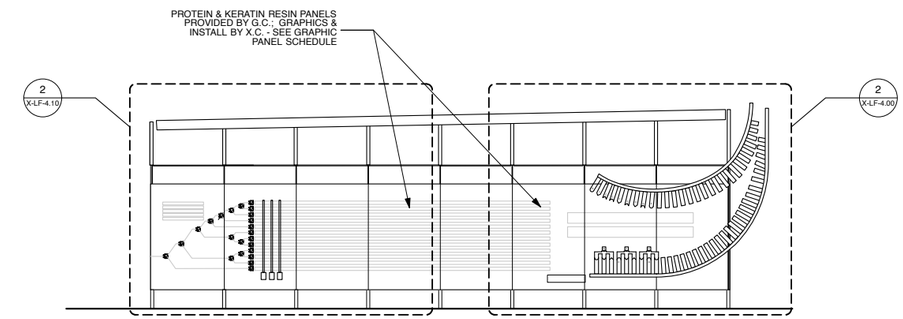
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X4-LF-2.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



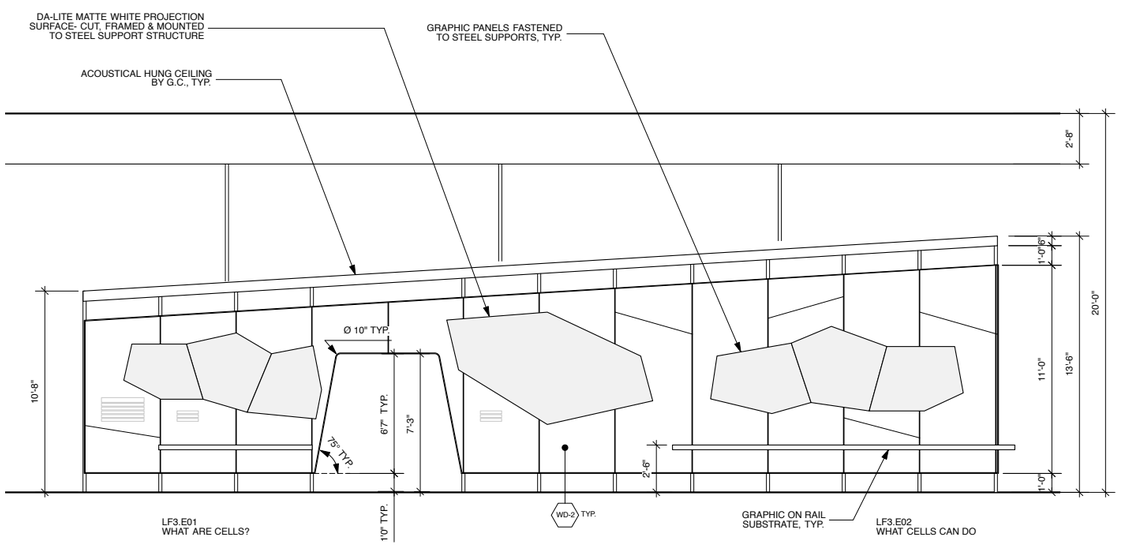
1 DEVELOPED ELEVATION: DNA/AA/PROTEINS (FRONT)

SCALE: 1/4"= 1'-0"



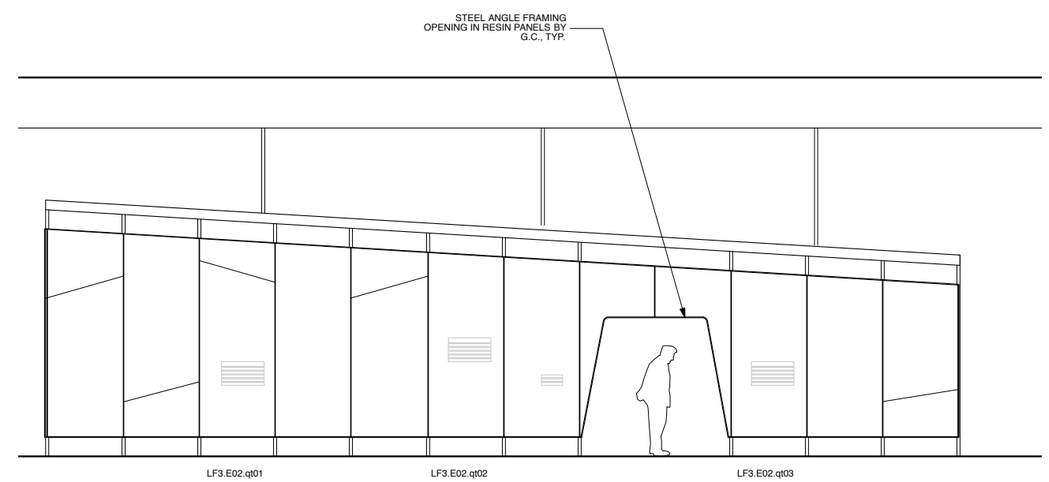
2 DEVELOPED ELEVATION: DNA/AA/PROTEINS (BACK)

SCALE: 1/4"= 1'-0"



3 DEVELOPED ELEVATION: CELLS (FRONT)

SCALE: 1/4"= 1'-0"



4 DEVELOPED ELEVATION: CELLS (BACK)

SCALE: 1/4"= 1'-0"

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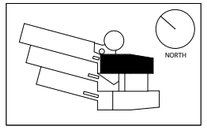


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

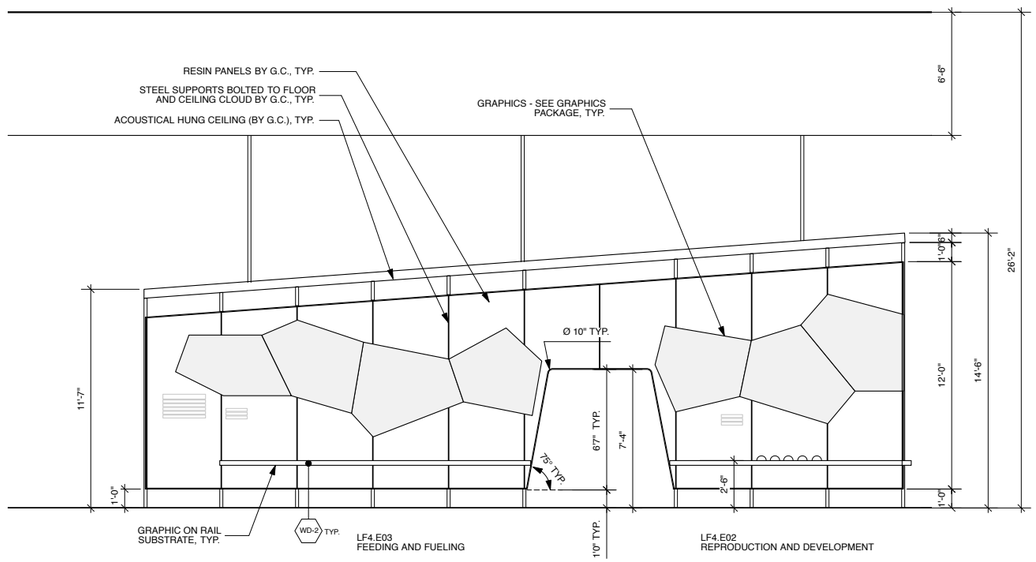
Sheet Title
Developed Elevations: Life

Date
April 2, 2009

Scale*
1/4"=1'-0"

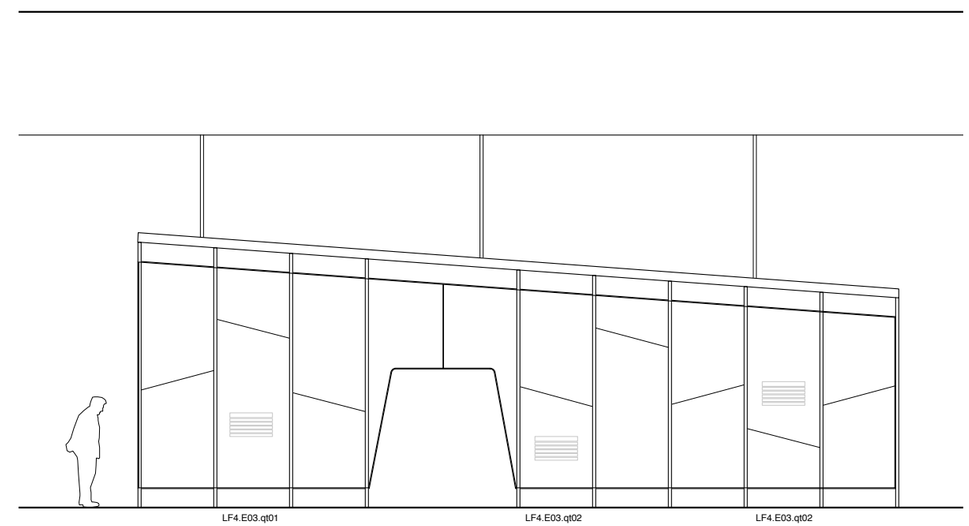
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X4-LF-2.03

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 DEVELOPED ELEVATION: ORGANISMS (FRONT)

SCALE: 1/4"= 1'-0"



2 DEVELOPED ELEVATION: ORGANISMS (BACK)

SCALE: 1/4"= 1'-0"

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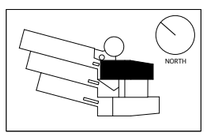


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

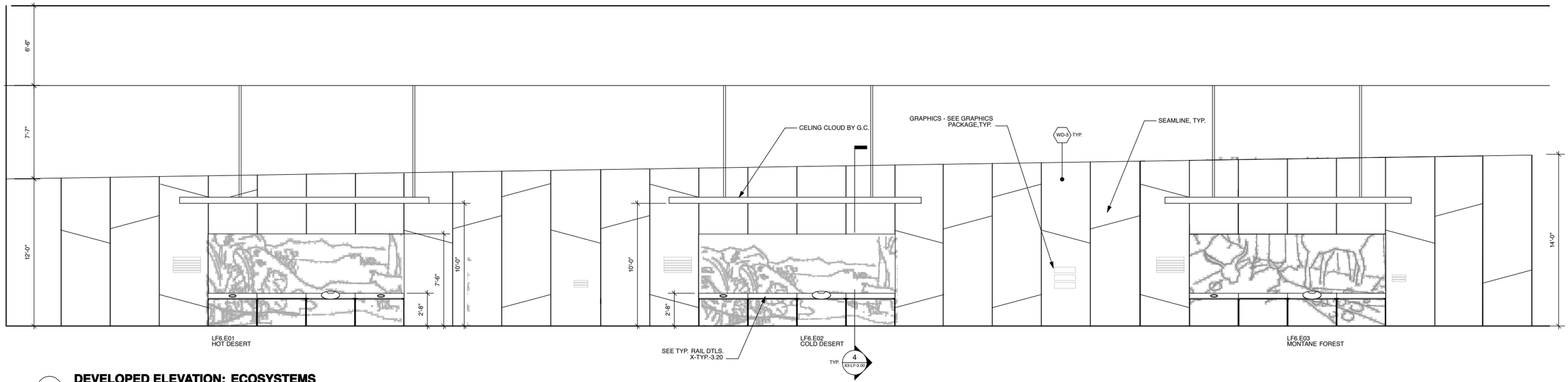
Sheet Title
Developed Elevations: Life

Date
April 2, 2009

Scale*
1/4"=1'-0"

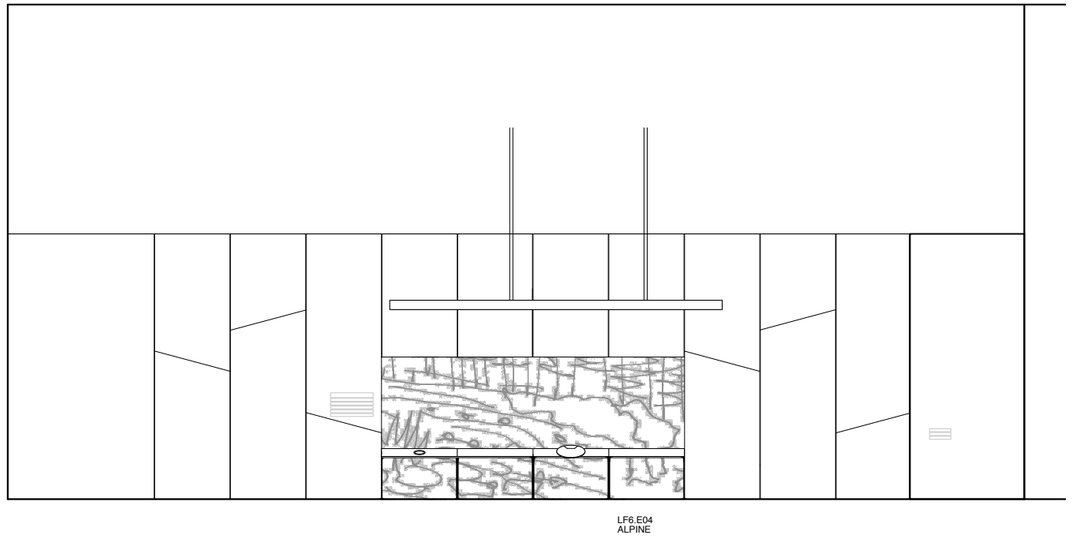
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X4-LF-2.04

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 DEVELOPED ELEVATION: ECOSYSTEMS

SCALE: 1/4"= 1'-0"



2 DEVELOPED ELEVATION: ECOSYSTEMS

SCALE: 1/4"= 1'-0"

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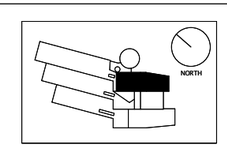


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

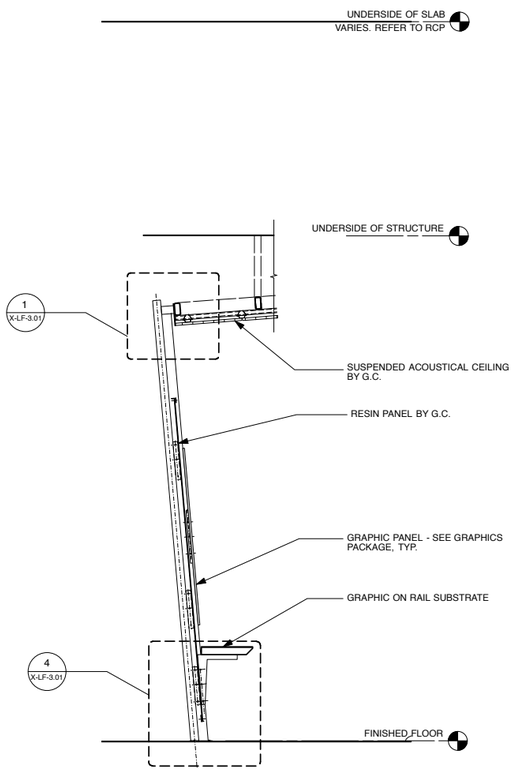
Sheet Title
Developed Elevations: Life

Date
April 2, 2009

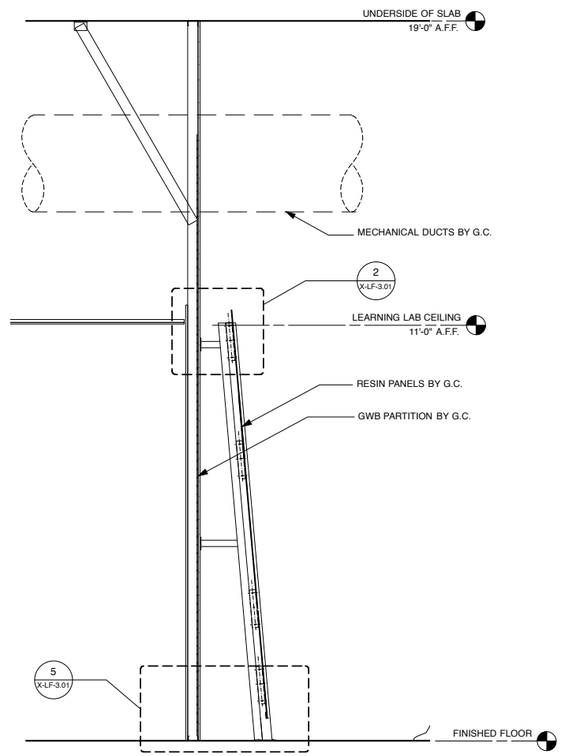
Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X4-LF-2.05

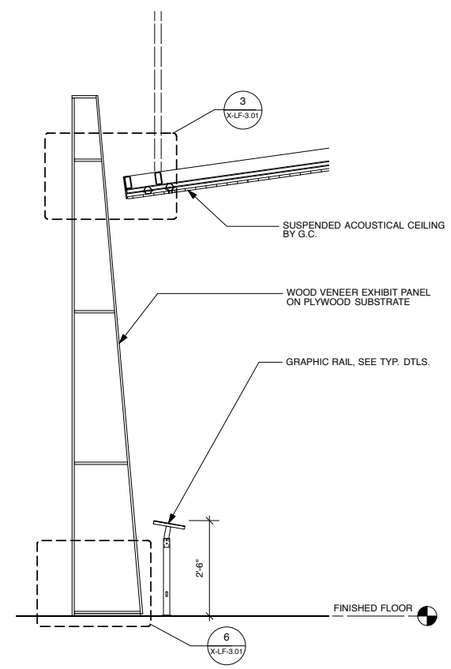
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



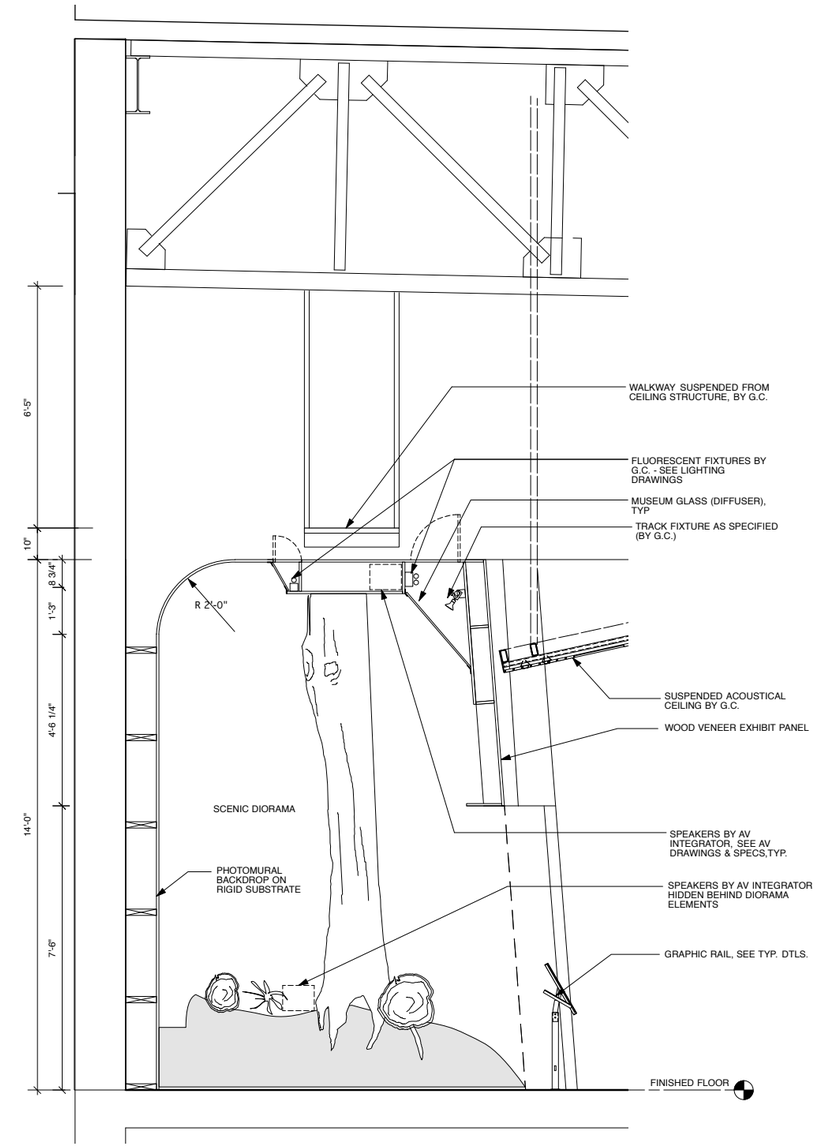
1 **EXHIBIT WALL: SECTION, TYP.**
SCALE: 1/2"= 1'-0"



2 **LEARNING LAB WALL: SECTION, TYP.**
SCALE: 1/2"= 1'-0"



3 **ECOSYSTEM WALL: SECTION, TYP.**
SCALE: 1/2"= 1'-0"



4 **ECOSYSTEM DIORAMA: SECTION, TYP.**
SCALE: 1/2"= 1'-0"

NOTE:

1. X.C. TO COORDINATE SCHEDULING OF TRACK FIXTURE INSTALL W/ G.C.

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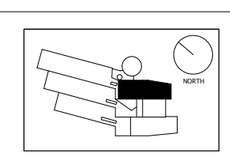


Key Plan

No. / Issue Name / Date

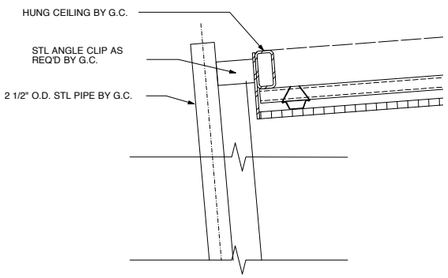
100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Details:
Life Typical Sections

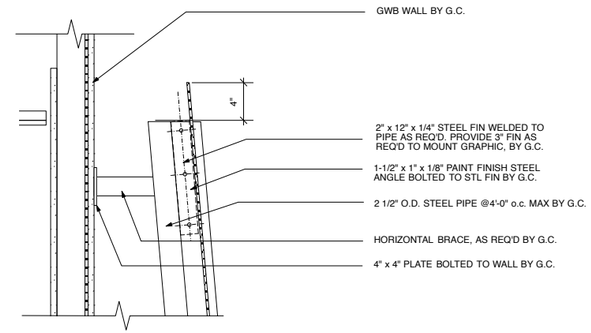
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/2"= 1'-0"	X4-LF-3.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



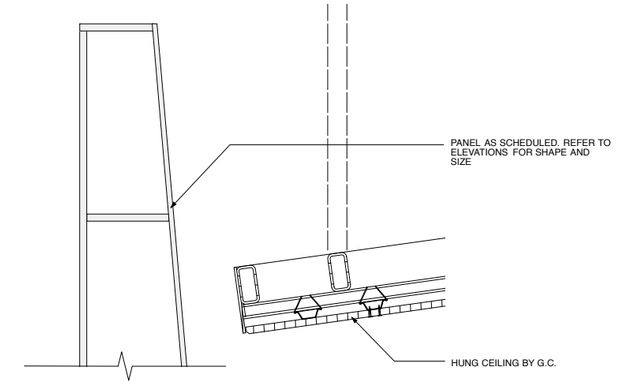
1 RESIN PARTITION, DETAIL AT CEILING CLOUD

SCALE: 1-1/2"= 1'-0"



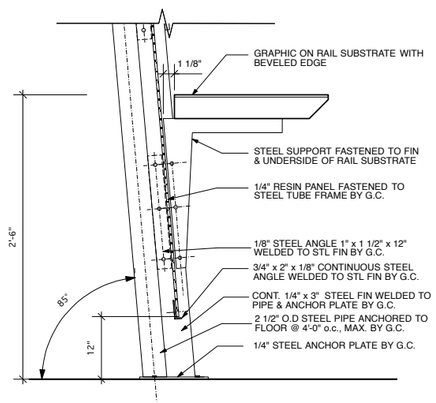
2 LL WALL: DETAIL AT TOP

SCALE: 1-1/2"= 1'-0"



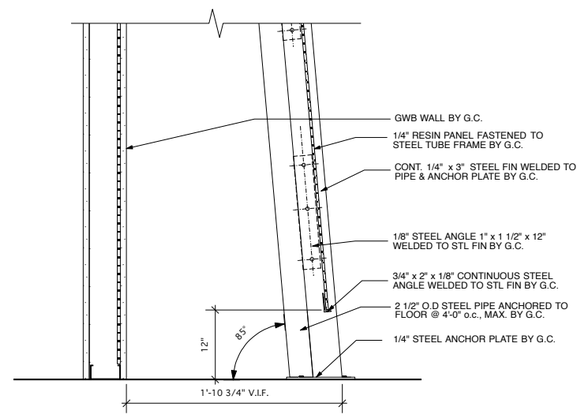
3 ECOSYSTEM WALL, DETAIL AT TOP

SCALE: 1-1/2"= 1'-0"



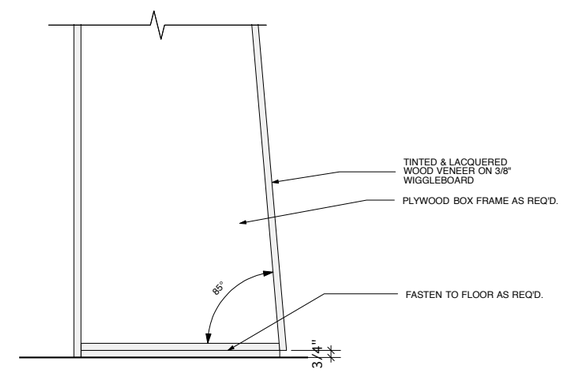
4 RESIN PARTITION, DETAIL AT BOTTOM

SCALE: 1-1/2"= 1'-0"



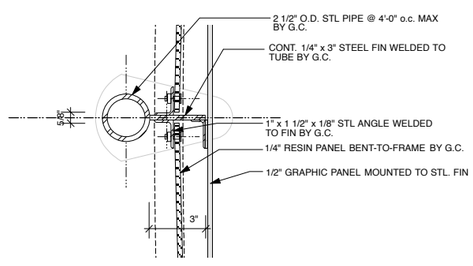
5 LL WALL, DETAIL AT BOTTOM

SCALE: 1-1/2"= 1'-0"



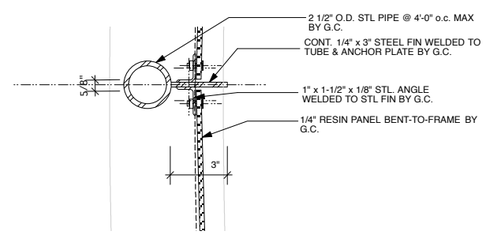
6 ECOSYSTEM WALL, DETAIL AT BOTTOM

SCALE: 1-1/2"= 1'-0"



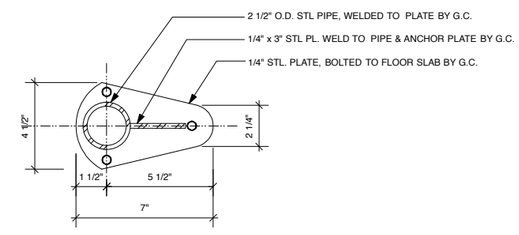
7 RESIN PARTITION DETAIL PLAN

SCALE: 3" = 1'-0"



8 LL WALL DETAIL PLAN

SCALE: 3" = 1'-0"



9 RESIN PARTITION FLOOR PLATE, PLAN

SCALE: 3" = 1'-0"

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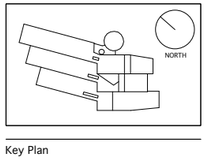


Key Plan

No. / Issue Name / Date

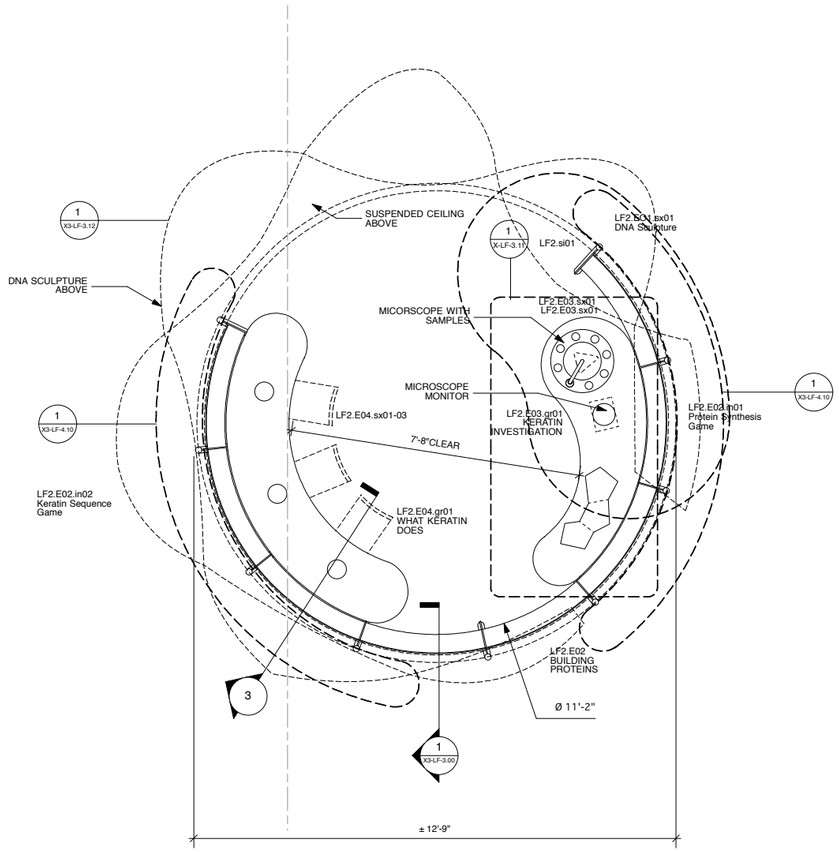
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Details:
Life Wall / Panels

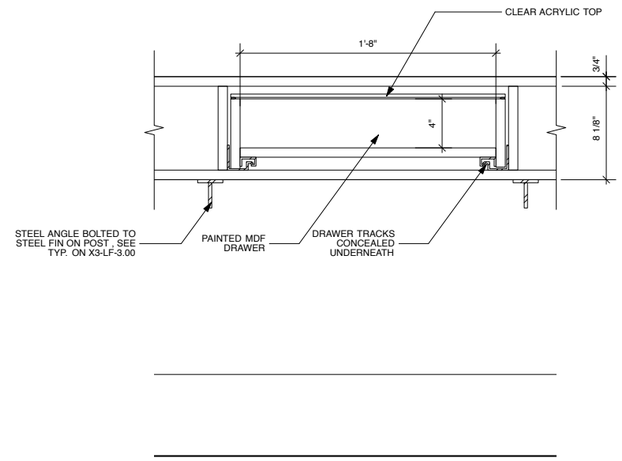
Date April 2, 2009	RAA Project No. 0275 U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale* As Noted	Sheet No. X4-LF-3.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



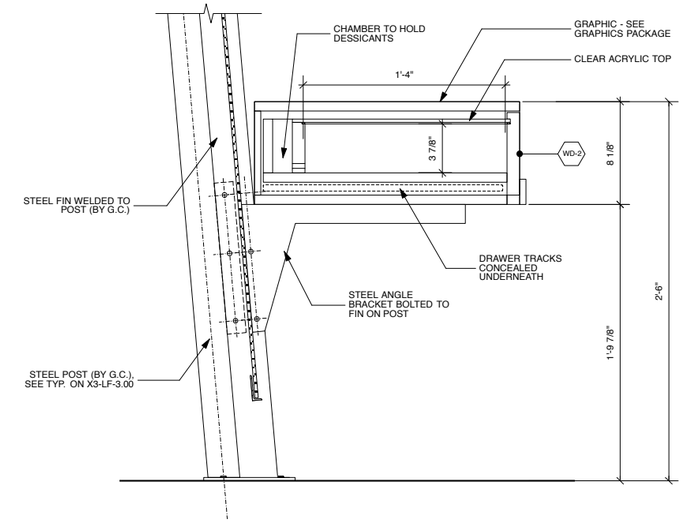
1 PLAN

SCALE: 1/2"= 1'-0"



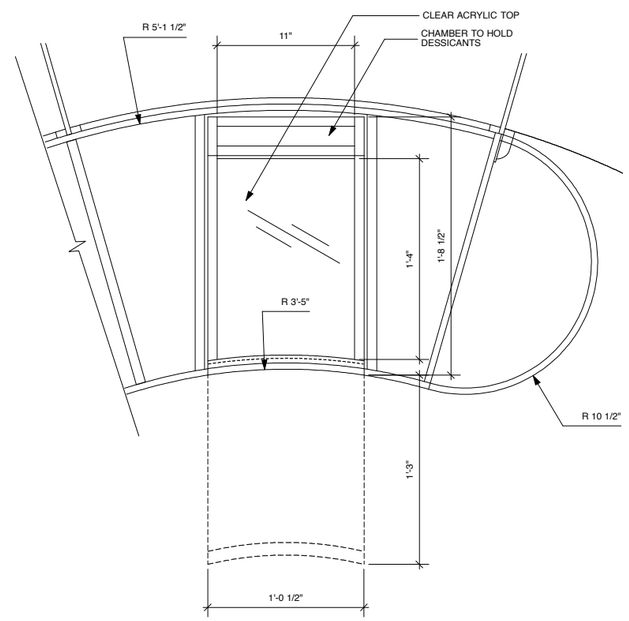
2 DETAIL SECTION

SCALE: 2"= 1'-0"



3 DETAIL SECTION

SCALE: 2"= 1'-0"



4 DETAIL PLAN

SCALE: 1/2

NOTE:

1. X.C. TO COORDINATE WALL STRUCTURE W/ G.C.
2. X.C. TO FIELD MEASURE LIFE RESIN PANELS PRIOR TO CREATION OF FINAL SHOP DRAWINGS OF EXHIBIT RAILS

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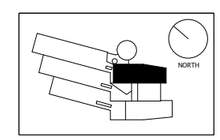


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

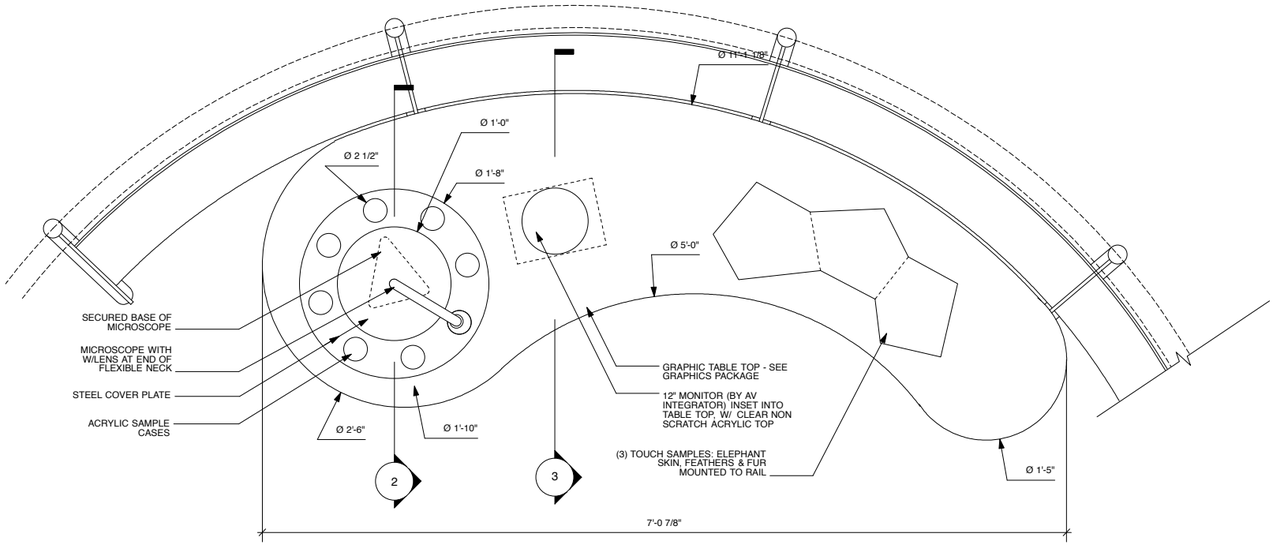
100% Final Design April 2, 2009

Sheet Title

Details:
Life - DNA

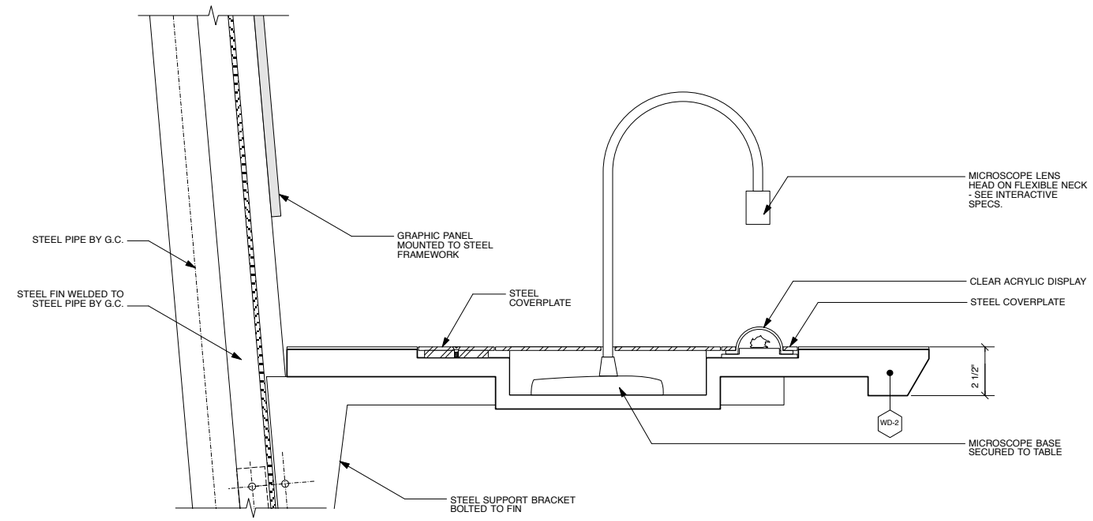
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X4-LF-3.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



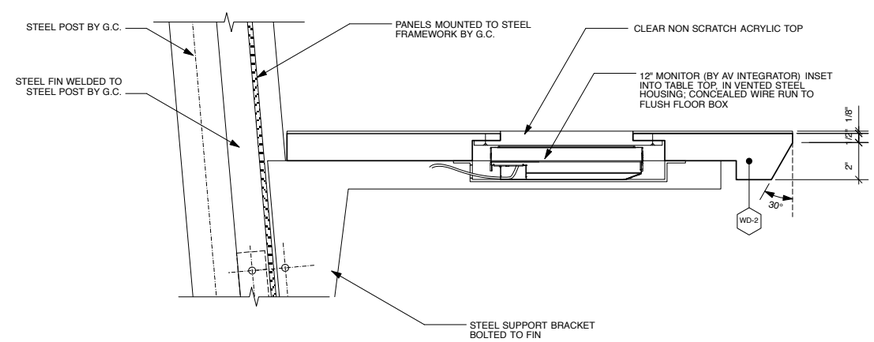
1 **PLAN: KERATIN INVESTIGATION**

SCALE: 1/2"= 1'-0"



2 **DETAIL SECTION**

SCALE: 3"= 1'-0"



3 **DETAIL SECTION**

SCALE: 3"= 1'-0"

NOTE:

1. X.C. TO COORDINATE WALL STRUCTURE W/ G.C.
2. X.C. TO FIELD MEASURE LIFE RESIN PANELS PRIOR TO CREATION OF FINAL SHOP DRAWINGS OF EXHIBIT RAILS

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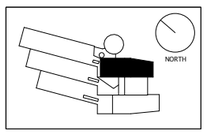


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

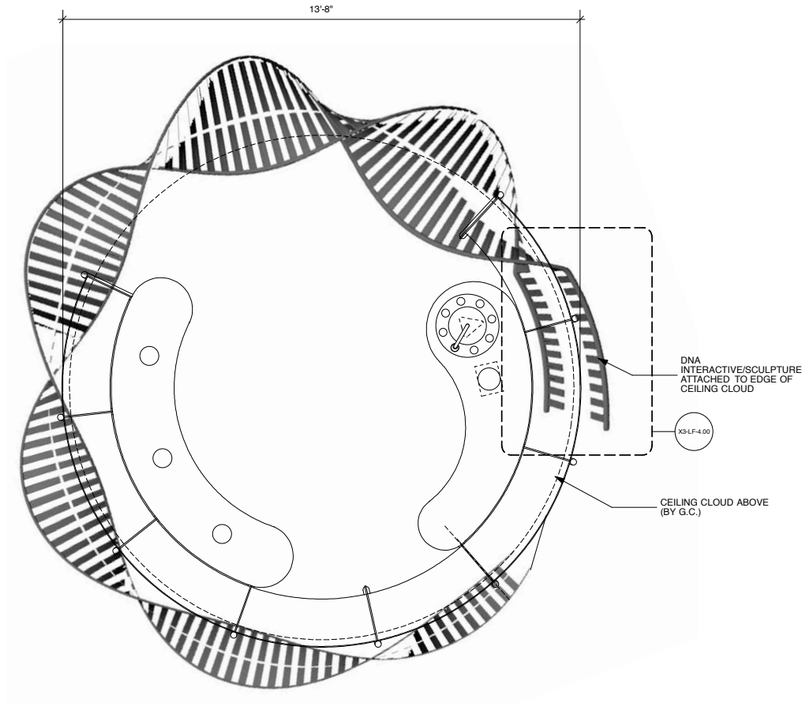
100% Final Design April 2, 2009

Sheet Title

Details:
Life - DNA

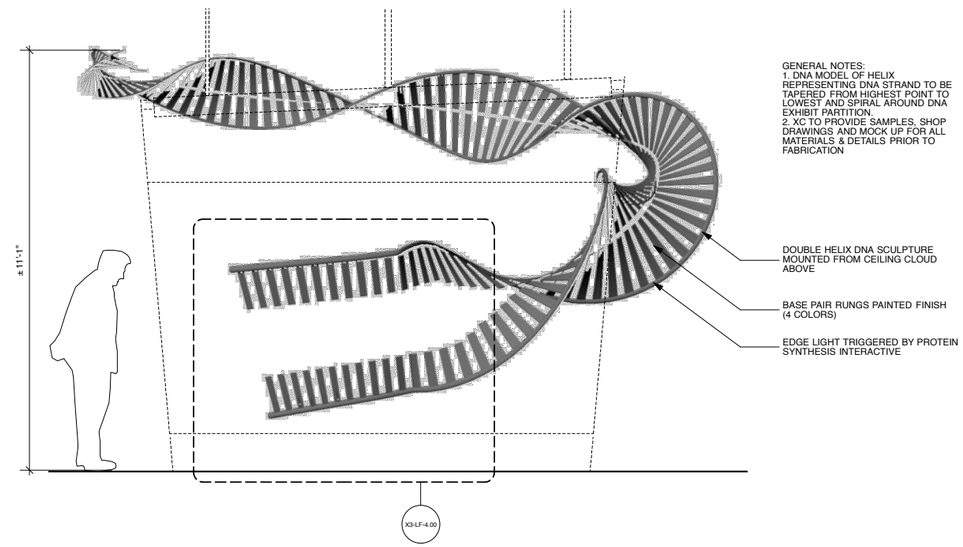
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X4-LF-3.11

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



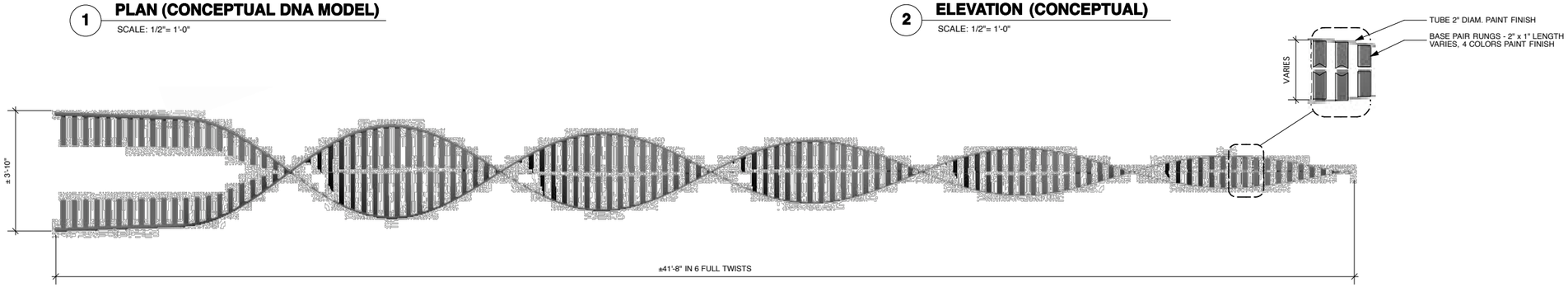
1 **PLAN (CONCEPTUAL DNA MODEL)**

SCALE: 1/2"= 1'-0"



2 **ELEVATION (CONCEPTUAL)**

SCALE: 1/2"= 1'-0"



3 **DEVELOPED ELEVATION (CONCEPTUAL)**

SCALE: 1/2"= 1'-0"

NOTE:

1. X.C. TO COORDINATE WALL STRUCTURE W/ G.C. CEILING CLOUDS

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Exhibit Construction

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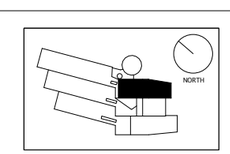
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Details:
Life - DNA Helix

Date

April 2, 2009

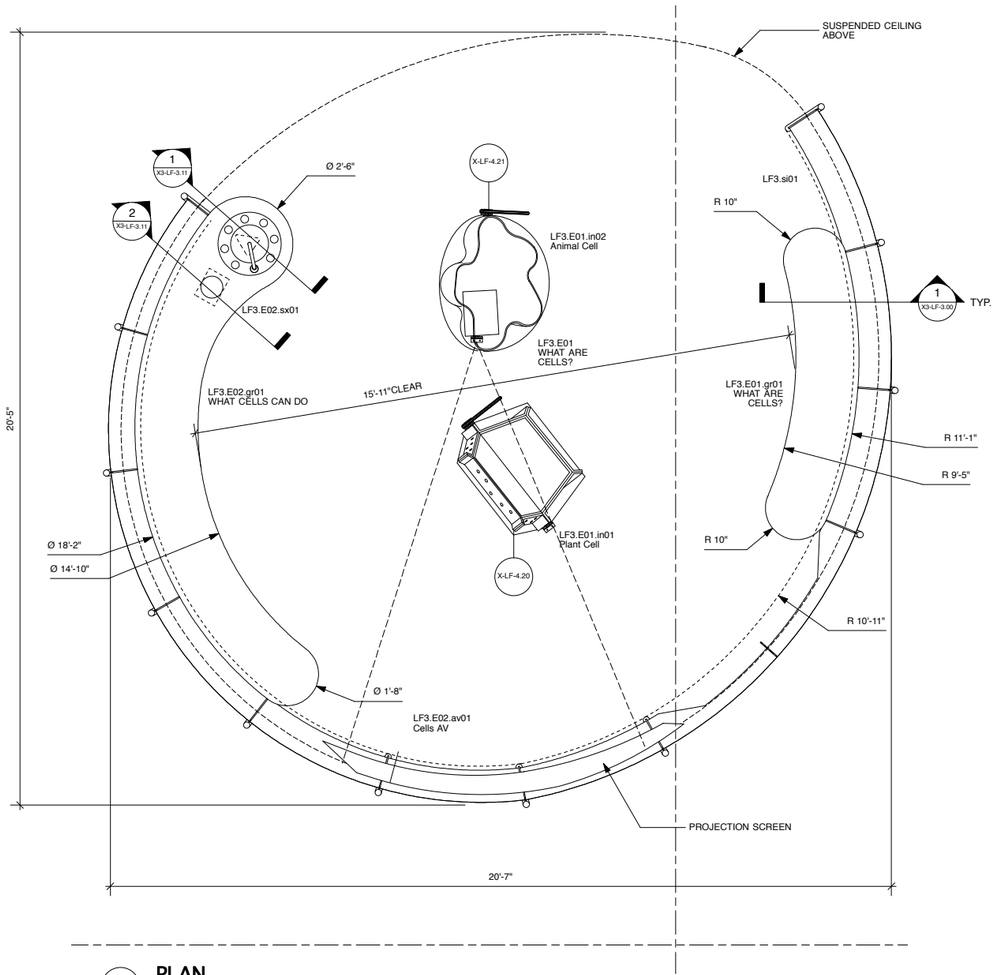
Scale*

1/2"= 1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

X4-LF-3.12

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **PLAN**

SCALE: 1/2"= 1'-0"

NOTE:

1. X.C. TO COORDINATE WALL STRUCTURE W/ G.C.
2. X.C. TO FIELD MEASURE LIFE RESIN PANELS PRIOR TO CREATION OF FINAL SHOP DRAWINGS OF EXHIBIT RAILS

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Exhibit Construction

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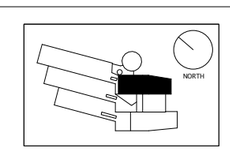


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Details:
Life- Cells

Date

April 2, 2009

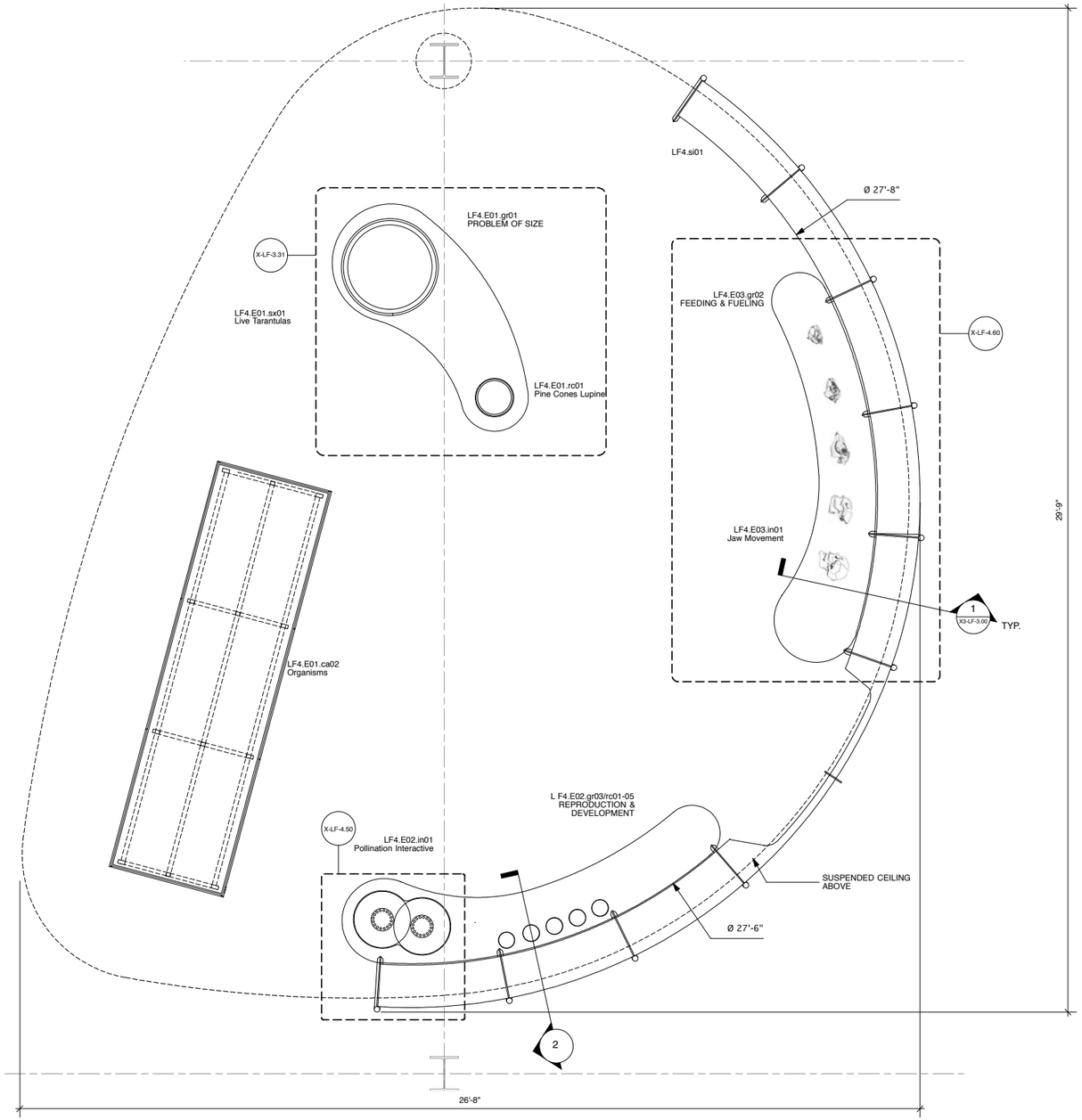
Scale*

1/2"= 1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

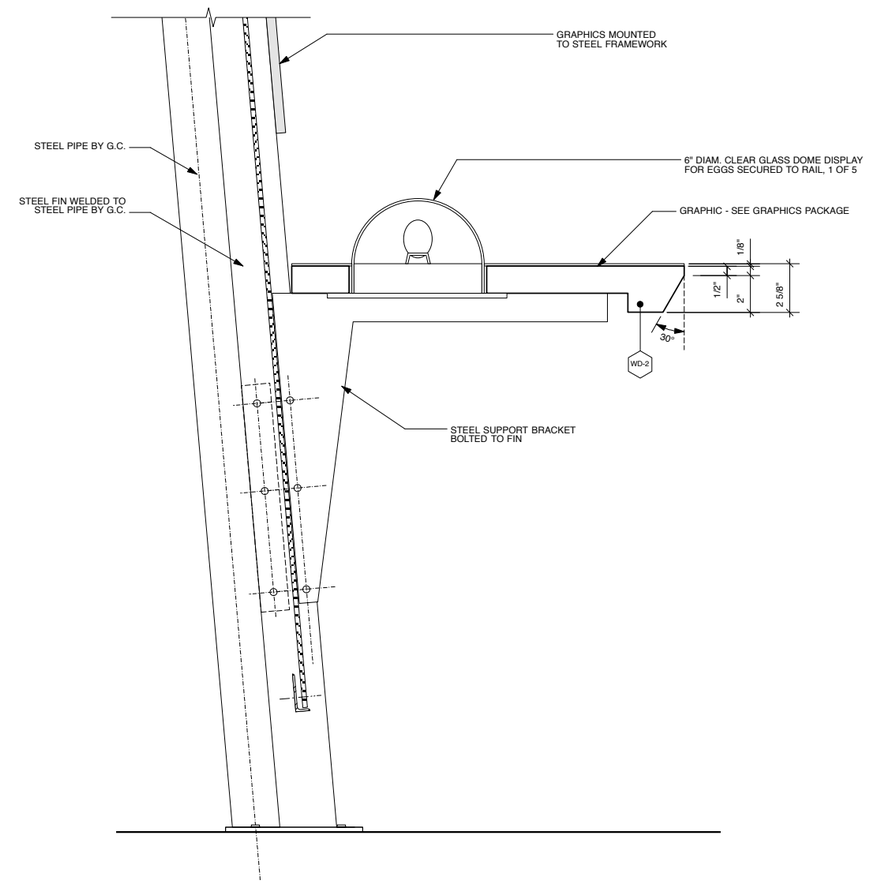
X4-LF-3.20

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **PLAN**

SCALE: 1/2"= 1'-0"



2 **DETAIL SECTION**

SCALE: 3"= 1'-0"

NOTE:

1. X.C. TO COORDINATE WALL STRUCTURE W/ G.C.
2. X.C. TO FIELD MEASURE LIFE RESIN PANELS PRIOR TO CREATION OF FINAL SHOP DRAWINGS OF EXHIBIT RAILS

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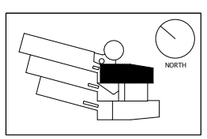


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

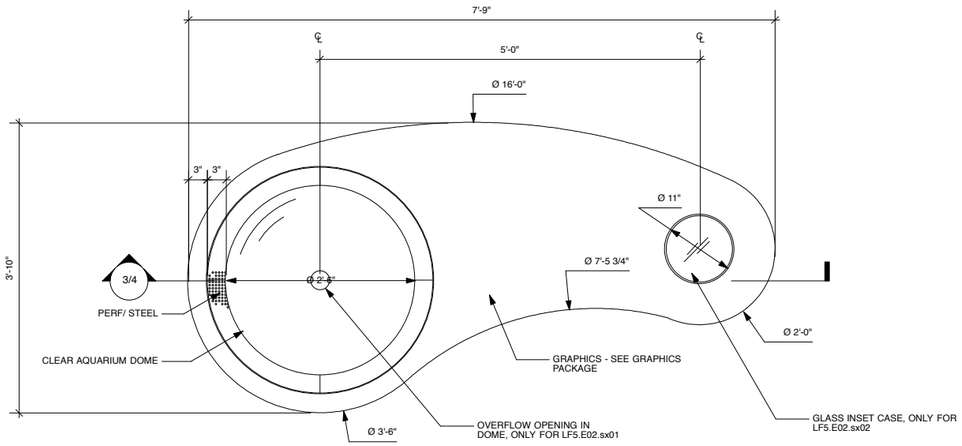
100% Final Design April 2, 2009

Sheet Title

Details:
Life - Organisms

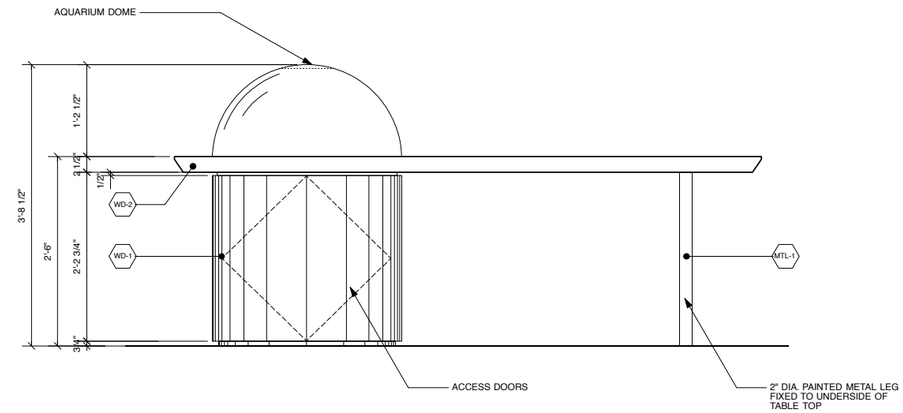
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X4-LF-3.30

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



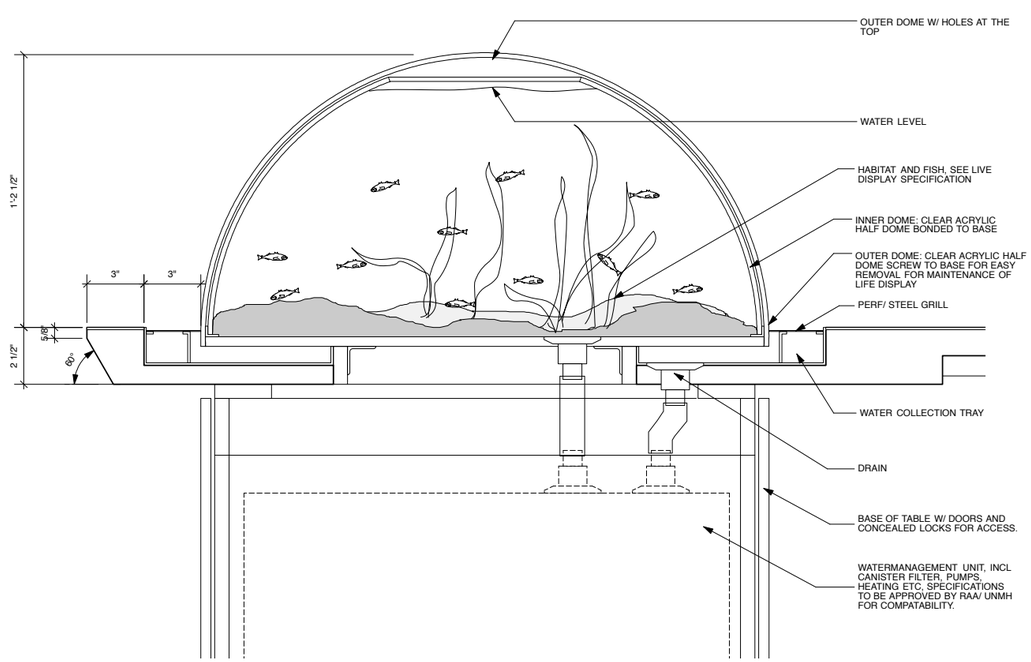
1 TABLE PLAN

SCALE: 1"= 1'-0"



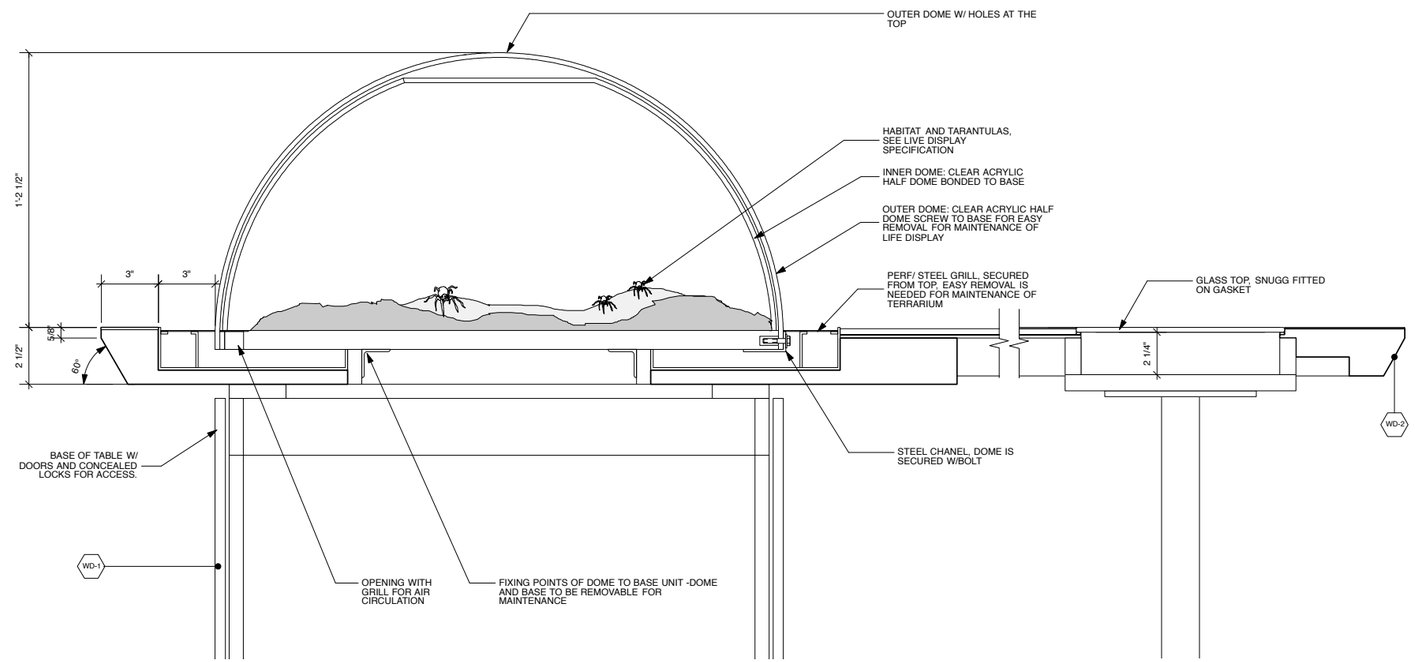
2 ELEVATION

SCALE: 1"= 1'-0"



3 DETAIL SECTION: LF5.E01.sx01

SCALE: 1"= 1'-0"



4 DETAIL SECTION: LF4.E01.sx02

SCALE: 1"= 1'-0"

NOTE:

1. CONTRACTOR TO RESEARCH ALL EQUIPMENT NEEDED, TO BE APPROVED BY RAA AND UNMH FOR COMPATIBILITY .
2. ALL TANKS TO BE REMOVABLE FOR CLEANING AND MAINTENANCE
3. TO BE PROTOTYPED PRIOR TO FABRICATION
4. SEE LIVE SYSTEMS SPECIFICATIONS

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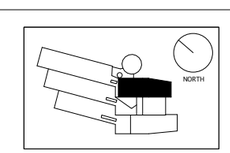
Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

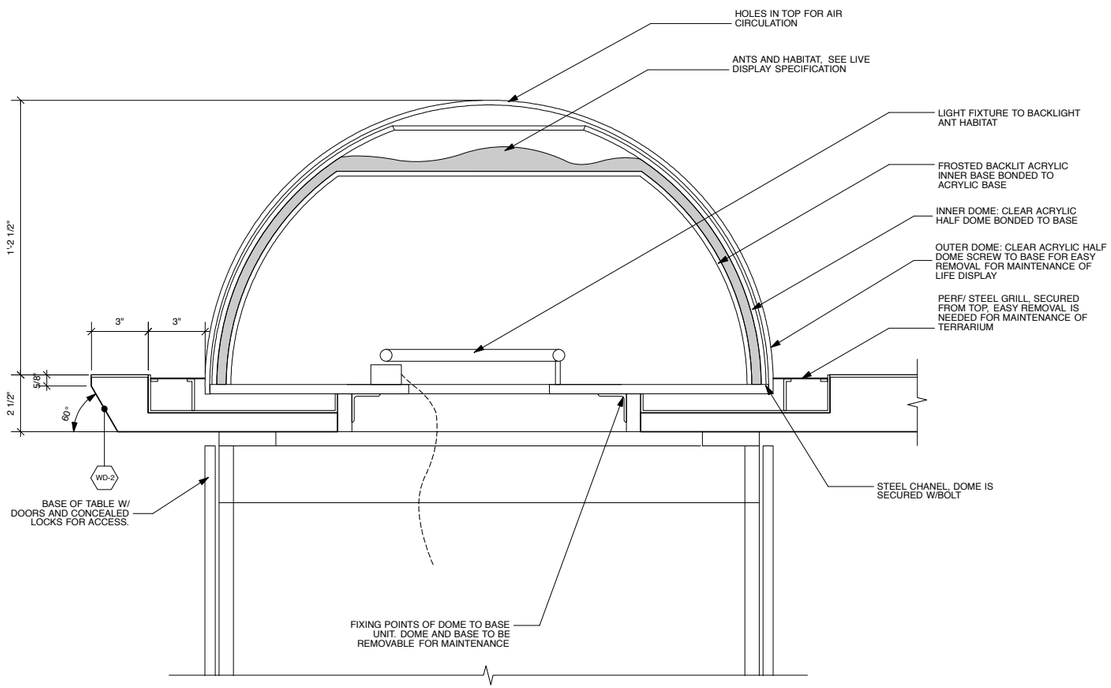
100% Final Design April 2, 2009

Sheet Title

Details:
Life Aquarium Table: LF5.E02.sx02

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X4-LF-3.31

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **DETAIL SECTION: LF5.E01.sx01**

SCALE: 1"= 1'-0"

NOTE:

1. CONTRACTOR TO RESEARCH ALL EQUIPMENT NEEDED, TO BE APPROVED BY RAA AND UMMH FOR COMPATABILTY.
2. TO BE PROTOTYPED PRIOR TO FABRICATION
3. SEE LIVE SYSTEMS SPECIFICATIONS

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Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
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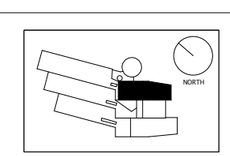


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

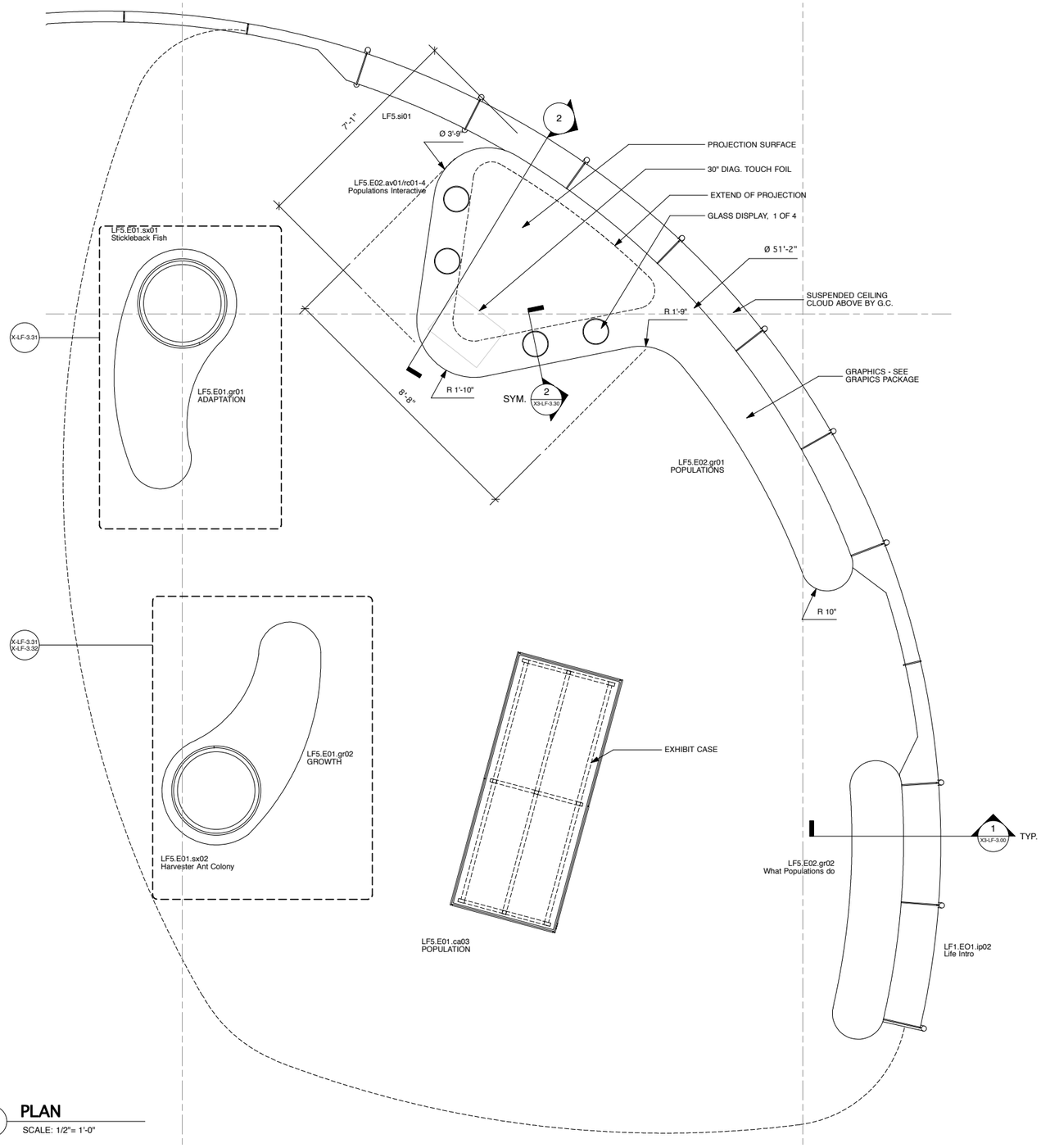
100% Final Design April 2, 2009

Sheet Title

Details:
LIfe Ant Colony, LF5.E01.sx01

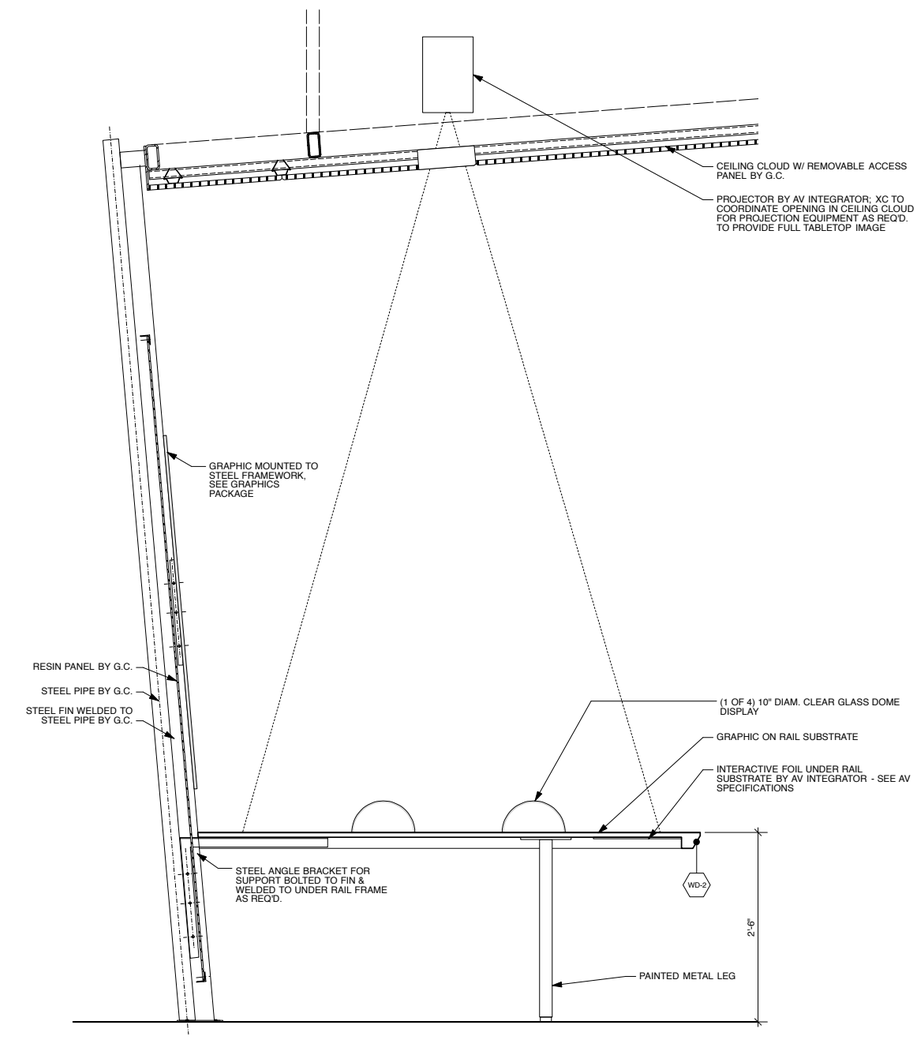
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1"= 1'-0"	X4-LF-3.32

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **PLAN**

SCALE: 1/2"= 1'-0"



2 **DETAIL SECTION**

SCALE: 1"= 1'-0"

NOTE:

1. X.C. TO COORDINATE WALL STRUCTURE W/ G.C.
2. X.C. TO FIELD MEASURE LIFE RESIN PANELS PRIOR TO CREATION OF FINAL SHOP DRAWINGS OF EXHIBIT RAILS

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Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

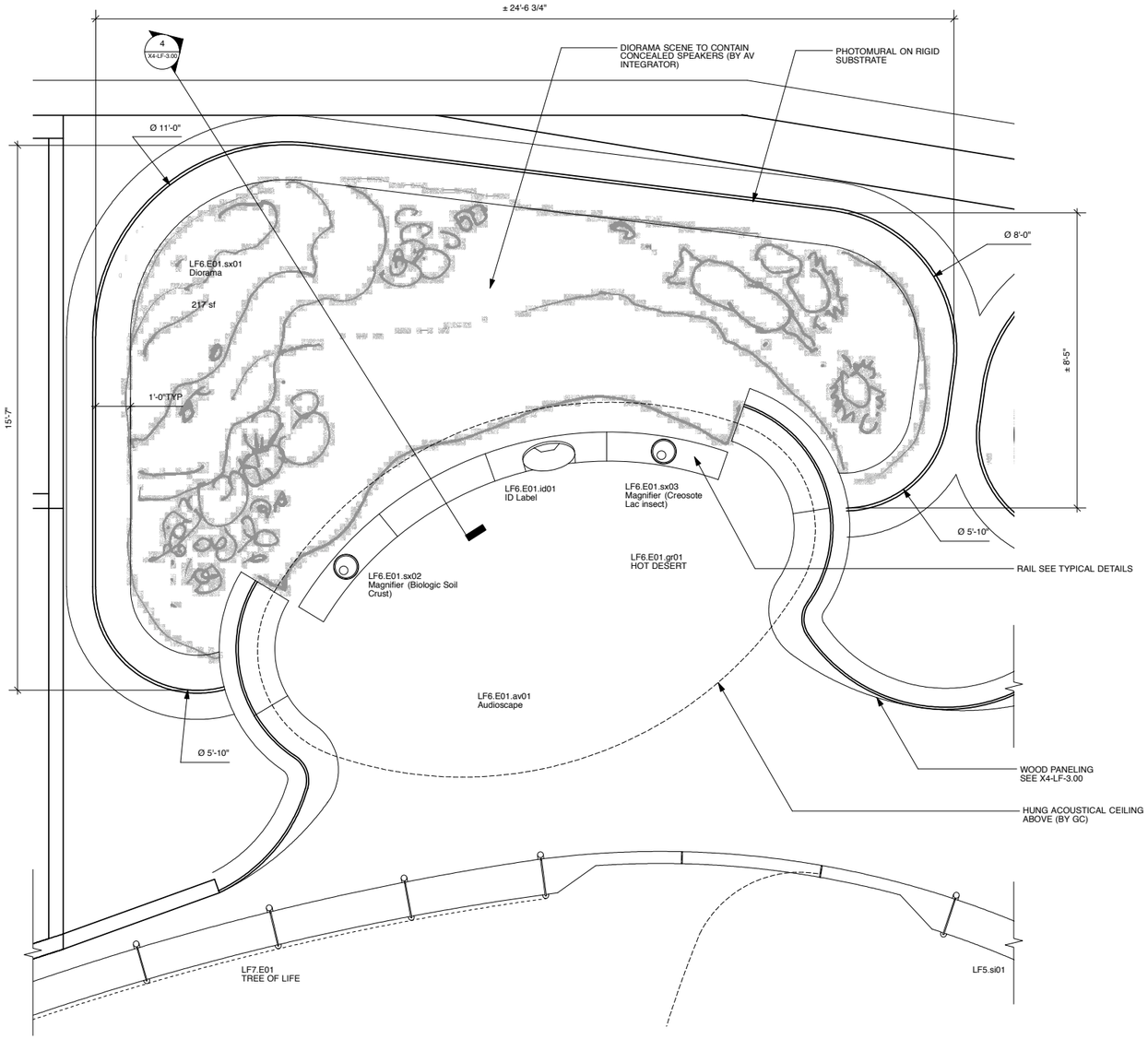
Details:
Life - Population

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X4-LF-3.40

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

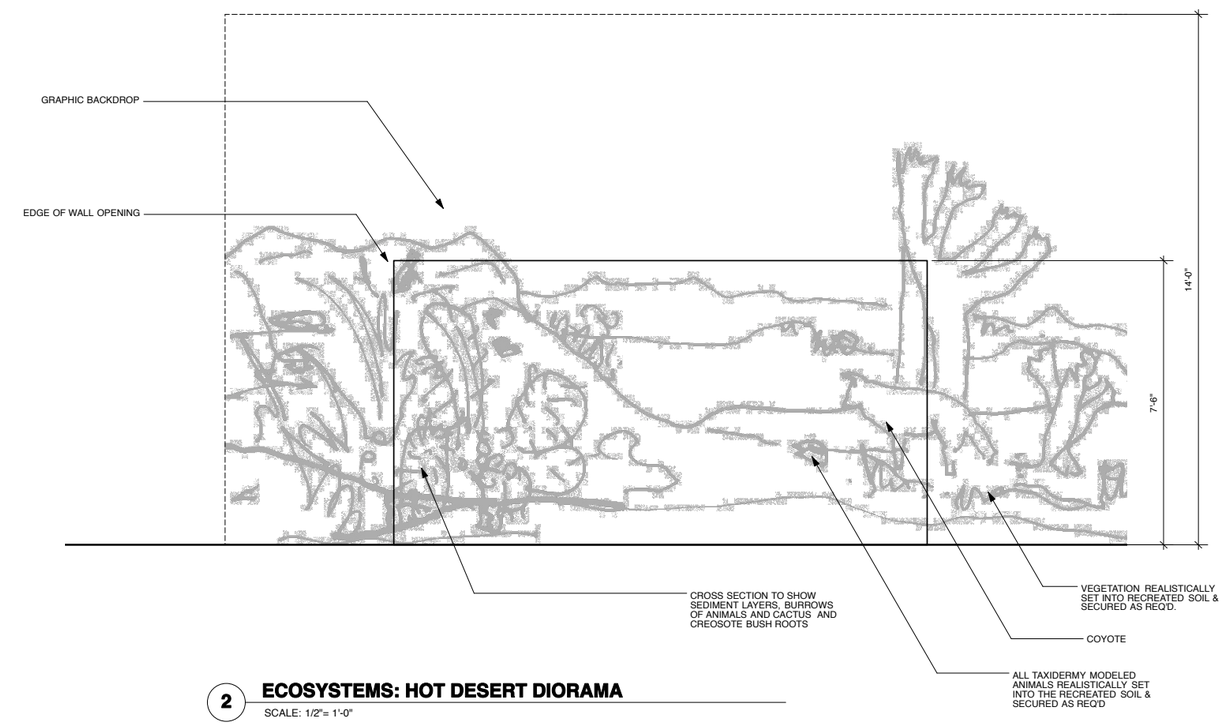
NOTE:

1. SEE DIORAMA SPECIFICATIONS FOR ADDITIONAL INFO
2. XC TO PROVIDE SAMPLES OF ALL SURFACES PRIOR TO FABRICATION FOR RAA TO APPROVE.



1 ECOSYSTEMS: HOT DESERT DIORAMA PLAN: LF6.E01

SCALE: 1/2"= 1'-0"



2 ECOSYSTEMS: HOT DESERT DIORAMA

SCALE: 1/2"= 1'-0"

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Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
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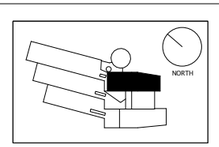


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

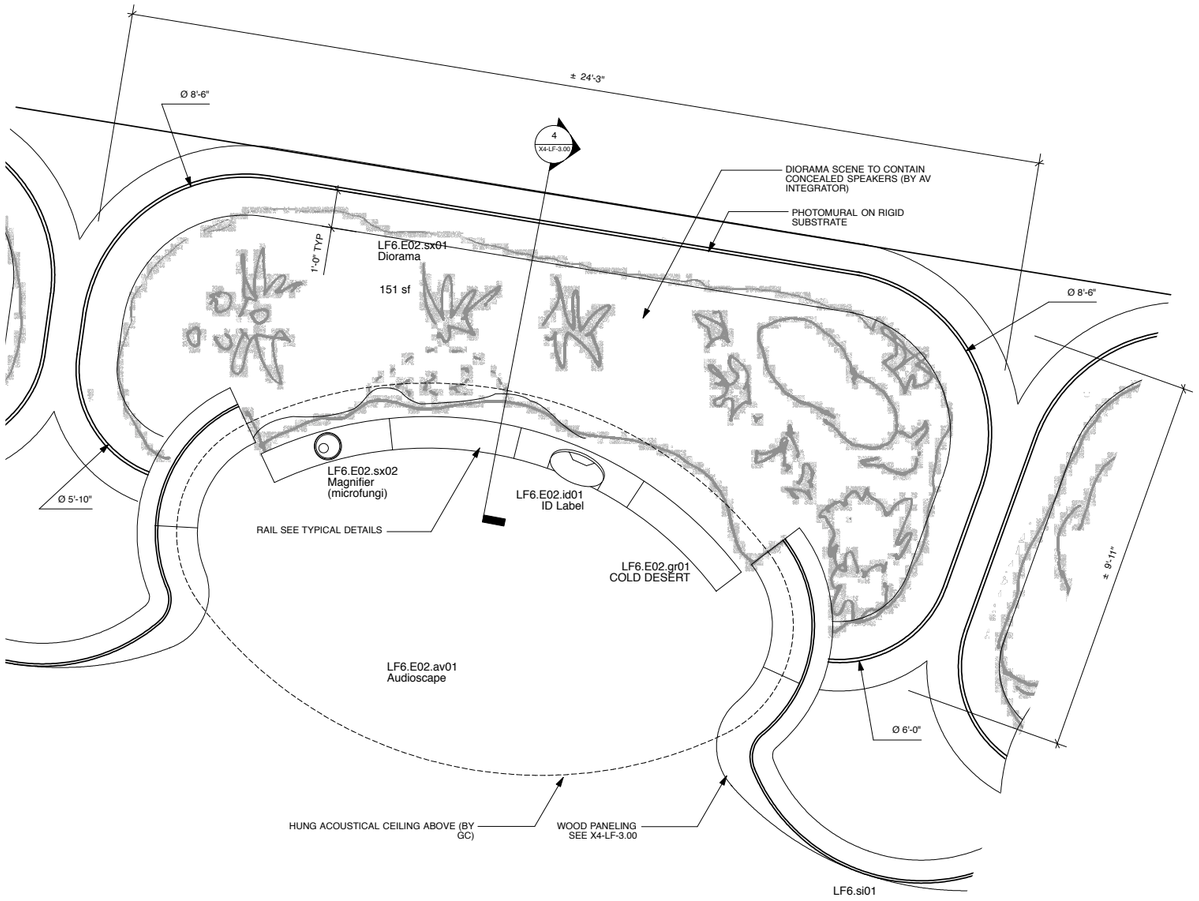
Sheet Title
Details:
Life Hot Desert Diorama

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/2"= 1'-0"	X4-LF-3.50

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

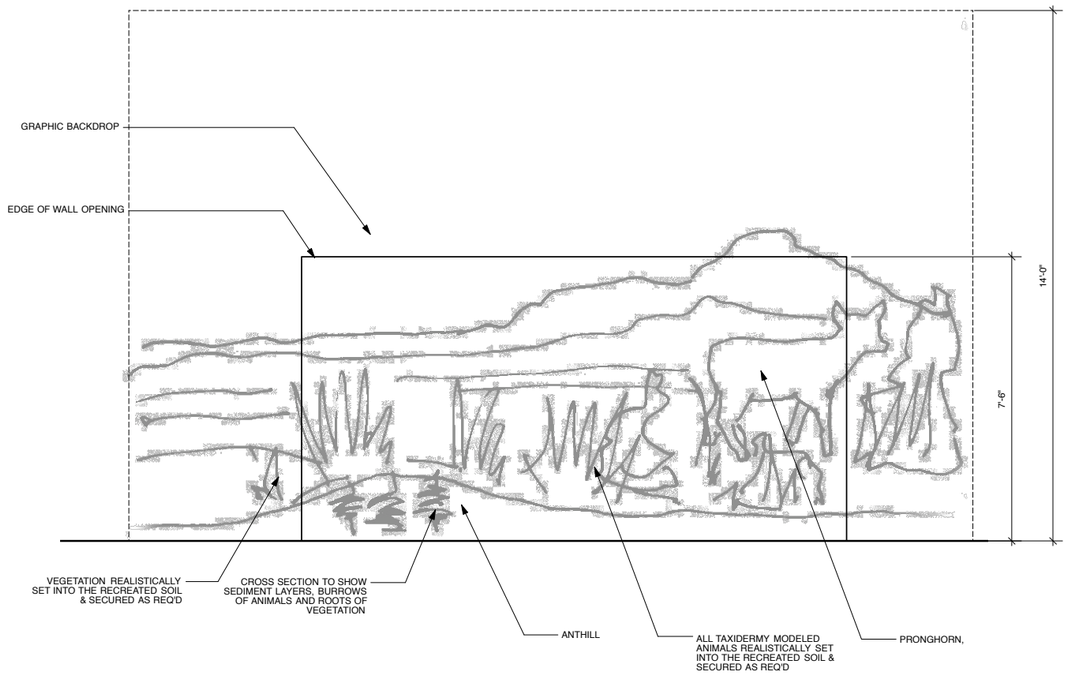
NOTE:

1. SEE DIORAMA SPECIFICATIONS FOR ADDITIONAL INFO
2. XC TO PROVIDE SAMPLES OF ALL SURFACES PRIOR TO FABRICATION FOR RAA TO APPROVE.



1 ECOSYSTEMS: COLD DESERT DIORAMA PLAN: LF6.E02

SCALE: 1/2"= 1'-0"



2 ECOSYSTEMS: COLD DESERT DIORAMA

SCALE: 3/8"= 1'-0"

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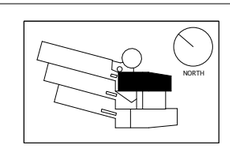


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

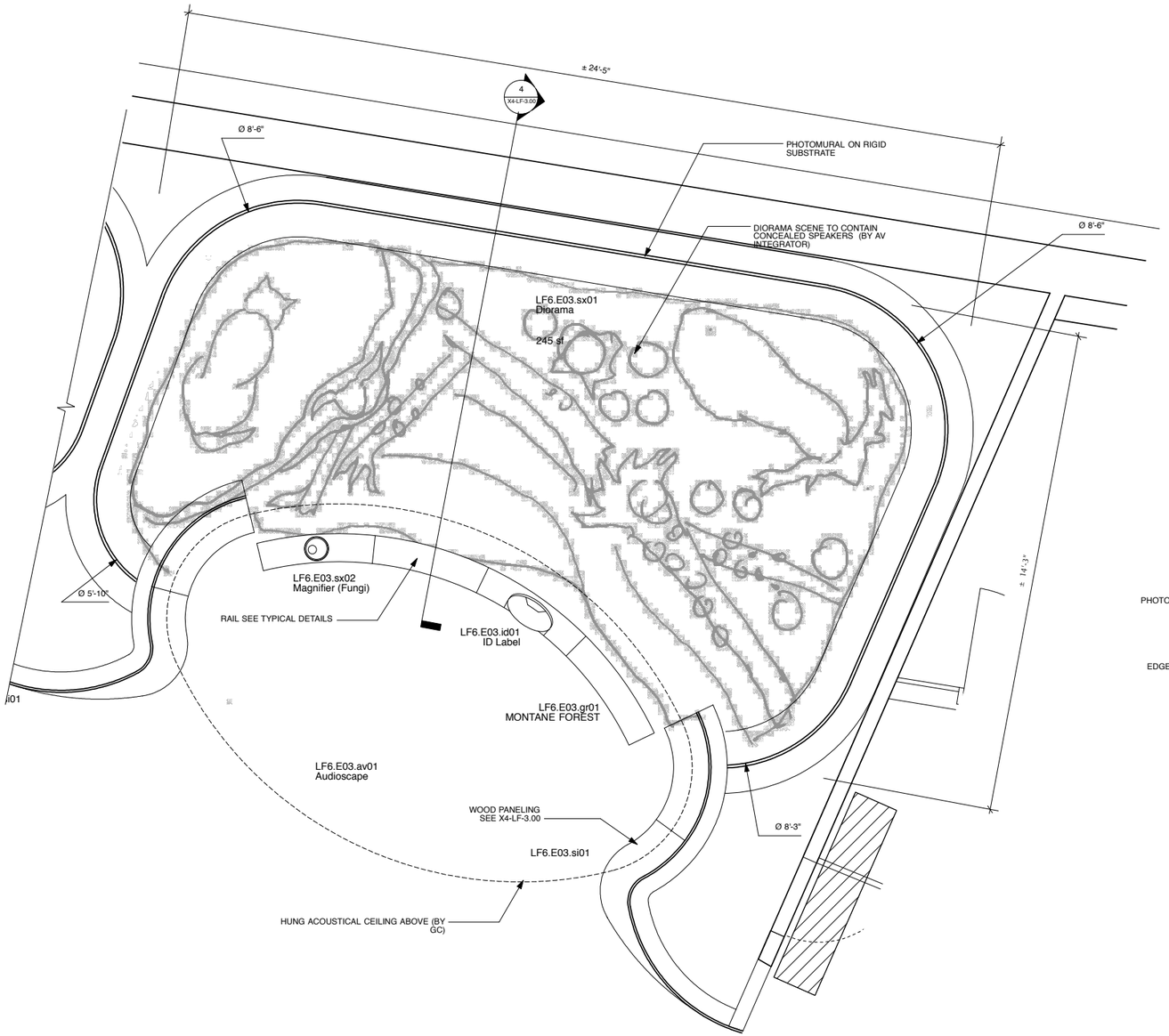
Sheet Title
Details:
LIfe Cold Desert Diorama

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale* 1/2"= 1'-0"	Sheet No. X4-LF-3.60

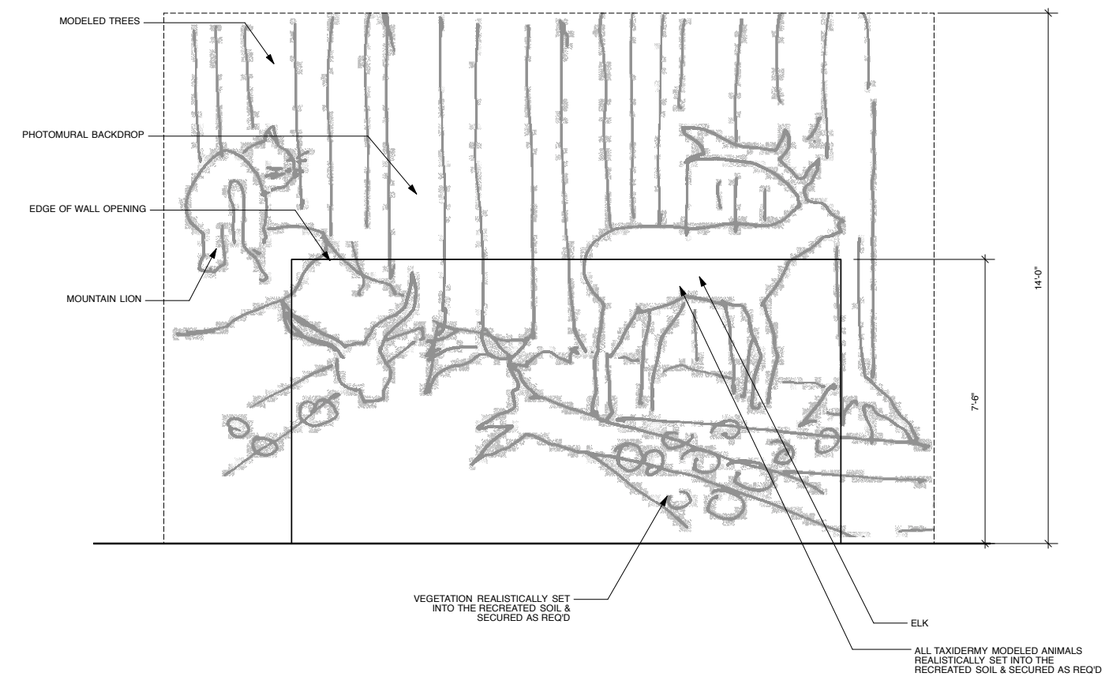
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

NOTE:

1. SEE DIORAMA SPECIFICATIONS FOR ADDITIONAL INFO
2. XC TO PROVIDE SAMPLES OF ALL SURFACES PRIOR TO FABRICATION FOR RAA TO APPROVE.



1 **ECOSYSTEMS: MONTANE FOREST DIORAMA PLAN: LF6.E03**
SCALE: 1/2"= 1'-0"



2 **ECOSYSTEMS: MONTANE FOREST DIORAMA**
SCALE: 1/2"= 1'-0"

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Exhibit Construction

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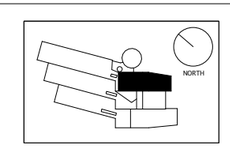


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

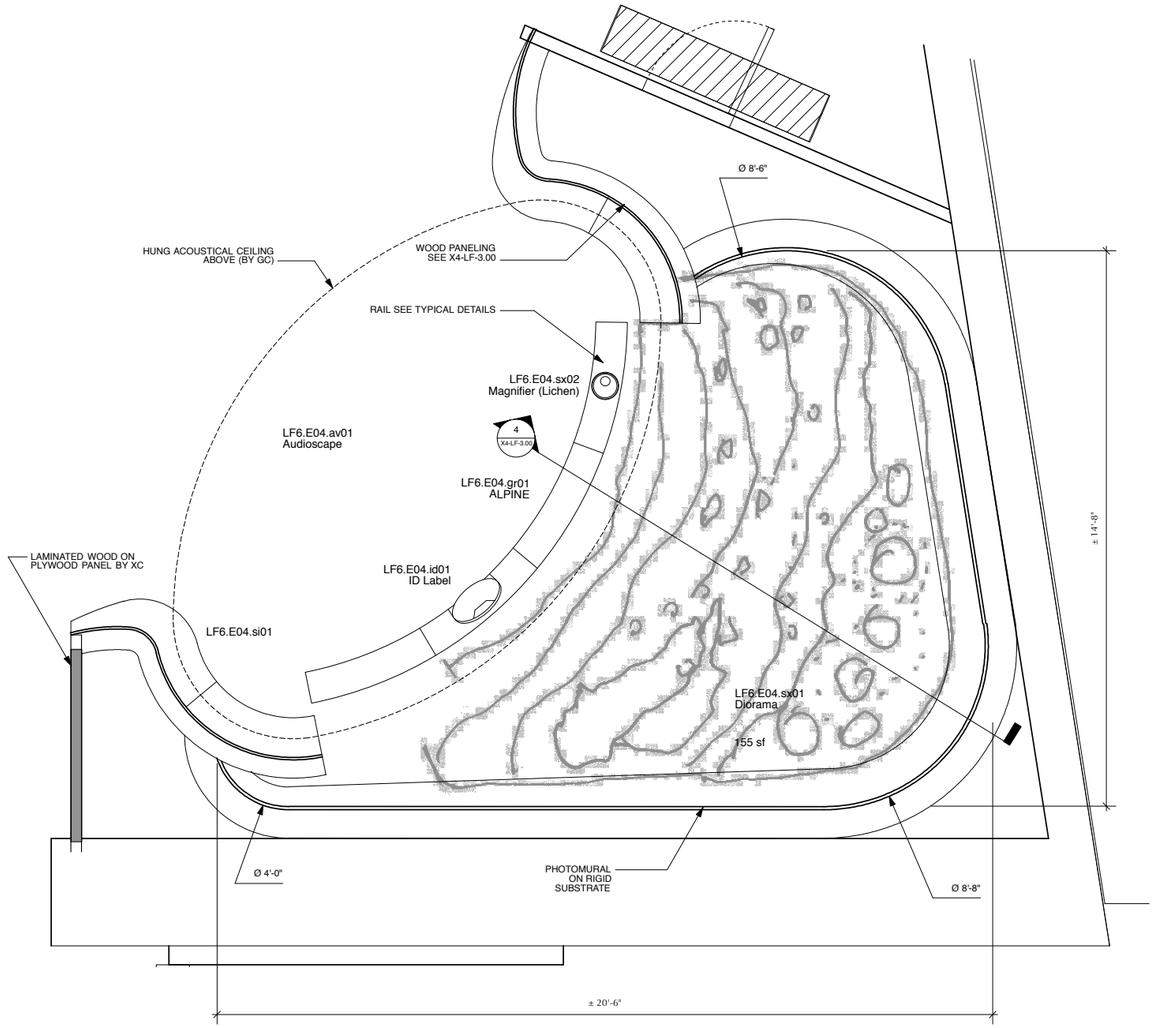
Sheet Title
Details:
Life Montane Forest Diorama

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/2"= 1'-0"	X4-LF-3.70

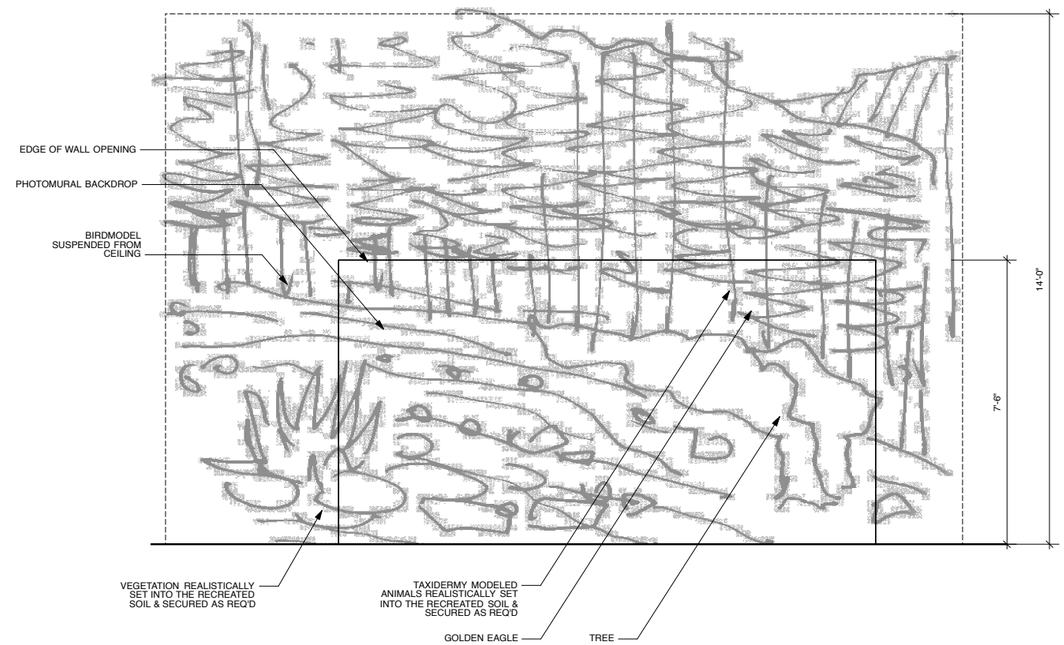
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

NOTE:

1. SEE DIORAMA SPECIFICATIONS FOR ADDITIONAL INFO
2. XC TO PROVIDE SAMPLES OF ALL SURFACES PRIOR TO FABRICATION FOR RAA TO APPROVE.



1 **ECOSYSTEMS: ALPINE DIORAMA PLAN: LF6.E04**
SCALE: 1/2"= 1'-0"



2 **ECOSYSTEMS: ALPINE DIORAMA**
SCALE: 1/2"= 1'-0"

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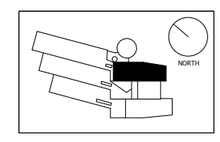


Key Plan

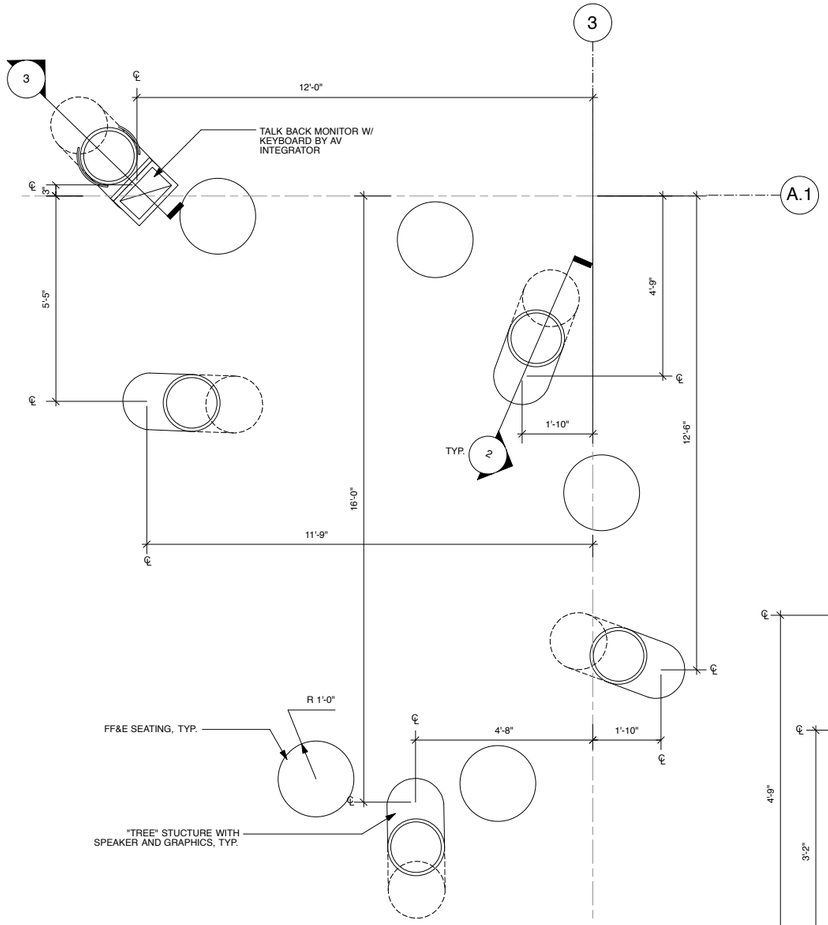
No. / Issue Name / Date

100% Final Design April 2, 2009
No. / Issue Name / Date

Sheet Title
Details:
Life Alpine Diorama

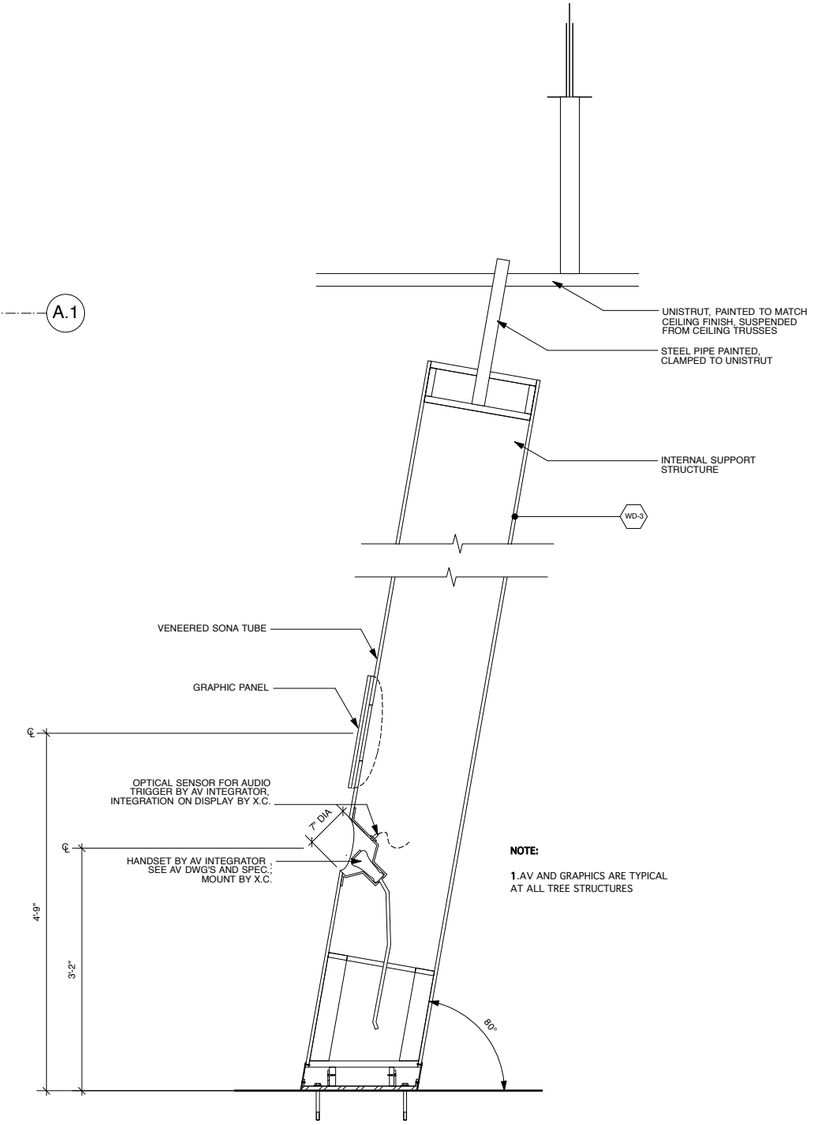
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/2"= 1'-0"	X4-LF-3.80

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **DETAIL PLAN**

SCALE: 1/2"= 1'-0"

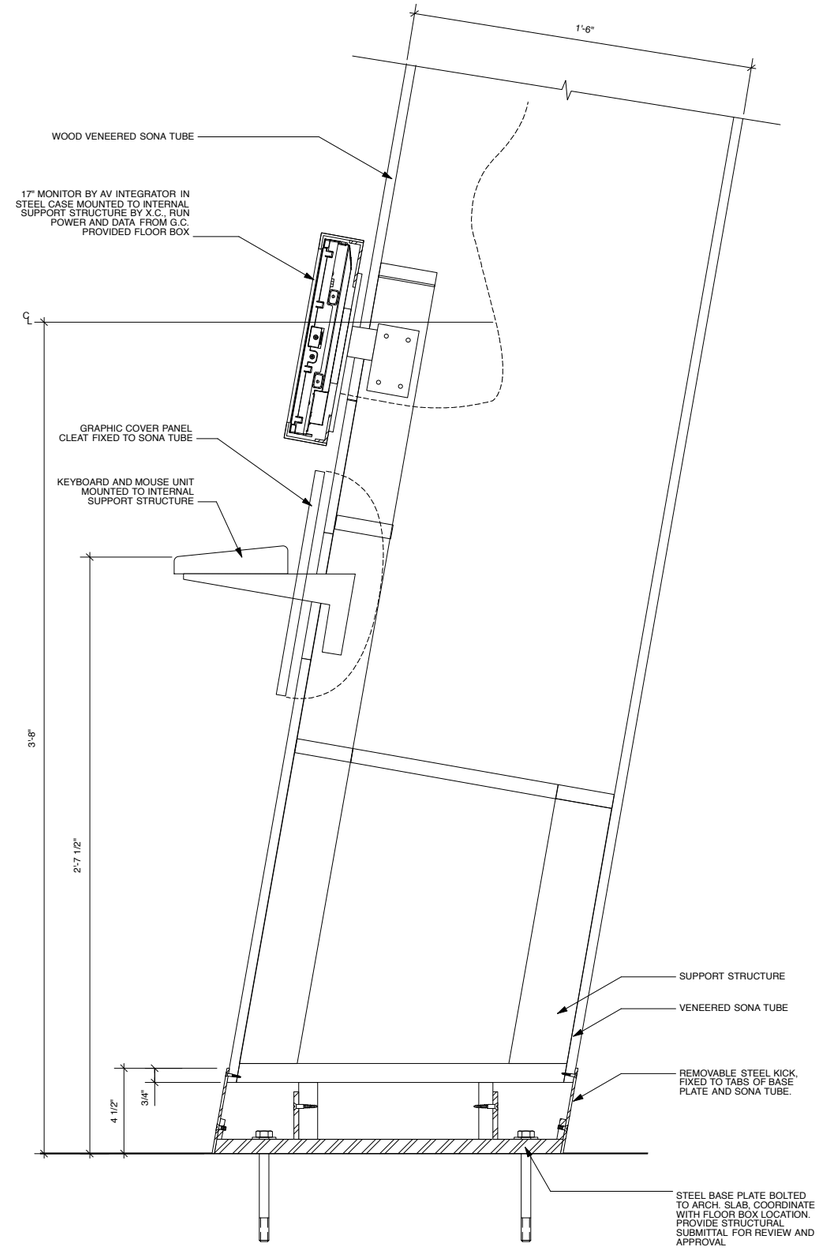


NOTE:

1. AV AND GRAPHICS ARE TYPICAL AT ALL TREE STRUCTURES

3 **TYP. DETAIL SECTION**

SCALE: 1"= 1'-0"



3 **TYP. DETAIL**

SCALE: 3"= 1'-0"

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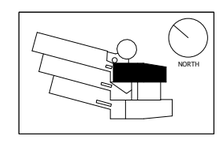


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

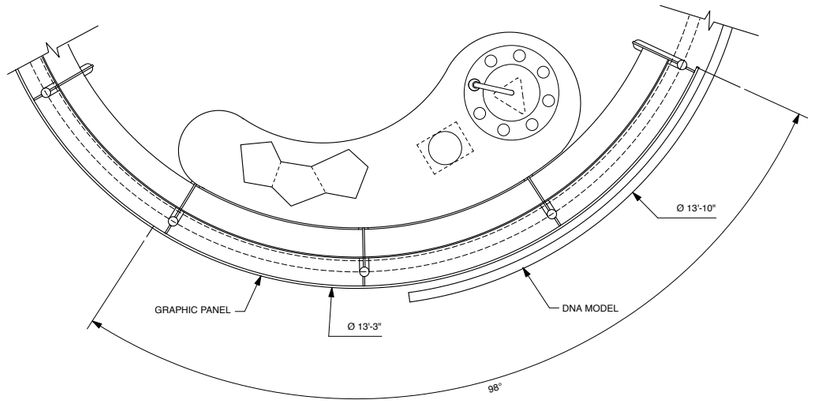
100% Final Design April 2, 2009

Sheet Title

Details:
Life Human Interactions

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X4-LF-3.90

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

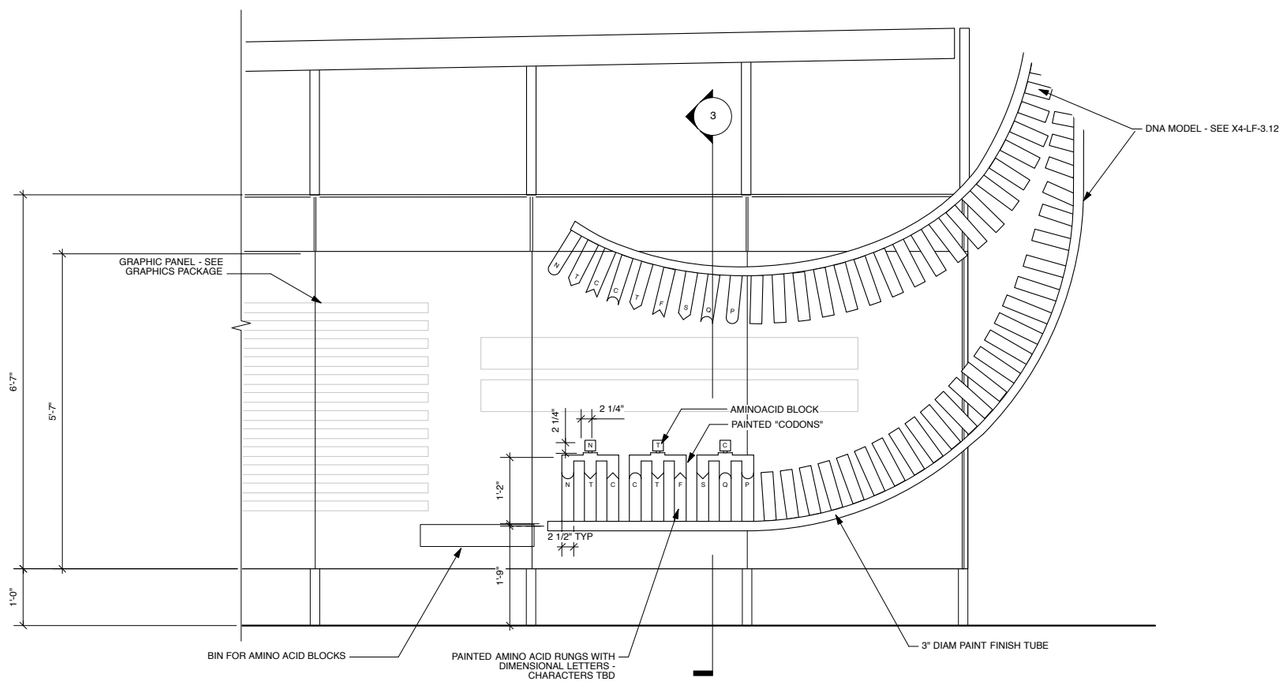


1 PLAN VIEW

SCALE: 3/4" = 1'-0"

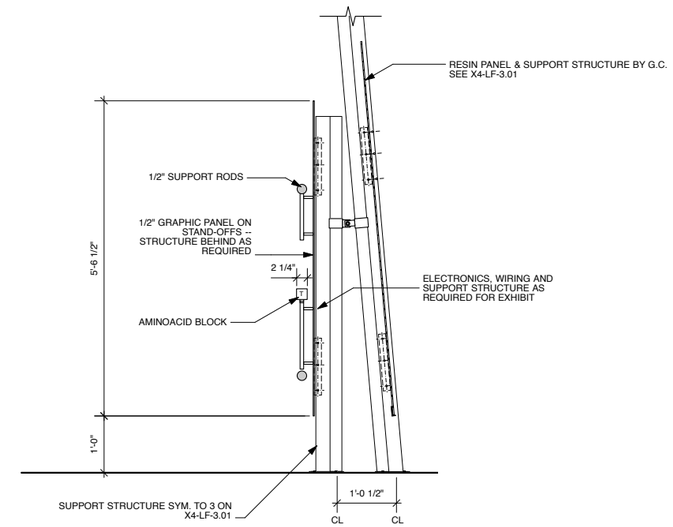
NOTES:

1. SEE INTERACTIVE SPECIFICATIONS FOR ADDITIONAL INFO.
2. ALL INTERACTIVES TO BE PROTOTYPED PRIOR TO INSTALL
3. PROVIDE STRUCTURAL SUBMITTAL FOR REVIEW AND APPROVAL
4. X.C. TO COORDINATE WITH AV INTEGRATOR FOR SEAMLESS INTEGRATION OF ALL AV EQUIPMENT REQUIRED FOR INTERACTIVES



2 DEVELOPED ELEVATION

SCALE: 3/4" = 1'-0"



3 SECTION

SCALE: 3/4" = 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
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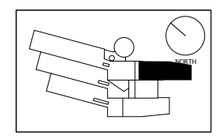


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

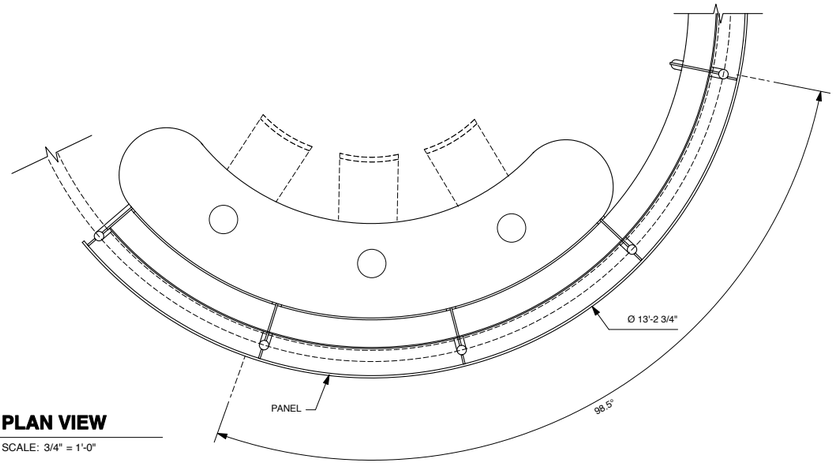
100% Final Design April 2, 2009

Sheet Title
Interactives:
Life Protein Synthesis

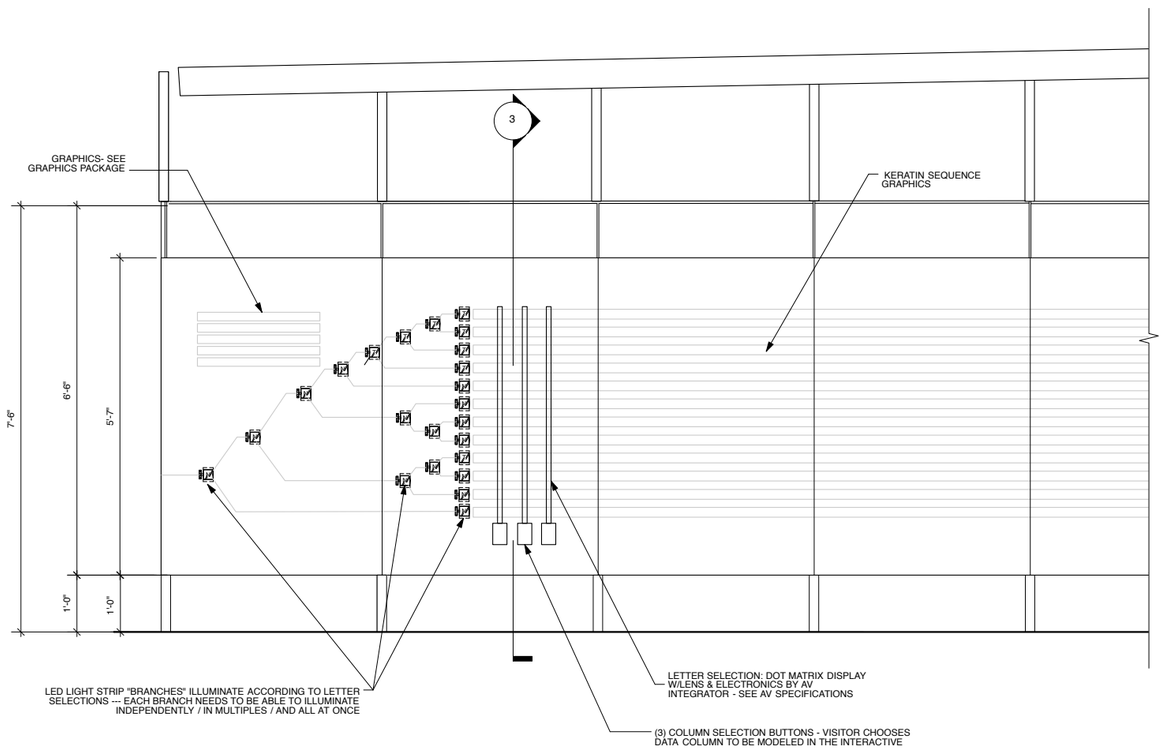
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3/4"= 1'-0"	X4-LF-4.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

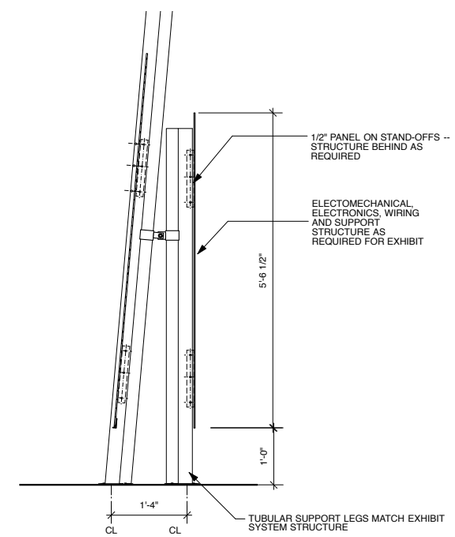
GENERAL NOTES:
1. SEE INTERACTIVE SPECIFICATIONS FOR ADDITIONAL INFO.
2. ALL INTERACTIVES TO BE PROTOTYPED PRIOR TO INSTALL
3. X.C. TO COORDINATE WITH AV INTEGRATOR FOR SEAMLESS INTEGRATION OF ALL AV EQUIPMENT REQUIRED FOR INTERACTIVES



1 **PLAN VIEW**
SCALE: 3/4" = 1'-0"



2 **DEVELOPED ELEVATION**
SCALE: 3/4" = 1'-0"



3 **SECTION**
SCALE: 3/4" = 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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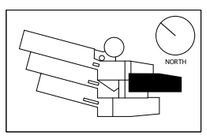


Key Plan

No. / Issue Name / Date

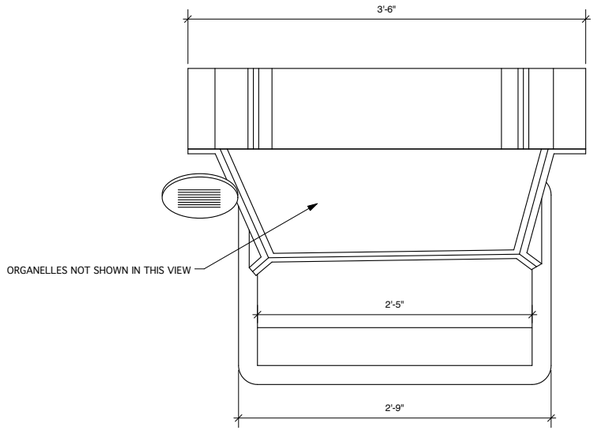
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Interactives:
Life Keratin Sequencing Game

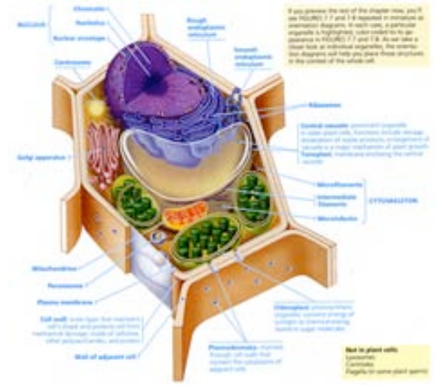
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3/4"= 1'-0"	X4-LF-4.10

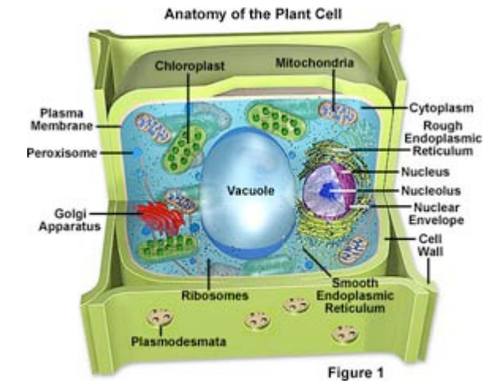
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 PLAN VIEW LF3.E01.in01

SCALE: 1-1/2" = 1'-0"

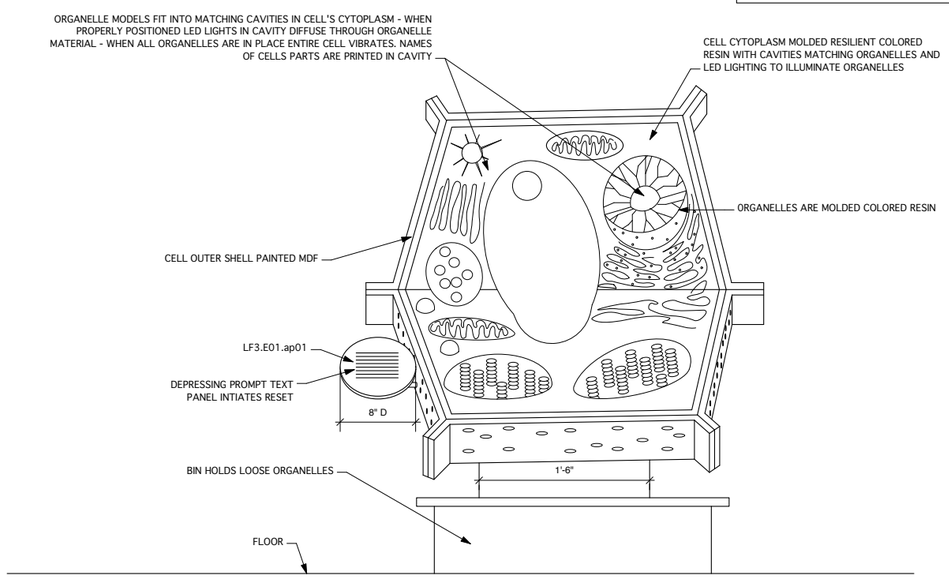




4 REFERENCE

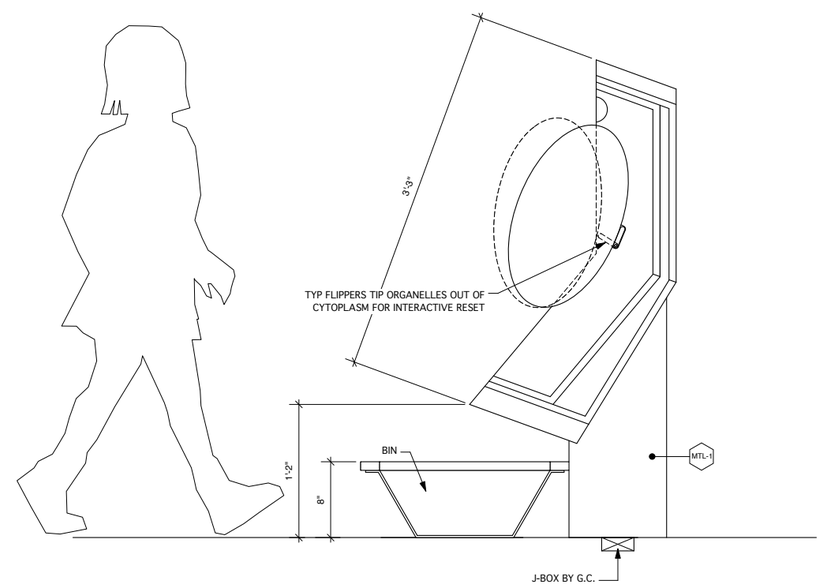
SCALE: NTS

PLANT CELL INTERACTIVE ORGANELLES THAT THE VISITOR WOULD INSTALL ARE: THE NUCLEUS, CHLOROPLAST, MITOCHONDRION, GOLGI BODY, RIBOSOMES. THE OTHER ORGANELLES ARE PERMANENTLY IN PLACE AND PART OF THE CYTOPLASM MOLDED PART. PLANT CELL WALL TO BE RIGID CAST MATERIAL. (ALL MATERIALS SUBJECT TO DESIGNER FOR REVIEW & APPROVAL)



2 FRONT VIEW

SCALE: 1-1/2" = 1'-0"



3 SIDE VIEW

SCALE: 1-1/2" = 1'-0"

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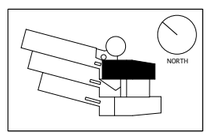


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

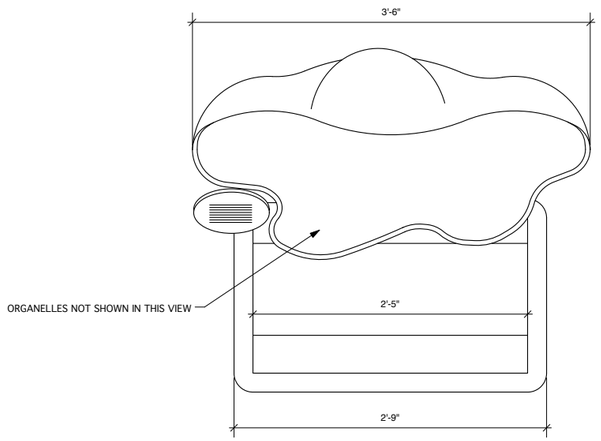
No. / Issue Name / Date

Sheet Title

Interactives:
Life Build a Plant Cell

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1 1/2"= 1'-0"	X4-LF-4.20

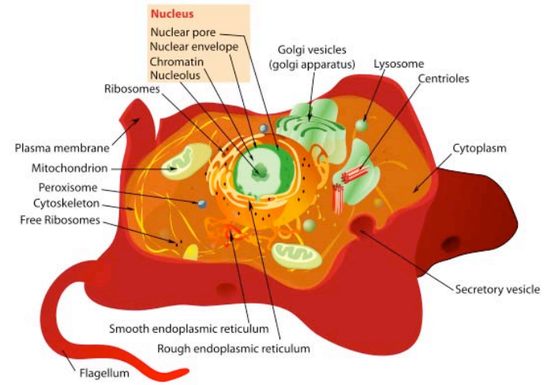
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

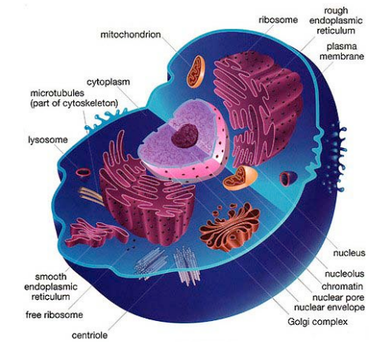


1 PLAN VIEW LF3.E01.in02

SCALE: 1-1/2" = 1'-0"

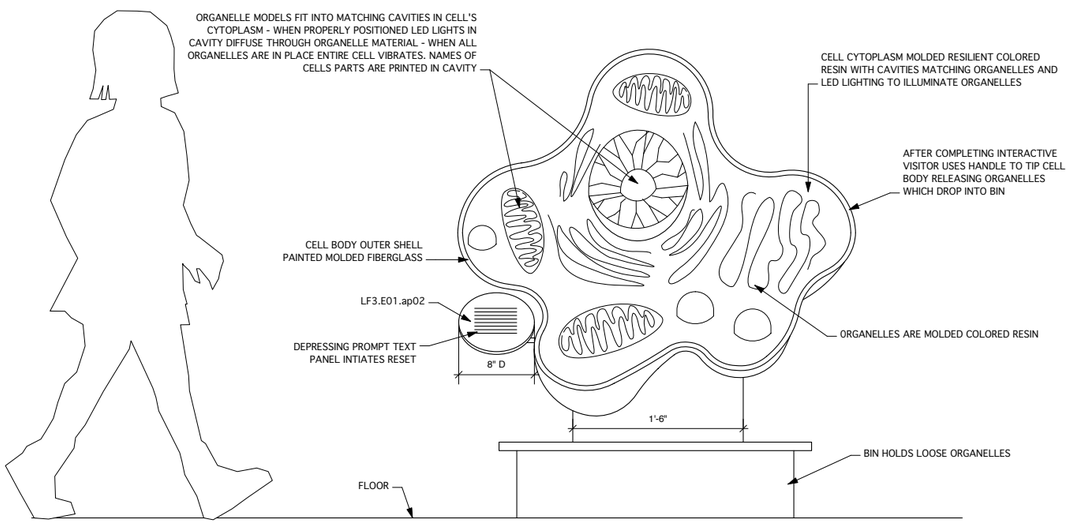
ANIMAL CELL INTERACTIVE ORGANELLES THAT THE VISITOR WOULD INSTALL ARE: THE NUCLEUS, MITOCHONDRION, GOLGI BODY, RIBOSOMES AND LYSOSOME. THE OTHER ORGANELLES ARE PERMANENTLY IN PLACE AND PART OF THE CYTOPLASM MOLDED PART. ANIMAL CELL WALL TO BE SOFT/ FLEXIBLE CAST MATERIAL. (ALL MATERIALS SUBJECT TO DESIGNER FOR REVIEW & APPROVAL)





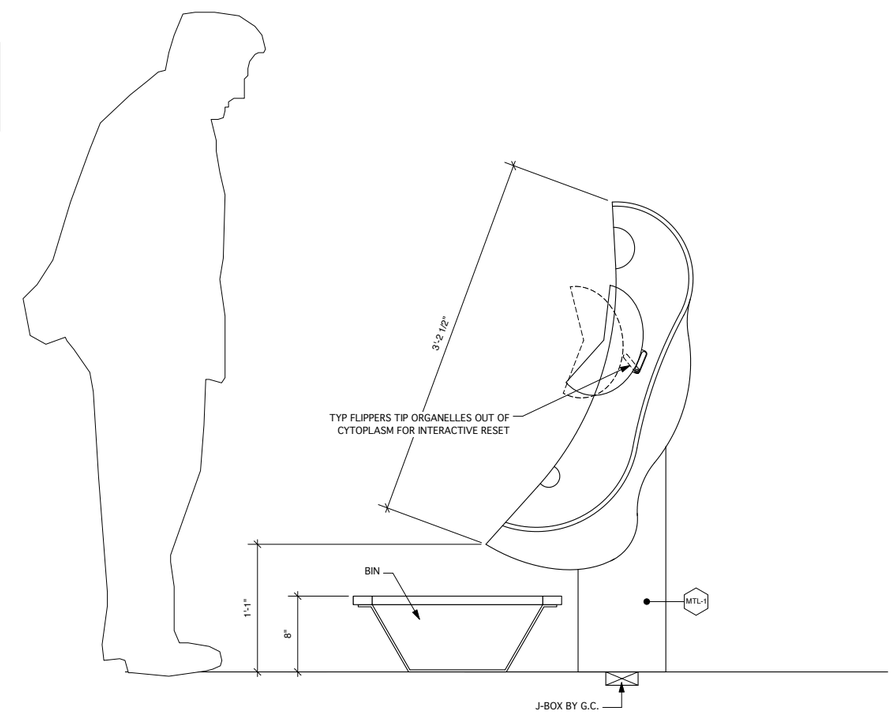
4 REFERENCE

SCALE: NTS



2 FRONT VIEW

SCALE: 1-1/2" = 1'-0"



3 SIDE VIEW

SCALE: 1-1/2" = 1'-0"

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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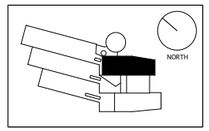


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Interactives:
Life Build an Animal Cell

Date: April 2, 2009

Scale*: 1 1/2"= 1'-0"

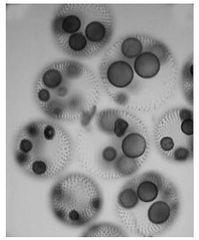
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

X4-LF-4.21

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

WATER LILY

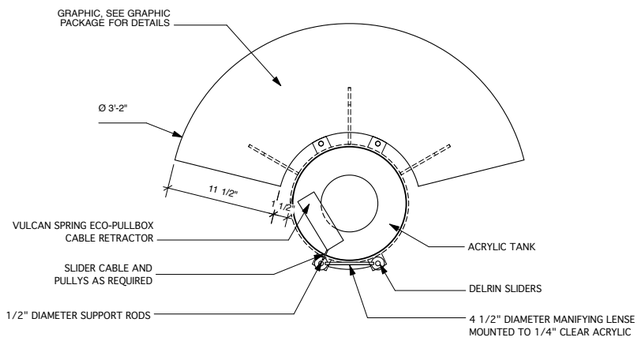
ELODEA



VOLVOX

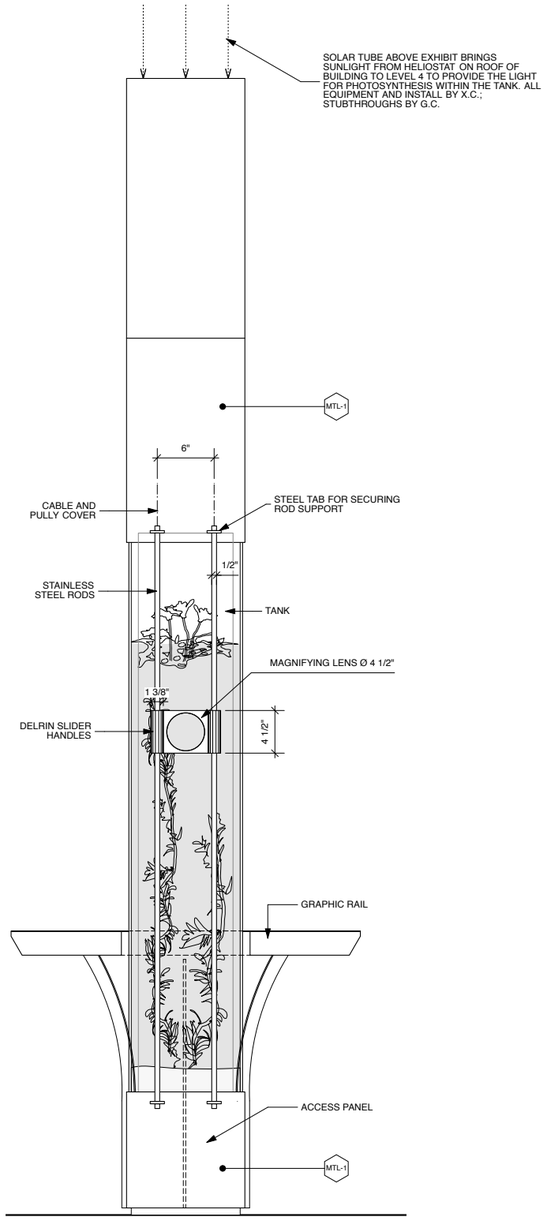
4 PLANT REFERENCE

SCALE: NTS



1 PLAN VIEW LF3.E03.sx01

SCALE: 3/4" = 1'-0"

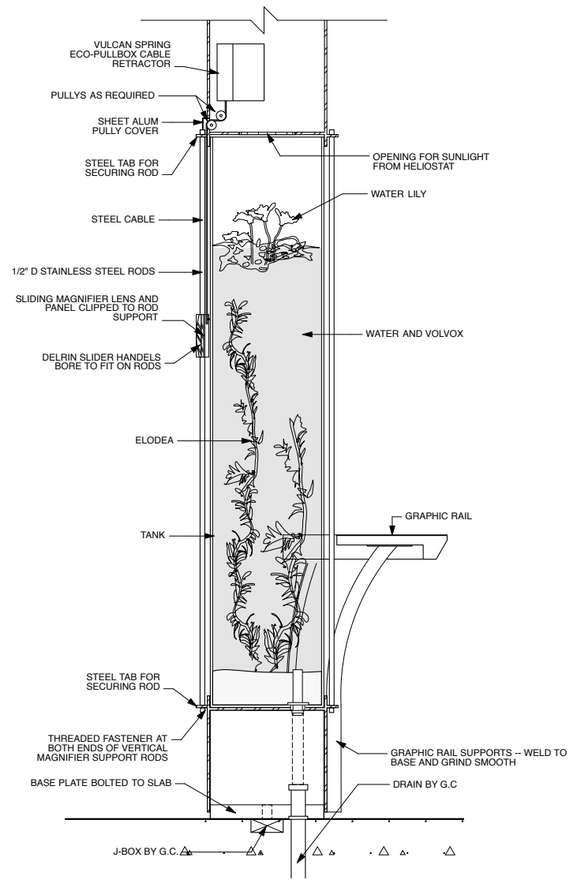


2 ELEVATION

SCALE: 3/4" = 1'-0"

NOTES:

1. PROVIDE COORDINATED SHOP DRAWINGS W/ LIVE DISPLAY CONSULTANT FOR REVIEW.
2. TANK MUST HAVE ACCESS FROM ABOVE + BE REMOVABLE FOR MAINTENANCE.



3 DETAIL SECTION

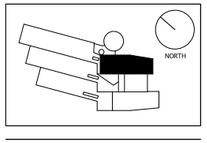
SCALE: 1-1/2" = 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **89 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Interactives:
Life Photosynthesis

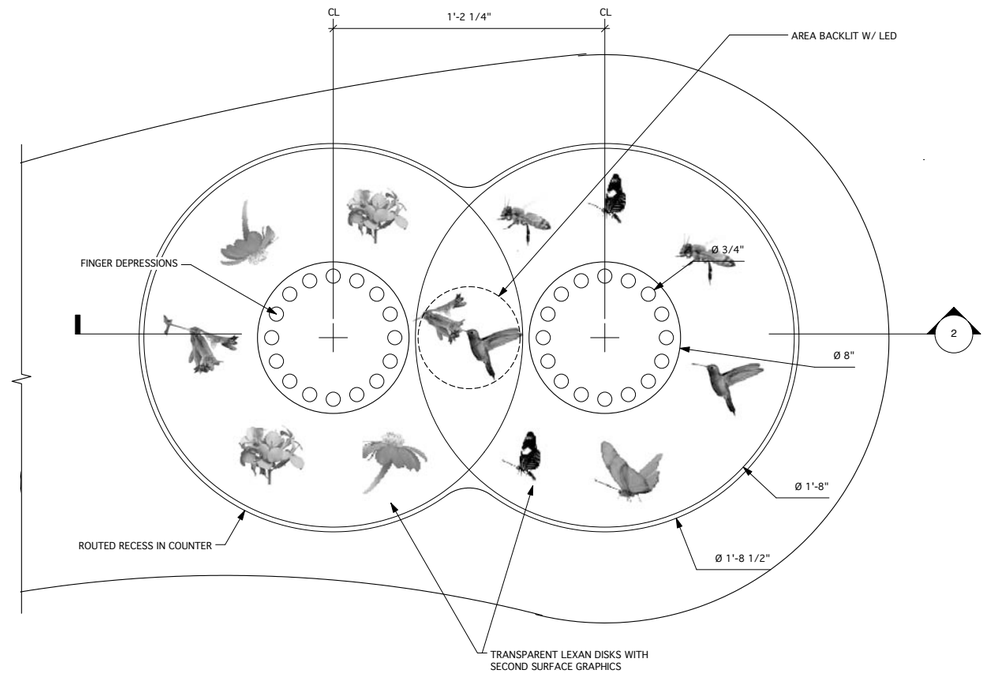
Date: April 2, 2009

Scale*: As Noted

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

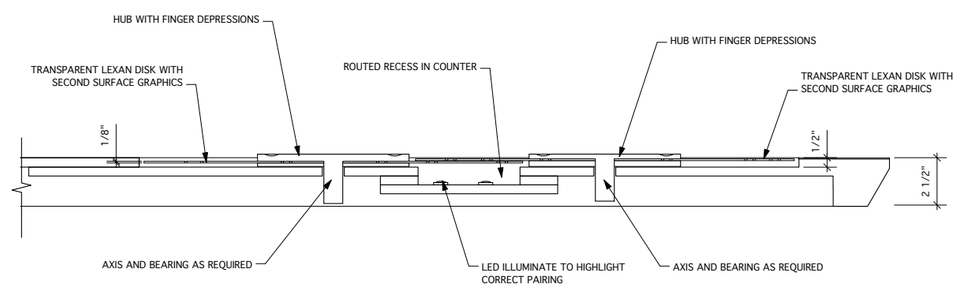
X4-LF-4.30

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **DETAIL PLAN**

SCALE: 3" = 1'-0"



2 **SECTION VIEW**

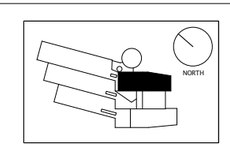
SCALE: 3" = 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

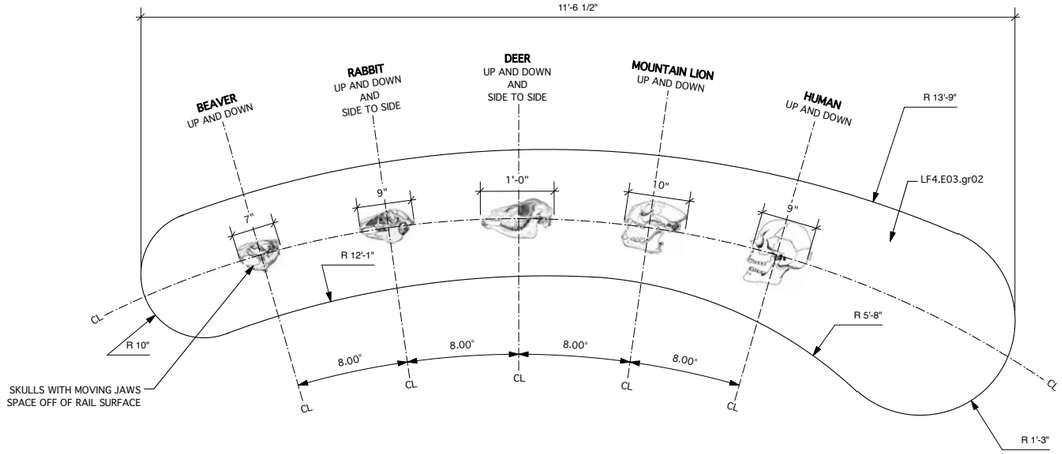
100% Final Design April 2, 2009

Sheet Title

Interactives:
Life Pollination Interactive

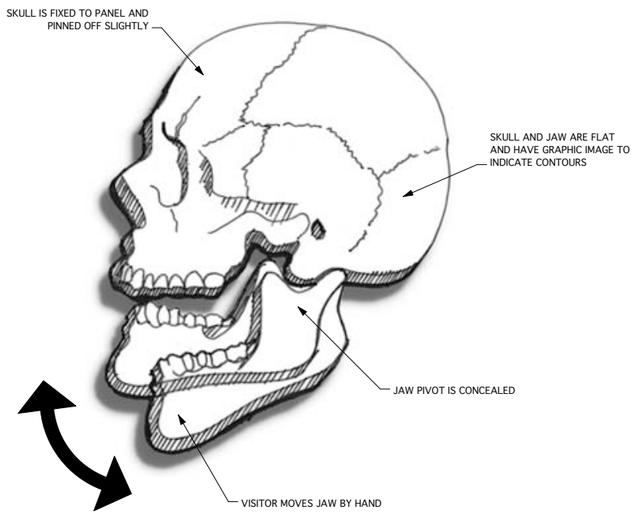
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3"= 1'-0"	X4-LF-4.50

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 PLAN VIEW LF4.E03.in01

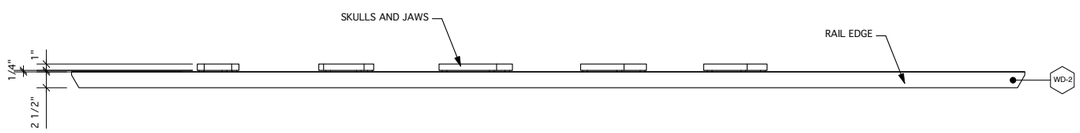
SCALE: 1" = 1'-0"



IMPORTANT NOTE: HUMAN JAW (SHOWN) DEMONSTRATES UP AND DOWN MOVEMENT ONLY -- ANIMAL JAWS THAT HAVE SIDE TO SIDE MOVEMENT TO UTILIZE A CAM PIVOT TO VARY THE JAW'S HEIGHT OFF OF THE COUNTER -- UP AND DOWN MOVEMENT MAY ALSO INCUDE FORWARD AND BACK GRINDING MOTION AND ALL SHOULD BE PRICED AS SUCH

3 TYP SKULL OPERATION

SCALE: HALF SCALE



2 FRONT VIEW

SCALE: 1" = 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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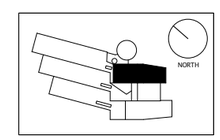


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Interactives:
LIfe Jaw Movement

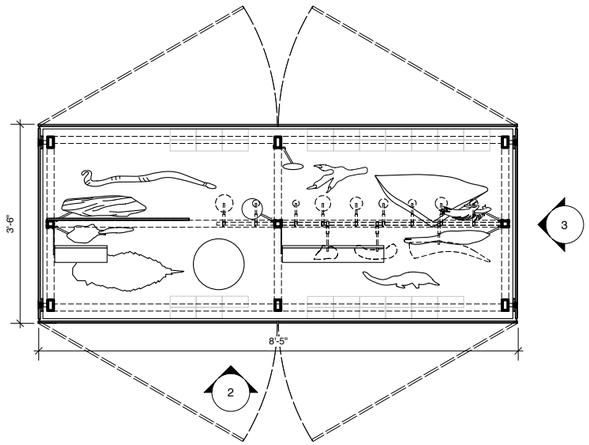
Date: April 2, 2009

Scale*: As Noted

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

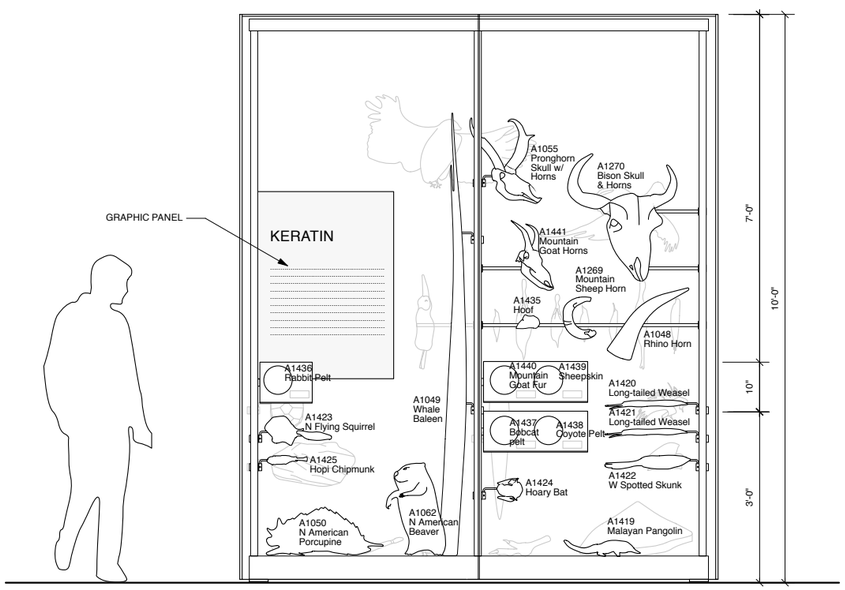
X4-LF-4.60

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



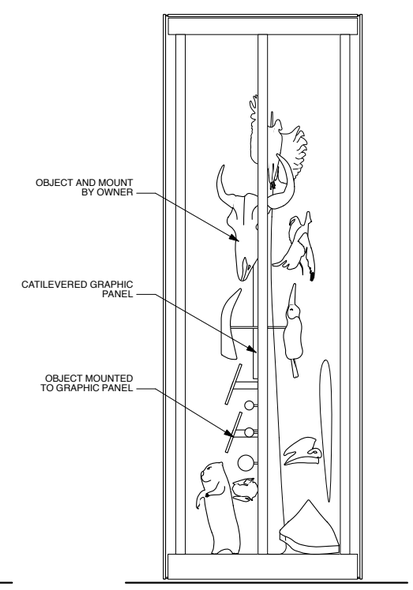
1 PLAN

SCALE: 3/4"= 1'-0"



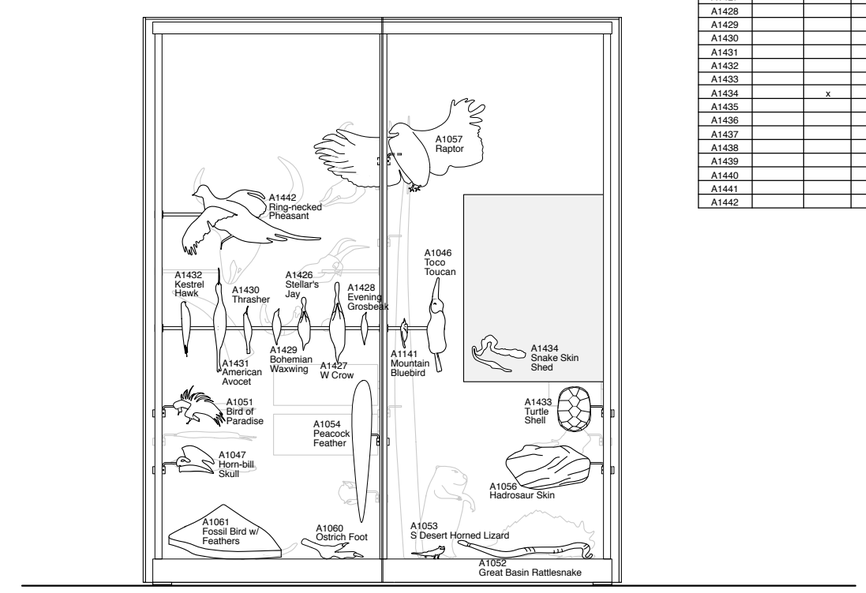
2 ELEVATION

SCALE: 3/4"= 1'-0"



3 ELEVATION

SCALE: 3/4"= 1'-0"



4 ELEVATION

SCALE: 3/4"= 1'-0"

ARTIFACT MOUNTING SCHEDULE

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A1046							x	
A1047					x			
A1048								x
A1049					x			
A1050				x				
A1051					x			
A1052				x				
A1053				x				
A1054					x			
A1055					x			
A1056					x			
A1057					x			
A1060				x				
A1061				x				
A1062				x				
A1141							x	
A1269								x
A1270							x	
A1419				x				
A1420					x			
A1421					x			
A1422					x			
A1423					x			
A1424					x			
A1425					x			
A1426								x
A1427								x
A1428								x
A1429								x
A1430								x
A1431								x
A1432								x
A1433					x			
A1434		x						
A1435								x
A1436			x					
A1437			x					
A1438			x					
A1439			x					
A1440			x					
A1441						x		
A1442							x	

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner
UMNH
1390 East President's Circle
Salt Lake City, Utah 84112
801.581.6927 tel.

Design Architect
Polshek Partnership Architects LLP
320 West 13th Street
New York, New York
212.807.7171 tel.

Architect of Record
Gillies Stransky Brems Smith
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Salt Lake City, Utah
801.521.8600 tel.

Exhibit Structural Engineer
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Building Engineer
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801.575.8877 tel.

Mechanical/Plumbing/FP Engineer
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Salt Lake City, Utah 84103
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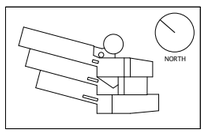
Electrical/AV Engineer
Spectrum Engineers
175 South Main Street
Salt Lake City, Utah 84111
800.678.7077 tel

Lighting
Branston Partnership
122 West 26th Street
New York, NY 10001
212.924.4050 tel.

Audio Visual
BBI Engineering, Inc.
241 Quint Street
San Francisco, CA 94124
415 685 9555 tel.

Exhibition Planner and Designer
Ralph Appelbaum Associates
88 Pine Street
New York, New York 10005
212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Exhibit Case Layouts:
Life LF2.EO3.ca01

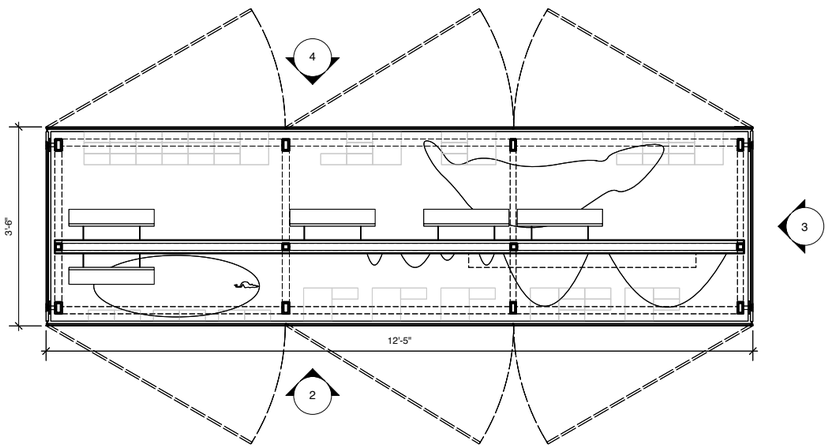
Date
April 2, 2009

Scale*
3/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750

Sheet No.
X4-LF-5.10

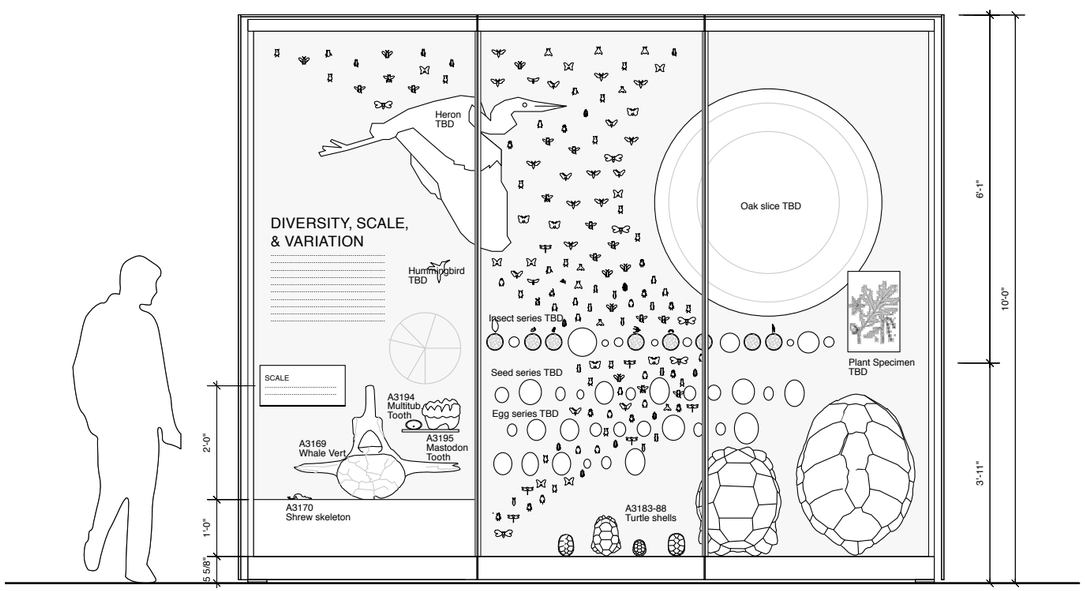
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



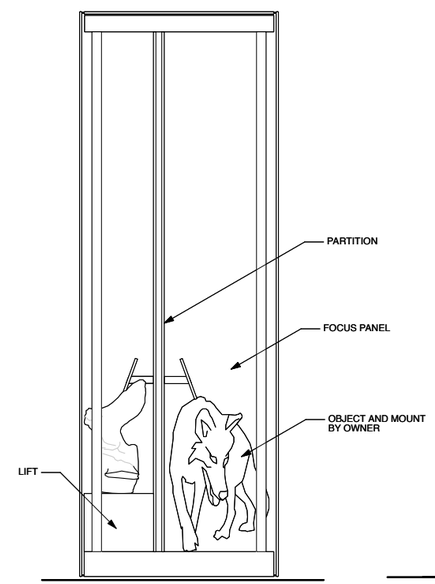
1 **PLAN**
SCALE: 3/4"= 1'-0"

ARTIFACT MOUNTING SCHEDULE

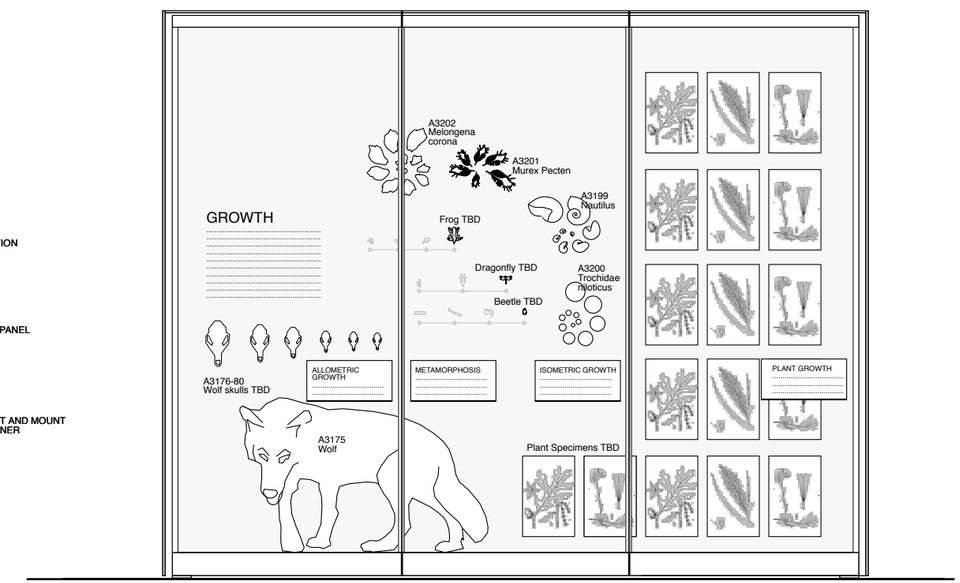
Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A3169				x				
A3170				x				
A3175				x				
A3176	x							
A3177	x							
A3178	x							
A3179	x							
A3180	x							
A3183	x							
A3184	x							
A3185	x							
A3186	x							
A3187	x							
A3188	x							
A3194			x					
A3195			x					
A3199	x							
A3200	x							
A3201	x							
A3202	x							



2 **ELEVATION**
SCALE: 3/4"= 1'-0"



3 **ELEVATION**
SCALE: 3/4"= 1'-0"



4 **ELEVATION**
SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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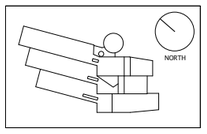


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Exhibit Case Layouts:
Life LF4.EO1.ca02

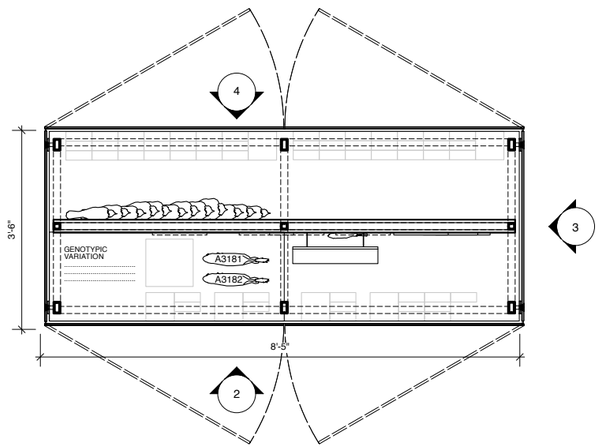
Date
April 2, 2009

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750

Scale*
3/4"=1'-0"

Sheet No.
X4-LF-5.20

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

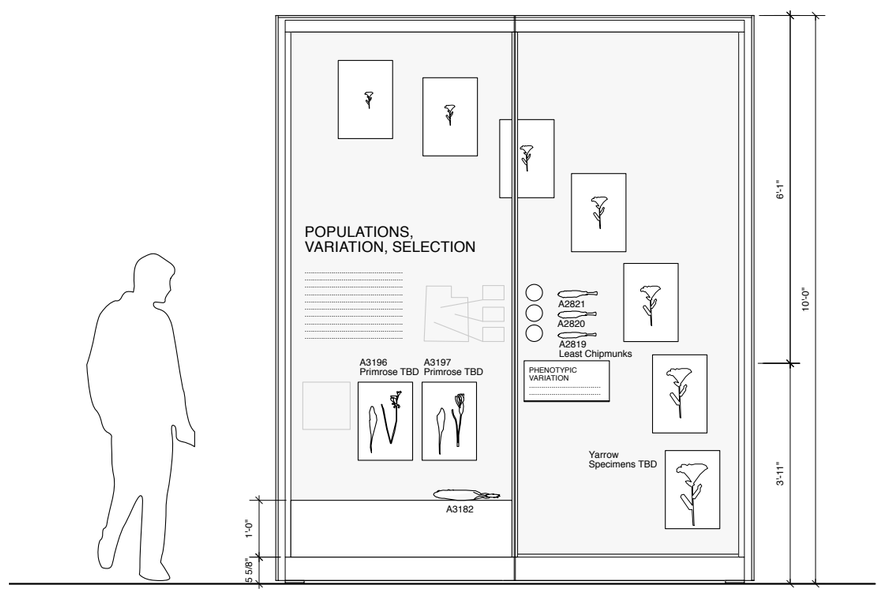


1 PLAN

SCALE: 3/4"= 1'-0"

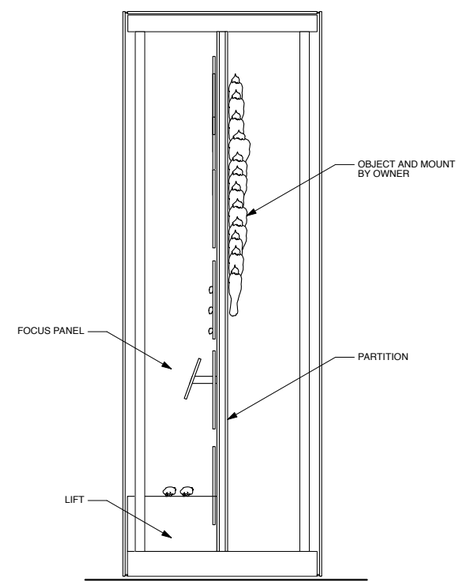
ARTIFACT MOUNTING SCHEDULE

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A2783	x							
A2784	x							
A2785	x							
A2786	x							
A2787	x							
A2788	x							
A2789	x							
A2790	x							
A2791	x							
A2792	x							
A2793	x							
A2818	x							
A2819	x							
A2820	x							
A2821	x							
A3181				x				
A3182				x				
A3196	x							
A3197	x							



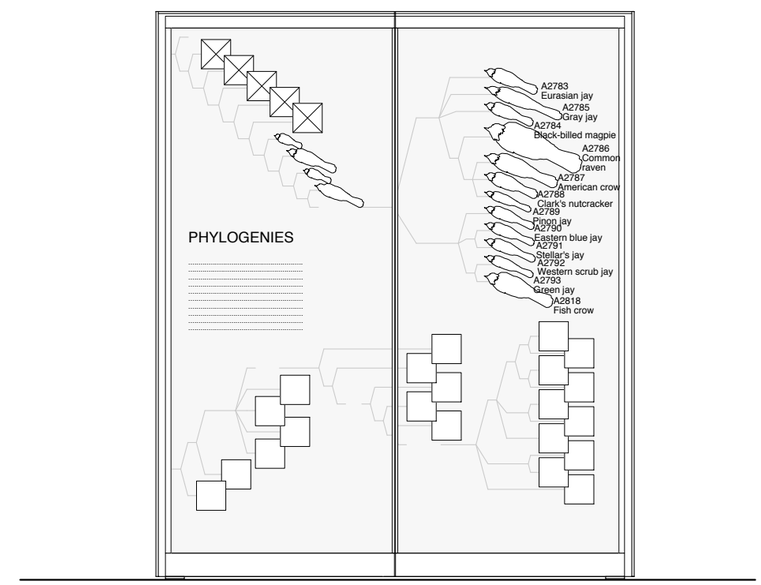
2 ELEVATION

SCALE: 3/4"= 1'-0"



3 ELEVATION

SCALE: 3/4"= 1'-0"



4 ELEVATION

SCALE: 3/4"= 1'-0"

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

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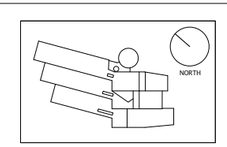


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Exhibit Case Layouts:
Life LF5.E01.ca03

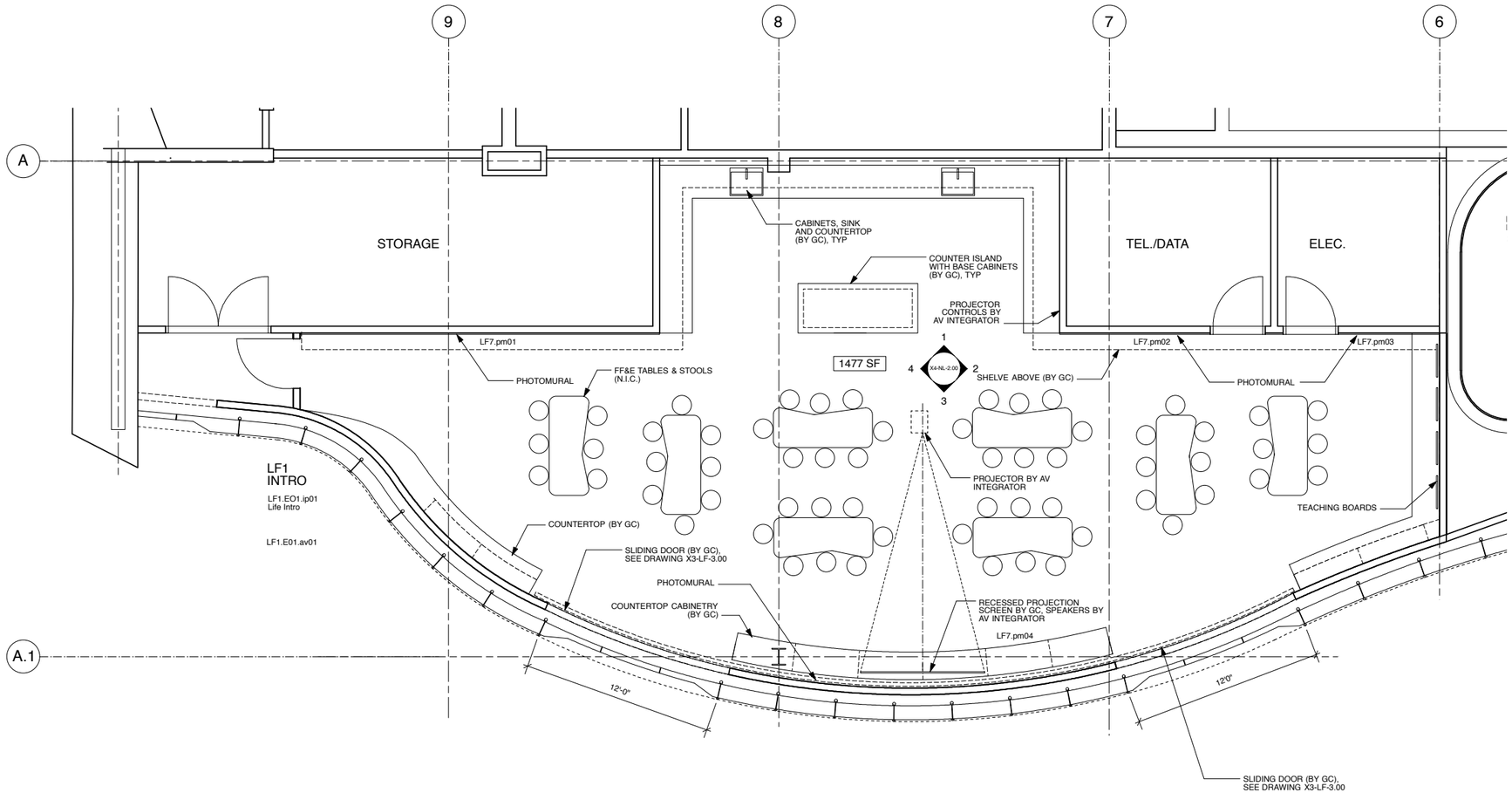
Date
April 2, 2009

Scale*
3/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750

Sheet No.
X4-LF-5.30

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
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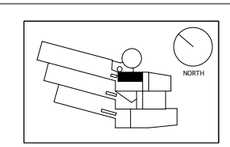


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

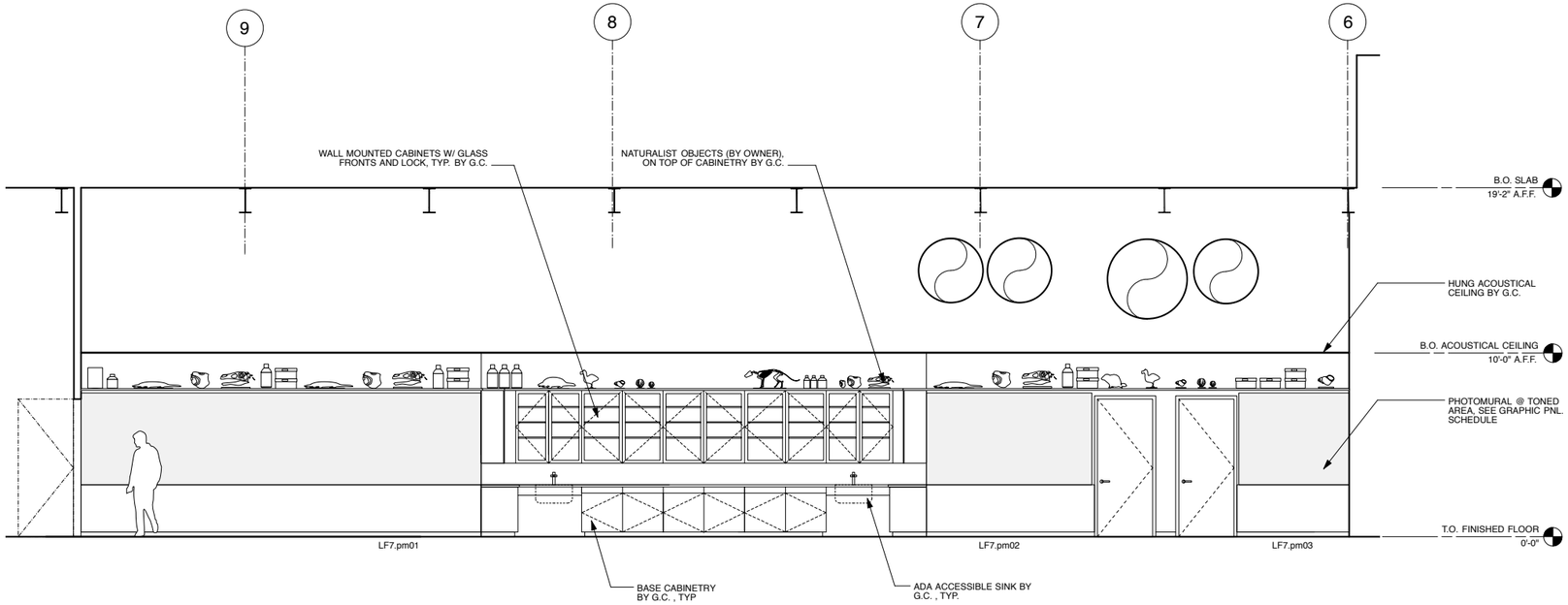
No. / Issue Name / Date

Sheet Title

Partial Plan:
Naturalist Lab

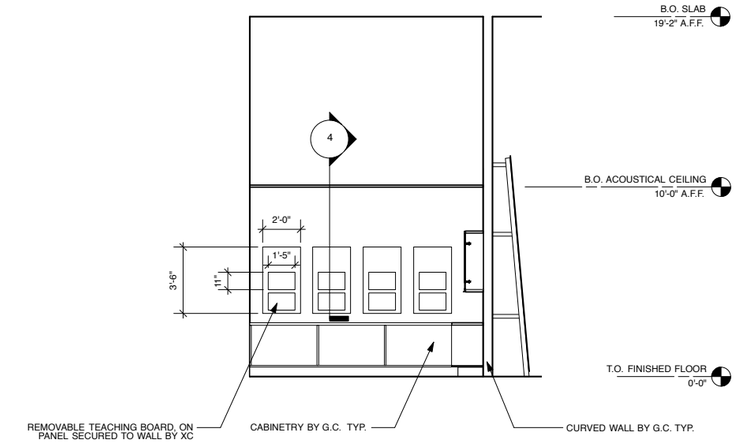
Date	RAA Project No. 0275
.Feb. 6, 2008	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X4-NL-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



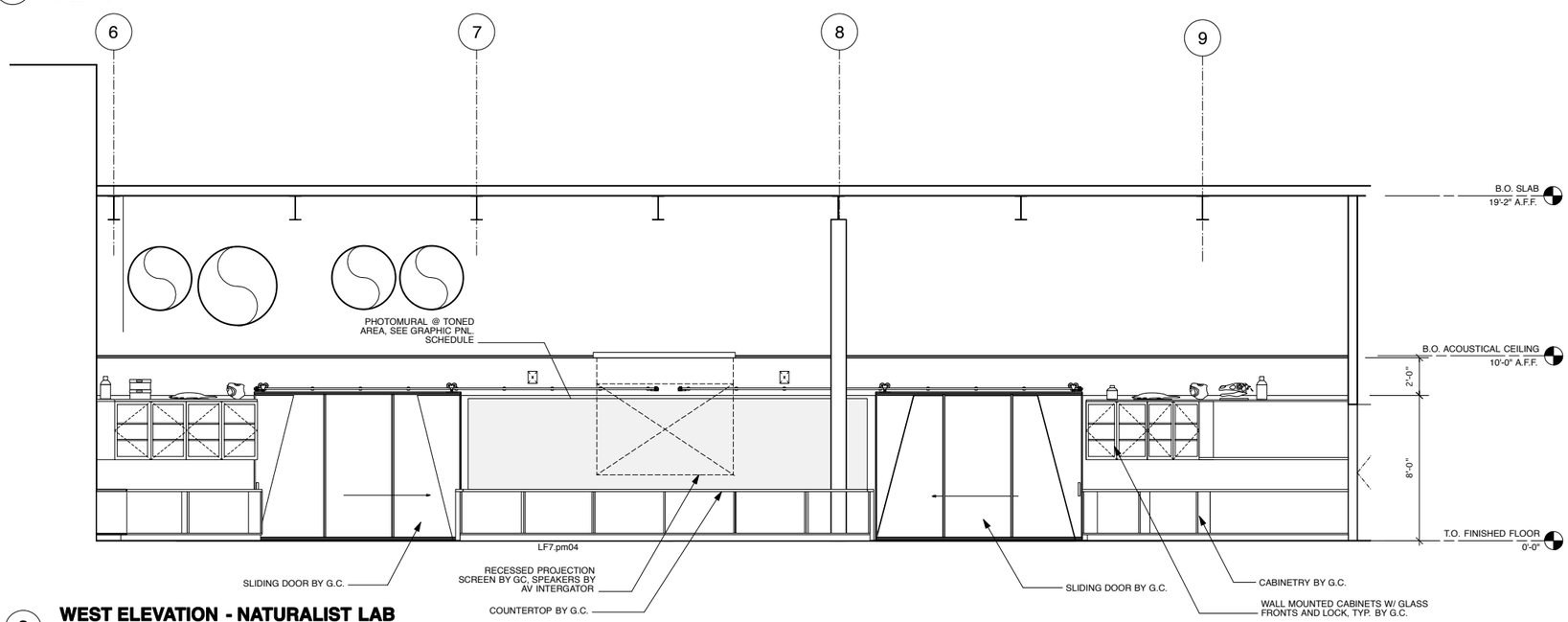
1 EAST ELEVATION - NATURALIST LAB

SCALE: 1/4"= 1'-0"



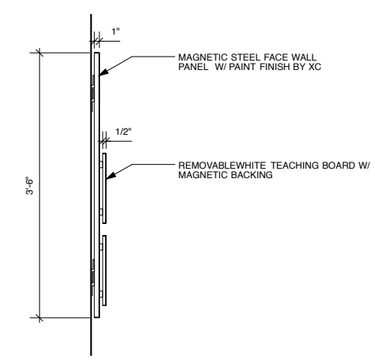
3 NATURALIST LAB SECTION ALONG COLUMN LINE 7

SCALE: 1/4"= 1'-0"



3 WEST ELEVATION - NATURALIST LAB

SCALE: 1/4"= 1'-0"



4 DETAIL

SCALE: 1"= 1'-0"

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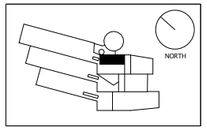


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

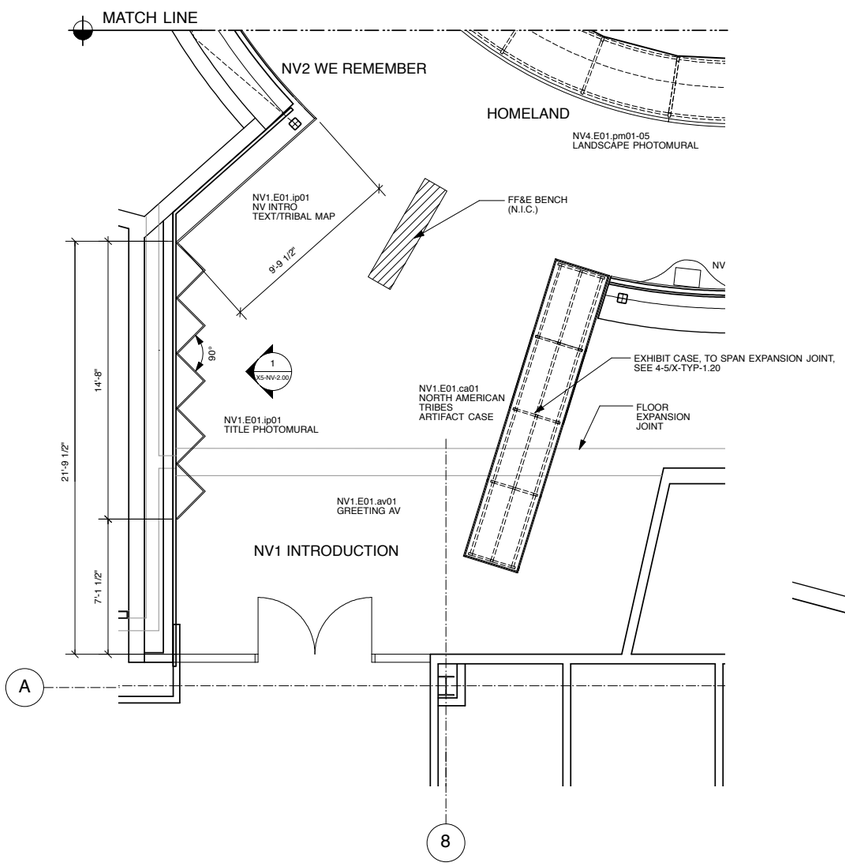
No. / Issue Name / Date

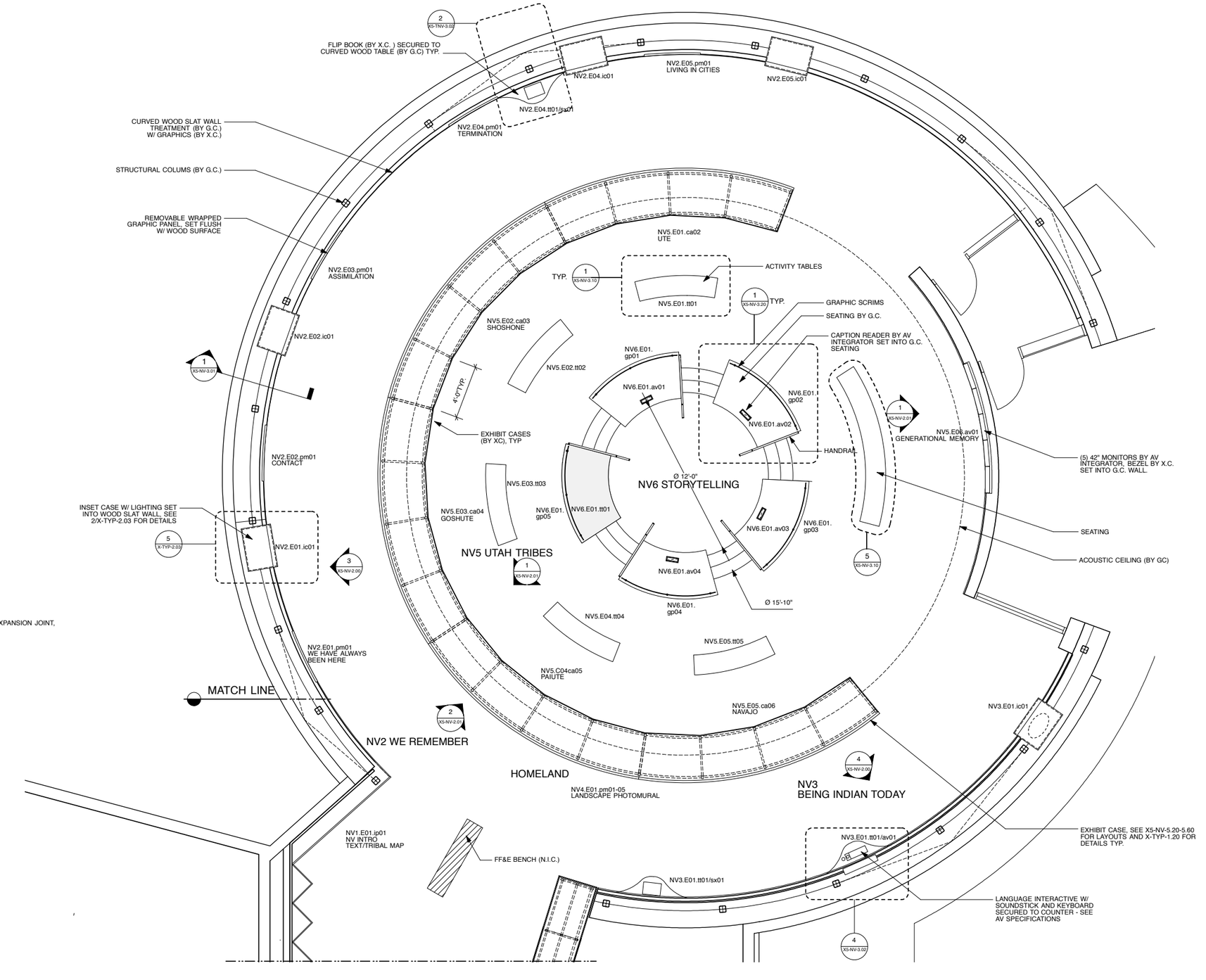
Sheet Title

Elevations & Sections: Naturalist Lab

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X4-NL-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")





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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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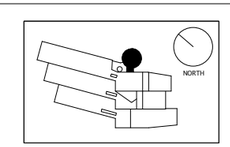


Key Plan

No. / Issue Name / Date

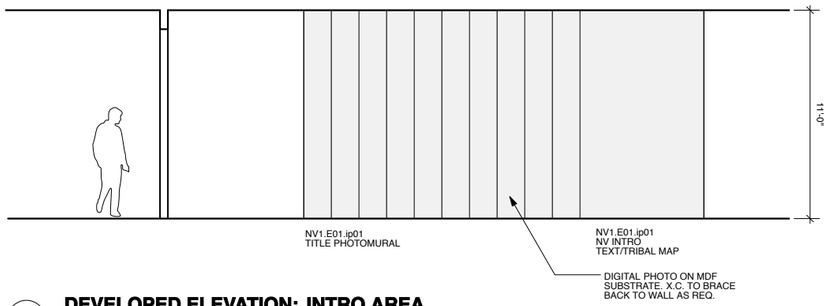
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Partial Plan:
Native Voices

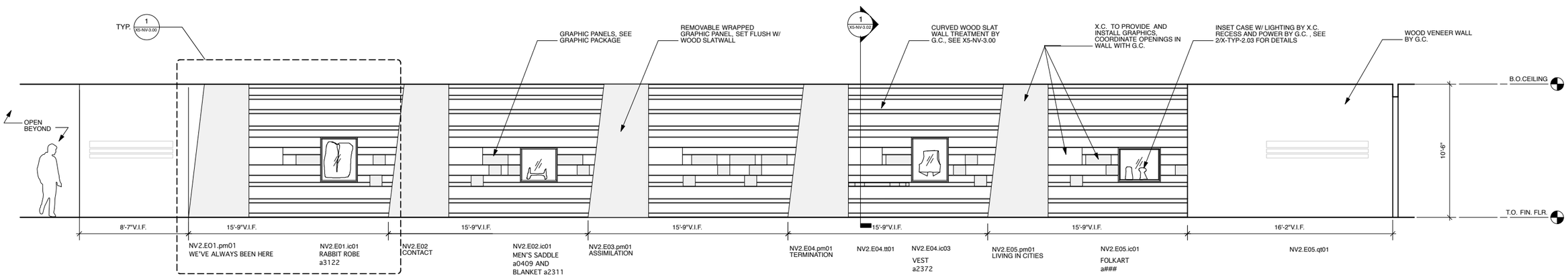
Date April 2, 2009	RAA Project No. 0275 U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale* 1/4"=1'-0"	Sheet No. X5-NV-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



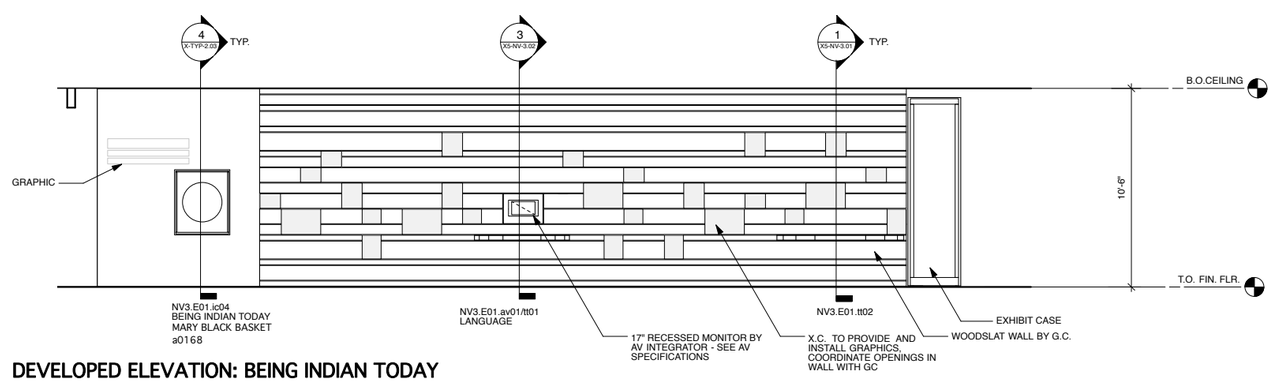
2 DEVELOPED ELEVATION: INTRO AREA

SCALE: 1/4"= 1'-0"



3 DEVELOPED ELEVATION: WE REMEMBER

SCALE: 1/4"= 1'-0"



4 DEVELOPED ELEVATION: BEING INDIAN TODAY

SCALE: 1/4"= 1'-0"

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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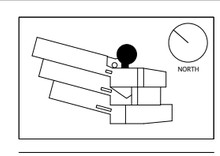


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

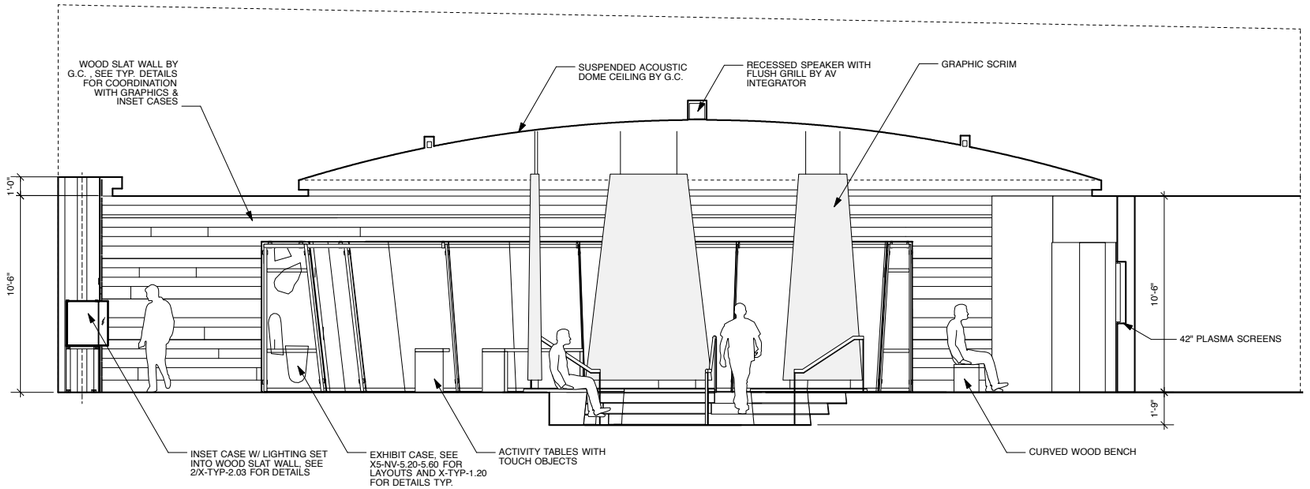
No. / Issue Name / Date

Sheet Title

Elevations & Sections:
Native Voices

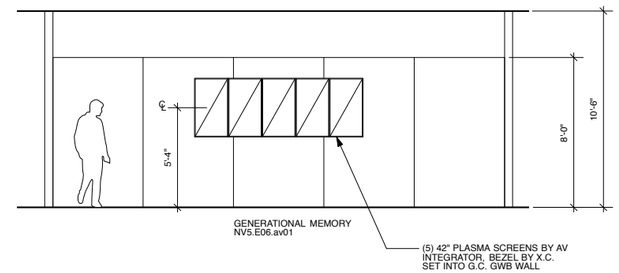
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X5-NV-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



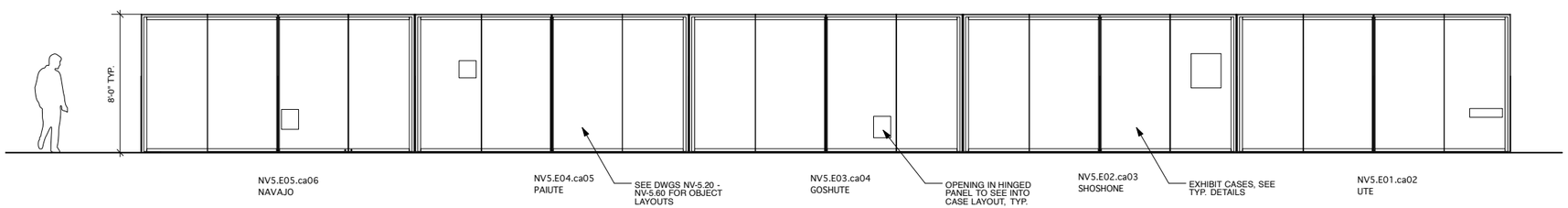
1 SECTION: STORYTELLING

SCALE: 1/4= 1'-0"



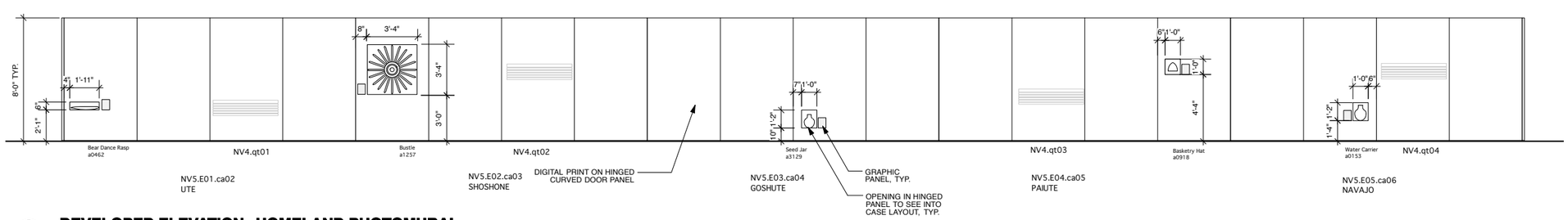
2 ELEVATION

SCALE: 1/4= 1'-0"



3 DEVELOPED ELEVATION: EXHIBIT CASES

SCALE: 1/4= 1'-0"



4 DEVELOPED ELEVATION: HOMELAND PHOTOMURAL

SCALE: 1/4= 1'-0"

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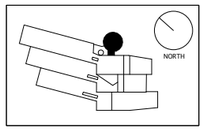


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Elevations & Sections:
Native Voices

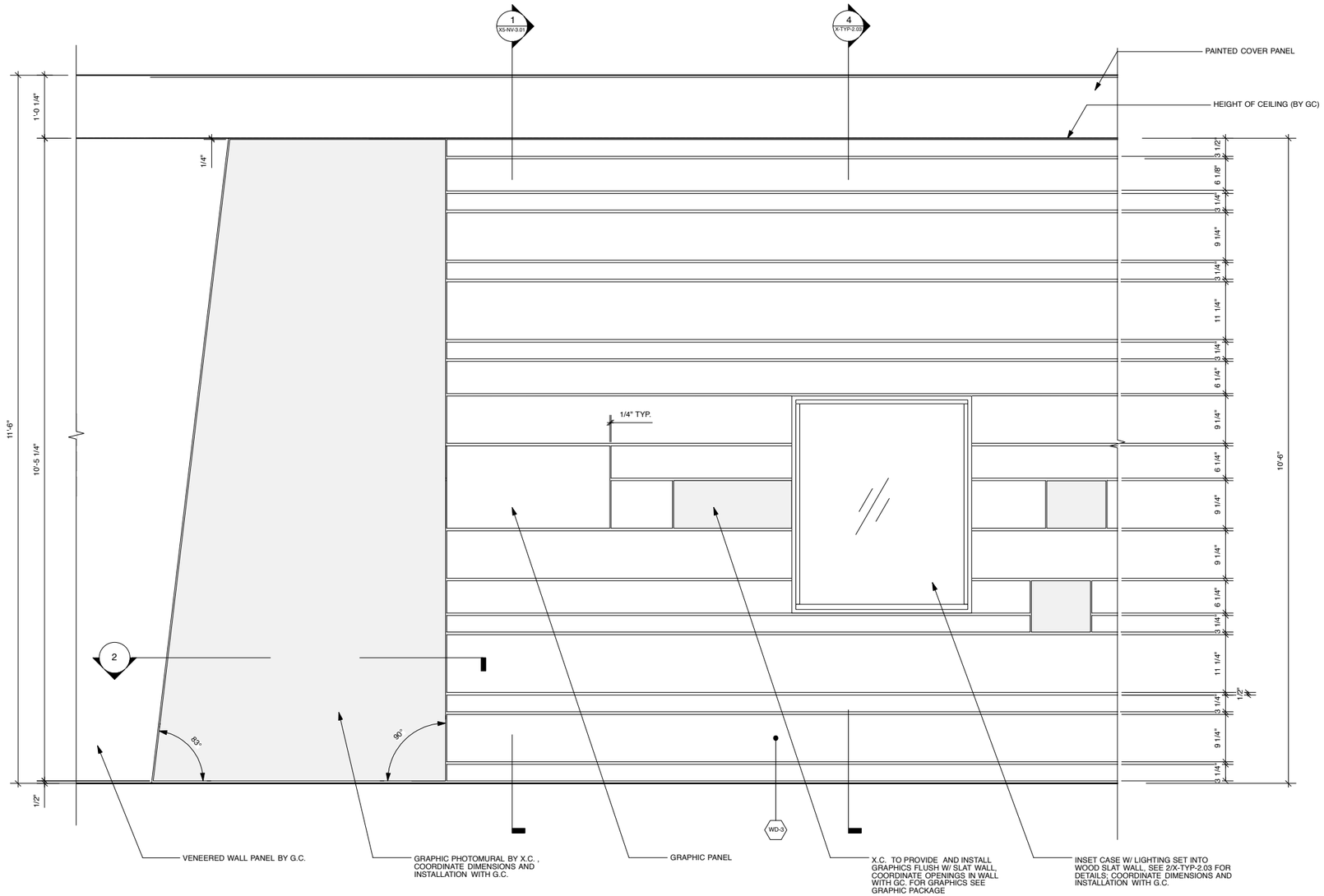
Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

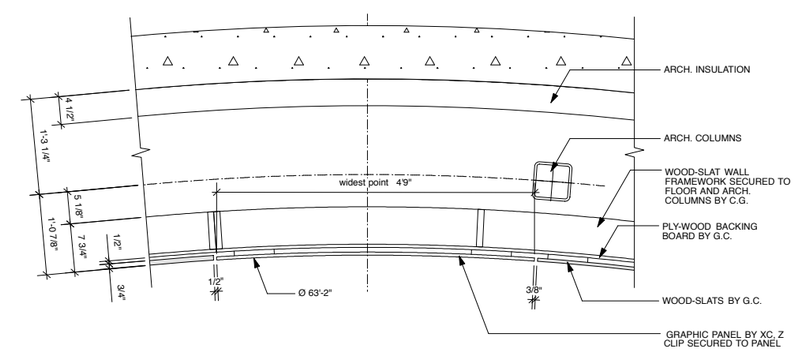
X5-NV-2.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 SECTION: WE REMEMBER WALL

SCALE: 1"= 1'-0"



2 TYP. DETAIL PLAN: INSET PANEL

SCALE: 1"= 1'-0"

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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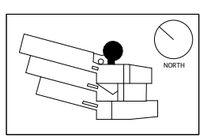

Key Plan

No. / Issue Name / Date

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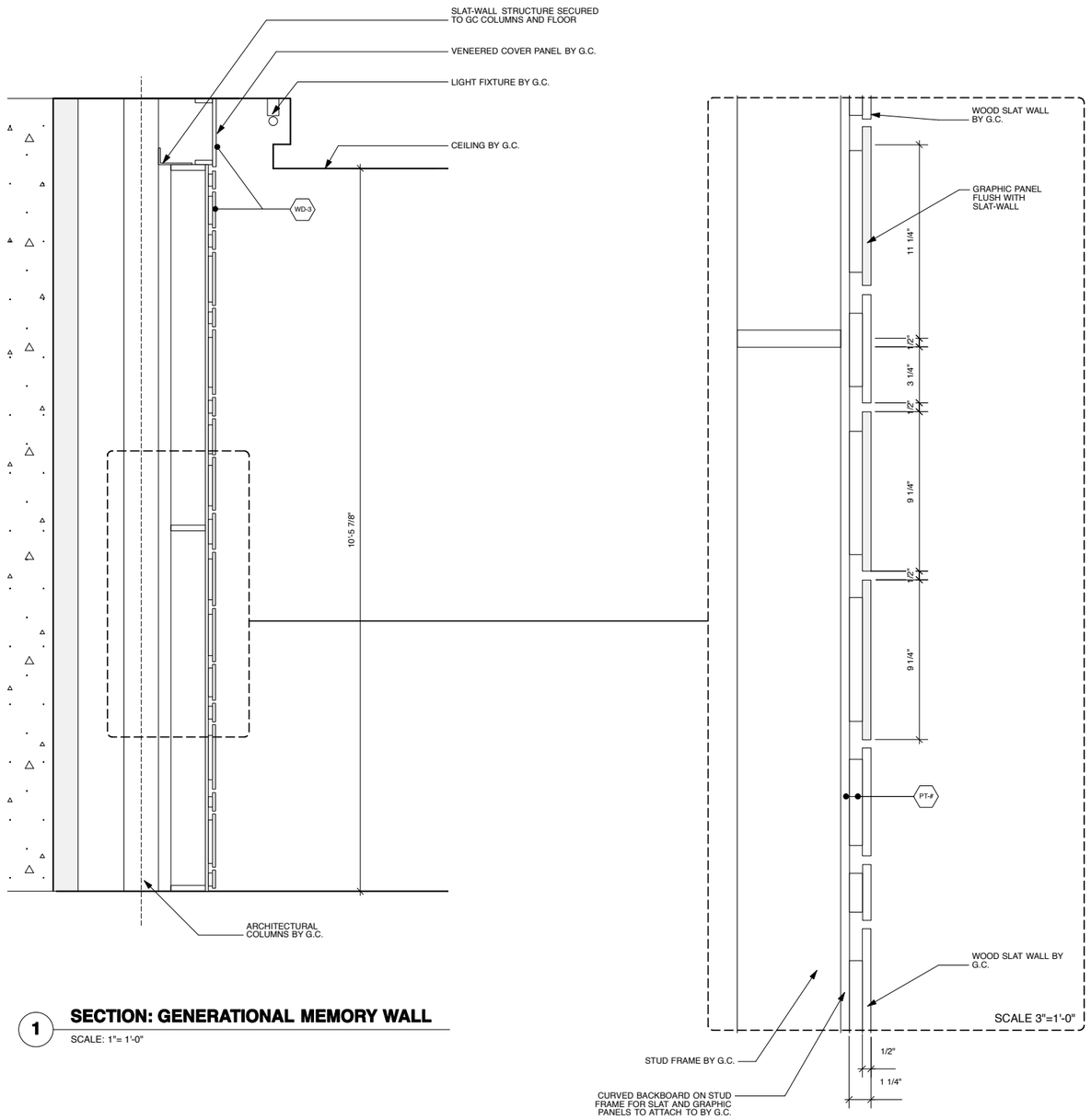
Details:
Native Voices

Date
April 2, 2009

Scale*
1"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X5-NV-3.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **SECTION: GENERATIONAL MEMORY WALL**

SCALE: 1"= 1'-0"

NOTES:

1. X.C TO CONFIRM WOODLSAT WALL FIELD CONDITIONS PRIOR TO SHOPDRAWINGS AND FABRICATION OF GRAPHIC PANELS AND INSET CASES.
2. SEE CASE AND GRAPHIC PANEL SCHEDULES FOR ADDITIONAL INFO.

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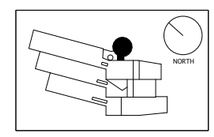

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Native Voices

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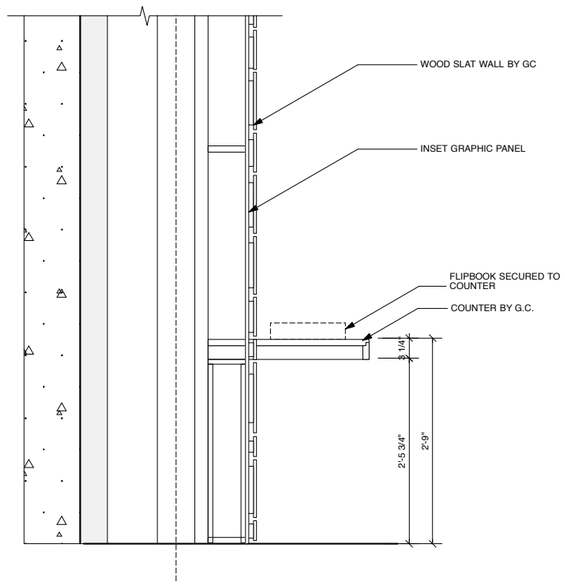
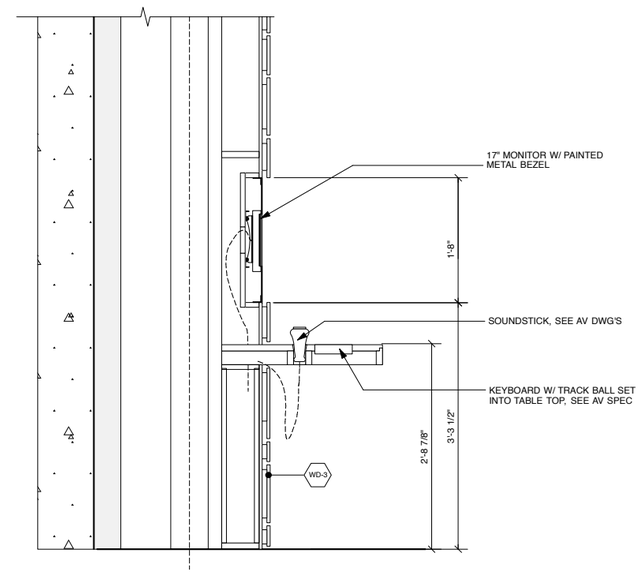


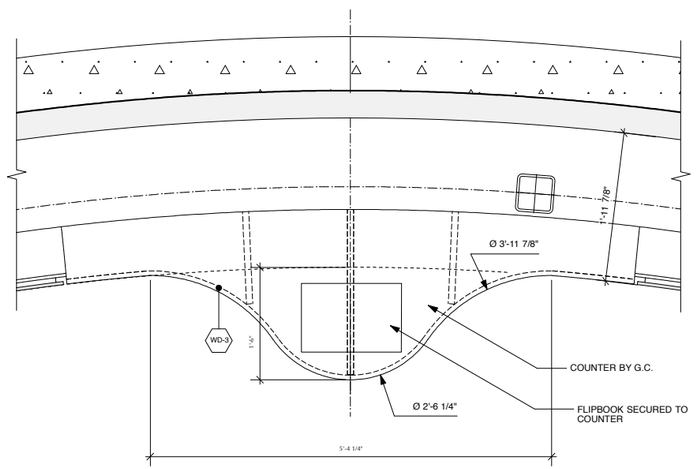
1 TYP. DETAIL SECTION: SHELF

SCALE: 1"= 1'-0"



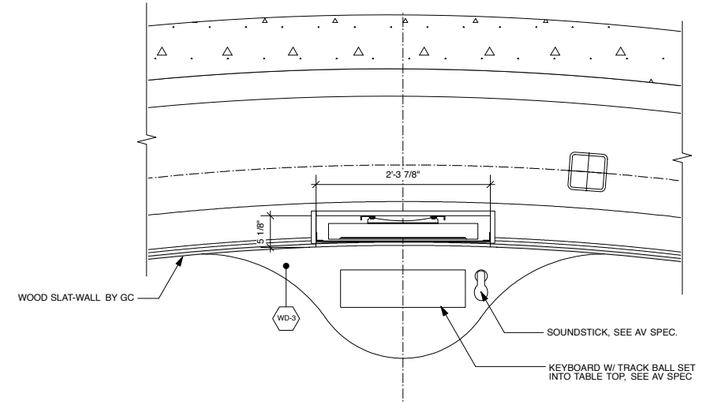
3 TYP. DETAIL SECTION: INSET AV MONITOR

SCALE: 1"= 1'-0"



2 TYP. DETAIL PLAN: SHELF

SCALE: 1"= 1'-0"



4 TYP. DETAIL PLAN: INSET AV MONITOR

SCALE: 1"= 1'-0"

NOTES:

1. ALL AV EQUIPMENT BY AV INTERGRATOR. XC TO COORDINATE INSTALLATION INTO EXHIBITS

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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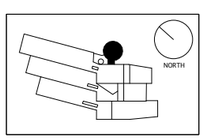

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100% Final Design April 2, 2009

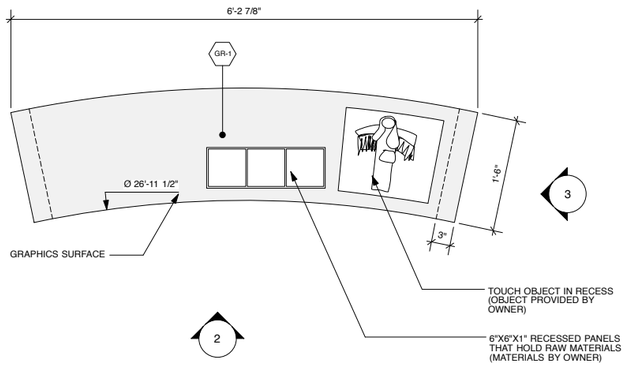
Sheet Title
Details:
Native Voices

Date
April 2, 2009

Scale*
1"=1'-0"

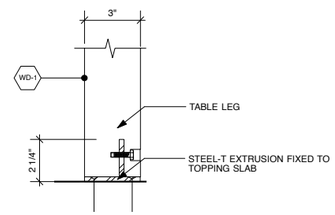
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X5-NV-3.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



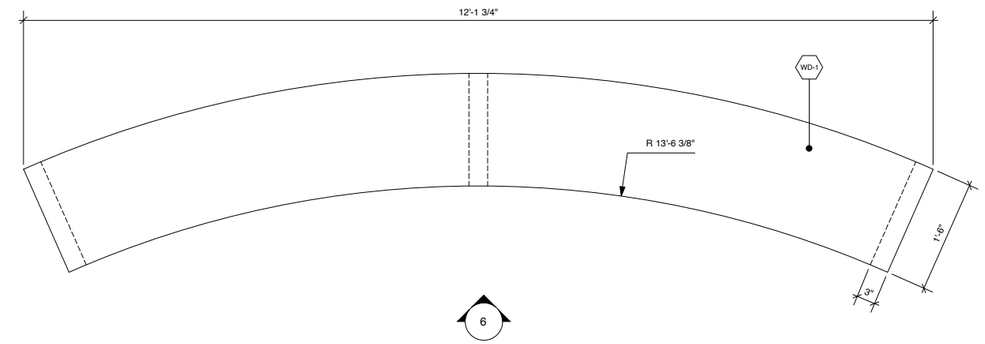
1 PLAN: TYP. ACTIVITY TABLE

SCALE: 1-1/2 = 1'-0"



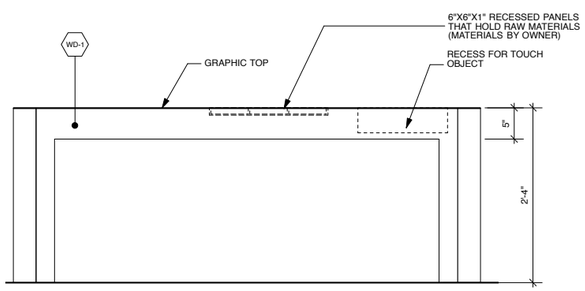
4 LEG DETAIL

SCALE: 3" = 1'-0"



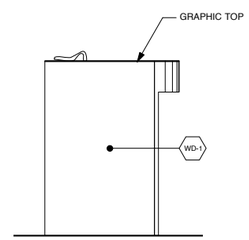
5 PLAN: BENCH

SCALE: 1-1/2 = 1'-0"



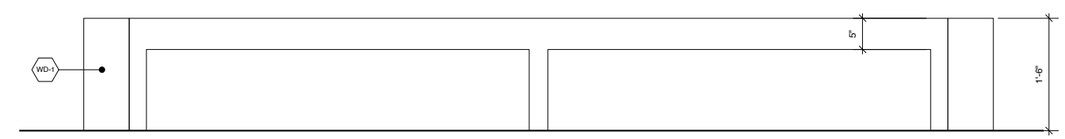
2 FRONT ELEVATION

SCALE: 1-1/2 = 1'-0"



3 SIDE ELEVATION

SCALE: 1-1/2 = 1'-0"



6 FRONT ELEVATION

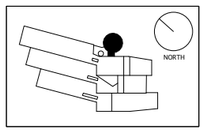
SCALE: 1-1/2 = 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Details:
Native Voices - Activity Tables

Date: April 2, 2009

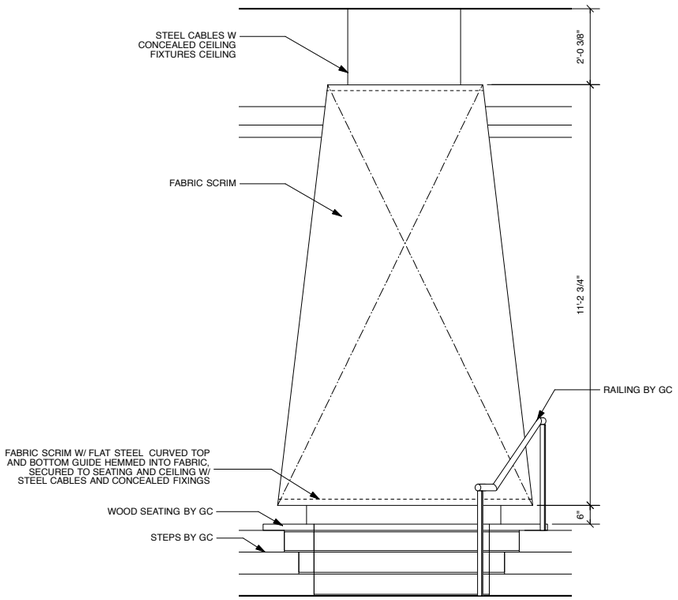
Scale*: As noted

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750

Sheet No.

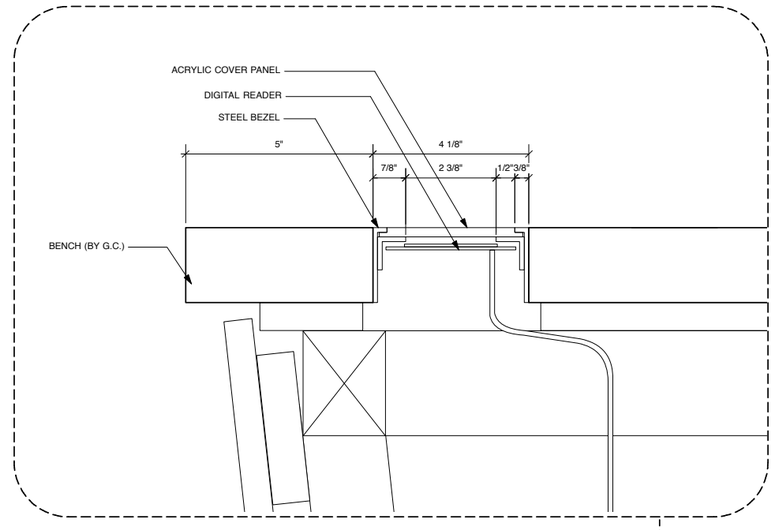
X5-NV-3.10

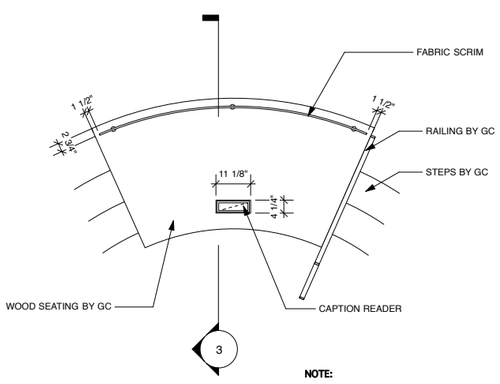
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



2 ELEVATION

SCALE: 1/2"= 1'-0"



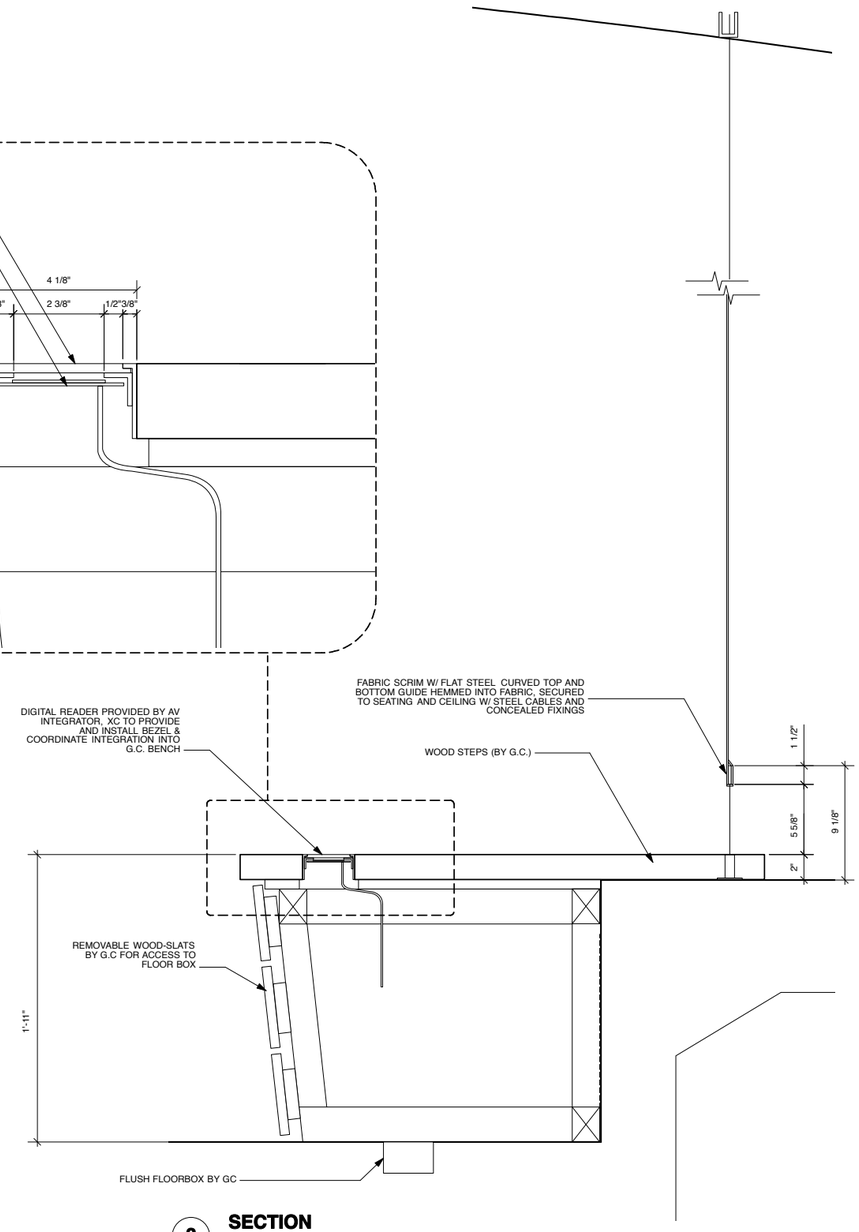


1 PLAN

SCALE: 1/2"= 1'-0"

NOTE:

1. NV6-E01.ti01 TABLE TOP TO HAVE ROUTED LETTERS IN PANEL, SEE GRAPHIC PACKAGE



3 SECTION

SCALE: 2"= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
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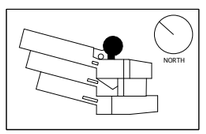


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

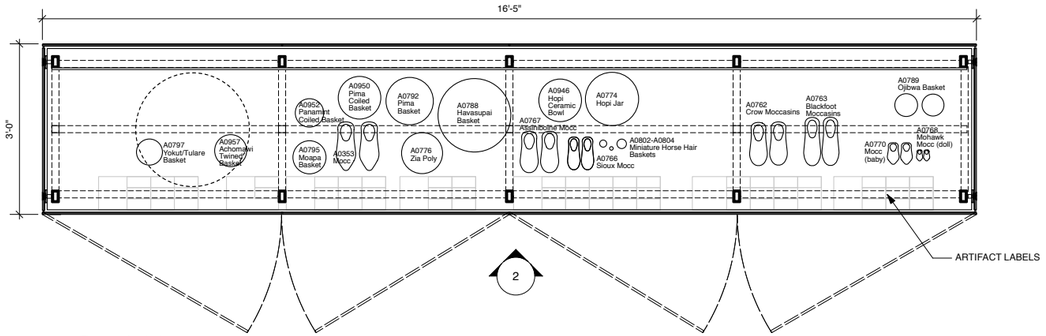
100% Final Design April 2, 2009

Sheet Title

Details:
Native Voices - Storytelling

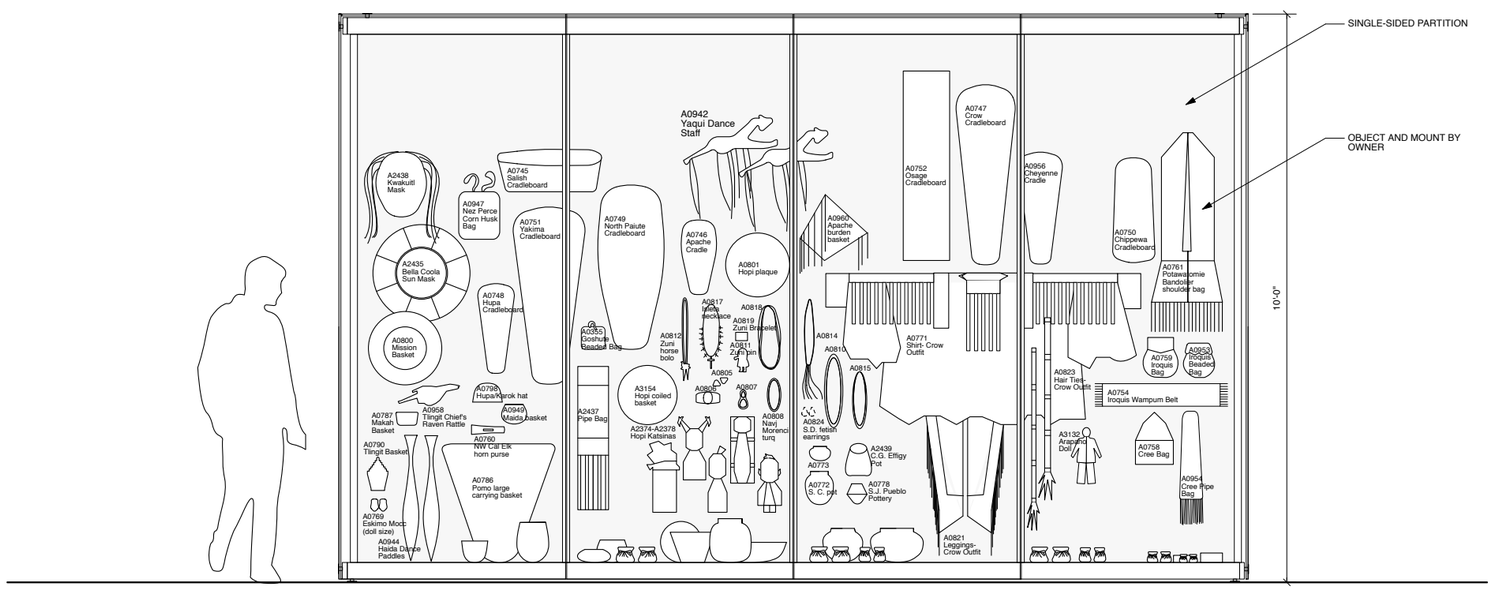
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As noted	X5-NV-3.20

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 PLAN

SCALE: 3/4"= 1'-0"



2 ELEVATION

SCALE: 3/4"= 1'-0"

ARTIFACT MOUNTING SCHEDULE

Artifact #	Partition	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A0353				x				
A0355	x							
A0745	x							
A0746	x							
A0747	x							
A0748	x							
A0749	x							
A0750	x							
A0751	x							
A0752	x							
A0754	x							
A0758	x							
A0759	x							
A0760	x							
A0761	x							
A0762				x				
A0763				x				
A0766				x				
A0767				x				
A0768				x				
A0769	x							
A0770				x				
A0771	x							
A0772	x							
A0773	x							
A0774				x				
A0776				x				
A0778	x							
A0786				x				
A0787	x							
A0788				x				
A0789				x				
A0790	x							
A0792				x				
A0795				x				
A0797				x				
A0798	x							
A0800	x							
A0801	x							
A0802				x				
A0803				x				
A0804				x				
A0805	x							
A0806	x							
A0807	x							
A0808	x							
A0810	x							
A0811	x							
A0812	x							
A0814	x							
A0815	x							
A0817	x							
A0818	x							
A0819	x							
A0821	x							
A0823	x							
A0824	x							
A0942	x							
A0944	x							
A0946				x				
A0947	x							
A0949	x							
A0950				x				
A0952				x				
A0953	x							
A0954	x							
A0956	x							
A0957				x				
A0958	x							
A0960	x							
A2374	x							
A2375	x							
A2376	x							
A2377	x							
A2378	x							
A2435	x							
A2437	x							
A2438	x							
A2439	x							
A3132	x							
A3154	x							

NOTE:

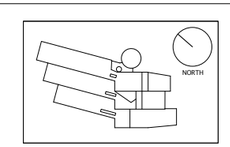
1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS
2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO
3. SEE X-TYP-1.20 FOR SEISMIC JOINT DETAIL

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

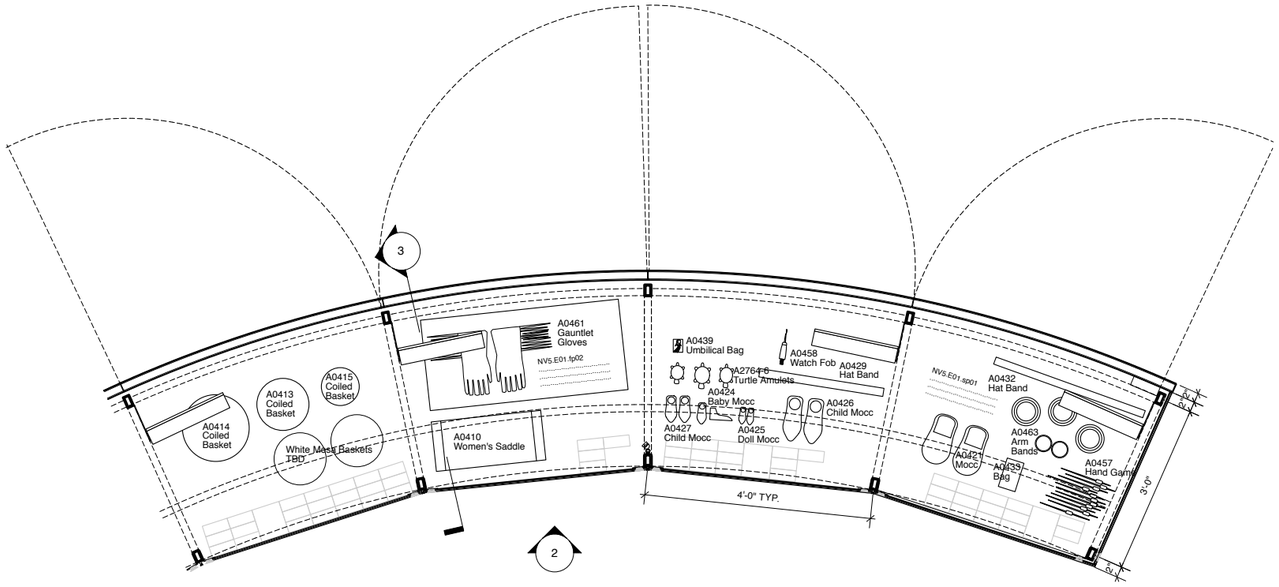
100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Exhibit Case Layouts:
Native Voices NV1.E01.ca01

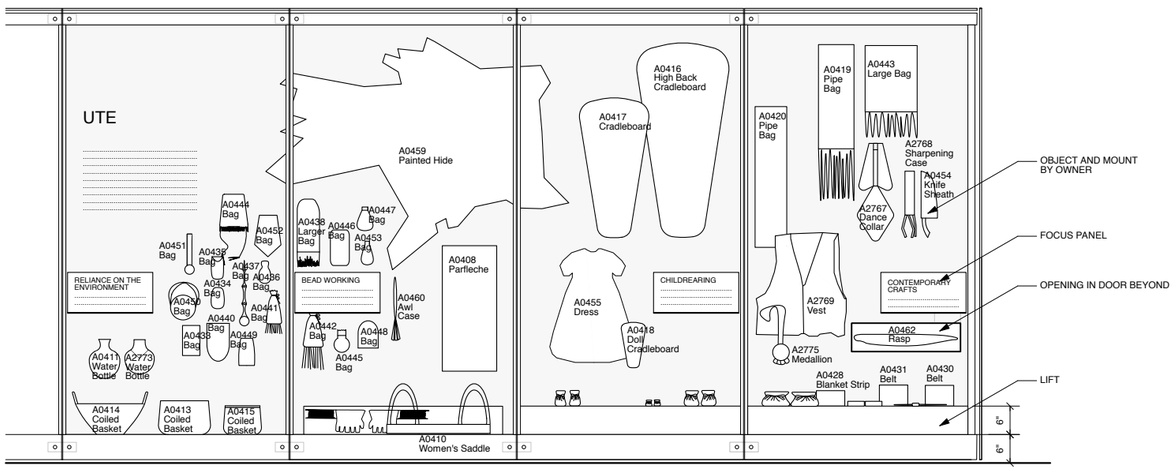
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3/4"=1'-0"	X5-NV-5.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



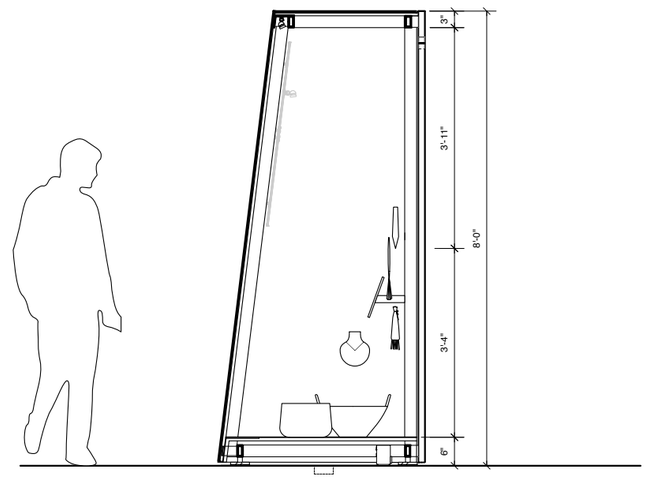
1 PLAN

SCALE: 3/4"= 1'-0"



2 DEVELOPED ELEVATION

SCALE: 3/4"= 1'-0"



3 SECTION

SCALE: 3/4"= 1'-0"

ARTIFACT MOUNTING SCHEDULE

Artifact #	Hinged Panel	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A0408	x							
A0410				x				
A0411	x							
A0413				x				
A0414				x				
A0415				x				
A0416	x							
A0417	x							
A0418	x							
A0419	x							
A0420	x							
A0421				x				
A0424				x				
A0425				x				
A0426				x				
A0427				x				
A0428	x							
A0429				x				
A0430	x							
A0431	x							
A0432				x				
A0433				x				
A0434	x							
A0435	x							
A0436	x							
A0437	x							
A0438	x							
A0439				x				
A0440	x							
A0441	x							
A0442	x							
A0443	x							
A0444	x							
A0445	x							
A0446	x							
A0447	x							
A0448	x							
A0449	x							
A0450	x							
A0451	x							
A0452	x							
A0453	x							
A0454	x							
A0455	x							
A0457				x				
A0458				x				
A0459	x							
A0460	x							
A0461			x					
A0462					x			
A0463				x				
A2764				x				
A2765				x				
A2766				x				
A2767	x							
A2768	x							
A2769	x							
A2773	x							
A2775	x							

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner
UMNH
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Salt Lake City, Utah 84112
801.581.6927 tel.

Design Architect
Polshek Partnership Architects LLP
320 West 13th Street
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Gillies Stransky Brems Smith
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Exhibit Structural Engineer
Leslie E. Robertson Associates
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380 West 800 South, Suite 100
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Colvin Engineering Associates, Inc.
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Salt Lake City, Utah 84103
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Spectrum Engineers
175 South Main Street
Salt Lake City, Utah 84111
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Lighting
Branston Partnership
122 West 26th Street
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San Francisco, CA 94124
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Exhibition Planner and Designer
Ralph Appelbaum Associates
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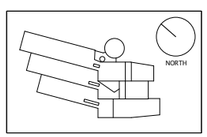


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

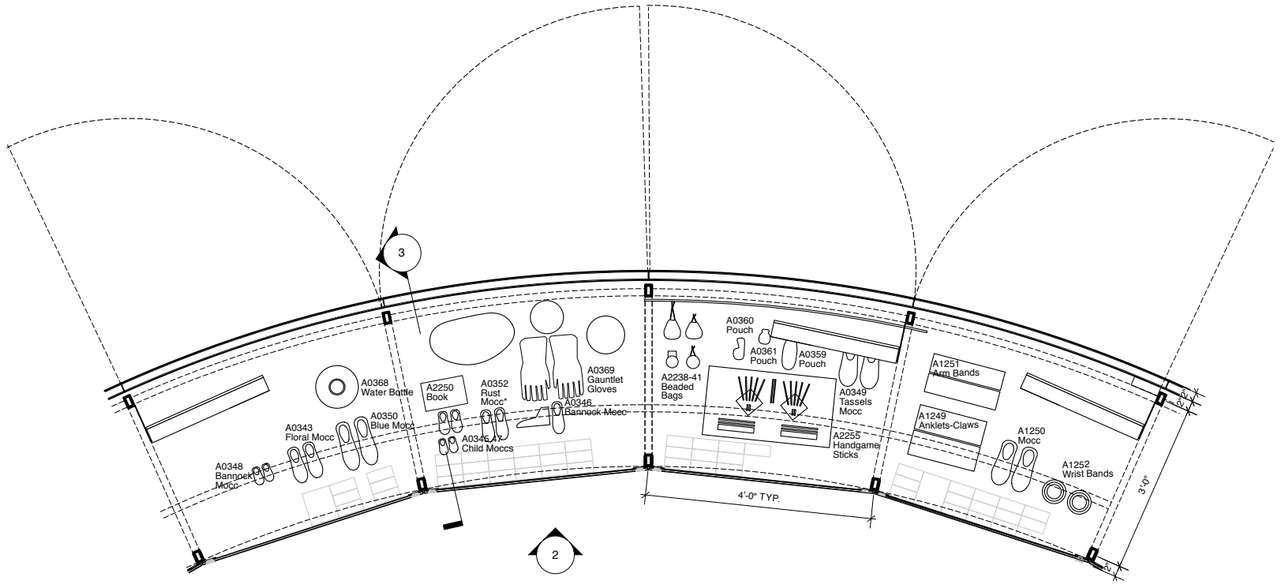
Sheet Title
Exhibit Case Layouts:
Native Voices NV5.E01.ca02

Date
April 2, 2009

Scale*
3/4"=1'-0"

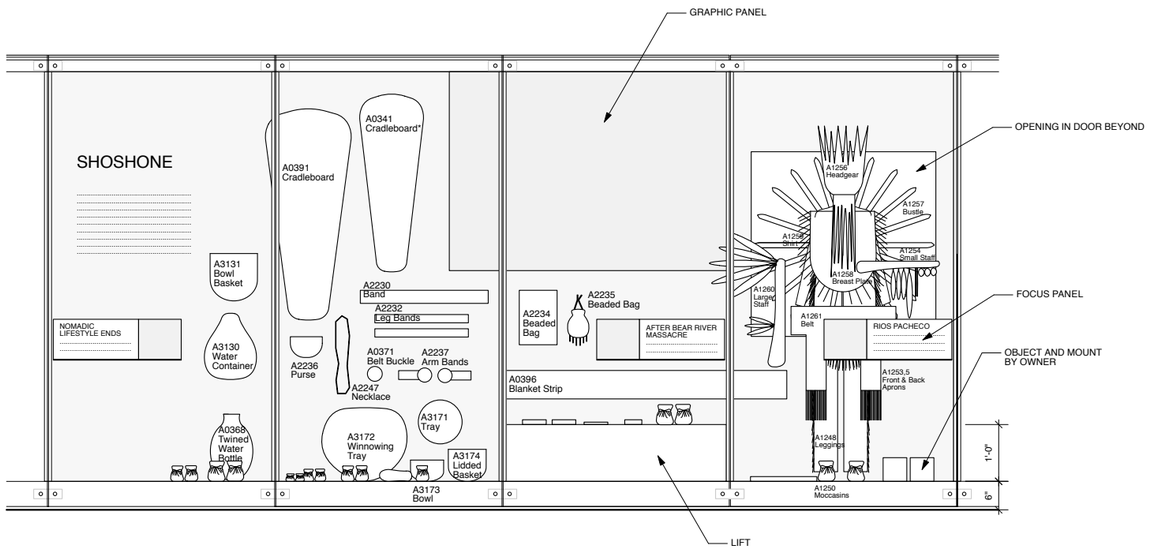
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X5-NV-5.20

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



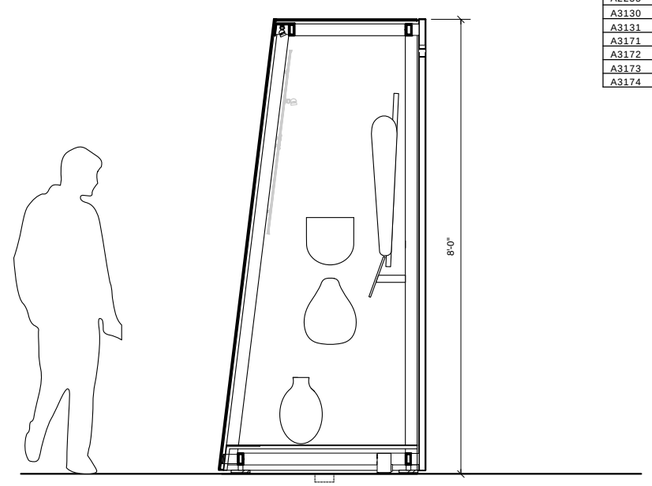
1 PLAN

SCALE: 3/4"= 1'-0"



2 DEVELOPED ELEVATION

SCALE: 3/4"= 1'-0"



3 SECTION

SCALE: 3/4"= 1'-0"

ARTIFACT MOUNTING SCHEDULE

Artifact #	Hinged Panel	Graphic Panel	Backer Board	Mannequin	Lift/ Deck	Brackets			
						B1	B2	B3	C1
A0341	x								
A0343					x				
A0345					x				
A0346					x				
A0347					x				
A0348					x				
A0349					x				
A0350					x				
A0352					x				
A0359					x				
A0360					x				
A0361					x				
A0368					x				
A0369					x				
A0371	x								
A0391	x								
A0396	x								
A1248				x					
A1249					x				
A1250					x				
A1251					x				
A1252					x				
A1253				x					
A1254				x					
A1255				x					
A1256				x					
A1257				x					
A1258				x					
A1259				x					
A1260				x					
A1261				x					
A2230	x								
A2232	x								
A2234	x								
A2235	x								
A2236	x								
A2237	x								
A2238					x				
A2239					x				
A2241					x				
A2247	x								
A2250					x				
A2255					x				
A3130	x								
A3131	x								
A3171	x								
A3172					x				
A3173					x				
A3174					x				

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

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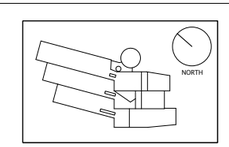


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

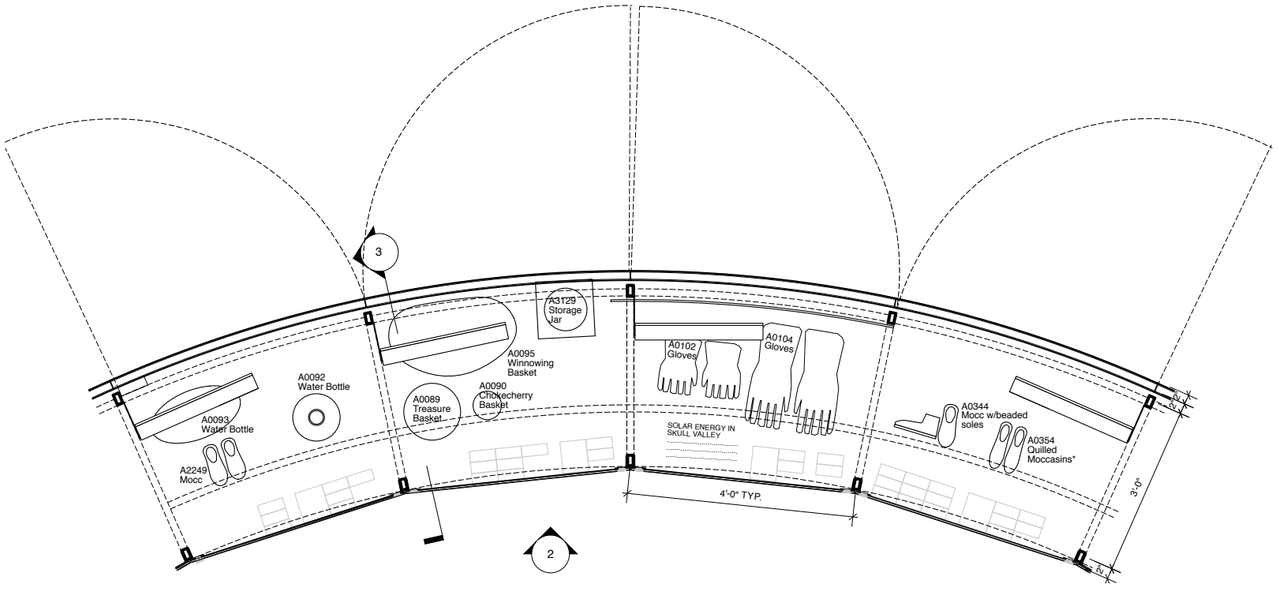
Sheet Title
Exhibit Case Layouts:
Native Voices NV5.E02.ca03

Date
April 2, 2009

Scale*
3/4"=1'-0"

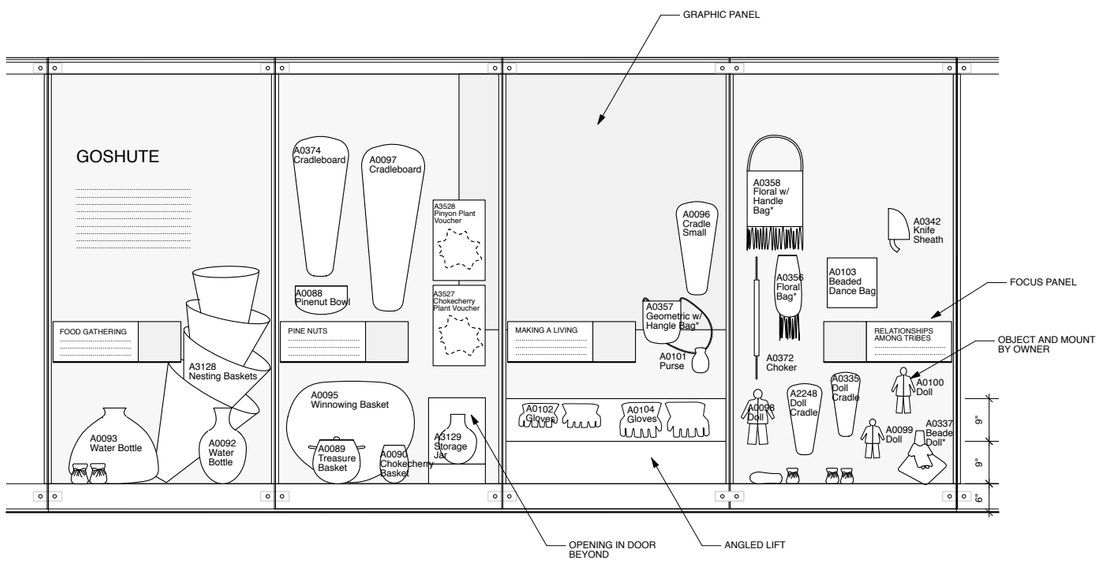
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X5-NV-5.30

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



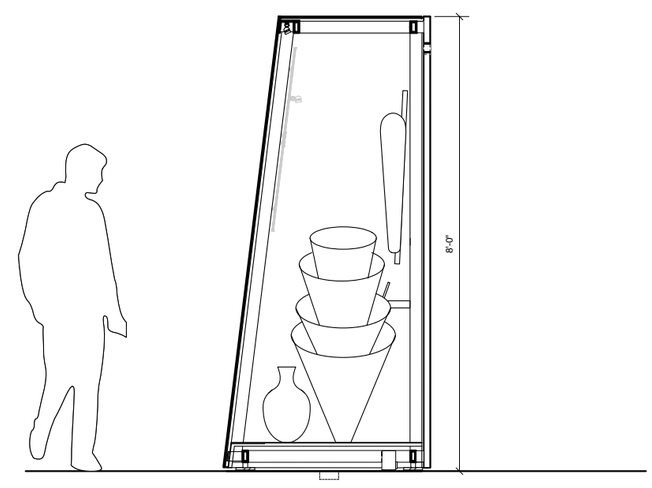
1 PLAN

SCALE: 3/4"= 1'-0"



2 ELEVATION

SCALE: 3/4"= 1'-0"



3 SECTION

SCALE: 3/4"= 1'-0"

ARTIFACT MOUNTING SCHEDULE

Artifact #	Hinged Panel	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A0088	x							
A0089				x				
A0090				x				
A0092				x				
A0093				x				
A0095				x				
A0096	x							
A0097	x							
A0098	x							
A0099	x							
A0100	x							
A0101	x							
A0102				x				
A0103	x							
A0104				x				
A0335	x							
A0337	x							
A0342	x							
A0344				x				
A0354				x				
A0356	x							
A0357	x							
A0358	x							
A0372	x							
A0374	x							
A2248	x							
A2249				x				
A3128	x			x				
A3129				x				
A3527	x							
A3528	x							

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner
UMNH
1390 East President's Circle
Salt Lake City, Utah 84112
801.581.6927 tel.

Design Architect
Polshek Partnership Architects LLP
320 West 13th Street
New York, New York
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Architect of Record
Gillies Stransky Brems Smith
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Salt Lake City, Utah
801.521.8600 tel.

Exhibit Structural Engineer
Leslie E. Robertson Associates
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Building Engineer
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380 West 800 South, Suite 100
Salt Lake City, Utah 84101
801.575.8877 tel.

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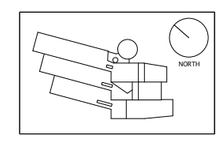
Colvin Engineering Associates, Inc.
244 West 300 North
Salt Lake City, Utah 84103
801.322.2400 tel

Electrical/AV Engineer
Spectrum Engineers
175 South Main Street
Salt Lake City, Utah 84111
800.678.7077 tel

Lighting
Branston Partnership
122 West 26th Street
New York, NY 10001
212.924.4050 tel.

Audio Visual
BBI Engineering, Inc.
241 Quint Street
San Francisco, CA 94124
415 685 9555 tel.

Exhibition Planner and Designer
Ralph Appelbaum Associates
88 Pine Street
New York, New York 10005
212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Exhibit Case Layouts:
Native Voices NV5.E03.ca04

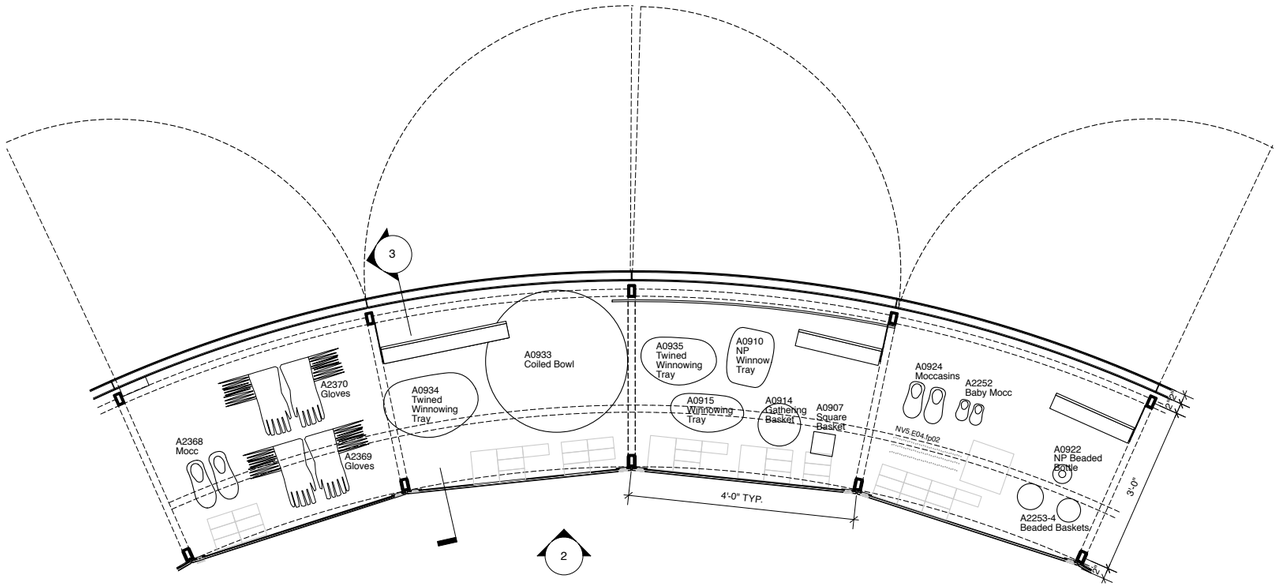
Date
April 2, 2009

Scale*
3/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750

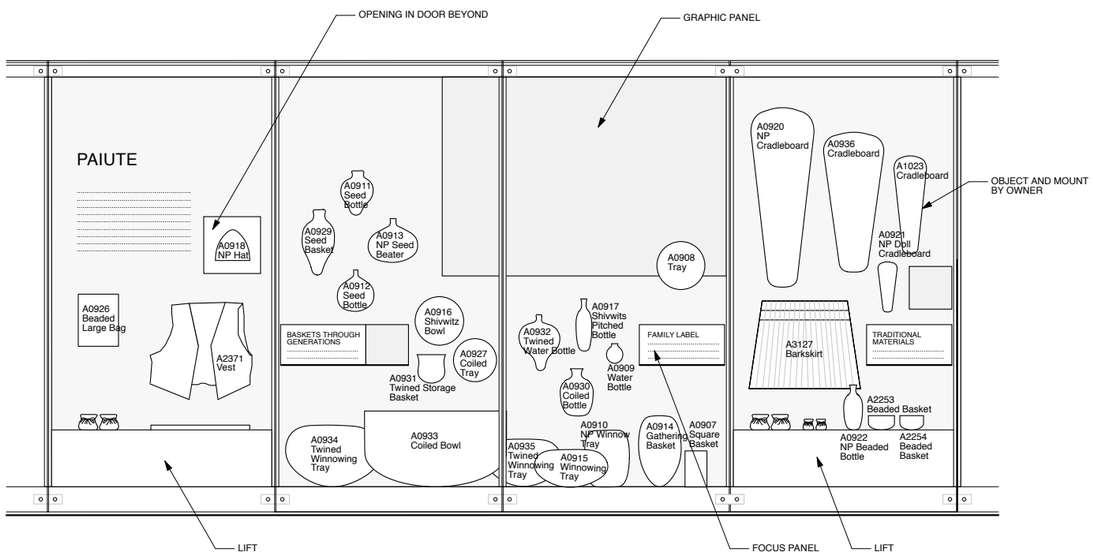
Sheet No.
X5-NV-5.40

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



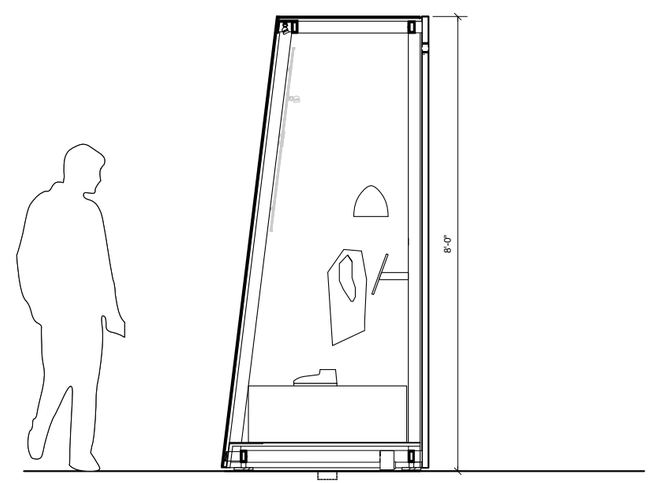
1 PLAN

SCALE: 3/4"= 1'-0"



2 ELEVATION

SCALE: 3/4"= 1'-0"



3 SECTION

SCALE: 3/4"= 1'-0"

ARTIFACT MOUNTING SCHEDULE

Artifact #	Hinged Panel	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A0907				x				
A0908	x							
A0909	x							
A0910				x				
A0911	x							
A0912	x							
A0913	x							
A0914				x				
A0915				x				
A0916	x							
A0917	x							
A0918					x			
A0920	x							
A0921	x							
A0922				x				
A0924				x				
A0926	x							
A0927	x							
A0929	x							
A0930	x							
A0931	x							
A0932	x							
A0933				x				
A0934				x				
A0935				x				
A0936	x							
A1023	x							
A2252				x				
A2253				x				
A2254				x				
A2368				x				
A2369				x				
A2370				x				
A2371	x							
A3127	x							

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

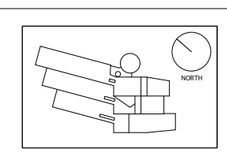
2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

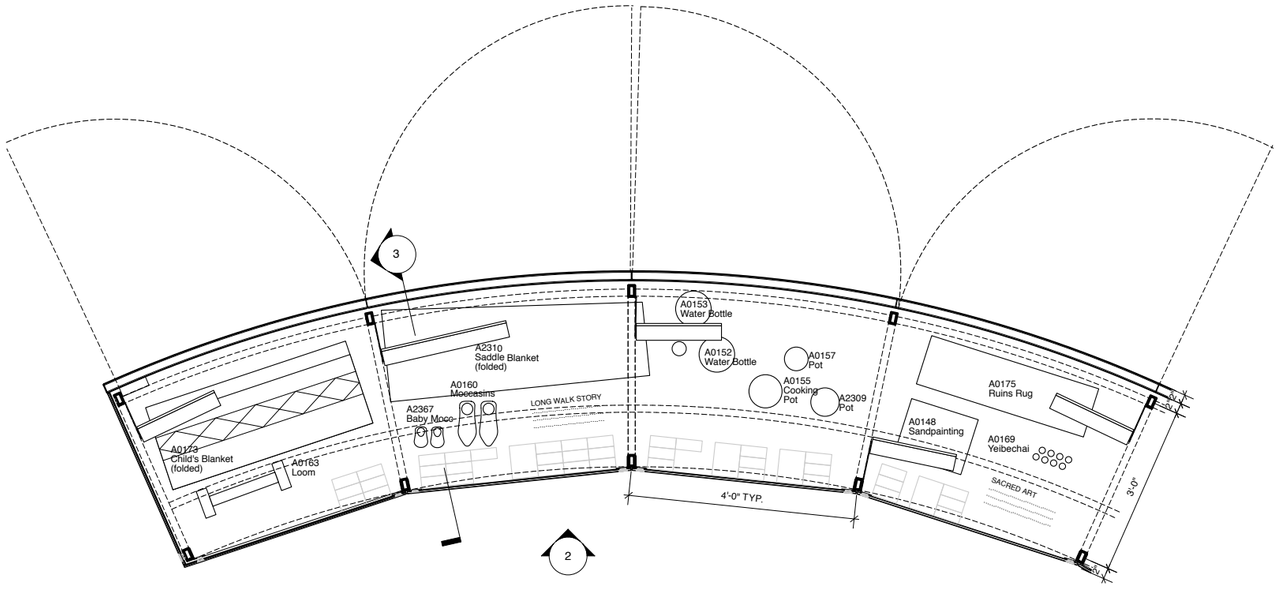
100% Final Design April 2, 2009

Sheet Title

Exhibit Case Layouts:
Native Voices NV5.E04.ca05

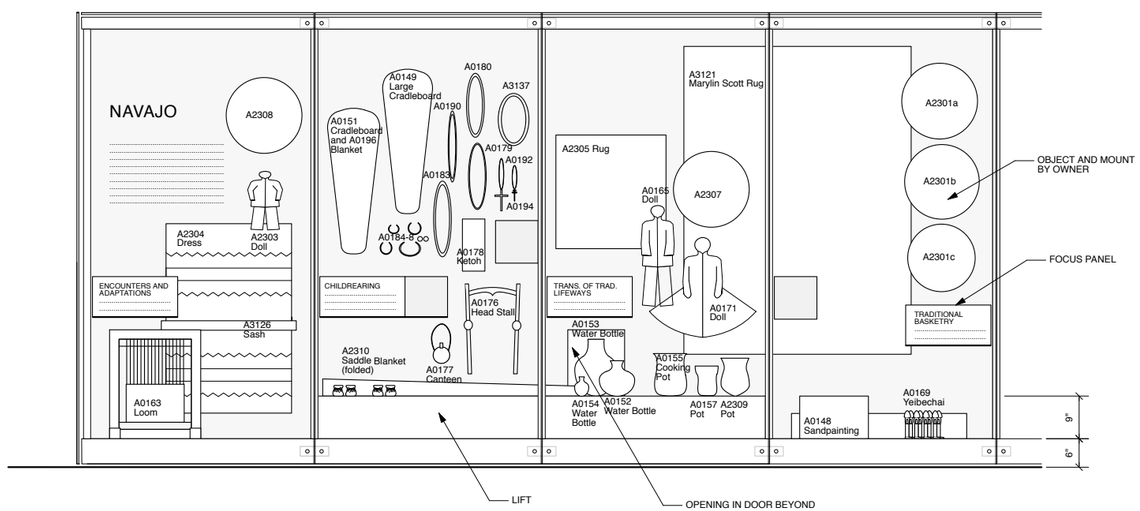
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3/4"=1'-0"	X5-NV-5.50

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



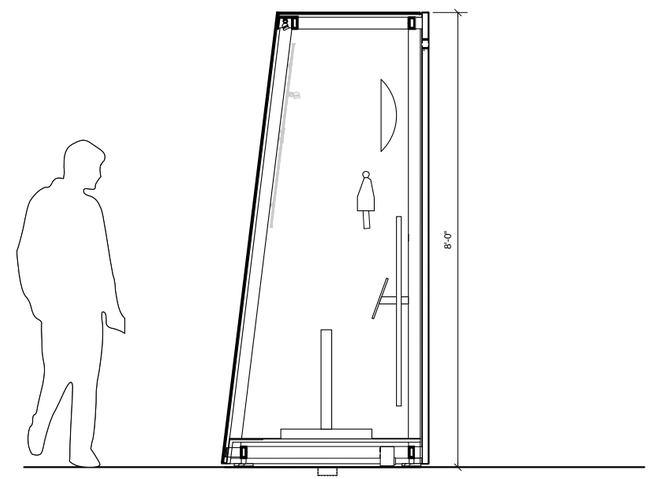
1 PLAN

SCALE: 3/4"= 1'-0"



2 ELEVATION

SCALE: 3/4"= 1'-0"



3 SECTION

SCALE: 3/4"= 1'-0"

ARTIFACT MOUNTING SCHEDULE

Artifact #	Hinged Panel	Graphic Panel	Backer Board	Lift/ Deck	Brackets			
					B1	B2	B3	C1
A0148				x				
A0149	x							
A0151	x							
A0152				x				
A0153				x				
A0154				x				
A0155				x				
A0157				x				
A0160				x				
A0163				x				
A0165	x							
A0169				x				
A0171	x							
A0173				x				
A0175				x				
A0176	x							
A0177	x							
A0178	x							
A0179	x							
A0180	x							
A0183	x							
A0184	x							
A0185	x							
A0186	x							
A0187	x							
A0188	x							
A0190	x							
A0192	x							
A0194	x							
A0196	x							
A2301a-c	x							
A2303	x							
A2304	x							
A2305	x							
A2307	x							
A2308	x							
A2309				x				
A2310				x				
A2367				x				
A3121	x							
A3126	x							
A3137	x							

NOTE:

1. SEE X-TYP-1.00 FOR GLASS CASE SCHEDULE AND TYP. CASE DWGS FOR BRACKET & PANEL DTLS

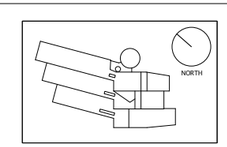
2. SEE CASEWORK SPECIFICATIONS AND GRAPHICS PACKAGE FOR ADDITIONAL INFO

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street, San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

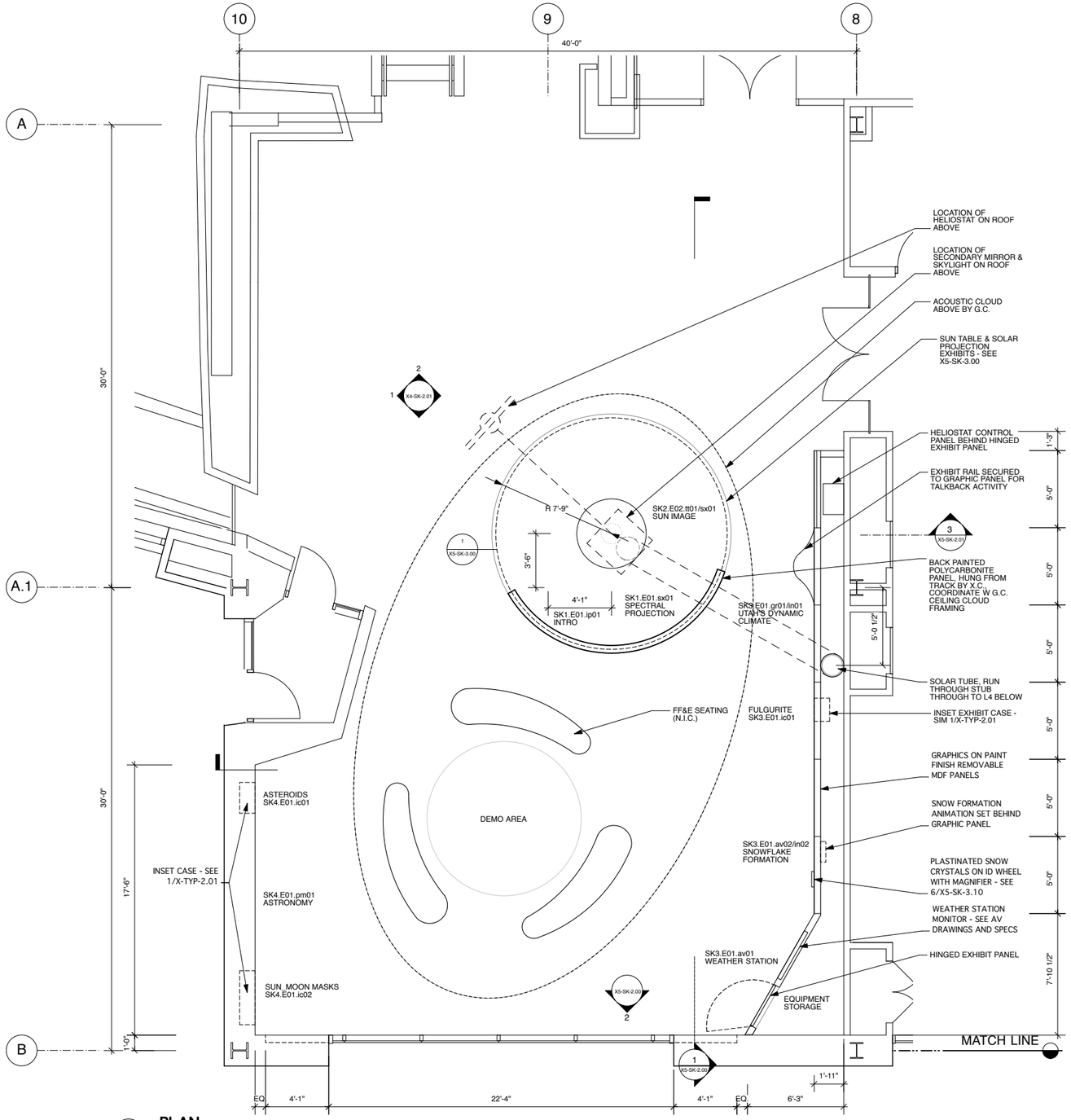
No. / Issue Name / Date

Sheet Title

Exhibit Case Layouts:
Native Voices NV5.E05.ca06

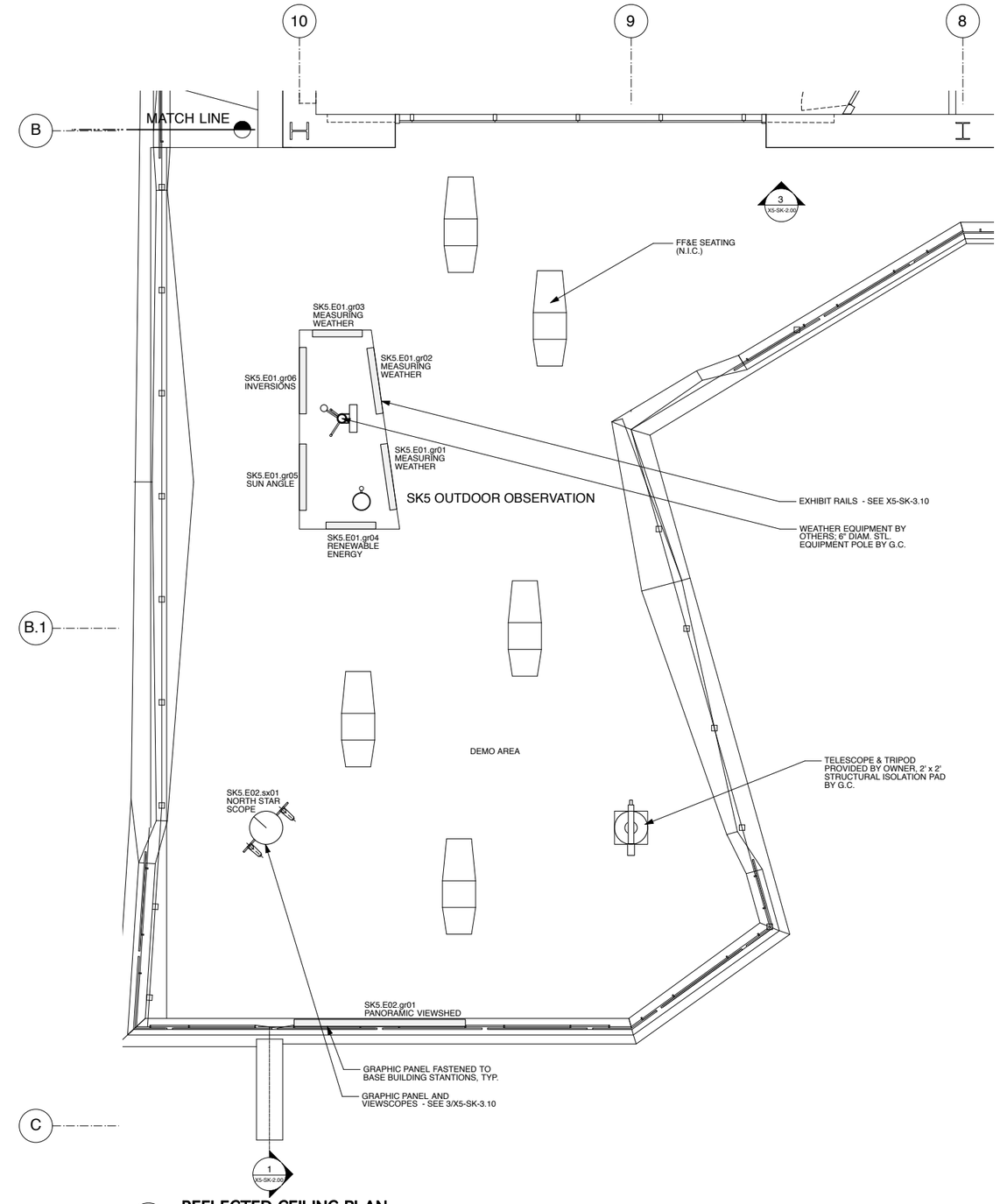
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3/4"=1'-0"	X5-NV-5.60

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **PLAN**

SCALE: 1/4"= 1'-0"



2 **REFLECTED CEILING PLAN**

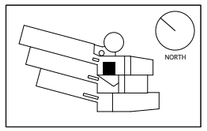
SCALE: 1/4"= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Partial Plan:
Sky

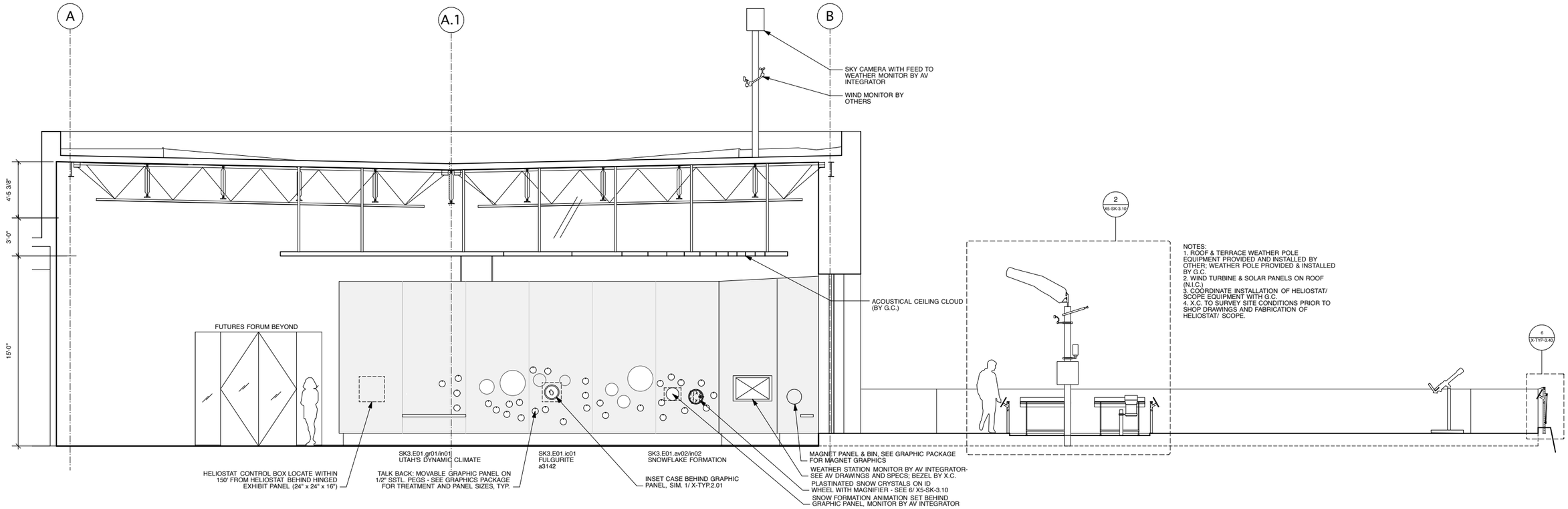
Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 0224375O
Sheet No.

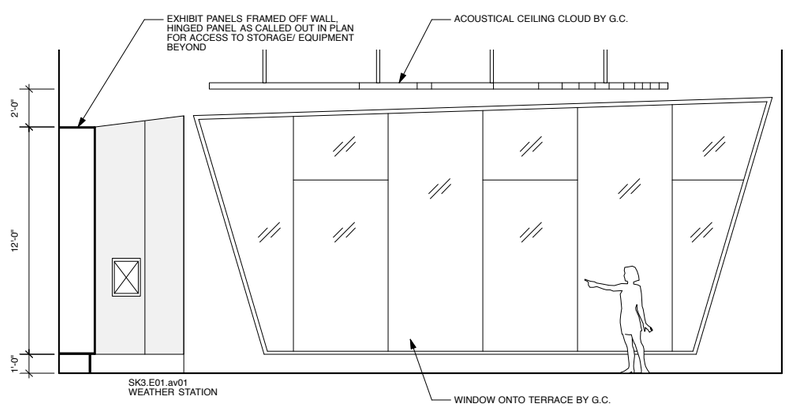
X5-SK-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



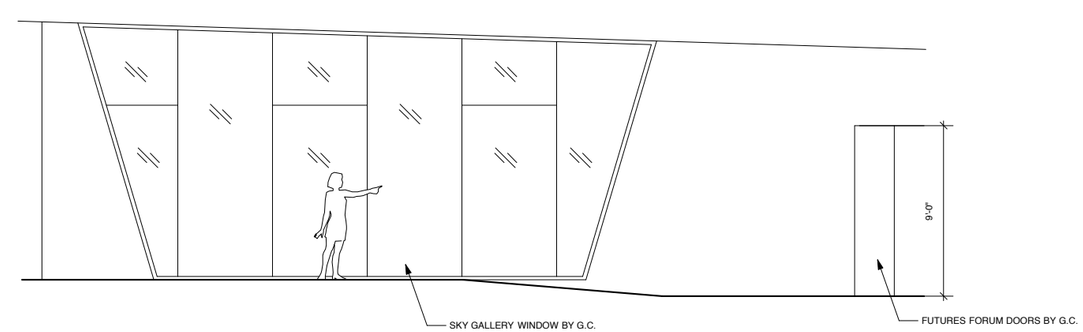
1 SECTION LOOKING SOUTH

SCALE: 1/4"= 1'-0"



2 WEST ELEVATION

SCALE: 1/4"= 1'-0"



3 EAST ELEVATION - EXTERIOR

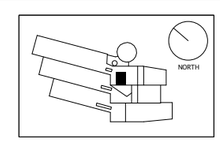
SCALE: 1/4"= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

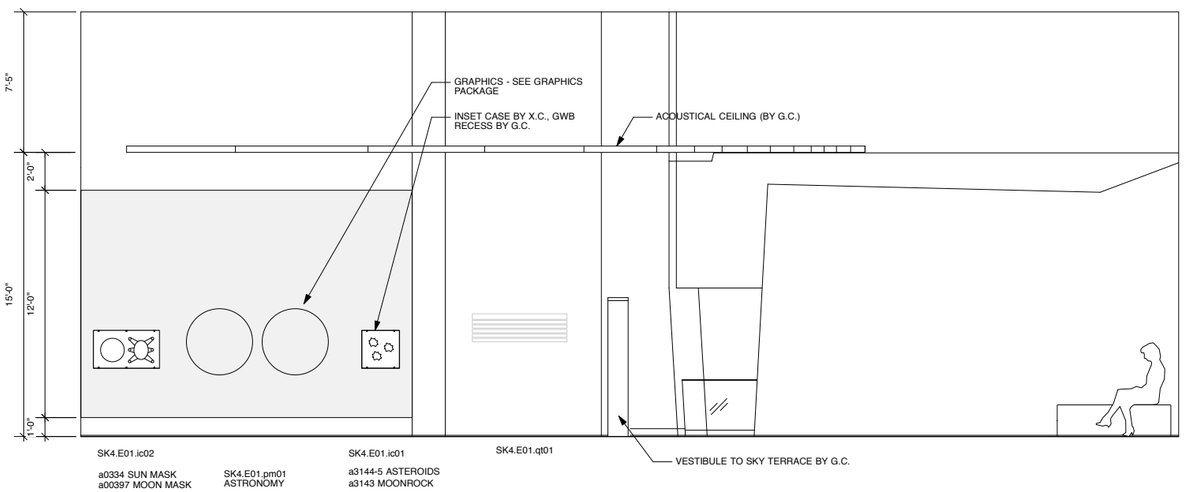
100% Final Design April 2, 2009

Sheet Title

Elevations & Sections: Sky

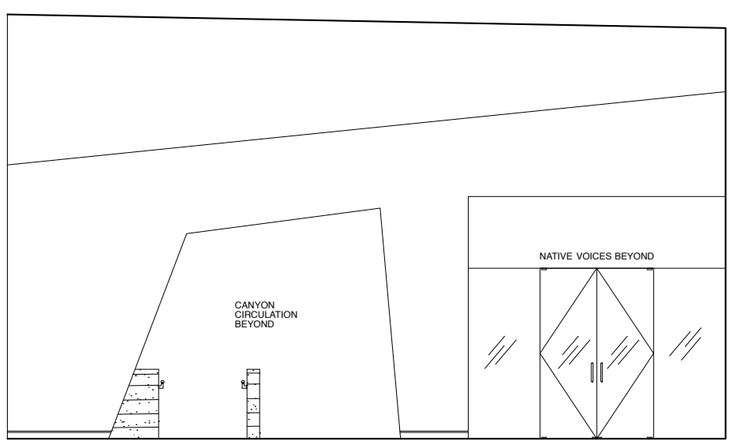
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X5-SK-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



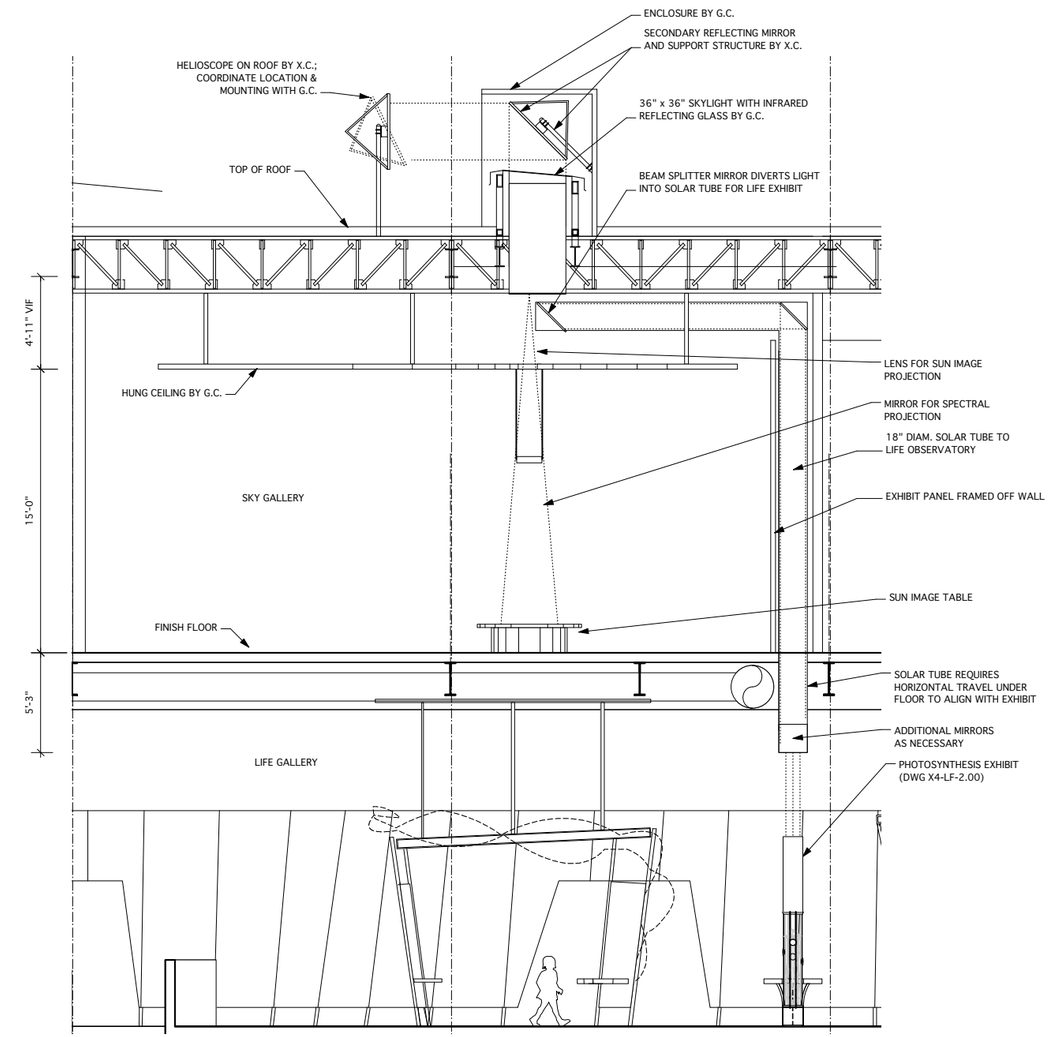
1 NORTH ELEVATION

SCALE: 1/4"= 1'-0"



2 EAST ELEVATION

SCALE: 1/4"= 1'-0"



3 SECTION LOOKING EAST

SCALE: 1/4"= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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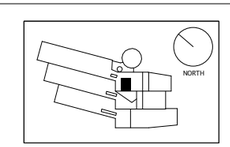


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

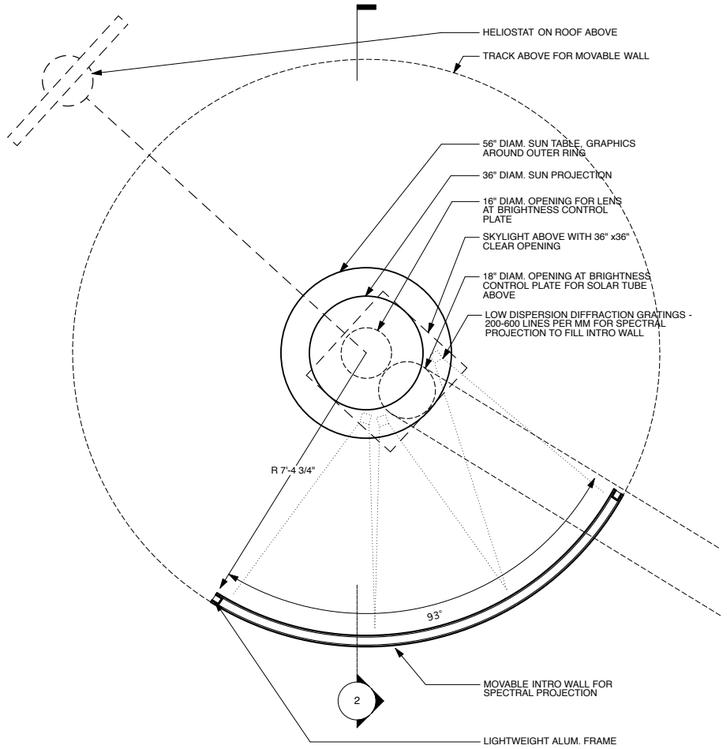
100% Final Design April 2, 2009

Sheet Title

Elevations & Sections: Sky

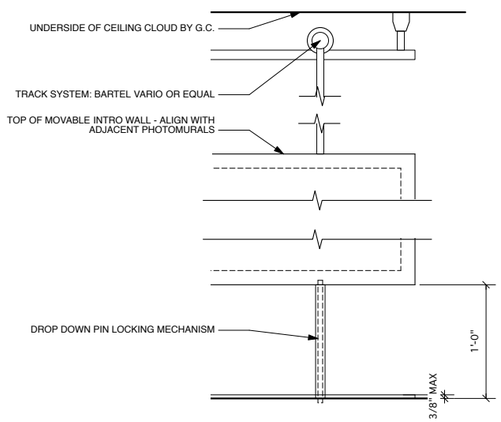
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	X5-SK-2.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



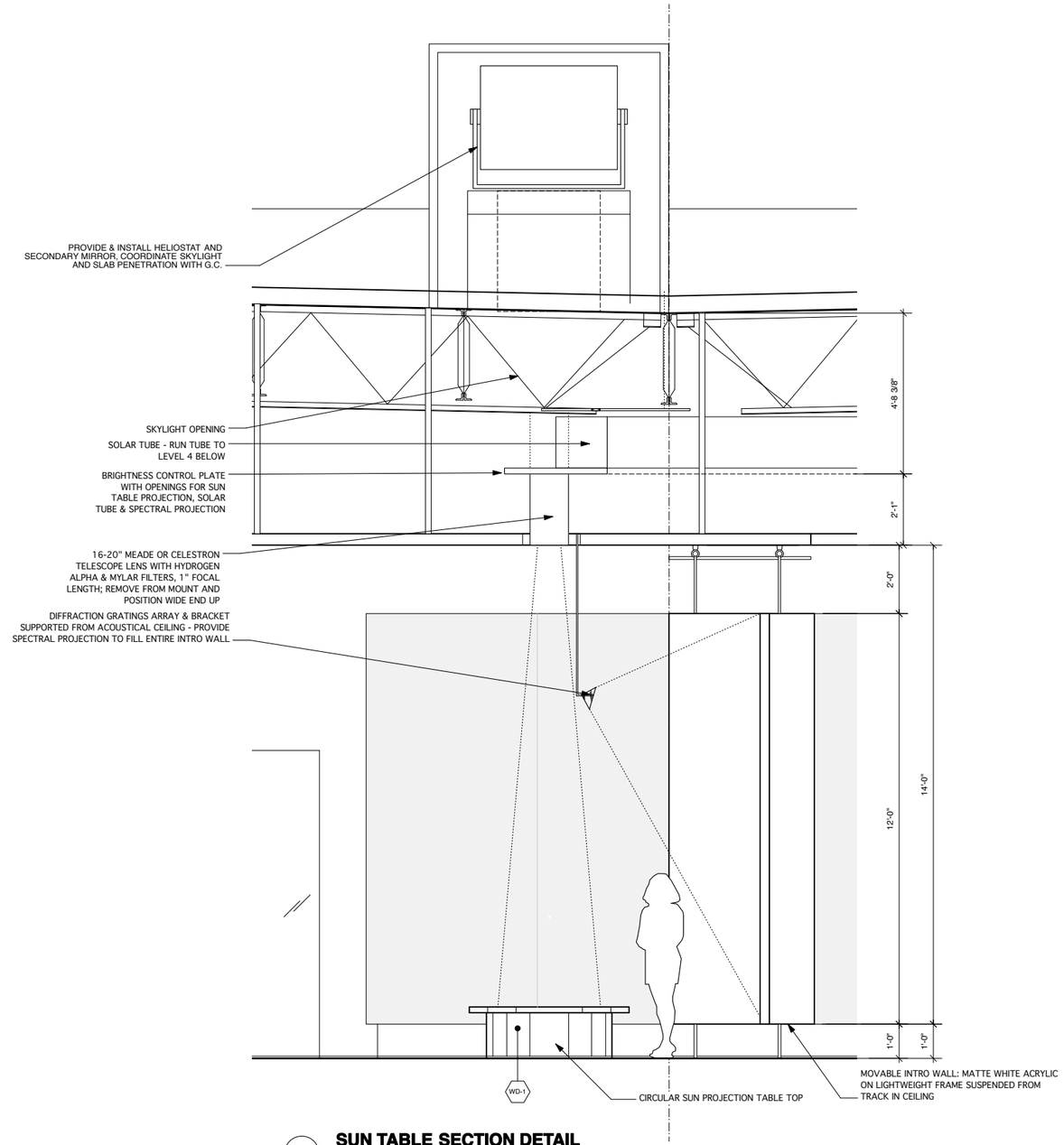
1 SUN TABLE PLAN DETAIL

SCALE: 1/2"= 1'-0"



3 INTRO WALL ELEVATION DETAIL

SCALE: 1 1/2"= 1'-0"



2 SUN TABLE SECTION DETAIL

SCALE: 1/2"= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**

Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

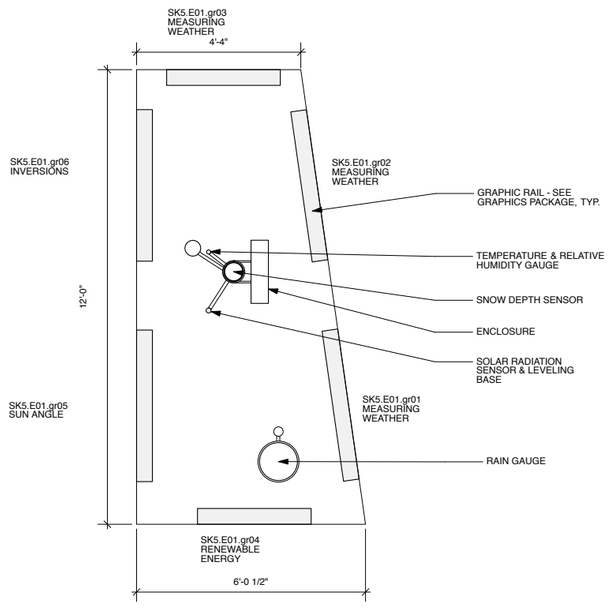
No. / Issue Name / Date

Sheet Title

Details:
Sky - Helioscope / Sun Table

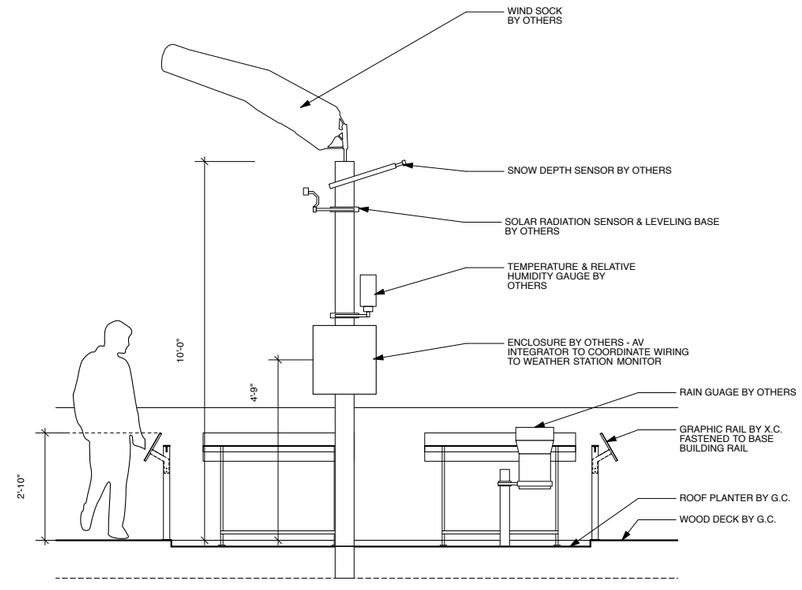
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X5-SK-3.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



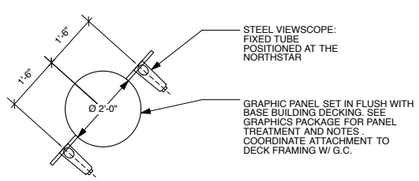
1 SKY TERRACE EQUIPMENT TOWER PLAN

SCALE: 1/2"= 1'-0"



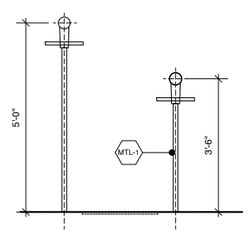
2 SKY ROOF EQUIPMENT TOWER ELEVATION

SCALE: 1/2"= 1'-0"



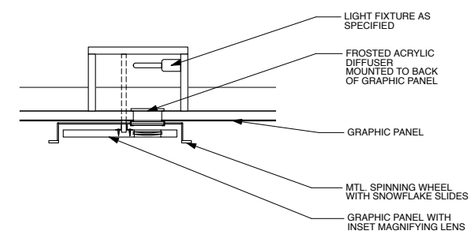
3 NORTH STAR SCOPE PLAN

SCALE: 1/2"= 1'-0"



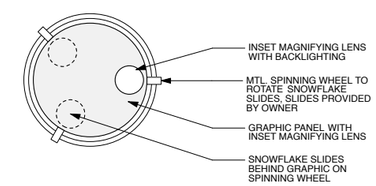
4 NORTH STAR SCOPE ELEVATION

SCALE: 1/2"= 1'-0"



5 SNOWFLAKE FORMATION PLAN

SCALE: 1 1/2"= 1'-0"



6 SNOWFLAKE FORMATION ELEVATION

SCALE: 1 1/2"= 1'-0"

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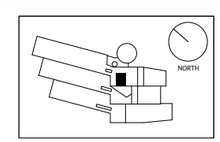


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

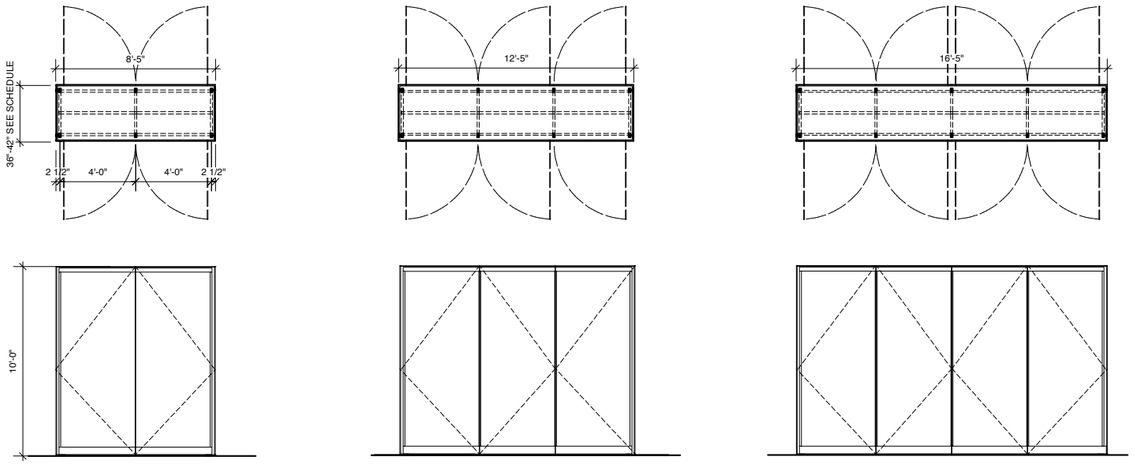
No. / Issue Name / Date

Sheet Title

Details:
Sky - Sky Terrace

Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
As Noted	X5-SK-3.10

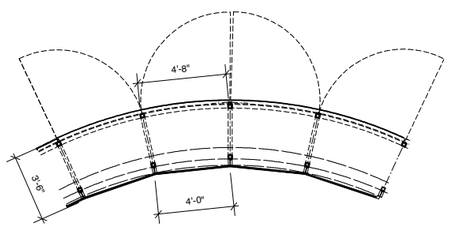
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

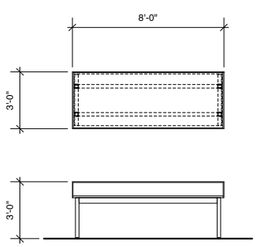


SEE X-TYP-1.10

1 TYPICAL GLASS EXHIBIT CASES

SCALE: 1/4"= 1'-0"

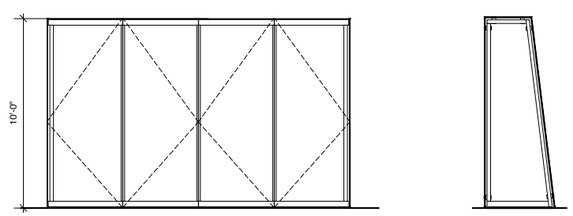




SEE X-TYP-1.50

2 TYPCAL GLASS TABLE CASE

SCALE: 1/4"= 1'-0"



SEE X-TYP-1.20

3 NATIVE VOICES CASE

SCALE: 1/4"= 1'-0"

NOTES:

1. ALL FULL HEIGHT CASE GLASS THICKNESS TO BE 1/2", UNLESS OTHERWISE NOTED.
2. GLASS TO BE LAMINATED LOW IRON GLASS U.O.N.
3. ALL STEEL CONNECTIONS TO BE WELDED AND GROUND SMOOTH. STEEL TO HAVE A MATTE BLK. LAQUER FINISH. FASTENERS TO BE SPECIFIED IN SHOP DRAWINGS.
4. STRUCTURAL STEEL TUBE TO BE FY46, SEE SPECIFICATIONS FOR STRUCTURAL & OTHER PERFORMANCE REQUIREMENTS.
5. CONTRACTOR TO PROVIDE A 10 PERCENT OVERAGE TO SCHEDULED QUANTITIES FOR OBJECT & GRAPHIC BRACKETS FOR FUTURE USE.
6. SEE 5.00 SERIES SHEETS FOR CASE LAYOUTS AND ATYPICAL CASE DETAILS.
7. SEE GRAPHIC PANEL SCHEDULE FOR GRAPHIC SIZES AND SUBSTRATES.
9. FULL CASE PROTOTYPE TO BE COORDINATED WITH LIGHTING AND GRAPHICS - SEE SPECS.

GLASS CASE SCHEDULE

Bldg. Level	Observatory	Exhibit Area	Case Code	L	H	D	Door Sides	Partition Width	Lift Quantity	Notes
L2	Canyon	Collection Wall	Not In Contract							Provide mounts and graphics for Collection Case
	Utah Futures	Carbon	UF2.E01.ca01	8'-5"	10'-0"	3'-0"	Single			
	Past Worlds	Pleistocene	PW2.E03.ca01	12'-5"	10'-0"	4'-0"	Double		1	
		EO - Green River	PW3.E03.ca02	12'-5"	10'-0"	3'-0"	Double	12'		
		CR - North Horn	PW4.E09.ca03	8'-5"	10'-0"	4'-0"	Double		2	
		CR - Cedar Mnt	PW4.E06.ca04	8'-5"	10'-0"	4-0"	Double			
		CR -Kaip. Div.	PW4.E03.ca05	12'-5"	8'-0"	3'-0"	Double			Case structure extends 4" into slab depression
		JR - CLDQ	PW5.E03.ca06	24'-3 1/2"	10'-0"	3'-0"	Single		6	No rear glass
L3	First Peoples	Tech - Tex/Basketry	FP5.E01.ca01	12'-5"	10'-0"	3'-6"	Double	12'	6	(2) end partitions with inset displays
		Trade	FP6.E01.ca02	8'-5"	10'-0"	3'-0"	Single	8'	2	end partition with inset display
		Tech - Weapons/Lithics	FP5.E05.ca03	8'-5"	10'-0"	3'-6"	Double	8'	2	(2) end partitions with inset displays
		Tech - Ornaments	FP5.E03.ca04	8'-0"	3'-0"	3'-0"	N/A		7	
		Tech - Footwear	FP5.E04.ca05	8'-0"	3'-0"	3'-0"	N/A		3	
		Tech - Pottery / Typ.	FP5.E07.ca06	16'-5"	10'-0"	3'-6"	Double	16'	4	(2) end partitions with inset displays
		Settlement-Subsist.	FP4.E01.ca07	16'-5"	10'-0"	3'-6"	Single	16'	4	end partition with inset display
		Range Creek	FP7.E01.ca08	8'-0"	3'-0"	3'-0"	N/A		2	
L4	Life	Keratin	LF2.E03.ca01	8'-5"	10'-0"	3'-6"	Double			
		Organisms	LF4.E03.ca02	12'-5"	10'-0"	3'-6"	Double	12'	1	
		Populations	LF4.E03.ca03	8'-5"	10'-0"	3'-6"	Double	8'	1	
L5	Native Voices	National Tribes	NV1.E01.ca01	16'-3 1/2"	10'-0"	3'-6"	Single	16'		Single sided partition
		Ute	NV5.E01.ca02	1'-6"	10'-0"	3'-6"	Single		2	Case front angles in toward the top.
		Shoshone	NV5.E02.ca03	16'-0"	10'-0"	3'-6"	Single		1	Case front angles in toward the top.
		Goshute	NV5.E03.ca04	16'-0"	10'-0"	3'-6"	Single		2	Case front angles in toward the top.
		Paiute	NV5.E04.ca05	16'-0"	10'-0"	3'-6"	Single		2	Case front angles in toward the top.
		Navajo	NV5.E05.ca06	16'-0"	10'-0"	3'-6"	Single		2	Case front angles in toward the top.

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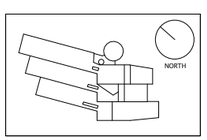

Key Plan

No. / Issue Name / Date

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100% Final Design April 2, 2009

Sheet Title

Typical Details
Exhibit Case Types

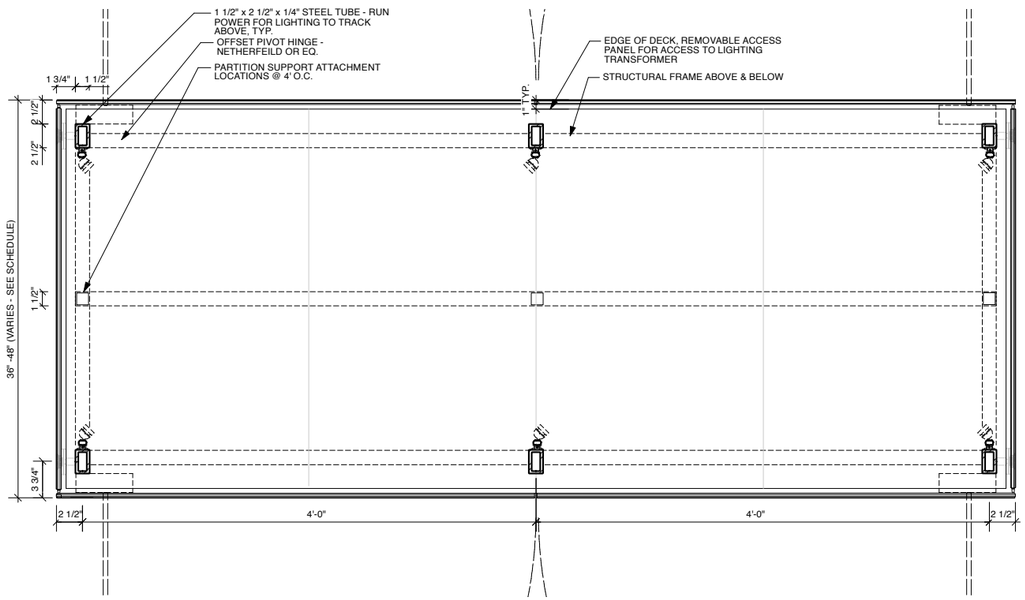
Date: April 2, 2009

Scale*: 1/4"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

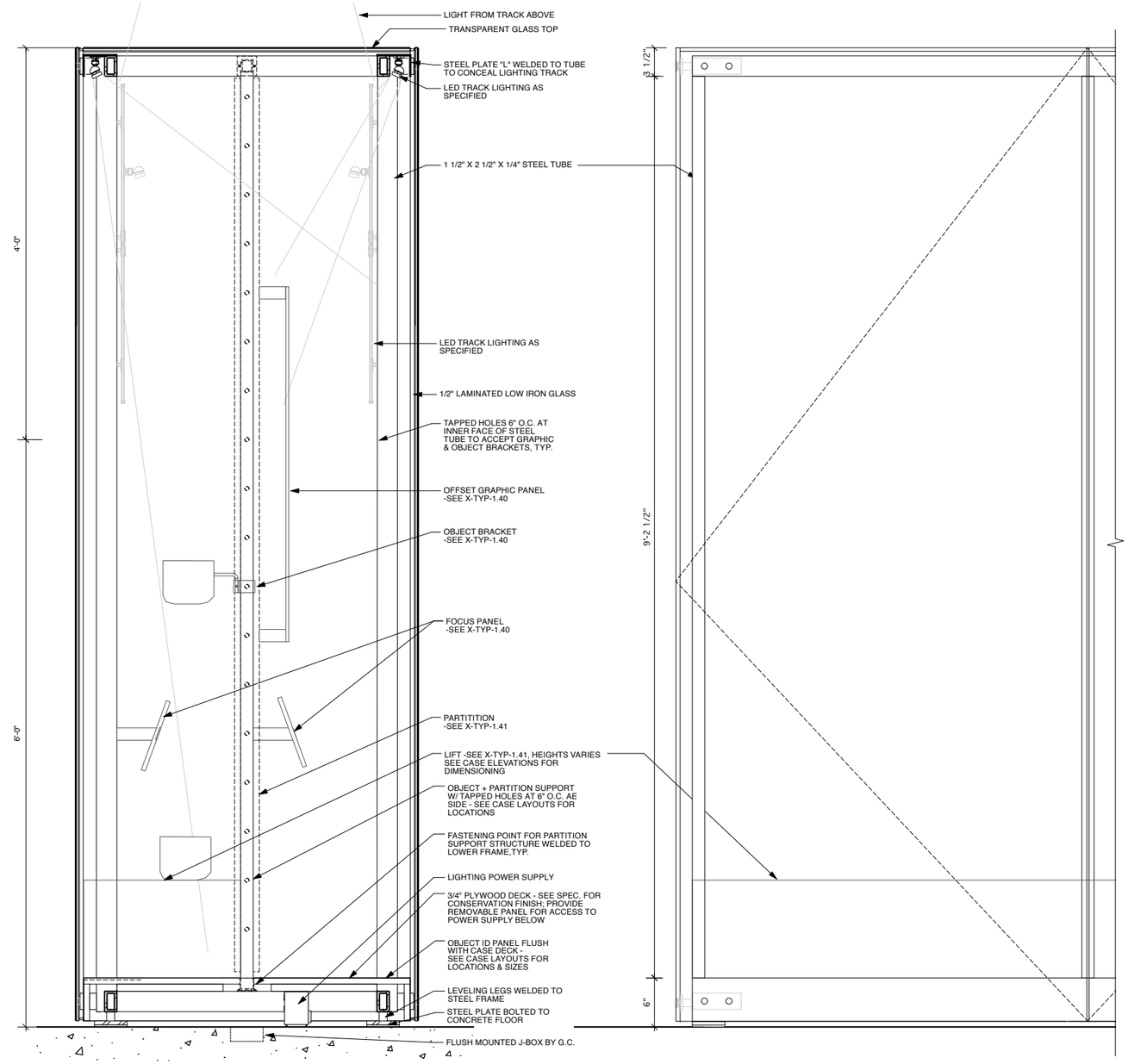
X-TYP-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 TYPICAL CASE PLAN DETAIL ALT. A

SCALE: 1 1/2"= 1'-0"

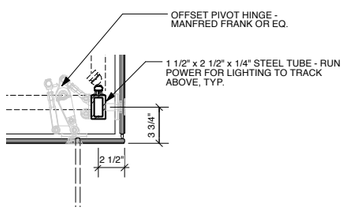


2 TYPICAL CASE SECTION DETAIL ALT. A

SCALE: 1 1/2"= 1'-0"

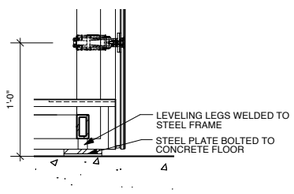
3 TYPICAL CASE ELEVATION DETAIL ALT. A

SCALE: 1 1/2"= 1'-0"



4 TYPICAL CASE PLAN DETAIL ALT. B

SCALE: 1 1/2"= 1'-0"



5 TYPICAL CASE SECTION DETAIL ALT. B

SCALE: 1 1/2"= 1'-0"

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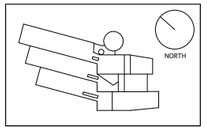

Key Plan

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100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Typical Details
Exhibit Case System

Date: April 2, 2009

Scale*: 1 1/2"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

X-TYP-1.10

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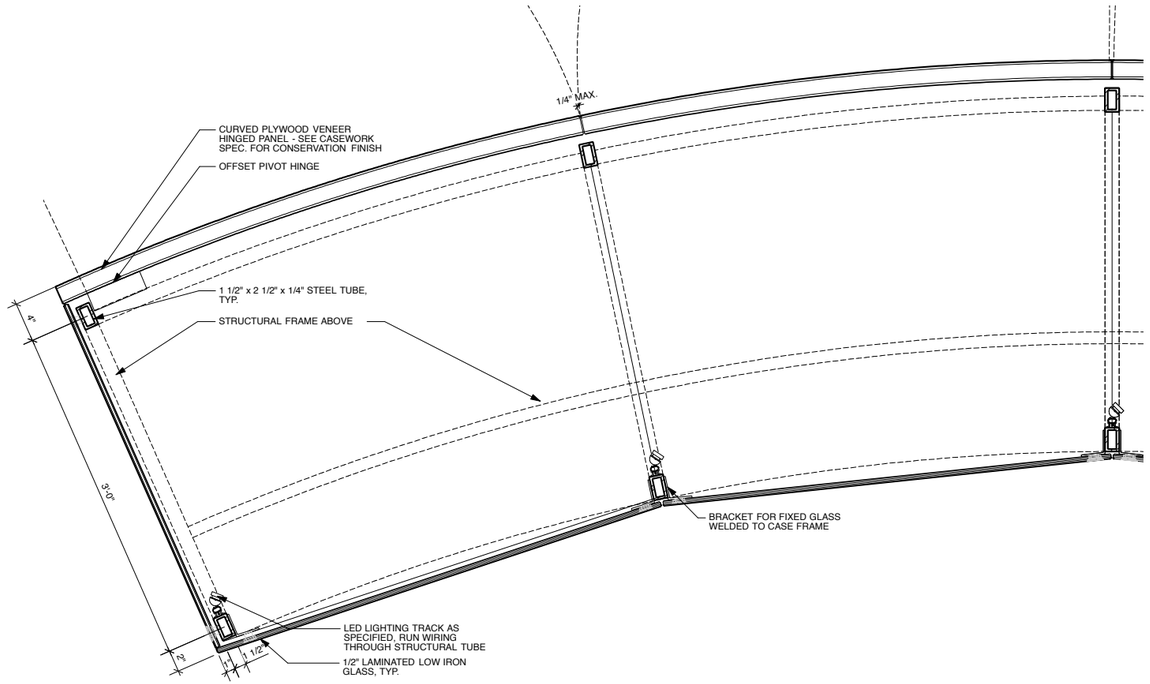
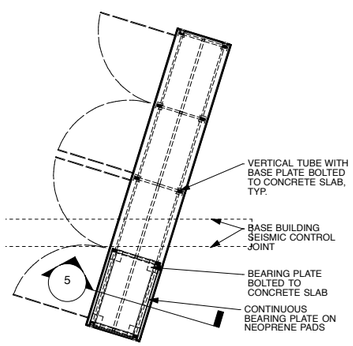


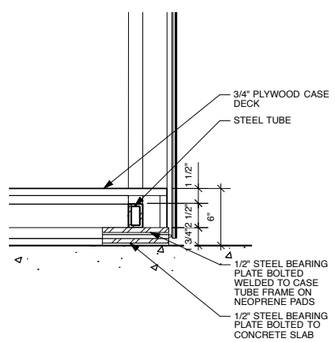
1 TYPICAL NV CASE PLAN DETAIL

SCALE: 1 1/2"= 1'-0"



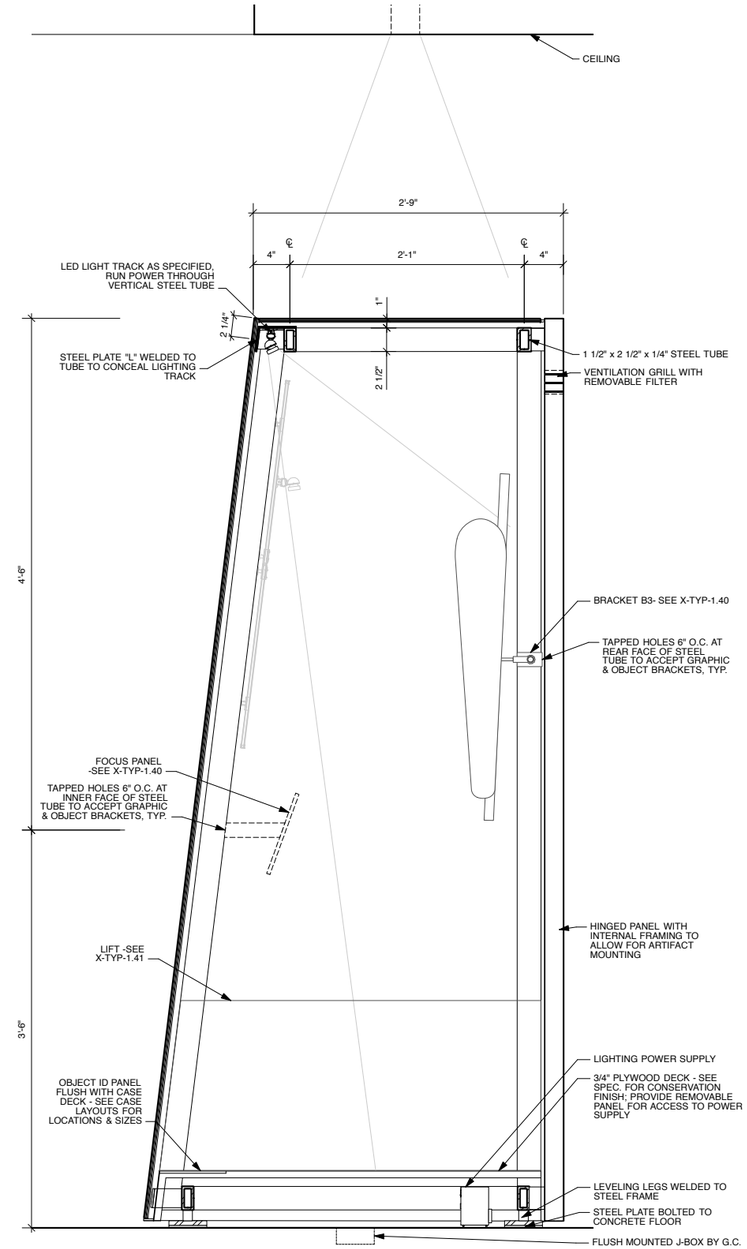
4 SEISMIC SEAM PLAN DETAIL: NV1.E01.ca01

SCALE: 1/4"= 1'-0"



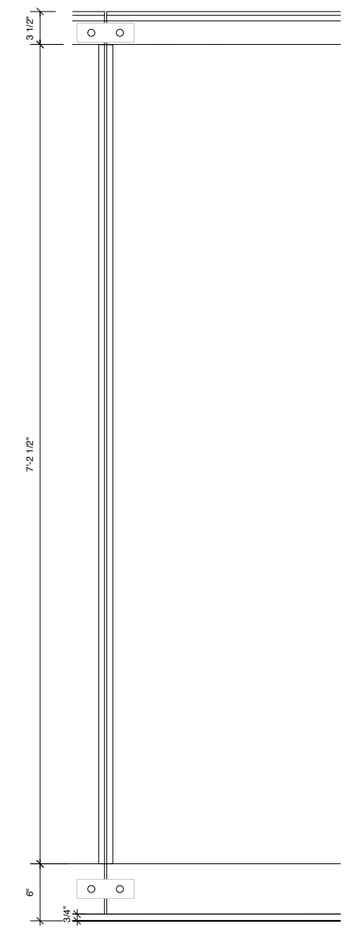
5 SEISMIC SEAM SECTION DETAIL: NV1.E01.ca01

SCALE: 1 1/2"= 1'-0"



2 TYPICAL NV CASE SECTION DETAIL

SCALE: 1 1/2"= 1'-0"



3 TYPICAL NV CASE ELEVATION DETAIL

SCALE: 1 1/2"= 1'-0"

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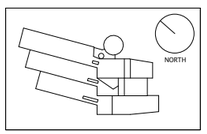

Key Plan

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100% Final Design April 2, 2009

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Sheet Title
Typical Details
Exhibit Case System -NV

Date
April 2, 2009

Scale*
1 1/2"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
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X-TYP-1.20

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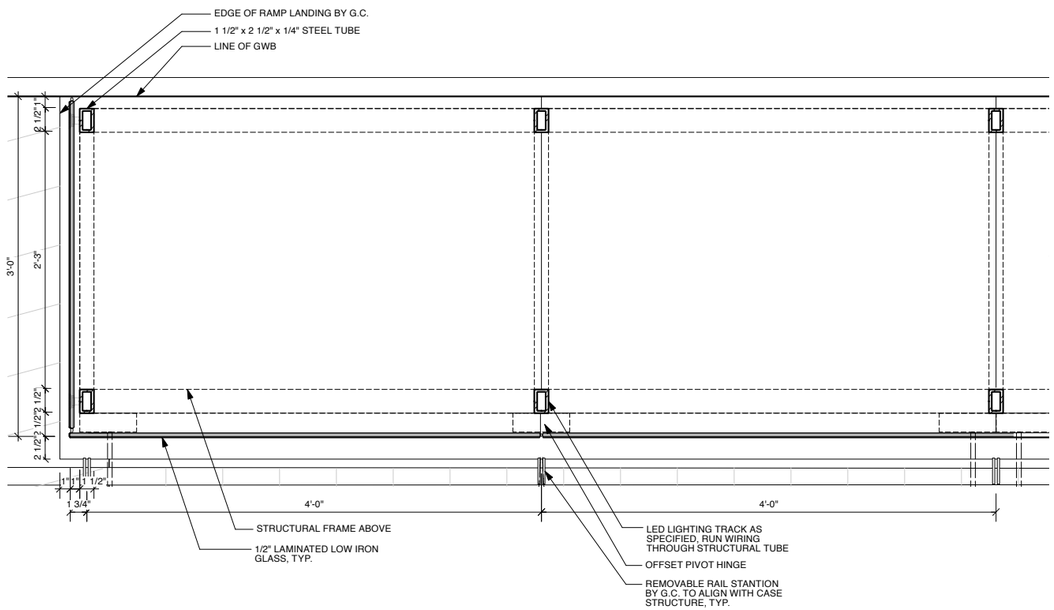
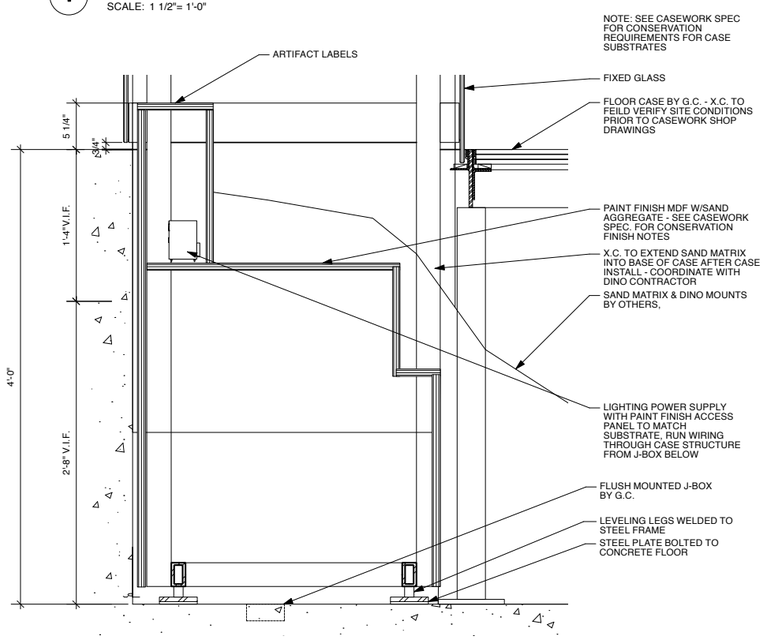


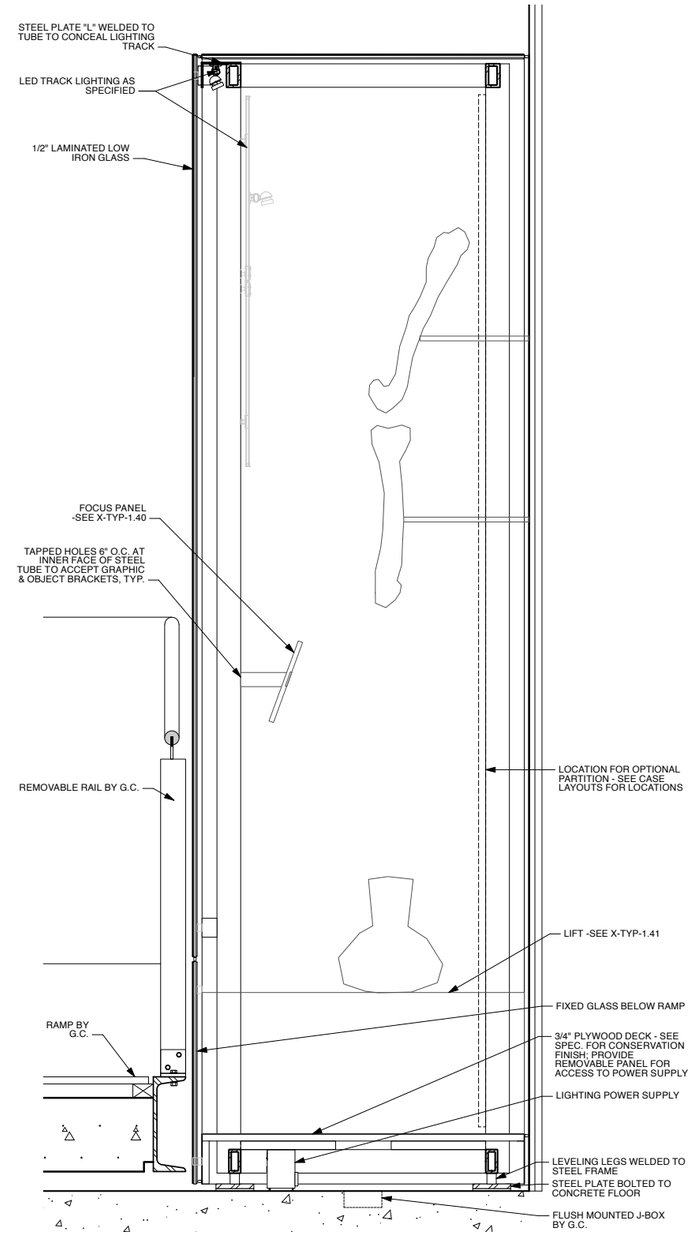
1 CLQ CASE PLAN DETAIL - PW5.E03.ca06

SCALE: 1 1/2"= 1'-0"



4 CASE /FLOOR CASE SECTION DETAIL - PW4.E03.ca05

SCALE: 1 1/2"= 1'-0"



2 CLQ CASE SECTION DETAIL - PW5.E03.ca06

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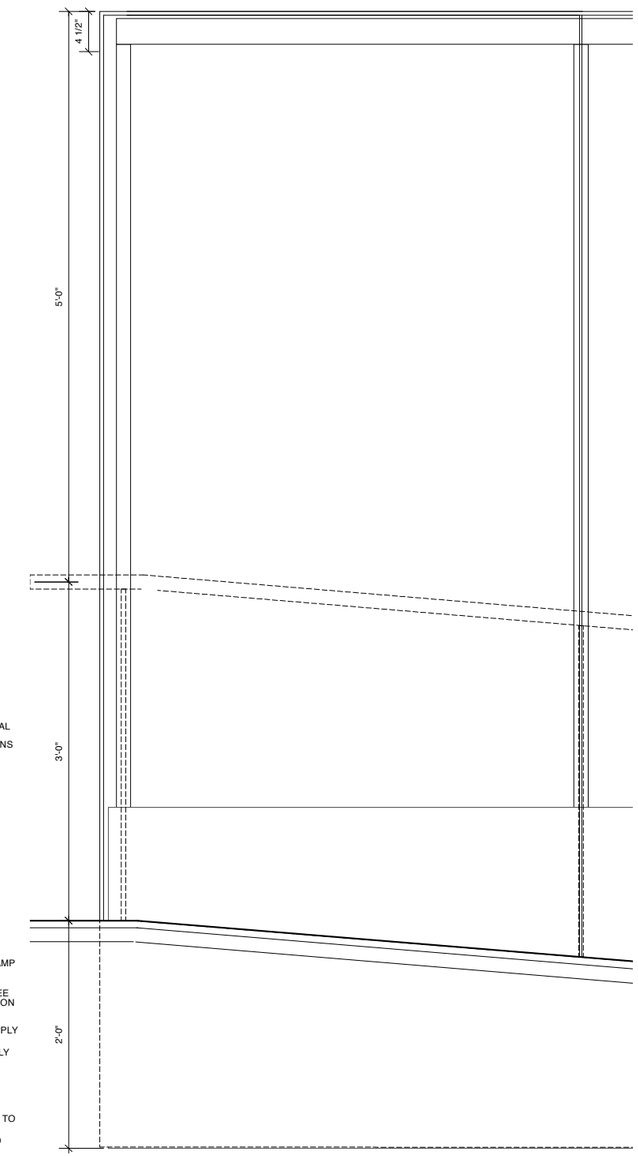

3 CLQ CASE ELEVATION DETAIL - PW5.E03.ca06

SCALE: 1 1/2"= 1'-0"

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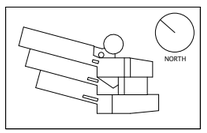
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

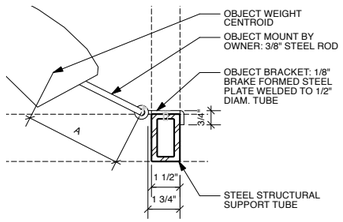
Sheet Title
Typical Details
Exhibit Case System - PW

Date
April 2, 2009

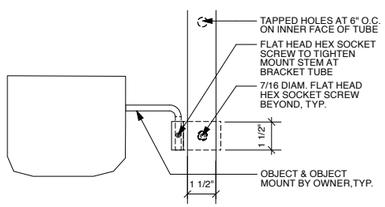
Scale*
1 1/2"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X-TYP-1.30

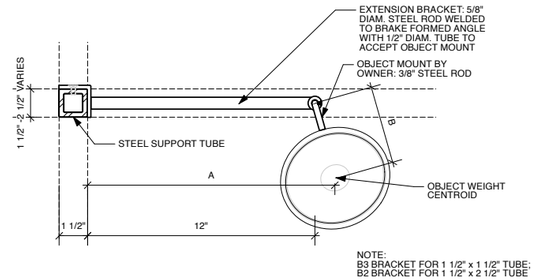
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



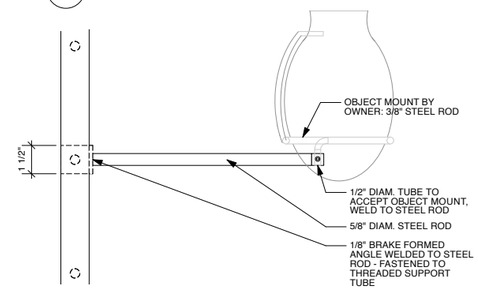
1 **ARTIFACT BRACKET PLAN - B1**



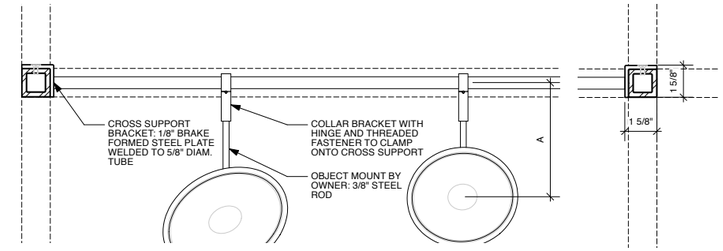
2 **ARTIFACT BRACKET ELEVATION - B1**



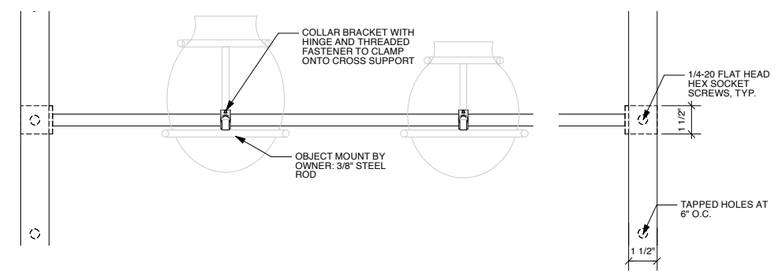
3 **ARTIFACT BRACKET PLAN - B2/ B3**



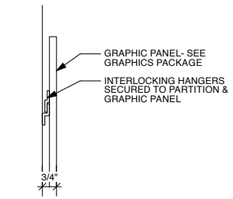
4 **ARTIFACT BRACKET ELEVATION - B2/ B3**



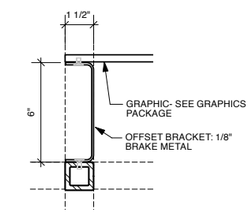
5 **ARTIFACT CROSS BRACKET PLAN - C1**



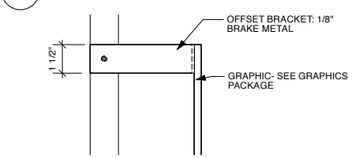
6 **ARTIFACT CROSS BRACKET ELEVATION - C1**



14 **GRAPHIC PANEL SECTION - G1**



15 **OFFSET GRAPHIC PLAN - G2**



16 **OFFSET GRAPHIC ELEVATION - G2**

GENERAL NOTES:
1. ALL STEEL TO HAVE MATTE BLACK LACQUER FINISH - SEE SPECIFICATIONS
2. (8) BRACKETS MAX. PER VERTICAL STEEL SUPPORT TUBE
3. SEE BRACKET LOADING SCHEDULE BELOW

EXHIBIT CASE BRACKET B1

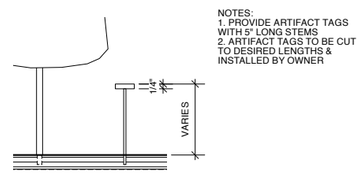
Mount Rod (Dia in Inches)	Bracket Plate (Thickness In Inches)	Object Weight in Pounds			
		Cantilever to Object Centroid A (Inches)			
		5"	9"	12"	18"
3/4	1/4	50	50	50	50
1/2	3/16	50	24	24	12
3/8	1/8	24	12	9	6

EXHIBIT CASE BRACKET B2, B3

Mount Rod (Dia in Inches)	Extension Bracket (Dia In Inches)	Bracket Plate (Thickness In Inches)	Object Weight in Pounds			
			Cantilever to Object Centroid (Inches)			
				B		
			A	2"	5"	9"
1/2	3/4	1/4	12"	50	50	24
			18"	50	50	24
1/2	5/8	3/16	12"	42	42	24
			18"	24	24	24
3/8	5/8	1/8	12"	24	24	12
			18"	24	24	12

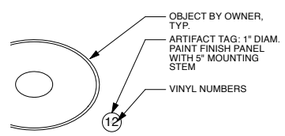
EXHIBIT CASE BRACKET C1

Mount Rod (Dia in Inches)	Collar Bracket Sleeve (Outer Dia in Inches)	Cross Bracket (Dia in Inches) + Bracket Plate (Thickness In Inches)	Object Weight in Pounds and Max Number of Object Mounts per Cross Bracket (Indicated in [ ])			
			Cantilever to Object Centroid A (Inches)			
			5"	9"	12"	18"
3/4	1	3/4 + 1/4	50[2]	50[2]	50[2]	50[2]
1/2	3/4	5/8 + 3/16	50[1]	24[2]	24[2]	12[2]
3/8	5/8	5/8 + 1/8	24[2]	12[2]	9[3]	6[3]

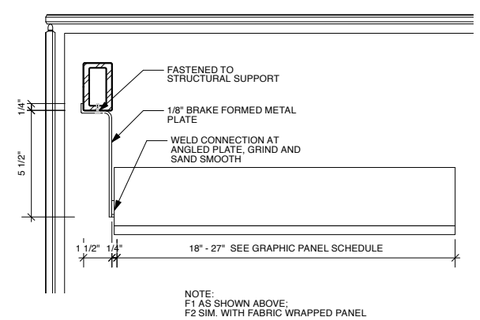


NOTES:
1. PROVIDE ARTIFACT TAGS WITH 5" LONG STEMS
2. ARTIFACT TAGS TO BE CUT TO DESIRED LENGTHS & INSTALLED BY OWNER

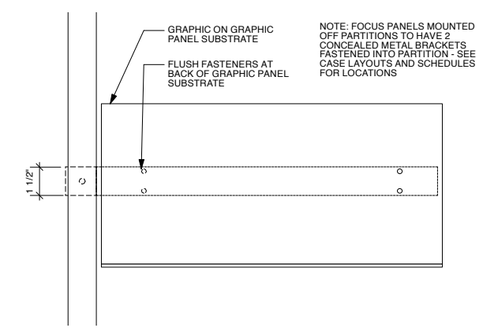
9 **ARTIFACT TAG PLAN**



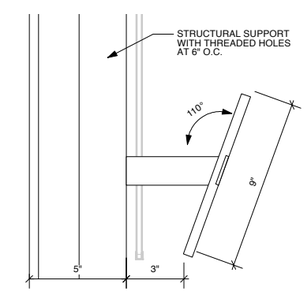
10 **ARTIFACT TAG ELEVATION**



11 **FOCUS PANEL PLAN - F1 / F2**



12 **FOCUS PANEL FRONT ELEVATION- F1 / F2**



13 **FOCUS PANEL ELEVATION- F1 / F2**

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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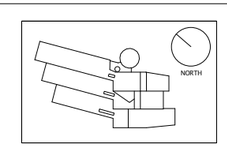

Key Plan

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100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Typical Details
Exhibit Case System- Brackets

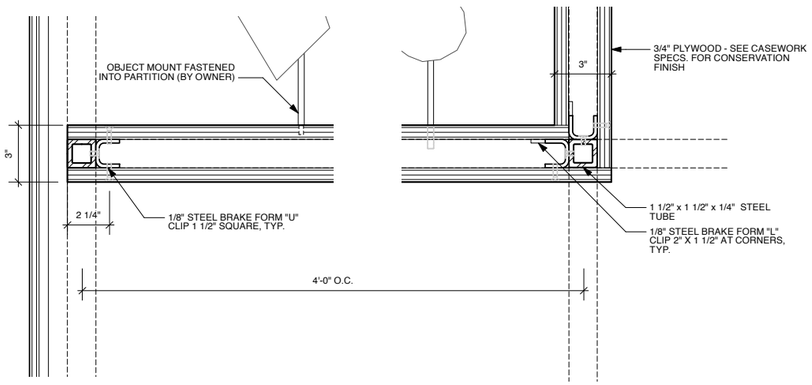
Date
April 2, 2009

Scale*
3"=1'-0"

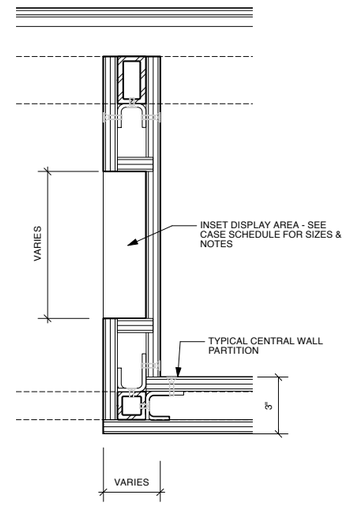
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X-TYP-1.40

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

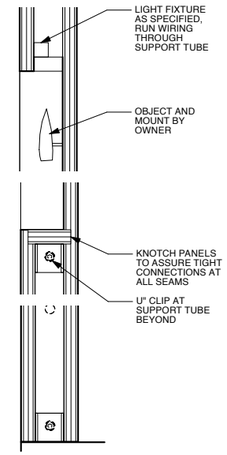
NOTES:
1. SEE CASEWORK SPECIFICATIONS FOR PARTITION & LIFTS SUBSTRATES AND FINISHES.
2. SEE CASEWORK SCHEDULE AND DETAILS
3. ALL PLYWOOD JOINTS TO BE FILLED AND SANDED PRIOR TO PAINT FINISH



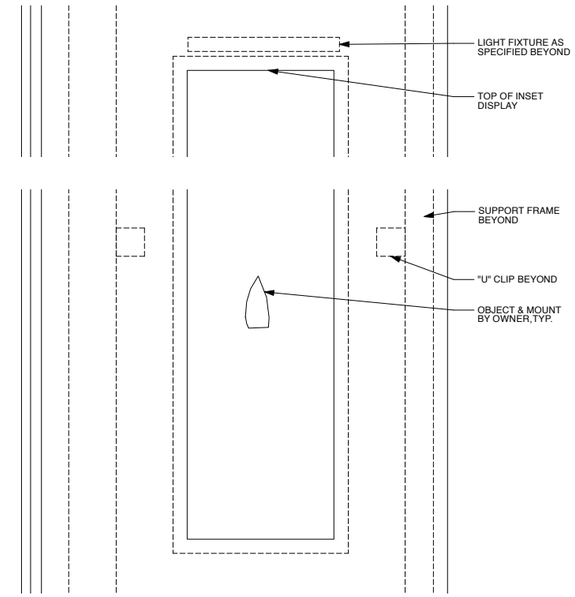
1 **CASE PARTITION PLAN**



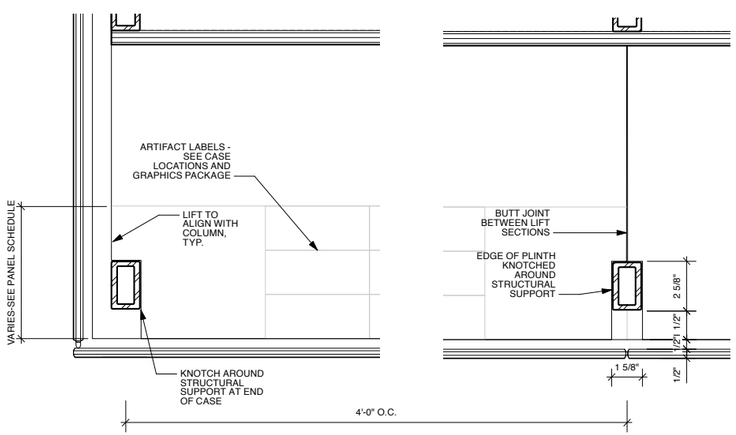
2 **PARTITION INSET DISPLAY PLAN**



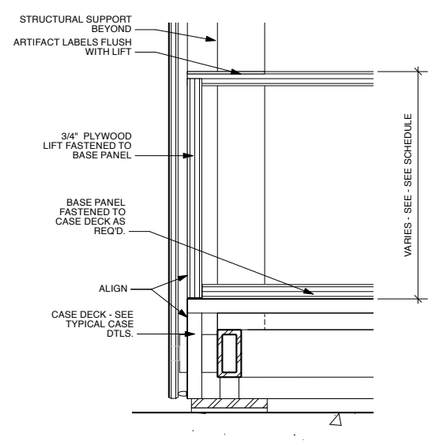
3 **PARTITION INSET DISPLAY SECTION**



4 **PARTITION INSET DISPLAY ELEVATION**



5 **CASE LIFT PLAN**



6 **CASE LIFT SECTION**

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Exhibit Construction

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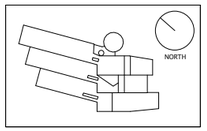

Key Plan

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100% Final Design April 2, 2009

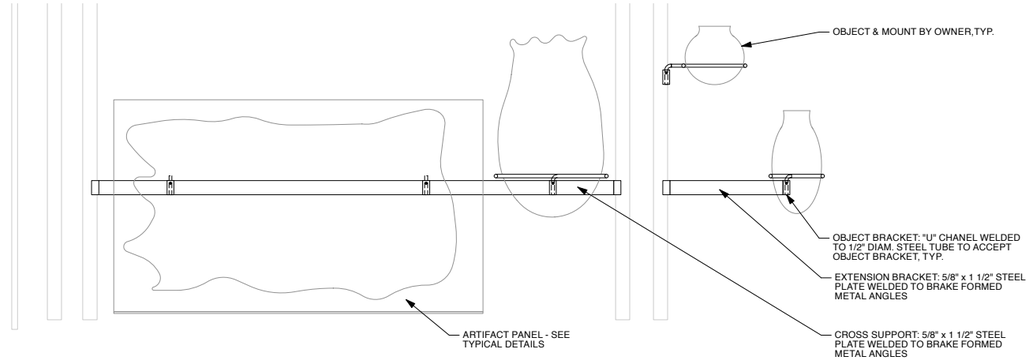
Sheet Title
Typical Details
Exh.Case System -Partitions & Lifts

Date
April 2, 2009

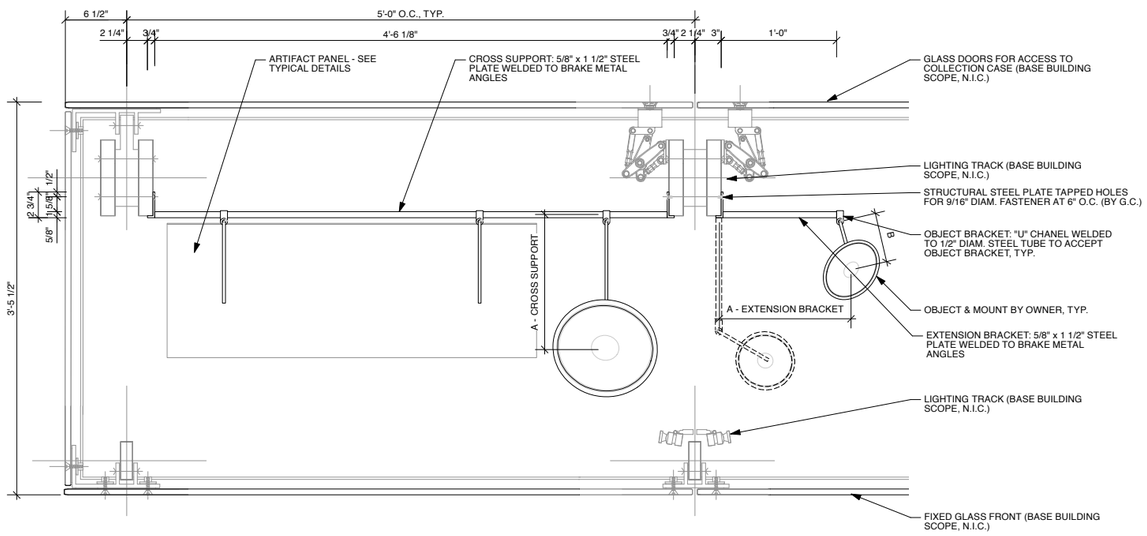
Scale*
3"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X-TYP-1.41

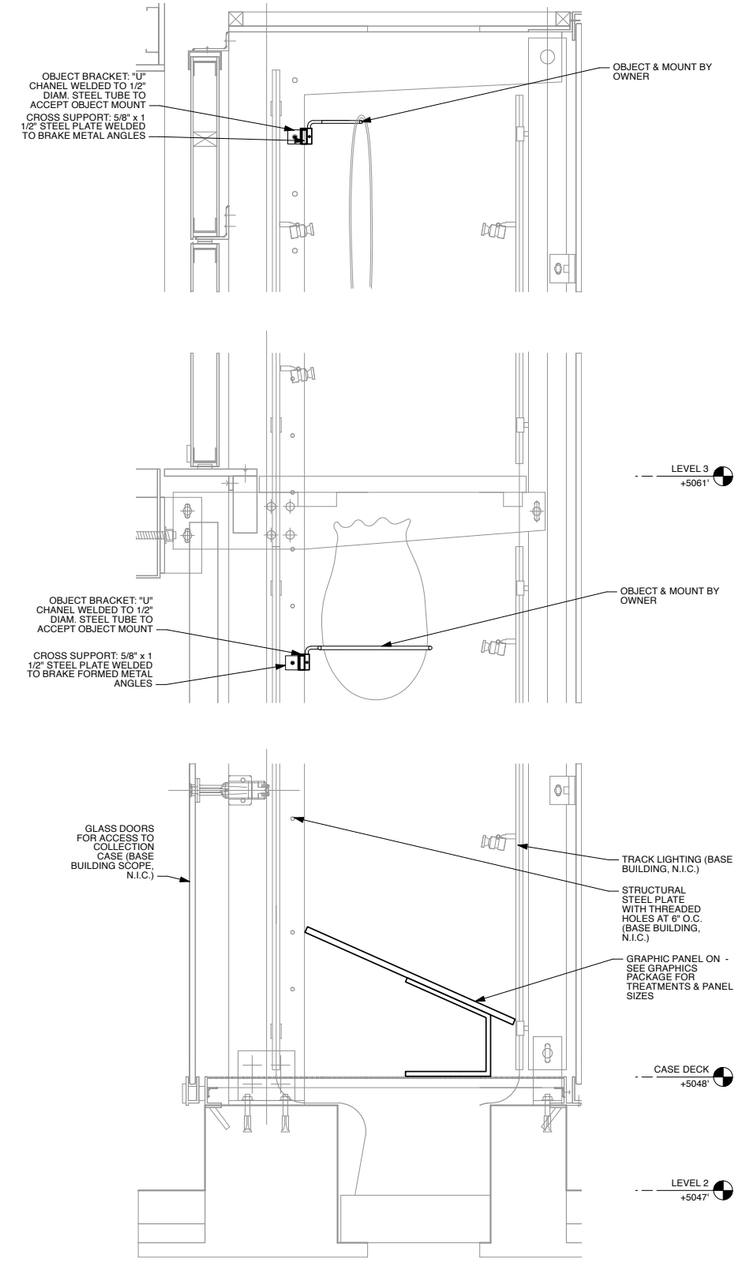
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



2 COLLECTION WALL ARTIFACT BRACKET ELEVATION



1 COLLECTION WALL PLAN DETAIL



3 COLLECTION WALL SECTION

GENERAL NOTES:

1. BASE BUILDING COLLECTION CASE BY G.C. (N.I.C) SHOWN HERE FOR REFERENCE ONLY.
2. SEE GRAPHIC PANEL SCHEDULE
3. X.C. TO ALLOW FOR MOUNTING OF 120 OBJECTS (CASE LAYOUTS TBD).
4. PROVIDE 10% ADDITIONAL PARTS FOR ALL BRACKET & CROSS SUPPORT TYPES.
5. 50 LB. MAX. ARTIFACT WEIGHT PER BRACKET CONNECTION TO VERTICAL STRUCTURAL STEEL PLATE
6. SEE BRACKET LOADING SCHEDULE FOR MAX. CANTILEVER DIMENSIONS & ARTIFACT OBJECT WEIGHTS BASED ON MEMBER SIZES.

COLLECTION WALL CROSS SUPPORT

Mount Rod (Dia in Inches)	Collar Bracket Sleeve (Outer Dia In Inches)	Cross Support Plate + Bracket Plate (Thickness In Inches)	Object Weight in Pounds and Max Number of Object Mounts or Panels per Cross Bracket (Indicated in [ ])			
			Cantilever to Object Centroid A (Inches)			
			5"	9"	12"	18"
1/2	1	5/8 x 11/2 + 1/4	50[2]	50[2]	50[2]	50[2]
1/2	3/4	5/8 x 11/2 + 1/4	50[2]	24[2]	24[2]	12[2]
3/8	5/8	5/8 x 11/2 + 1/4	24[2]	12[2]	9[3]	6[3]

COLLECTION WALL EXTENSION BRACKET

Mount Rod (Dia in Inches)	Collar Bracket Sleeve (Outer Dia In Inches)	Extension Bracket Plate (Thickness In Inches)	Cantilever to Object Centroid (Inches)			
				B		
			Max A	2"	5"	9"
1/2	3/4	5/8 x 11/2 + 1/4	24"	50	50	24
1/2	3/4	5/8 x 11/2 + 1/4	24"	50	50	24
3/8	5/8	5/8 x 11/2 + 1/4	24"	24	24	12

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Lighting
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Audio Visual
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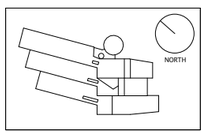

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April 2, 2009

Scale*
1 1/2"=1'-0" U.O.N.

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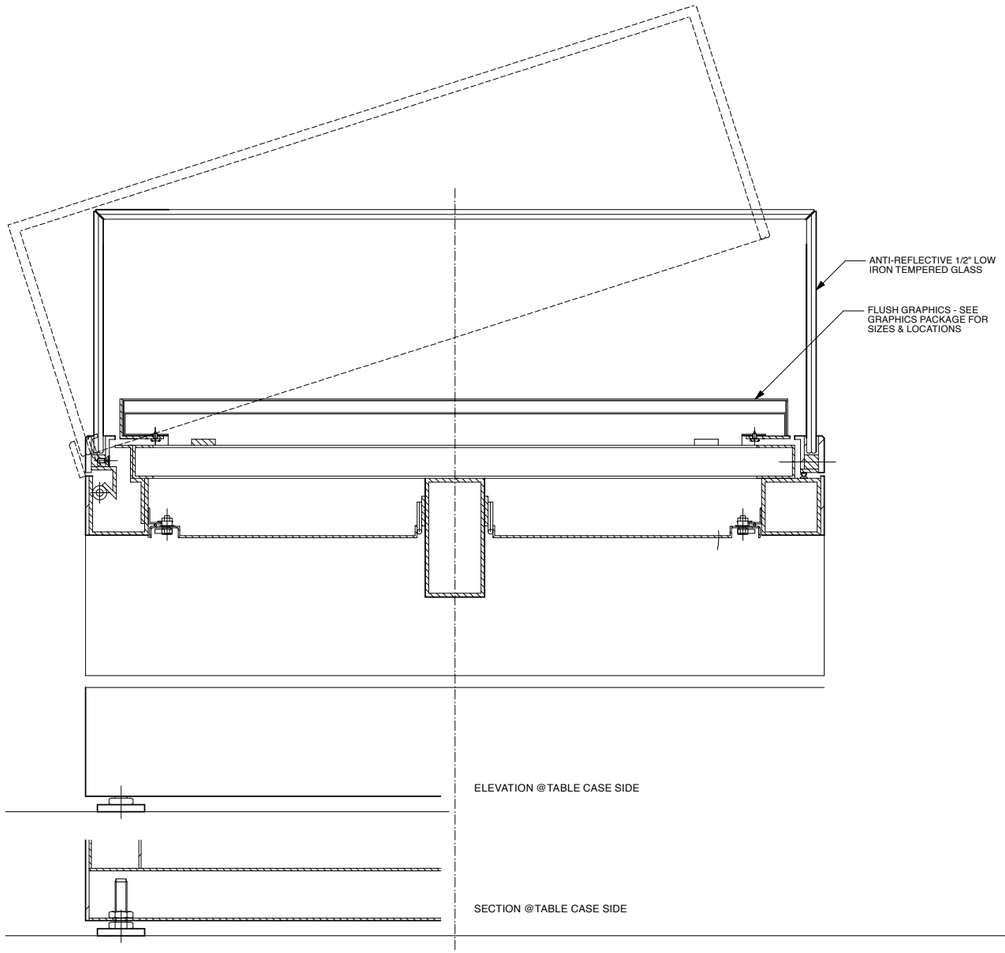
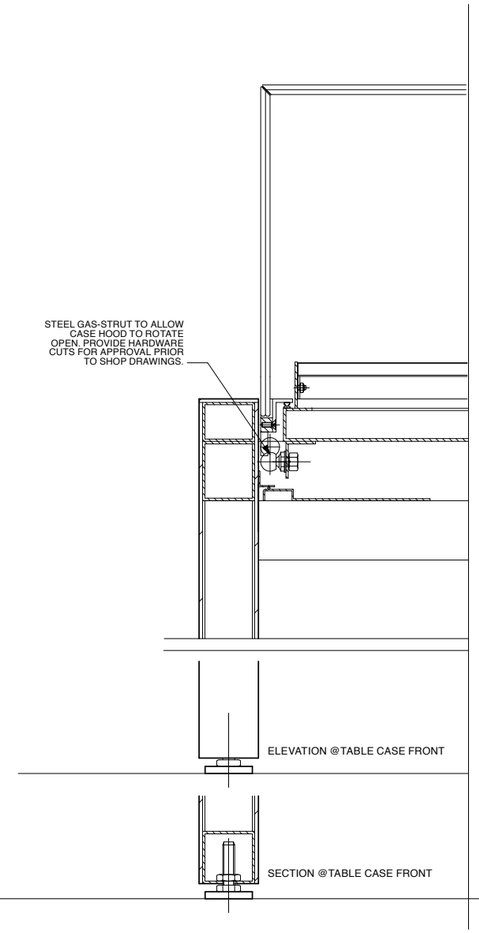
DFCM Project No. 02243750
Sheet No.
X-TYP-1.50

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



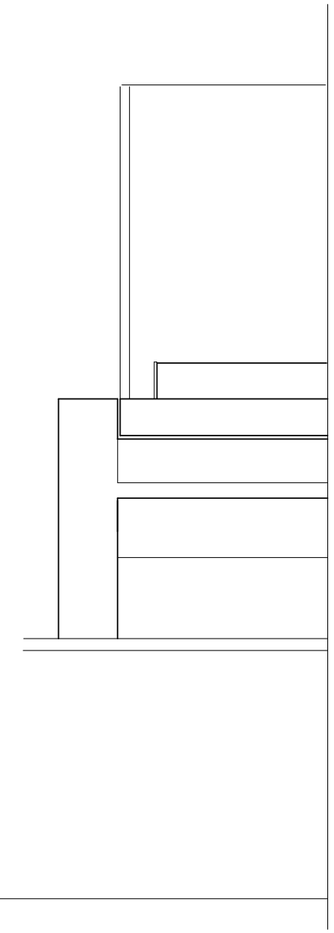
1 TABLE CASE CROSS SECTION DETAIL

SCALE: 1 1/2"= 1'-0"



2 TABLE CASE LONG. SECTION DTL.

SCALE: 1 1/2"= 1'-0"



3 TABLE CASE FRONT ELEVATION DTL.

SCALE: 1 1/2"= 1'-0"

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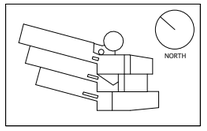

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Typical Details
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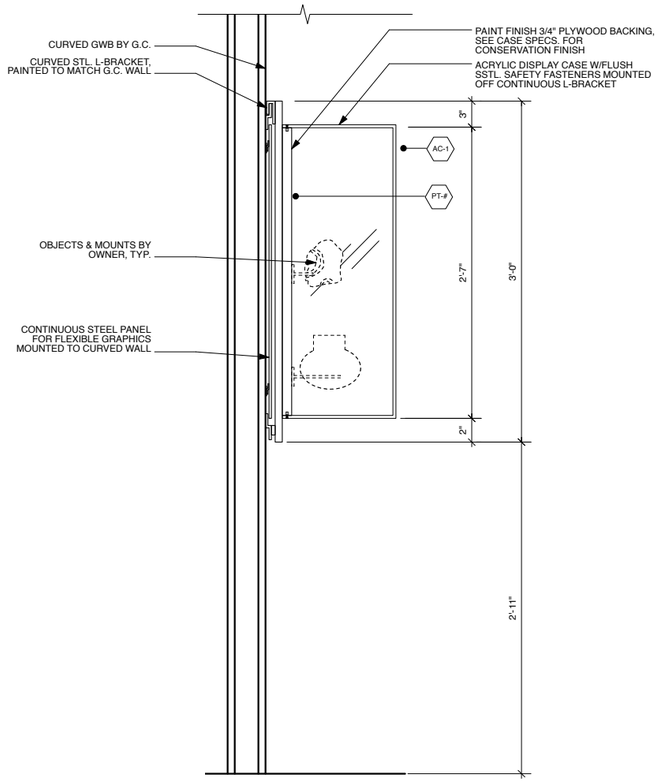
1 1/2"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

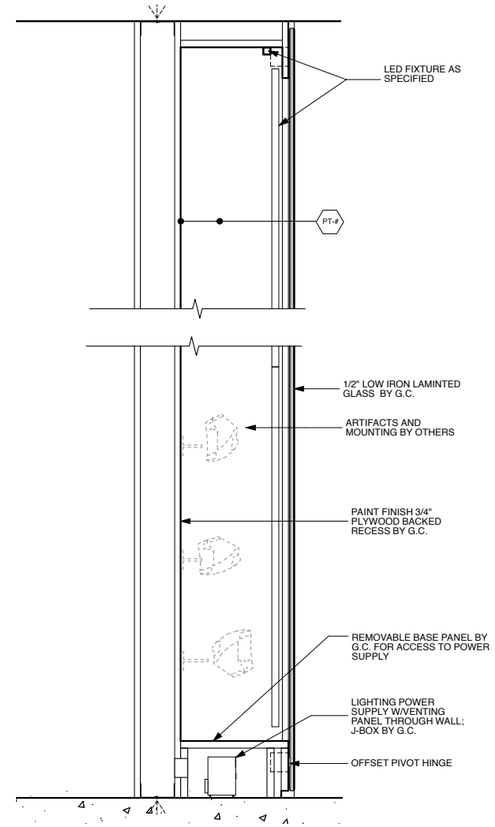
X-TYP-1.60

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 SECTION: HANGING CASE @ UTAH FUTURES

SCALE: 1-1/2"= 1'-0"



3 SECTION: INSET CASE @ MINERAL HALL (NORTH)

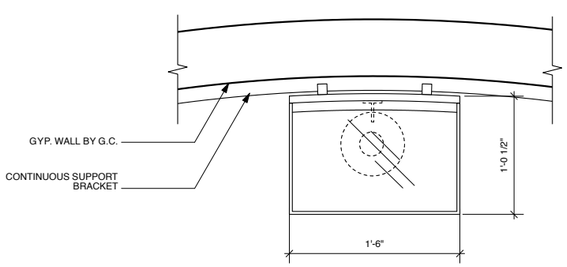
SCALE: 1-1/2"= 1'-0"

NOTES:

1. ACRYLIC TO BE 1/4" CLEAR SCRATCH RESISTANT U.O.N.; CORNER SEAMS TO BE P30 BONDED
2. GLASS TO BE 1/2" LOW IRON TEMPERED U.O.N.
3. PROVIDE SHOP DRAWINGS FOR COORDINATION OF ALL INSET CASE LIGHTING
4. INSET CASE PROTOTYPE TO DISPLAY COORDINATION BETWEEN LIGHTING & GRAPHICS - SEE SPECIFICATIONS
5. ALL EXPOSED FASTENERS TO BE SSTL
6. OBJECT MOUNTS & LIFTS BY OWNER
7. SEE 6.00 SERIES DRAWINGS FOR INSET /RAIL OBJECT LAYOUTS FOR COORDINATION WITH LIGHTING & GRAPHICS

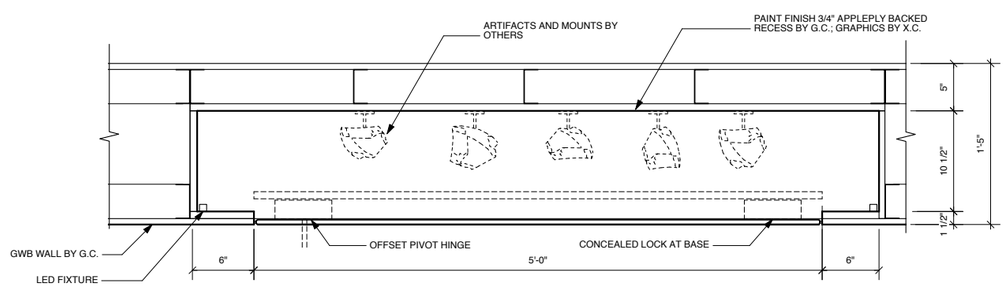
ACRYLIC CASE SCHEDULE

Bldg. Level	Observatory	Exhibit Area	Case Code	L	H	D	Lift Quantity	Notes
L2	Mineral Hall	Utah's Minerals	MH1.E01.ic01	5'-0"	9'-9"	10"	1	
		Colors	MH1.E01.ic04	5'-0"	9'-9"	10"	1	
		Crystals Large and Small	MH1.E01.ic02	5'-0"	6'-0"	1'-0"	1	
		Gemstones	MH1.E01.ic03	7'-8"	1'-10"	1'-0"	11	
		Fil/Acic/Radiating	MH1.E01.ic05	2'-8"	2'-2"	1'-4"	1	
		Twin/Retic/Rosettes	MH1.E01.ic06	3'-11"	2'-6"	1'-0"	1	
		Phan/Include/Zon	MH1.E01.ic07	4'-2"	1'-6"	1'-0"	1	
		Pseudomorph	MH1.E01.ic08	3'-0"	1'-2"	1'-0"	1	
		Bot/Mam/Stal/Dend	MH1.E01.ic09	5'-6"	1'-2"	1'-0"	1	
		Shapes and Habits	MH1.E01.ic10	3'-3"	1'-6"	1'-0"	1	
		Fluor- short wave	MH1.E01.ic11	2'-3"	10"	1'-0"	1	
		Fluor- long wave	MH1.E01.ic12	2'-3"	10"	1'-0"	1	
	Utah Futures	Sustainability - Science	UF3.E01.ic 01	1'-6"	2'-7"	1'-0"	1	
		Sustainability - Economics	UF3.E01.ic 02	1'-6"	2'-7"	1'-0"	1	
		Sustainability - Community	UF3.E01.ic 03	1'-6"	2'-7"	1'-0"	1	
L3	Lake	People and the Lake	LK2.E05.ic01	5'-4"	1'-4"	1'-3"	1	
		People and the Lake	LK2.E05.ic02	7'-3"	1'-4"	1'-3"	1	
	First Peoples	Danger Cave Intro	FP1.E01.ic01	2'-4"	1'-6"	1'-0"	1	objects placed in sand on lift
		Dry Caves - Cowboy	FP3.E01.ic01	1'-6"	1'-0"	10"	1	
		Dry Caves - Danger	FP3.E01.ic02	1'-0"	8"	10"	1	
		Dry Caves - Promontory	FP3.E01.ic03	1'-8"	1'-3"	1'-3"	1	
		Dry Caves - Hogup	FP3.E01.ic04	1'-6"	9"	10"	1	
		Sudden Shelter	FP3.E02.ic01	1'-0"	5'-4"	5"	1	
		Promontory Moccs	FP3.E04.ic01	7'-10"	1'-6"	9"	1	
		Iconography/ Rock Art	FP8.E01.ic01	2'-4"	1'-6"	1'-0"	1	
	Land	Drive through Time	LD1.E01.ic01	1'-0"	3'-6"	10"		
		Index fossils	LD3.E02.ic01	1'-2"	4'-3"	1'-8"		
L5	Native Voices	Rabbit Robe	NV2.E01.ic01	2'-11"	3'-6"	2' 3"	1	
		Saddle blanket and saddle	NV2.E02.ic01	2'-11"	2'-8"	2' 3"	1	
		Paiute vest	NV2.E04.ic03	2'-11"	3'-6"	2' 3"	1	
		Contemp. folk art	NV2.E05.ic01	3'-4"	2'-8"	2' 3"	1	
		Basket	NV3.E01.ic04	2'-11"	3'-5"	2' 3"	1	
	Sky	Fulgurite	SK3.E01.ic01	1'-2"	1'-2"	1'-0"	1	
		Moon rock, asteroids	SK4.E01.ic01	3'-6"	2'-0"	1'-0"	1	
		sun and moon mask	SK4.E01.ic02	2'-0"	2'-0"	1'-0"	1	



2 PLAN: HANGING CASE @ UTAH FUTURES

SCALE: 1-1/2"= 1'-0"



4 PLAN: INSET CASE @ MINERAL HALL (NORTH)

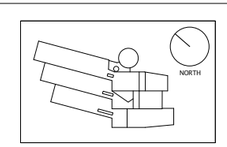
SCALE: 1-1/2"= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

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Sheet Title

Case Details
Acrylic Inset Cases

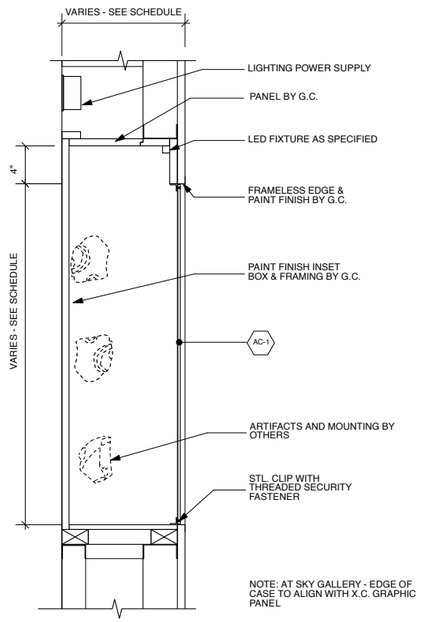
Date: April 2, 2009

Scale*: 1-1/2"=1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

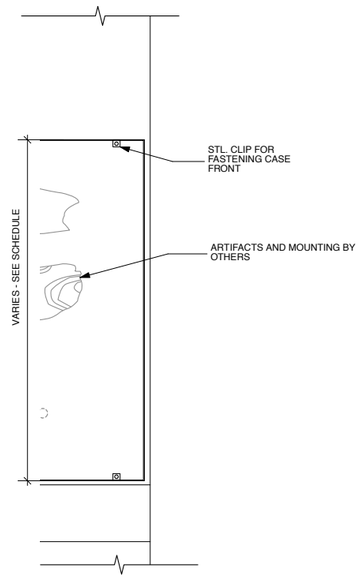
X-TYP-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



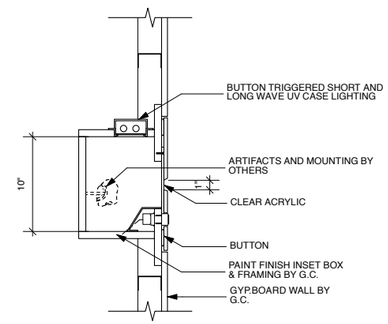
1 SECTION: INSET CASE @ MINERALS/LAKE/ FIRST PEOPLE/LAND/SKY

SCALE: 1-1/2"= 1'-0"



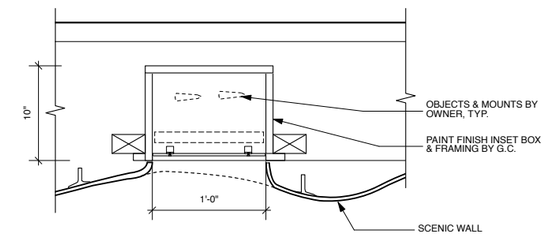
3 ELEVATION: TYP. INSET CASE

SCALE: 1-1/2"= 1'-0"



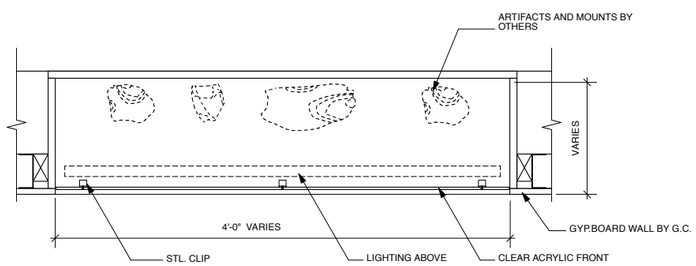
4 SECTION: INSET CASE @ MINERAL HALL INTERACTIVE

SCALE: 1-1/2"= 1'-0"



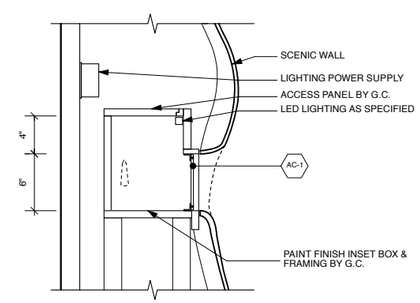
6 PLAN: INSET CASE @ DRY CAVE

SCALE: 1-1/2"= 1'-0"



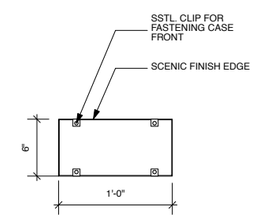
2 PLAN: INSET CASE @ MINERALS/ FIRST PEOPLE/SKY

SCALE: 1-1/2"= 1'-0"



5 SECTION: INSET CASE @ DRY CAVE

SCALE: 1-1/2"= 1'-0"



7 ELEVATION: INSET CASE @ DRY CAVE

SCALE: 1-1/2"= 1'-0"

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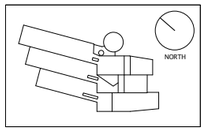

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1-1/2"=1'-0"

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U. of U. Project No. 0872-9630
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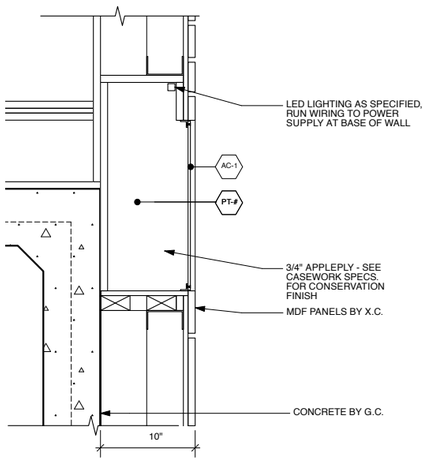
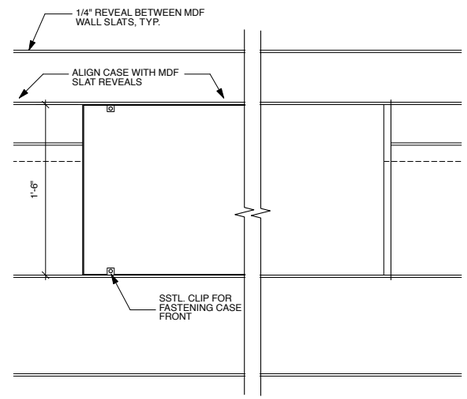
Sheet No.
X-TYP-2.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



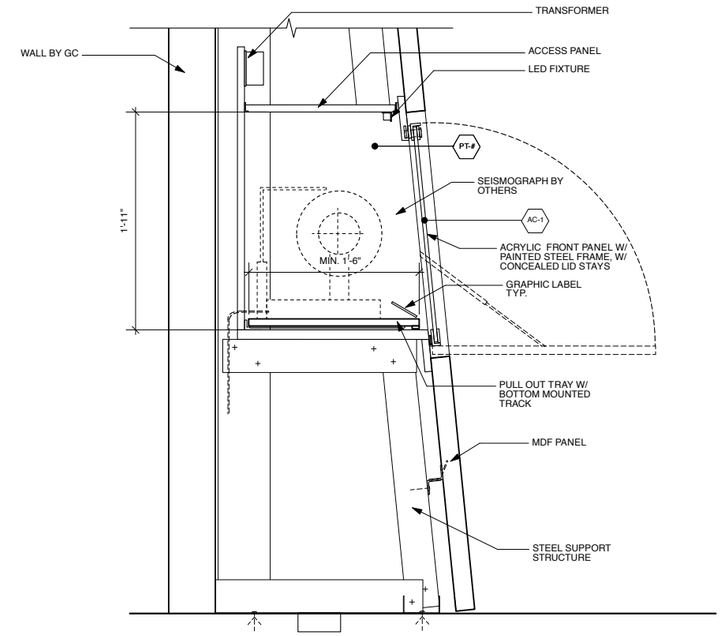
2 SECTION: INSET CASE @ FIRST PEOPLE

SCALE: 1-1/2"= 1'-0"



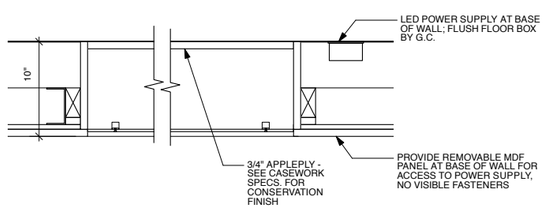
3 ELEVATION: INSET CASE @ FIRST PEOPLE

SCALE: 1-1/2"= 1'-0"



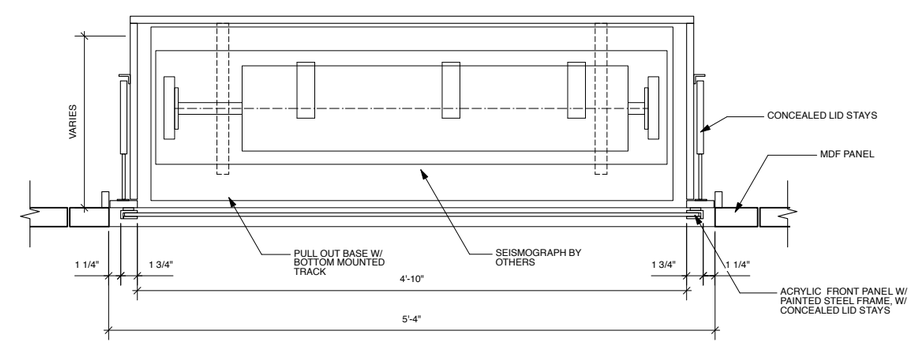
5 SECTION: INSET CASE @ LAND

SCALE: 1-1/2"= 1'-0"



1 PLAN: INSET CASE @ FIRST PEOPLE

SCALE: 1-1/2"= 1'-0"



4 PLAN: INSET CASE @ LAND

SCALE: 1-1/2"= 1'-0"

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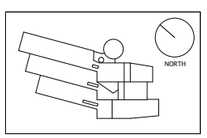

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100% Final Design April 2, 2009

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Sheet Title

Case Details
Acrylic Inset Cases

Date
April 2, 2009

Scale*
1-1/2"=1'-0"

RAA Project No. 0275
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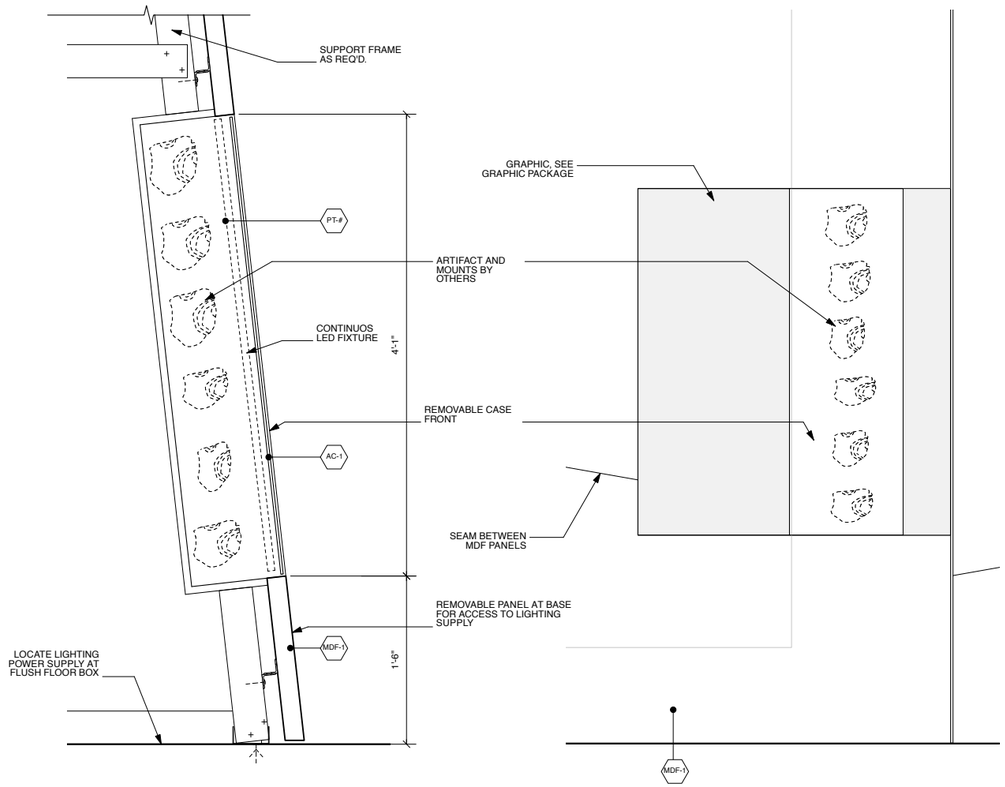
DFCM Project No. 02243750
Sheet No.

X-TYP-2.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

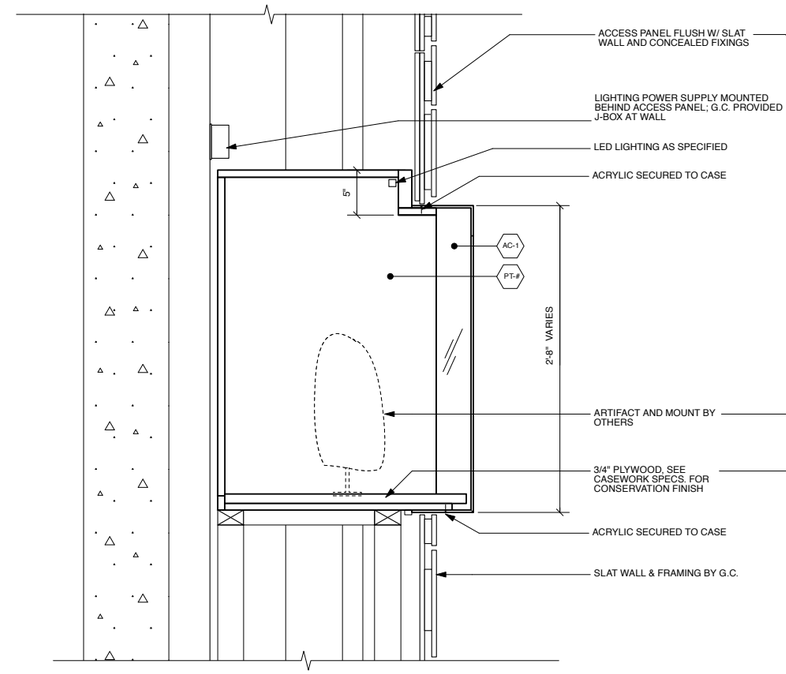


1 SECTION: INSET CASE @ LAND

SCALE: 1-1/2"= 1'-0"

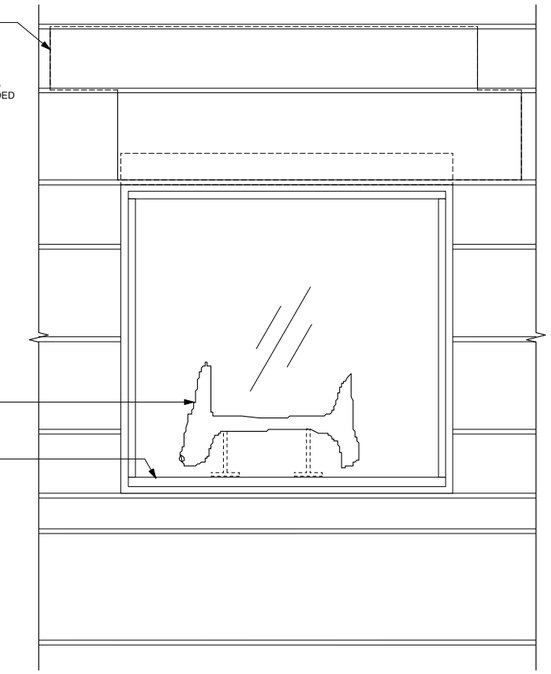
3 ELEVATION: INSET CASE @ LAND

SCALE: 1-1/2"= 1'-0"



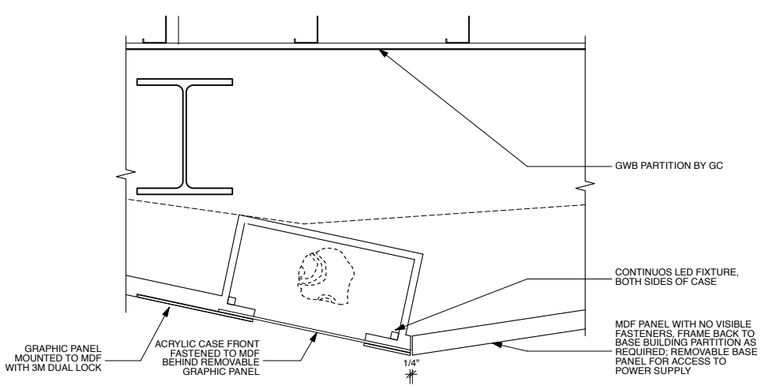
4 SECTION: INSET CASE @ NATIVE VOICES

SCALE: 1-1/2"= 1'-0"



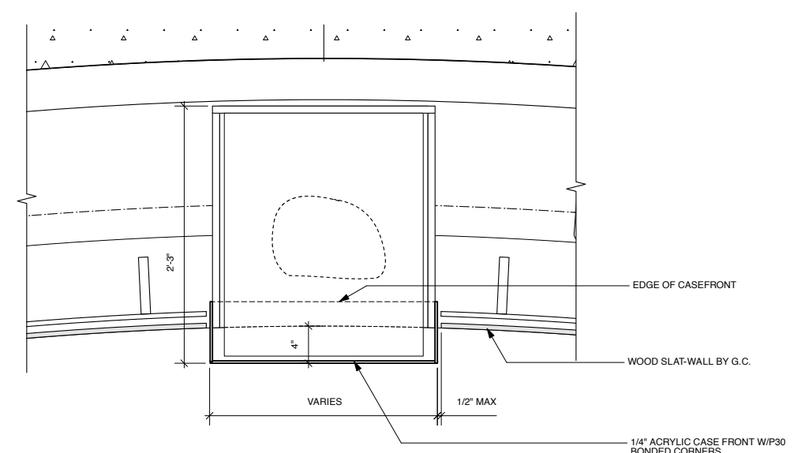
6 ELEVATION: INSET CASE @ NATIVE VOICES

SCALE: 1-1/2"= 1'-0"



2 PLAN: INSET CASE @ LAND

SCALE: 1-1/2"= 1'-0"



5 PLAN: INSET CASE @ NATIVE VOICES

SCALE: 1-1/2"= 1'-0"

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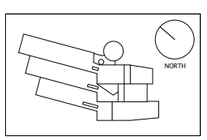

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100% Final Design April 2, 2009

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1-1/2"=1'-0"

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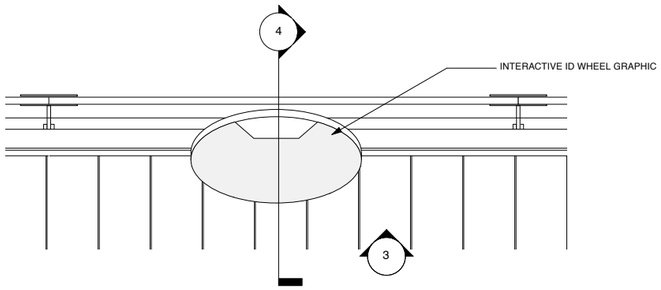
Sheet No.

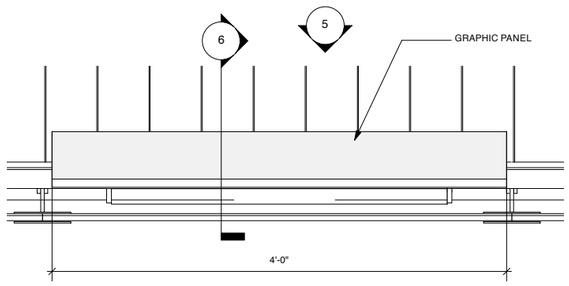
X-TYP-2.03

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



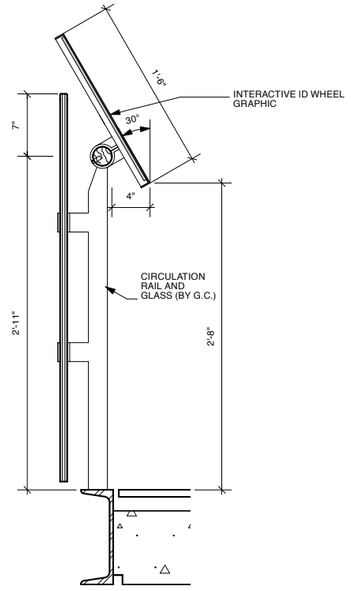
1 PLAN. BRIDGE ID GRAPHIC

SCALE: 1-1/2"= 1'-0"



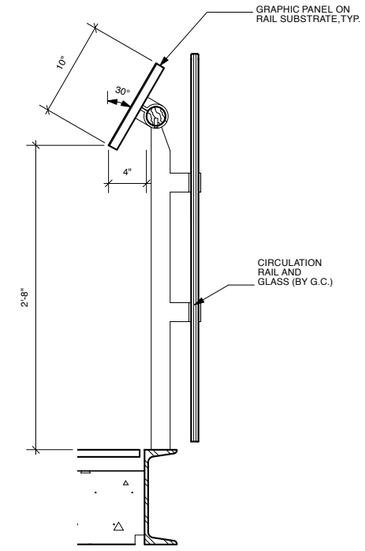
2 PLAN. BRIDGE GRAPHIC PANEL

SCALE: 1-1/2"= 1'-0"



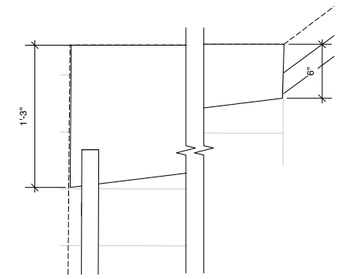
4 SECTION. BRIDGE ID GRAPHIC

SCALE: 1-1/2"= 1'-0"



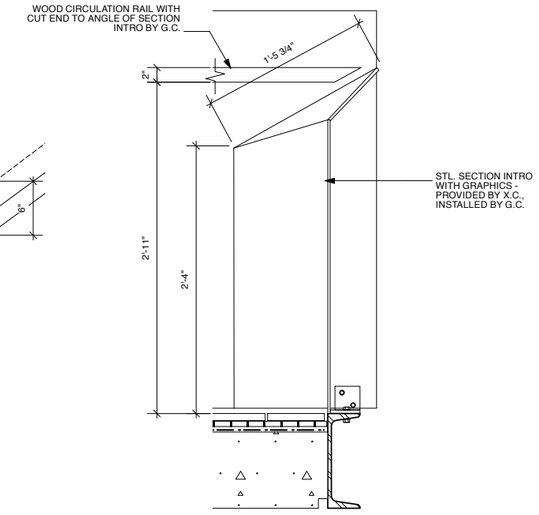
6 SECTION. BRIDGE GRAPHIC

SCALE: 1-1/2"= 1'-0"



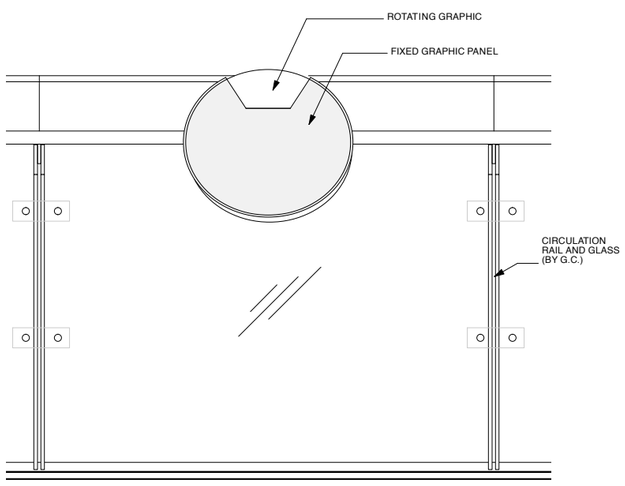
7 PLAN: BRIDGE SECTION INTRO

SCALE: 1-1/2"= 1'-0"



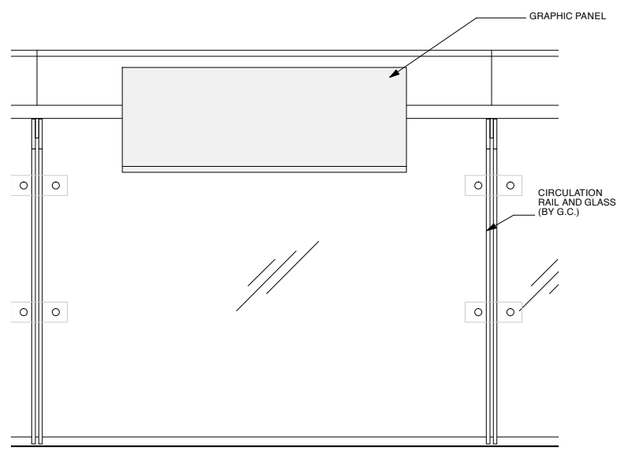
9 SECTION: BRIDGE SECTION INTRO

SCALE: 1-1/2"= 1'-0"



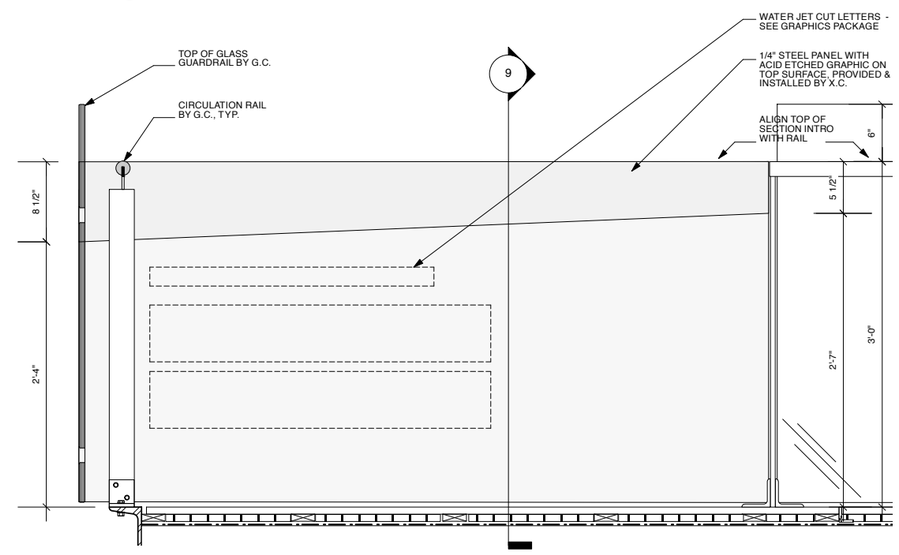
3 ELEVATION. BRIDGE ID GRAPHIC

SCALE: 1-1/2"= 1'-0"



5 ELEVATION. BRIDGE GRAPHIC PANEL

SCALE: 1-1/2"= 1'-0"



8 ELEVATION: BRIDGE SECTION INTRO

SCALE: 1-1/2"= 1'-0"

NOTE:

1. SEE GRAPHIC PANEL SCHEDULE FOR PANEL TREATMENTS AND SUBSTRATES
2. PROVIDE SHOP DWGS FOR COORDINATION OF ALL RAIL ELEMENTS WITH G.C.
3. X.C. TO FIELD SURVEY PRIOR TO SHOP DRAWINGS

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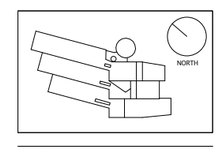
UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	**Exhibition Planner and Designer**
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Typical Details
Exhibit Rail System

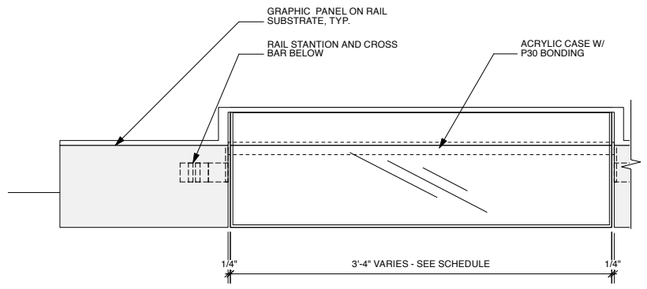
Date: April 2, 2009

Scale*: 1-1/2" =1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

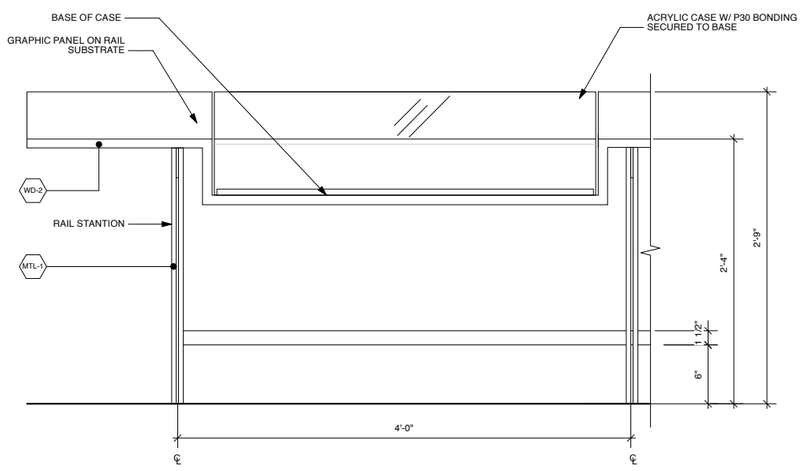
X-TYP-3.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 PLAN: TYP. RAIL CASE

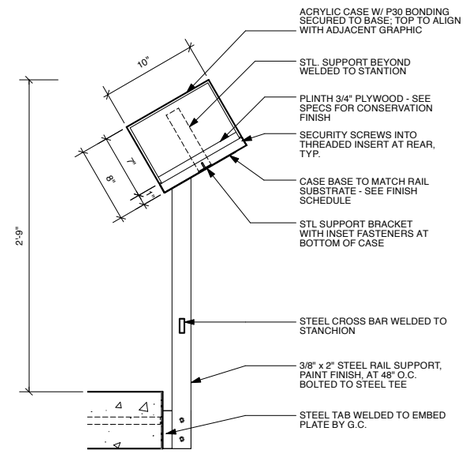
SCALE: 1-1/2"= 1'-0"



2 ELEVATION: TYP. RAIL CASE

SCALE: 1-1/2"= 1'-0"

NOTE: SEE RAIL CASE LAYOUTS (6.00 SERIES) FOR TYPICAL RAIL DETAIL VARIATIONS



3 SECTION: TYP. RAIL CASE

SCALE: 1-1/2"= 1'-0"

RAIL CASE SCHEDULE

Bldg. Level	Observatory	Exhibit Area	Case Code	L	H	D	Lift Quantity	Notes
L2	Past Worlds	Predator techniques	PW2.E02.rc01	3'-4"	12"	1'-3"	1	
		Hydrocarbons	PW3.E02.rc01	2'-8"	8"	10"	1	
		Plant eaters	PW4.E02.rc01	3'-4"	8"	1'-0"	1	
		Hypsilo/Pachy	PW4.E02.rc02	3'-4"	8"	1'-0"	1	
		Eggshells and teeth	PW4.E03.rc01	3'-4"	8"	10"	1	
		Leaves and Non-dinos	PW4.E03.rc02	3'-4"	8"	10"	1	
		Stream dwellers	PW4.E03.rc03	3'-4"	8"	10"	1	
		Allosaurus foot	PW5.E02.rc01	2'-1"	1'-3"	1'-0"	1	
	Lake	Salt crystal	LK2.E03.rc01	3'-4"	12"	1'-3"	1	
L3	First Peoples	Median Village	FP2.E01.rc01	3'-4"	8"	10"	1	
		Architecture	FP2.E01.rc02	3'-4"	8"	10"	1	
	Land	Human Interactions - Mining	LD4.E04.rc01	2'-1/2"	1'-0"	10"		
		Human Interactions - Grazing	LD4.E02.rc02	2'-1/2"	1'-0"	10"		
		Human Interactions - Dev.	LD4.E04.rc03	2'-1/2"	1'-0"	10"		
		Utah's Cambrian	LD4.E07.rc01	5'-10"	9"	2'-8"	1	
		Homestead Cave	LD4.E10.rc01	2'-2"	1'-4"	1'-1"	1	
			LD4.E10.rc02	2'-2"	1' 4"	1'-1"	1	
			LD4.E10.rc03	3'-2 1/2"	1'-2 1/2"	1'-2"		
			LD4.E10.rc04	4" diam.	4"			
			LD4.E10.rc05	4" diam.	4"			
			LD4.E10.rc06	4" diam.	4"			
			LD4.E10.rc07	4" diam.	4"			
L4	Life	Lupine/ Pine cones	LF4.E01.rc01	11" diam.	2 1/2"			
		Reproduction and Dev.- Eggs	LF4.E02.rc01	5" diam.	11"			
			LF4.E02.rc02	5" diam.	11"			
			LF4.E02.rc03	5" diam.	11"			
			LF4.E02.rc04	5" diam.	11"			
			LF4.E02.rc05	5" diam.	11"			
		Populations - Flickers	LF5.E02.rc01	5" diam.	11"			
		Populations - Pines	LF5.E02.rc02	5" diam.	11"			
		Populations - Mammals	LF5.E02.rc03	5" diam.	11"			
		Populations - Insects	LF5.E02.rc04	5" diam.	11"			

NOTE:

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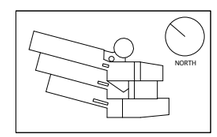


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Typical Details
Exhibit Rail System

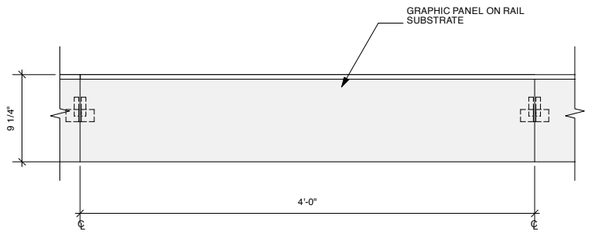
Date: April 2, 2009

Scale*: 1-1/2" =1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

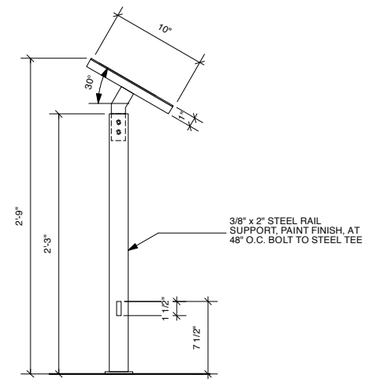
X-TYP-3.10

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



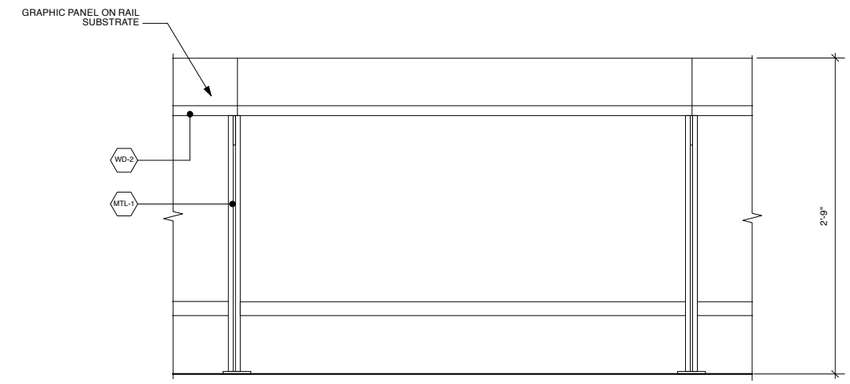
1 PLAN: TYP. GRAPHIC RAIL

SCALE: 1-1/2"= 1'-0"



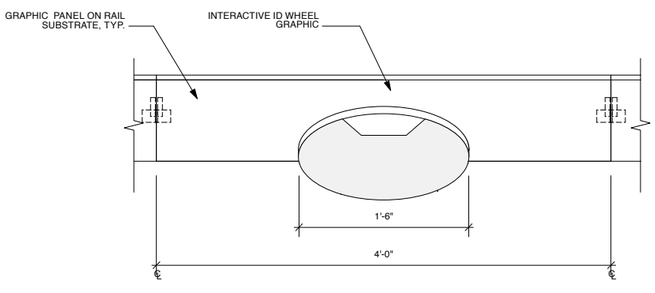
2 SECTION: TYP. GRAPHIC RAIL

SCALE: 1-1/2"= 1'-0"



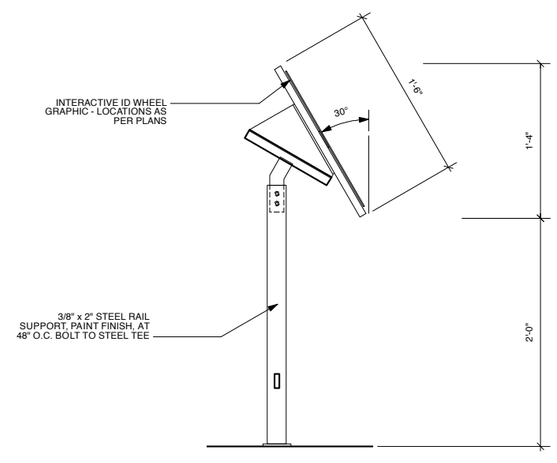
3 ELEVATION: TYP. GRAPHIC RAIL

SCALE: 1-1/2"= 1'-0"



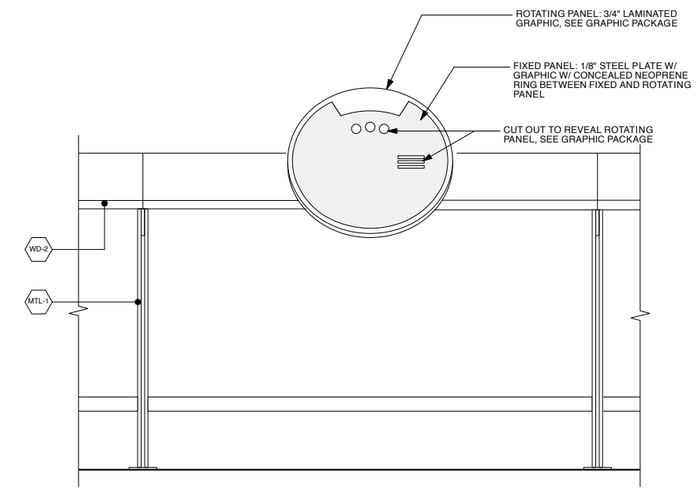
4 PLAN: TYP. RAIL ID LABEL

SCALE: 1-1/2"= 1'-0"



5 SECTION: TYP. RAIL ID LABEL

SCALE: 1-1/2"= 1'-0"



6 ELEVATION: TYP. RAIL ID LABEL

SCALE: 1-1/2"= 1'-0"

NOTE:

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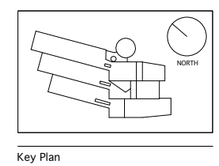


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Typical Details
Exhibit Rail System

Date: April 2, 2009

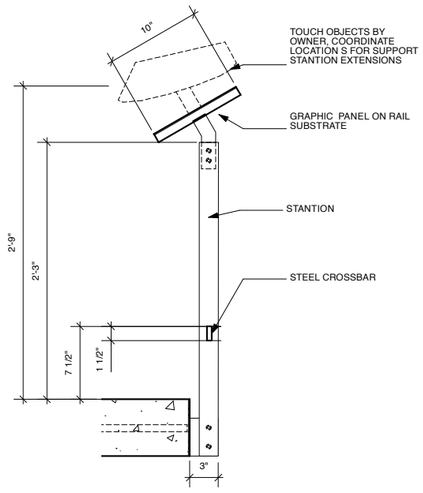
Scale*: 1-1/2" =1'-0"

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750

Sheet No.

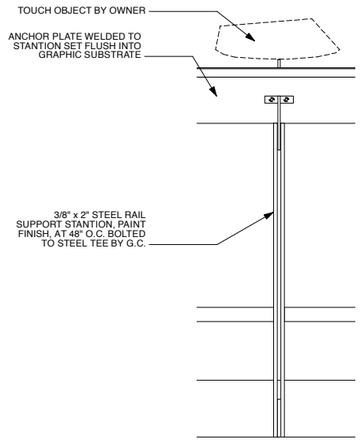
X-TYP-3.20

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



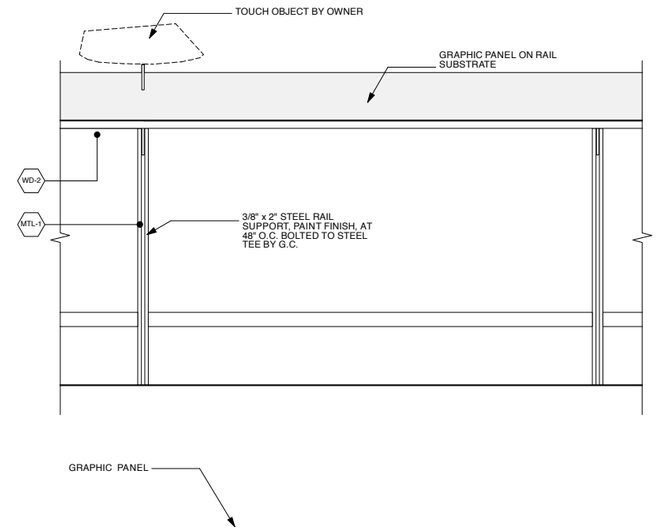
1 SECTION: TYP. TOUCH OBJECT RAIL

SCALE: 1-1/2"= 1'-0"



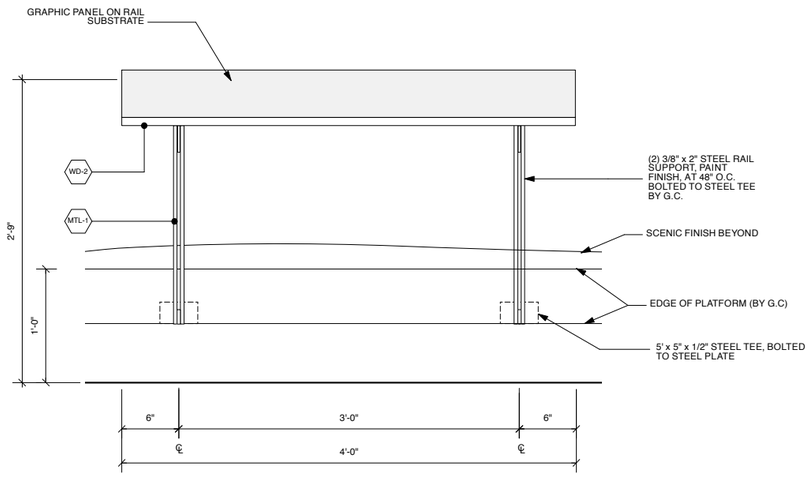
2 ELEVATION @ EDGE OF SLAB: TYP. TOUCH OBJECT RAIL

SCALE: 1-1/2"= 1'-0"



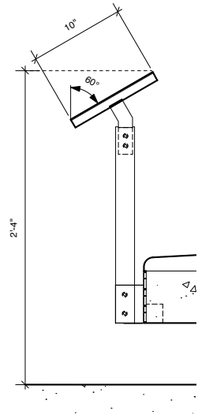
3 ELEVATION: TYP. TOUCH OBJECT RAIL

SCALE: 1-1/2"= 1'-0"



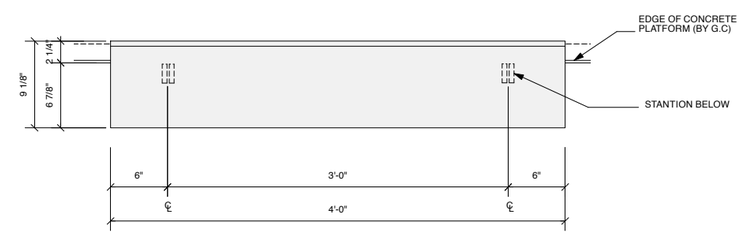
4 ELEVATION: TYP. PLATFORM EDGE RAIL

SCALE: 1-1/2"= 1'-0"



5 SECTION: TYP. PLATFORM EDGE RAIL

SCALE: 1-1/2"= 1'-0"



6 PLAN: TYP. PLATFORM EDGE RAIL

SCALE: 1-1/2"= 1'-0"

NOTE:

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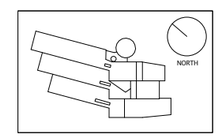

Key Plan

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100% Final Design April 2, 2009

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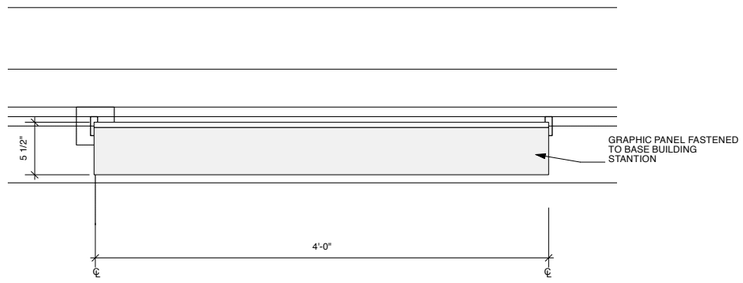
Sheet Title
Typical Details
Exhibit Rail System

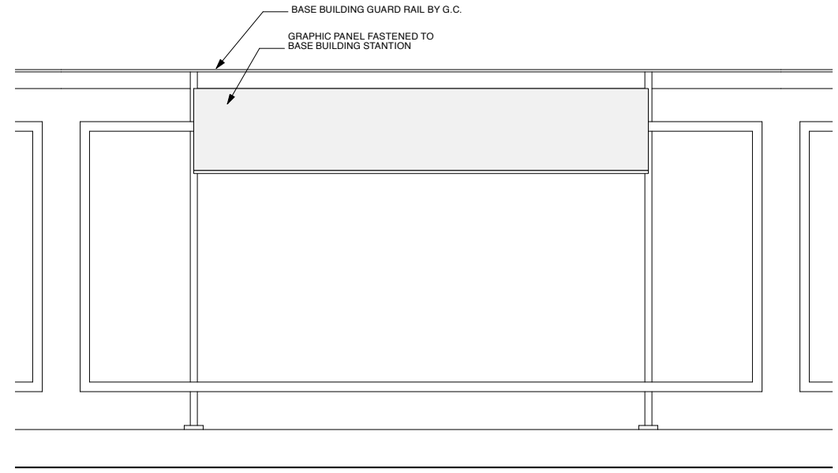
Date	RAA Project No. 0275
April 2, 2009	U. of U. Project No. 0872-9630 DFCM Project No. 02243750 Sheet No.
Scale*	
1-1/2" =1'-0"	X-TYP-3.30

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



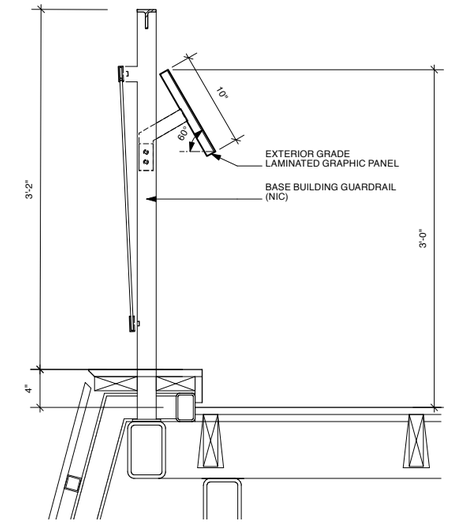
4 PLAN: ROOF RAIL GRAPHIC

SCALE: 1-1/2"= 1'-0"



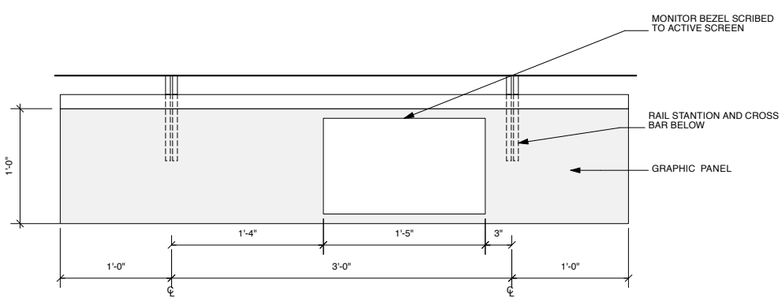
5 ELEVATION: ROOF RAIL GRAPHIC

SCALE: 1-1/2"= 1'-0"



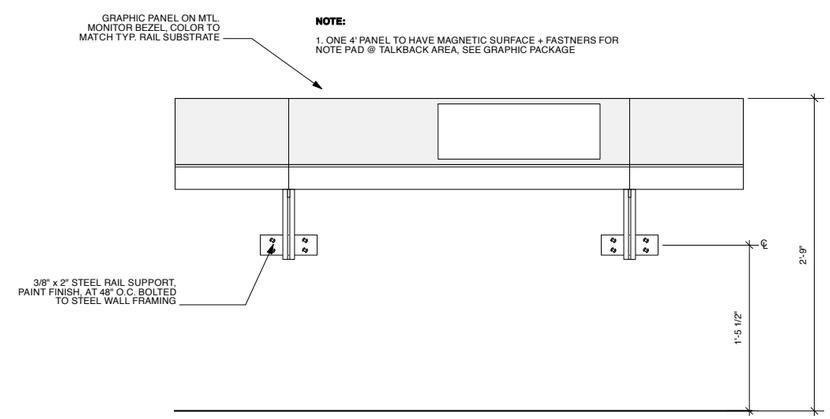
6 SECTION: ROOF RAIL GRAPHIC

SCALE: 1-1/2"= 1'-0"



1 PLAN: AV RAIL

SCALE: 1-1/2"= 1'-0"

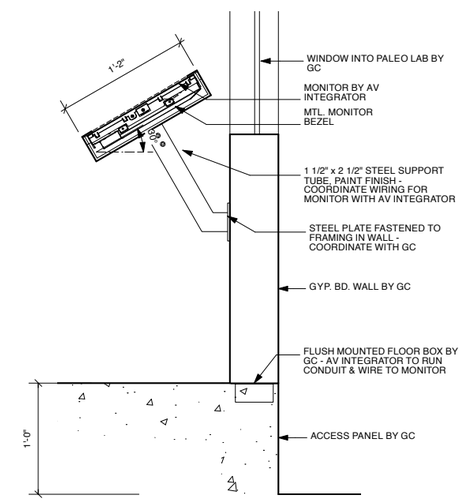


NOTE:

1. ONE 4' PANEL TO HAVE MAGNETIC SURFACE + FASTNERS FOR NOTE PAD @ TALKBACK AREA, SEE GRAPHIC PACKAGE

2 ELEVATION: PALEO PREP LAB AV RAIL

SCALE: 1-1/2"= 1'-0"



3 SECTION: PALEO PREP LAB AV RAIL

SCALE: 1-1/2"= 1'-0"

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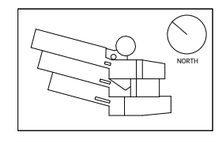
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415 685 9555 tel.	**Ralph Appelbaum Associates** **88 Pine Street** **New York, New York 10005** **212.334.8200 tel.**



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Typical Details
Exhibit Rail System

Date
April 2, 2009

Scale*
1-1/2" =1'-0"

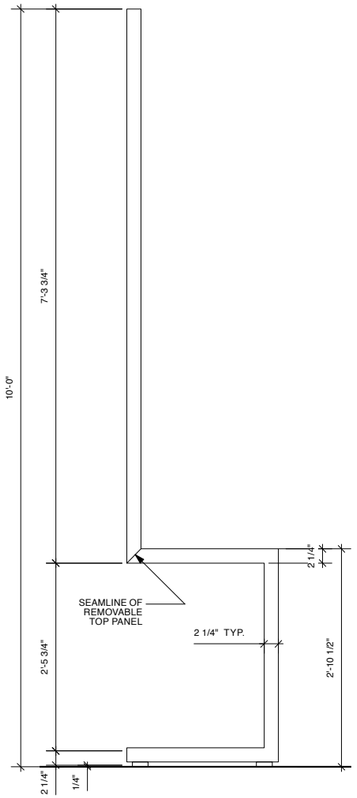
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X-TYP-3.40

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

NOTE:

1. QUANTITIES FOR "NHN" FLEXIBLE EXHIBITS SHOW ON X-TYP-4.00 - 4.03 AS SPECIFIED BELOW
2. X.C. TO PROVIDE STRUCTURAL REVIEW FOR INTRO PANEL W/ SHOP DRAWING SUBMITTAL

ITEM	QUANTITY
INTRO	3
SMALL GRAPHIC UNIT	1
LARGE GRAPHIC UNIT	1
TOUCH OBJECT UNIT	1
SMALL CASE UNIT	2
LARGE CASE UNIT	1
AV UNIT	3



1 **INTRO**
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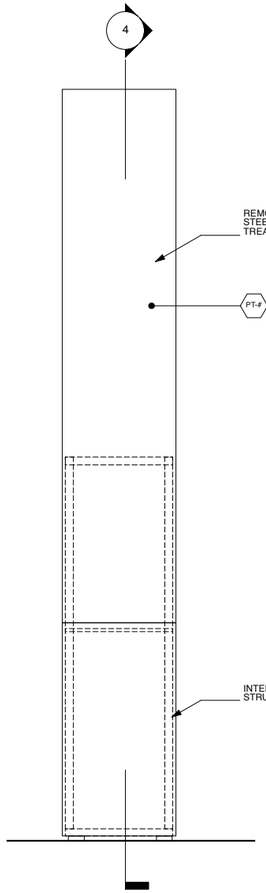
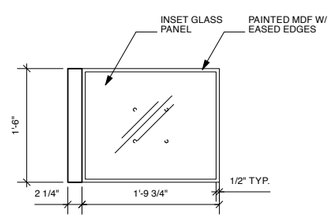
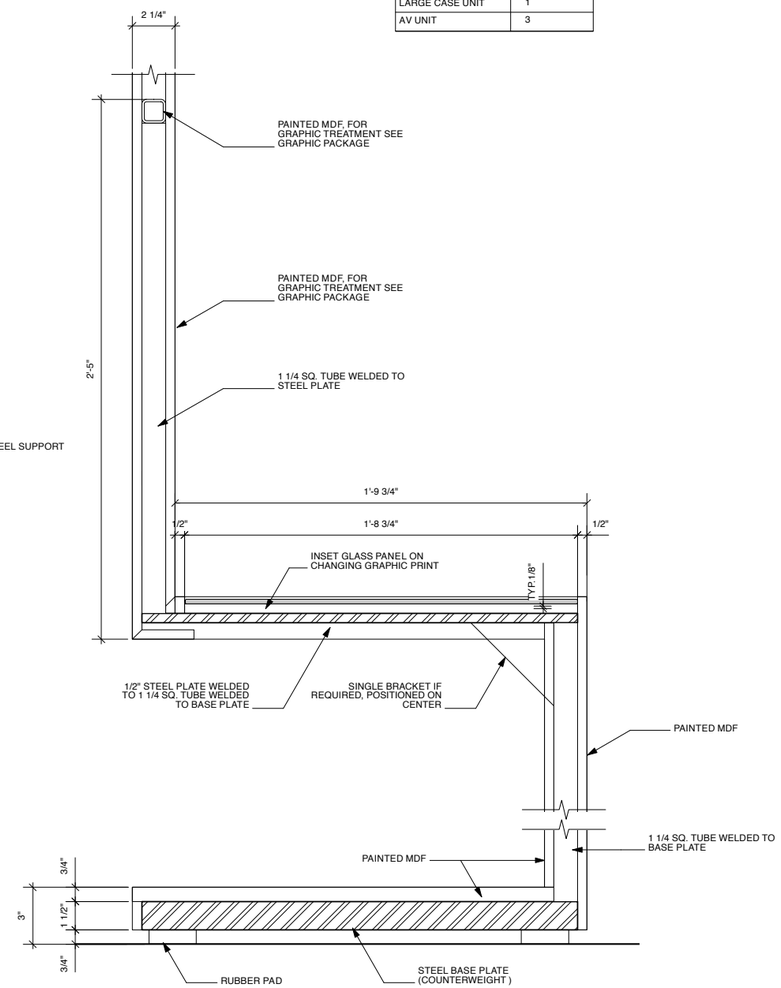


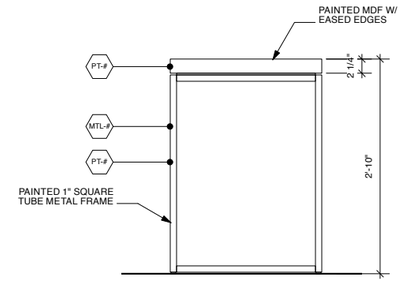
2 **SIDE ELEVATION**
SCALE: 1"= 1'-0"



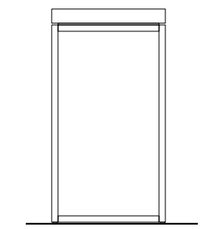
3 **PLAN**
SCALE: 1"= 1'-0"



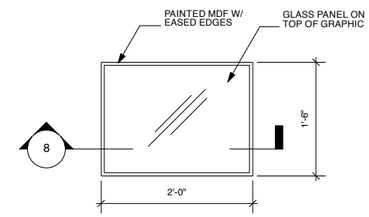
4 **DETAIL SECTION**
SCALE: 3"= 1'-0"



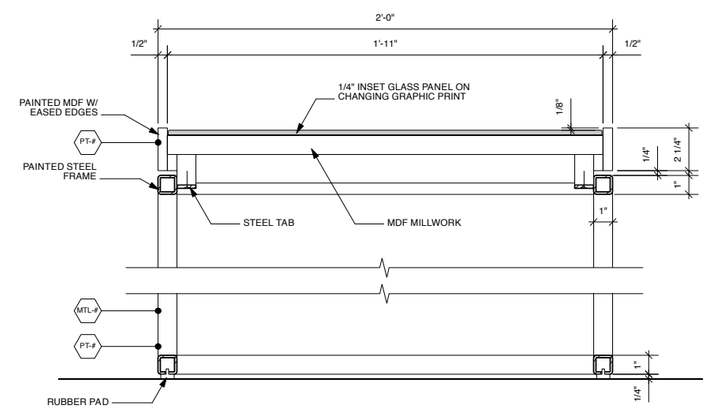
5 **SMALL GRAPHIC UNIT**
SCALE: 1"= 1'-0"



7 **SIDE ELEVATION**
SCALE: 1"= 1'-0"



6 **PLAN**
SCALE: 1"= 1'-0"



8 **DETAIL SECTION**
SCALE: 3"= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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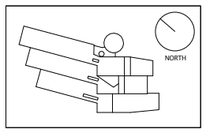


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009
No. / Issue Name / Date

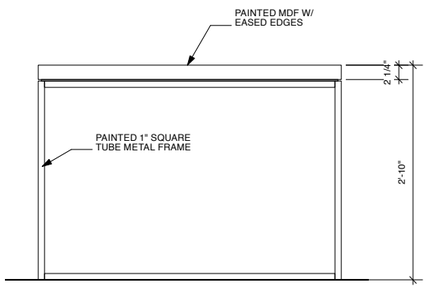
Sheet Title
Typical Details
Nat. Hist. Now Display: Intro/Graphic

Date
April 2, 2009

Scale*
As Noted

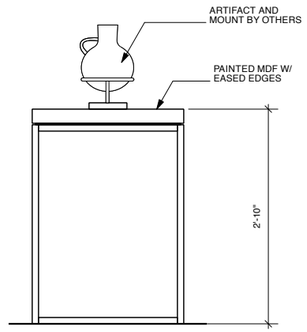
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X-TYP-4.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 LARGE GRAPHIC UNIT

SCALE: 1"= 1'-0"



3 TOUCH OBJECT UNIT

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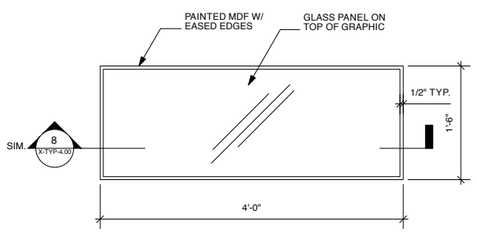

2 PLAN

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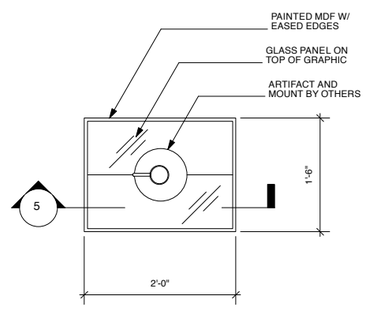
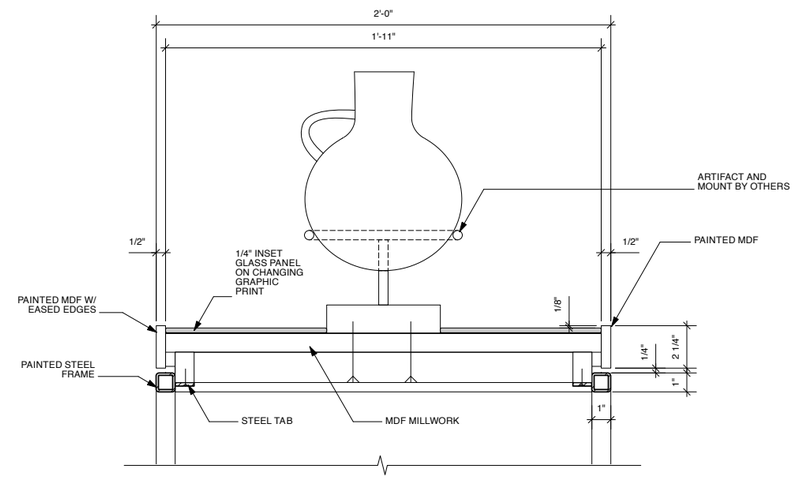


4 PLAN

SCALE: 1"= 1'-0"



5 DETAIL SECTION

SCALE: 3"= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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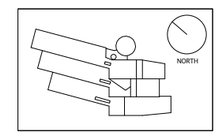


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

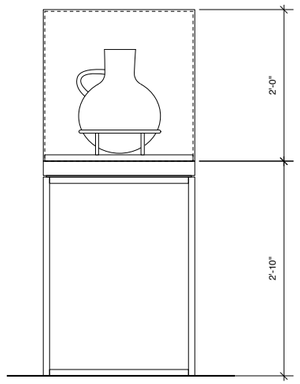
Sheet Title
Typical Details
Nat. Hist. Now Display: Open Display

Date
April 2, 2009

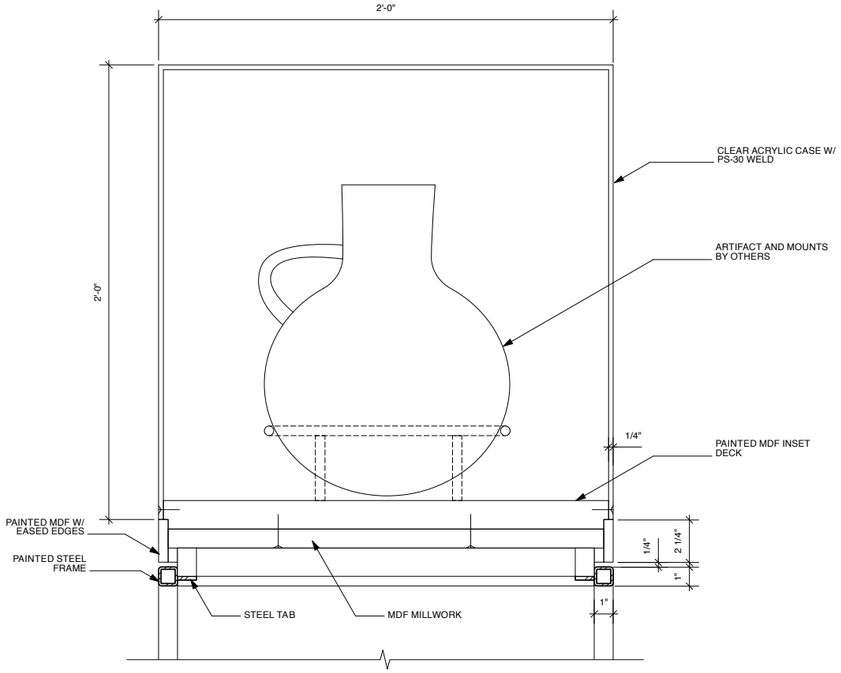
Scale*
As Noted

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X-TYP-4.01

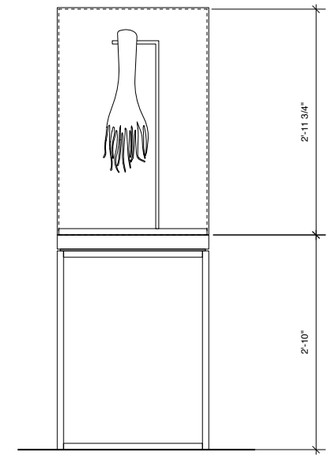
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 **SMALL CASE UNIT**
SCALE: 1"= 1'-0"



3 **DETAIL SECTION**
SCALE: 3"= 1'-0"



4 **LARGE CASE UNIT**
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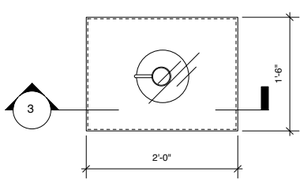
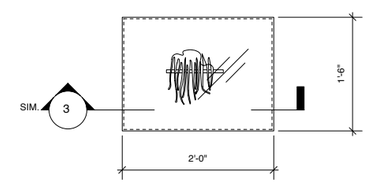


2 **PLAN**
SCALE: 1"= 1'-0"



5 **PLAN**
SCALE: 1"= 1'-0"

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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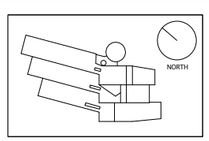


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

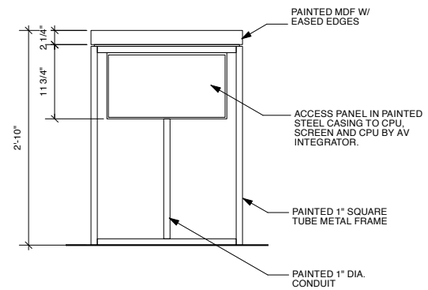
Sheet Title
Typical Details
Nat. Hist. Now Display: Cases

Date
April 2, 2009

Scale*
As Noted

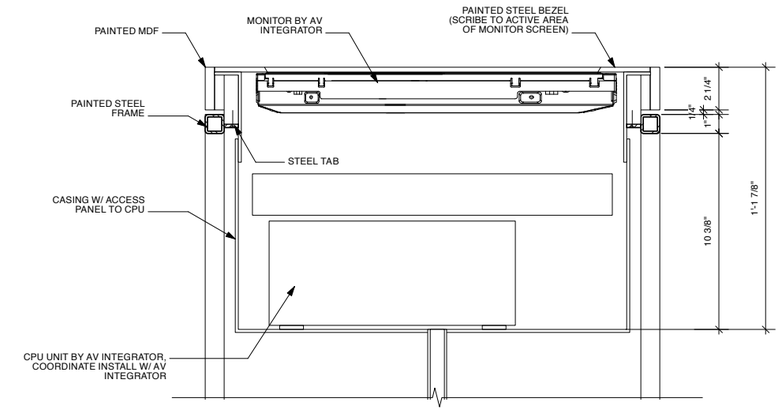
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X-TYP-4.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 AV UNIT

SCALE: 1"= 1'-0"



3 DETAIL SECTION

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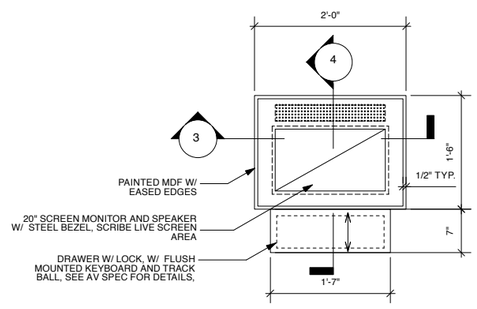

2 PLAN

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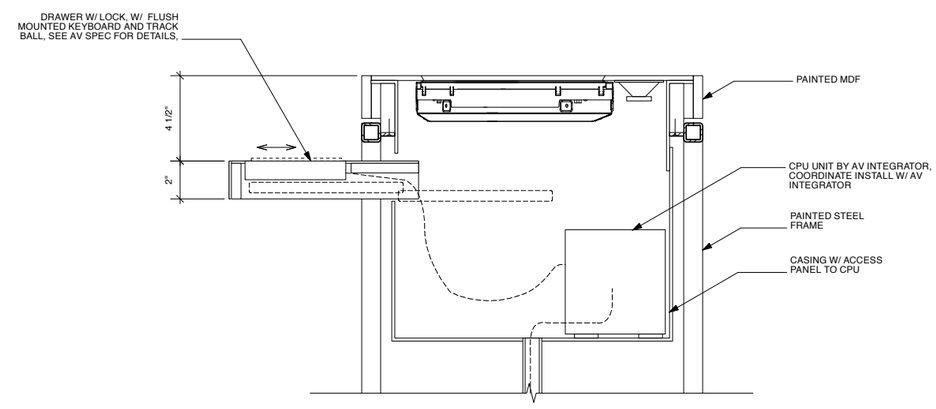

4 DETAIL SECTION

SCALE: 3"= 1'-0"

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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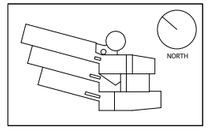


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

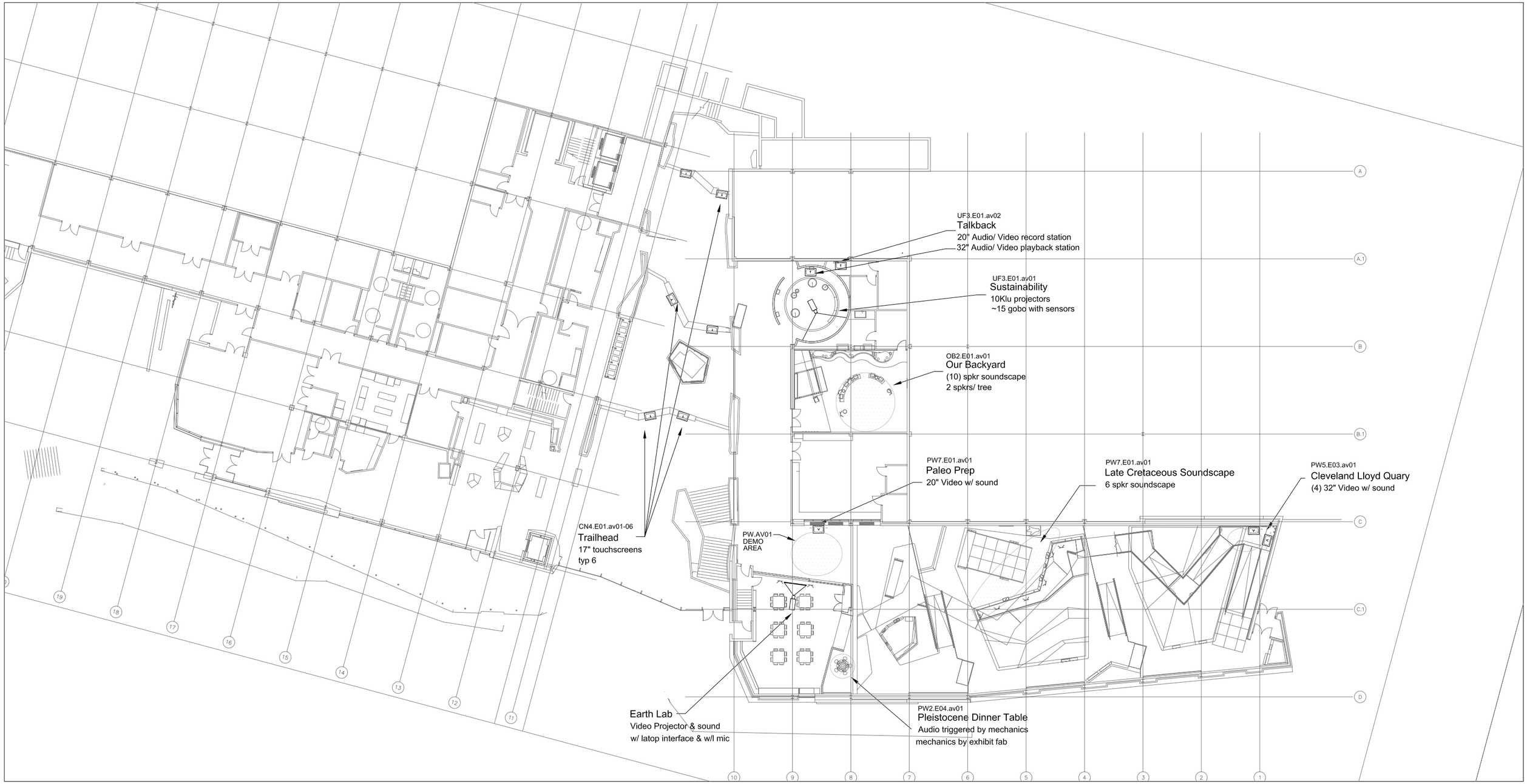
Sheet Title
Typical Details
Nat. Hist. Now Display: AV

Date
April 2, 2009

Scale*
As Noted

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
X-TYP-4.03

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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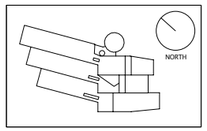


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

LEVEL 2-AV

Date

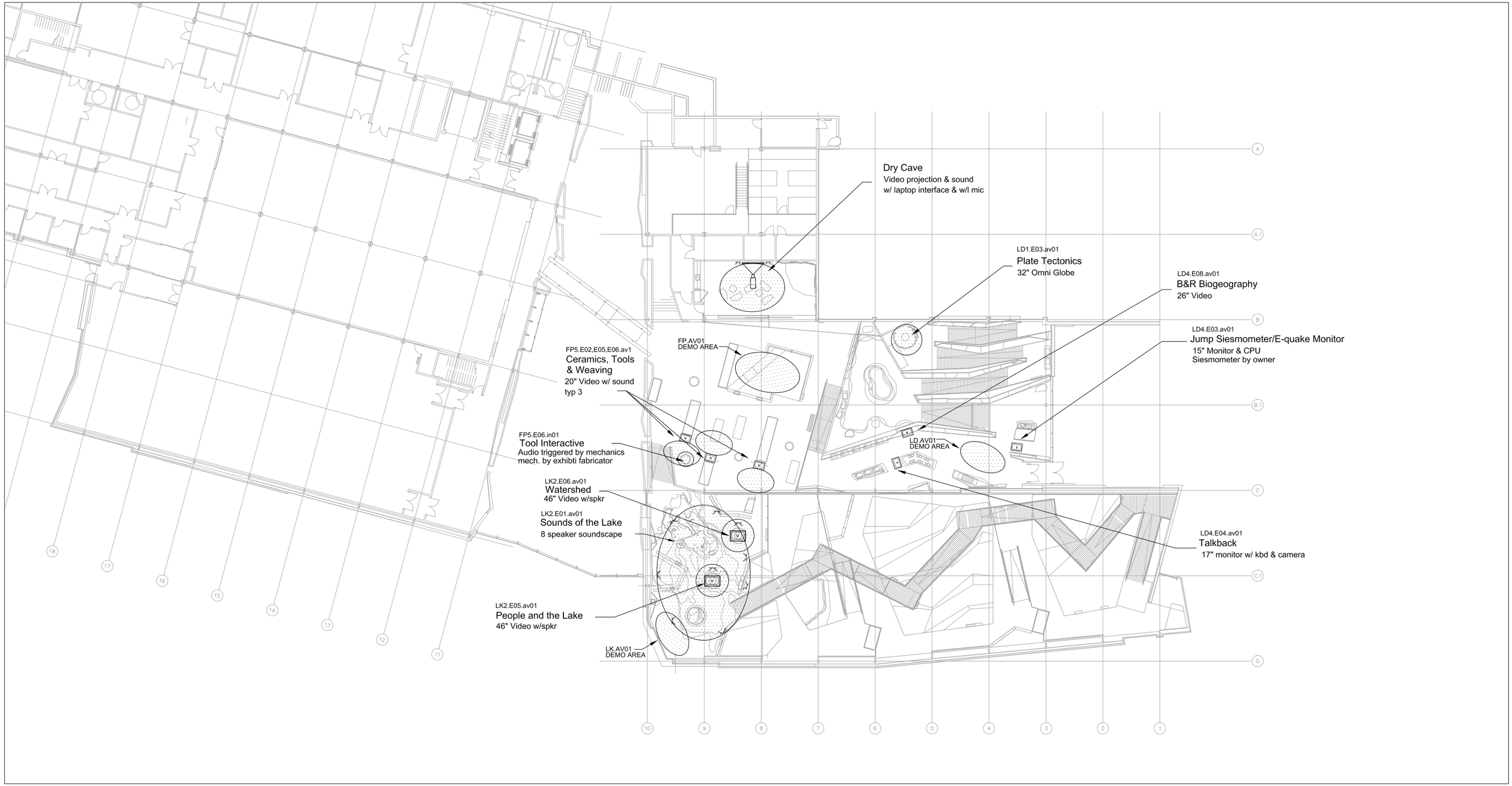
April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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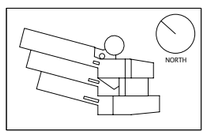

Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

LEVEL 3-AV

Date
April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

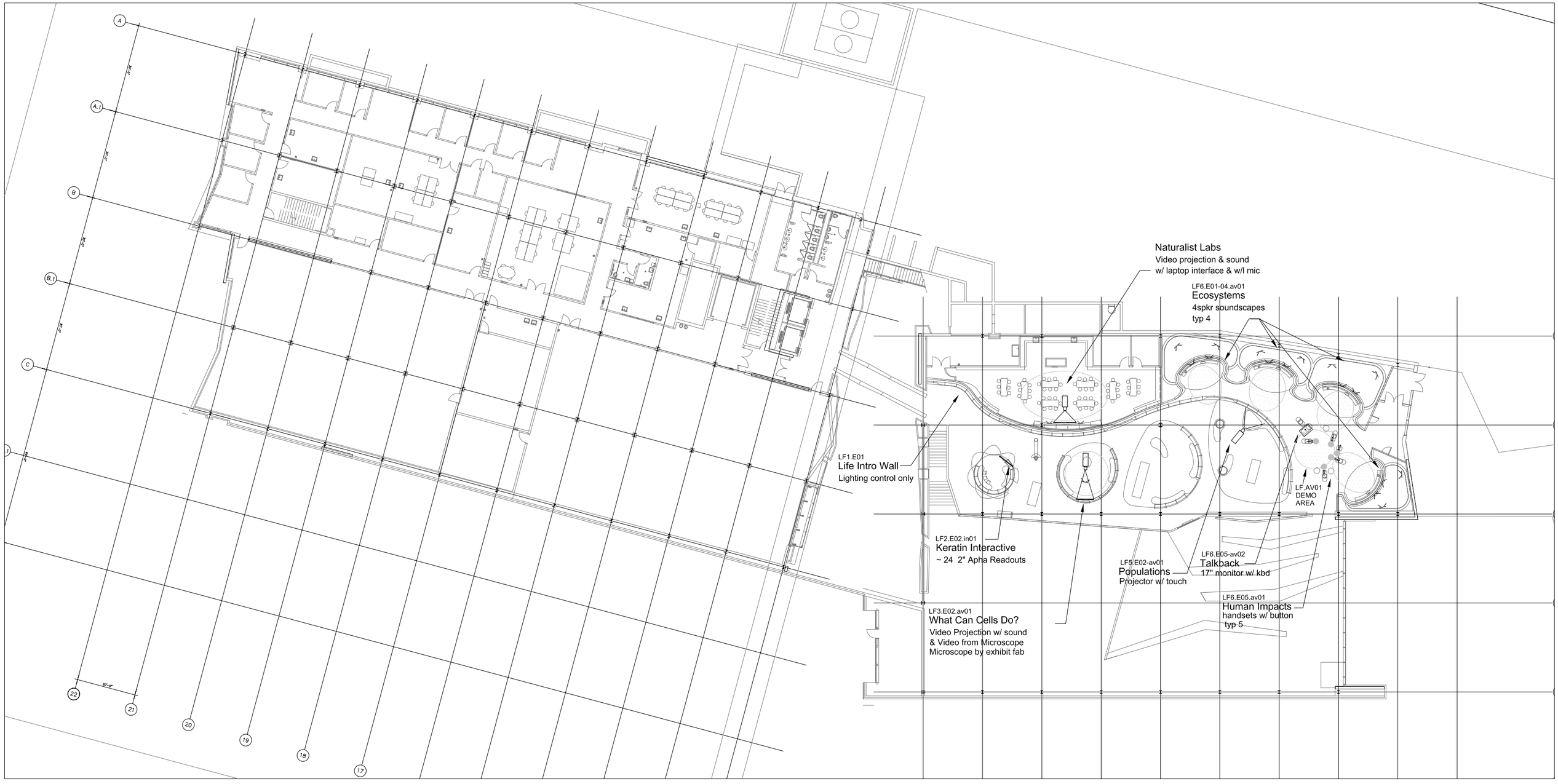

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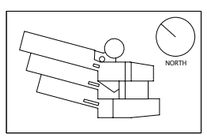
Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	**Audio Visual**	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

LEVEL 4-AV

Date

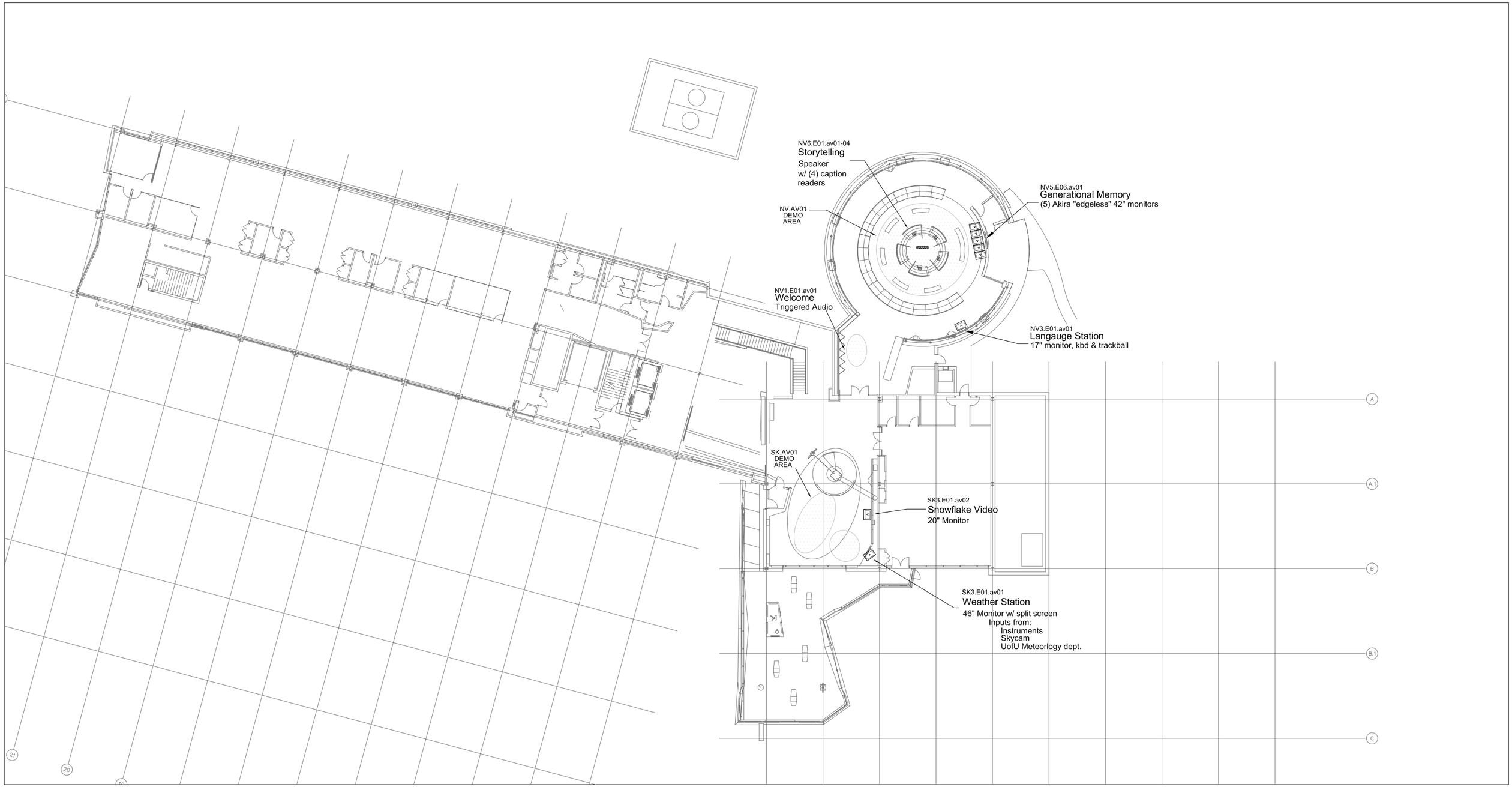
April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-03

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

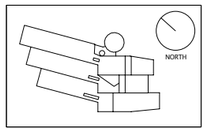


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	**Audio Visual**	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

LEVEL 5-AV

Date

April 2, 2009

Scale*

RAA Project No. 0275

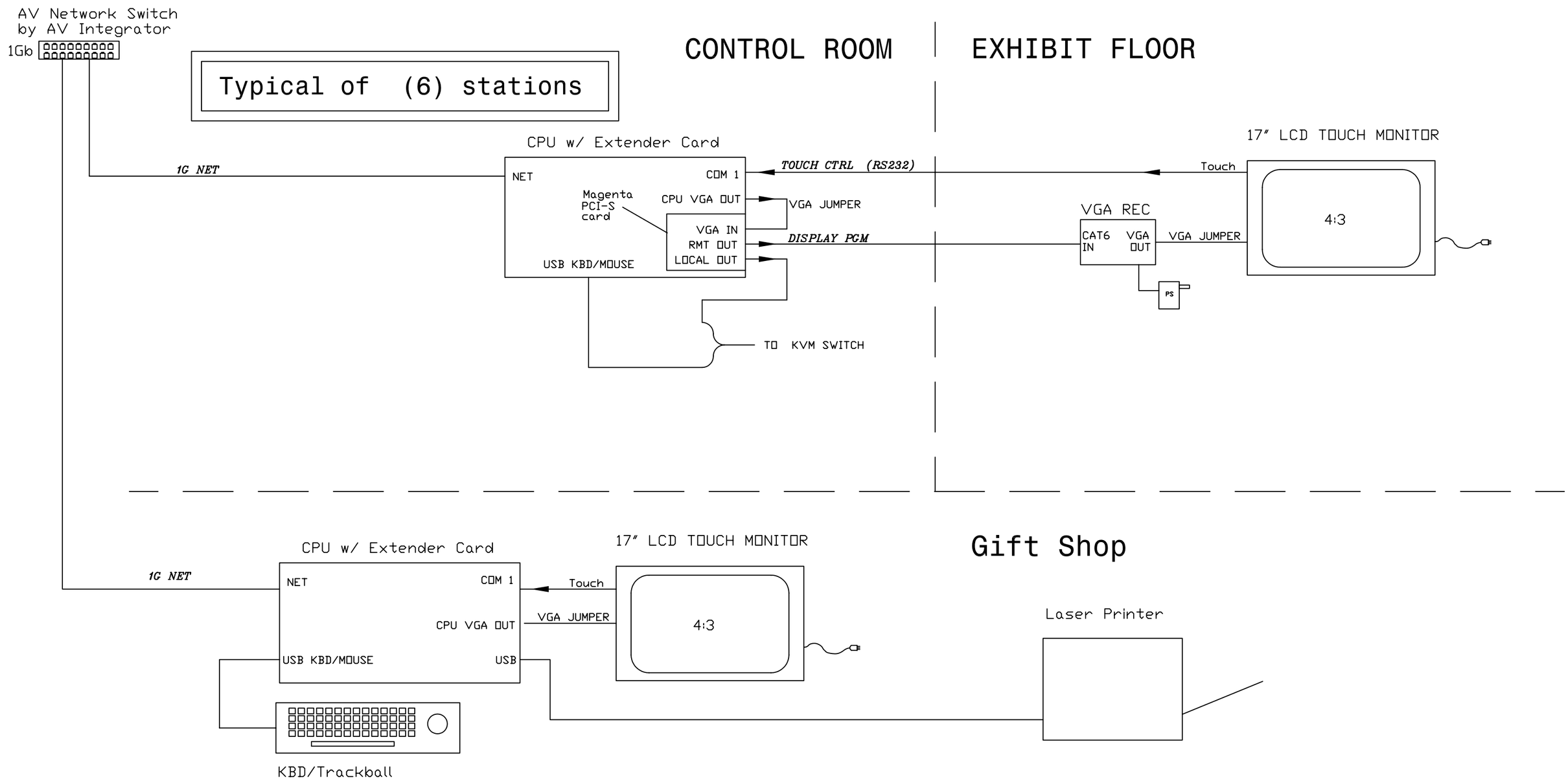
U. of U. Project No. 0872-9630

DFCM Project No. 02243750

Sheet No.

AV-04

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

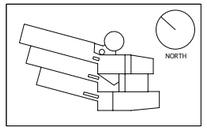


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title CN4.E01.av01-06

TRAILHEAD

Date April 2, 2009

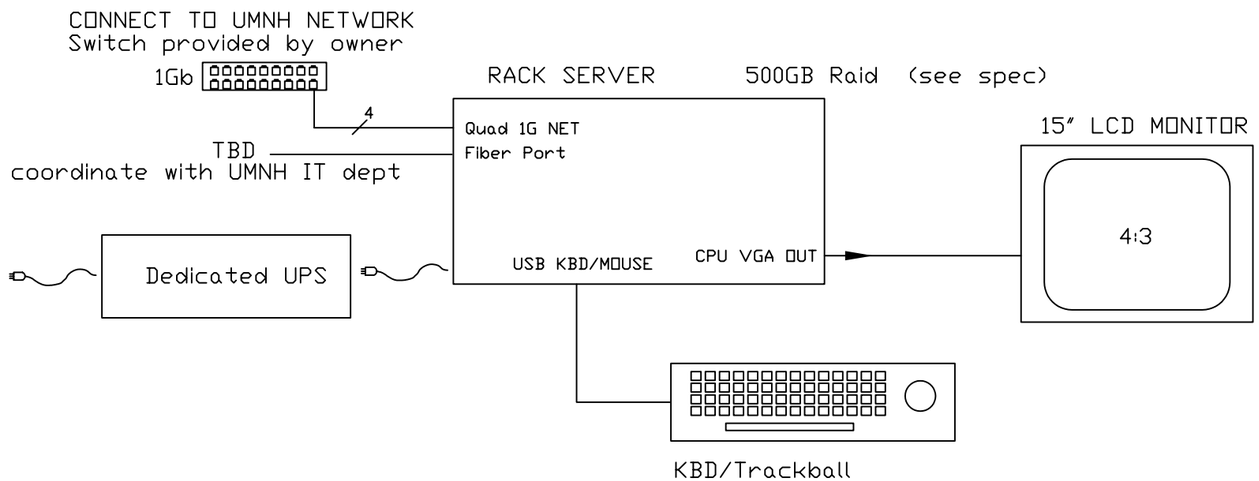
Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-100

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

CONTROL ROOM

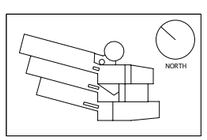


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

TRAIL SYSTEM

Date

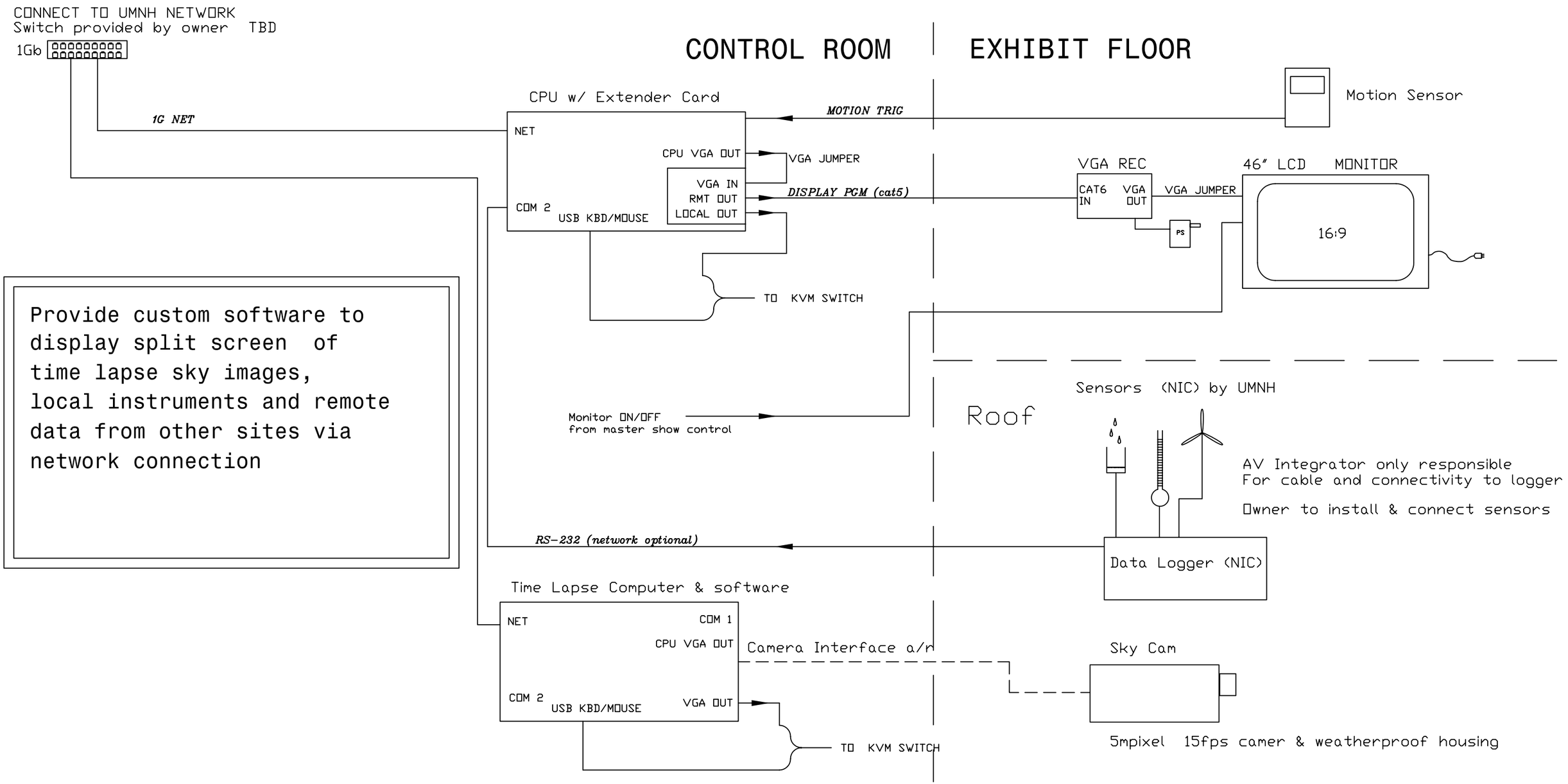
April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-101

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

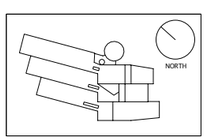


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title SK3.E01.av01

WEATHER STATION

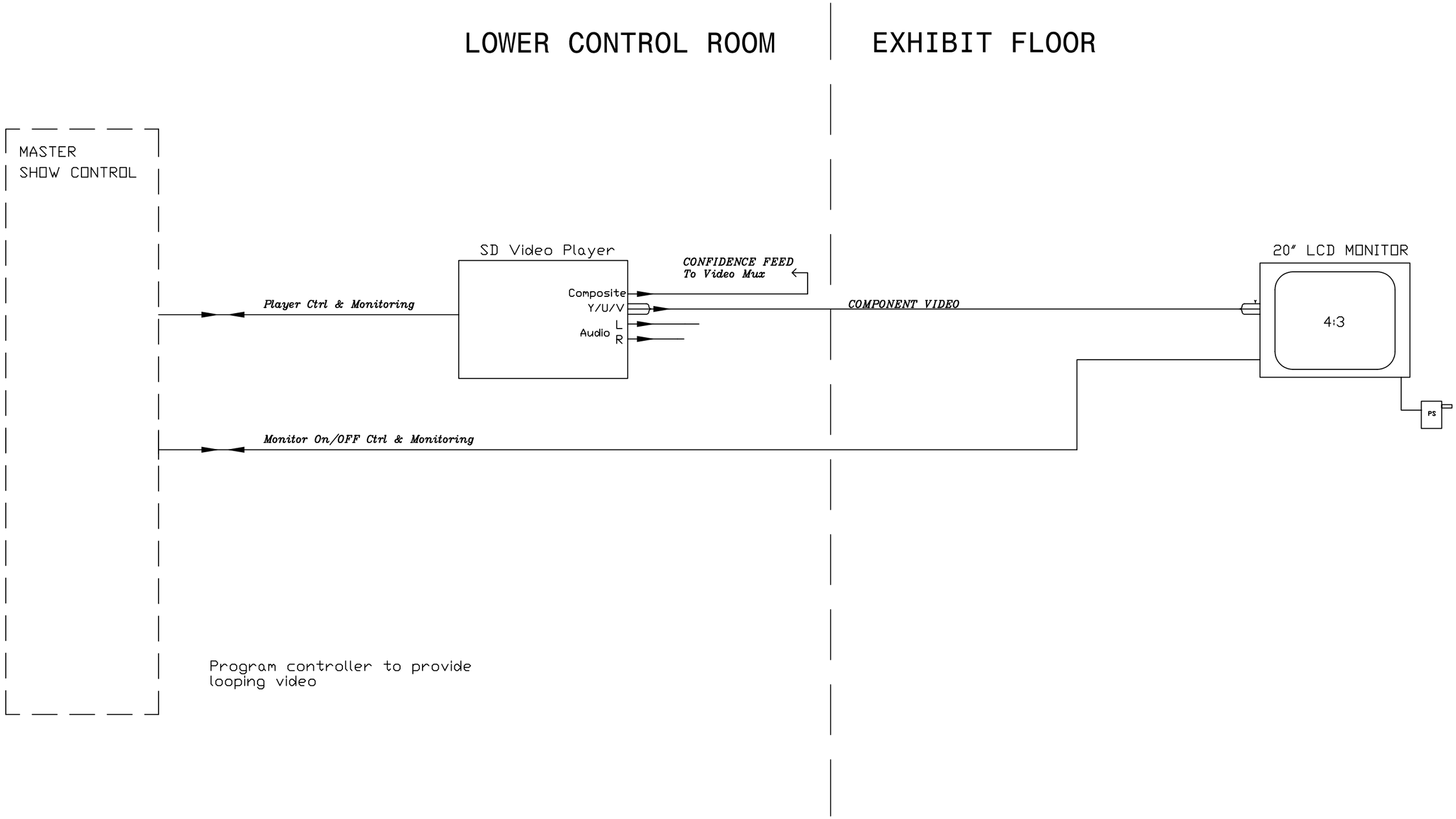
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-102

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

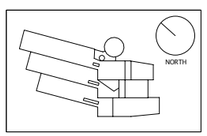


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title SK2.E01.av02

SNOWFLAKE

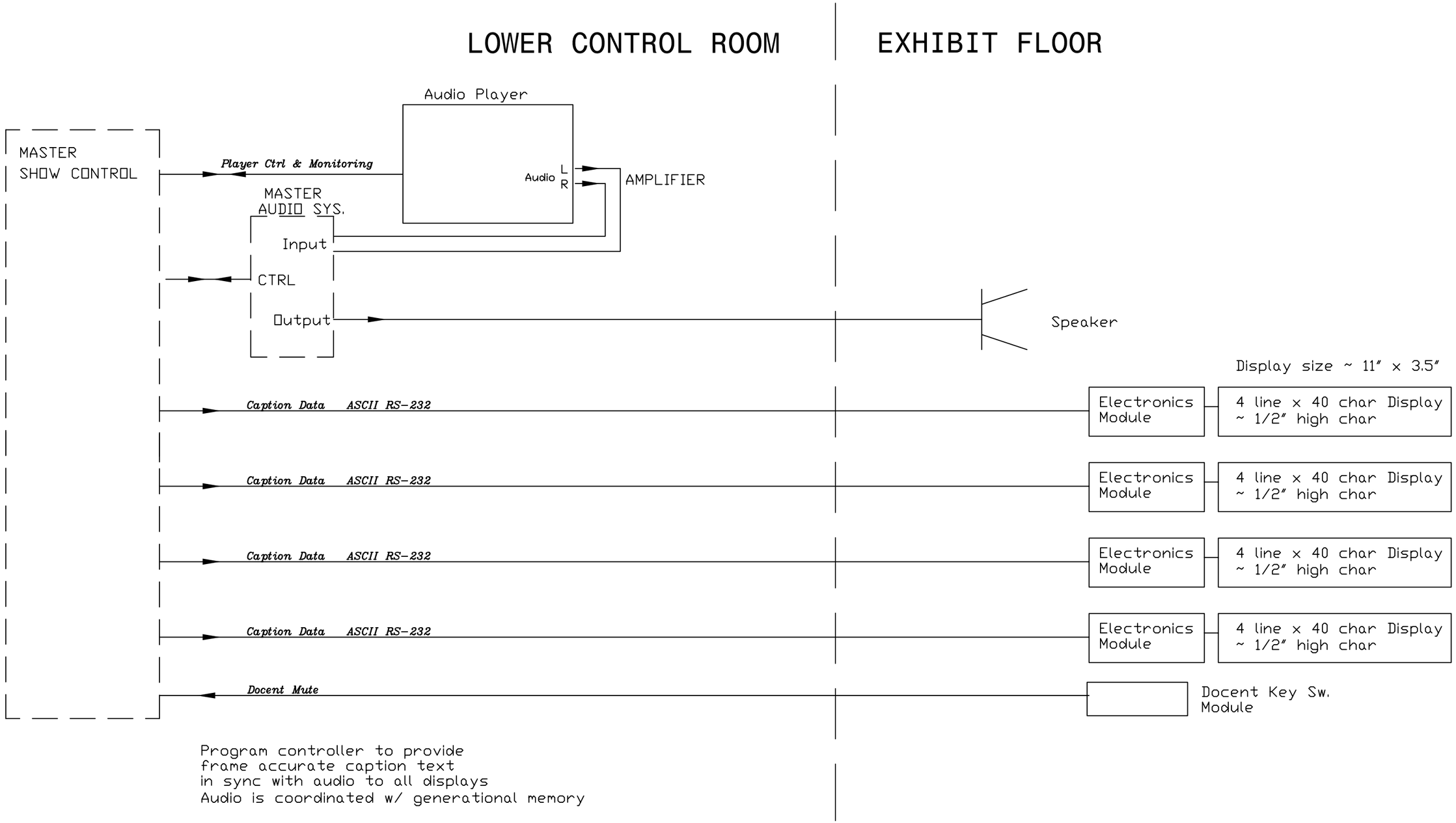
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-103

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

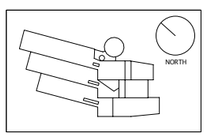


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title NV6.E01.av01-04

STORYTELLING

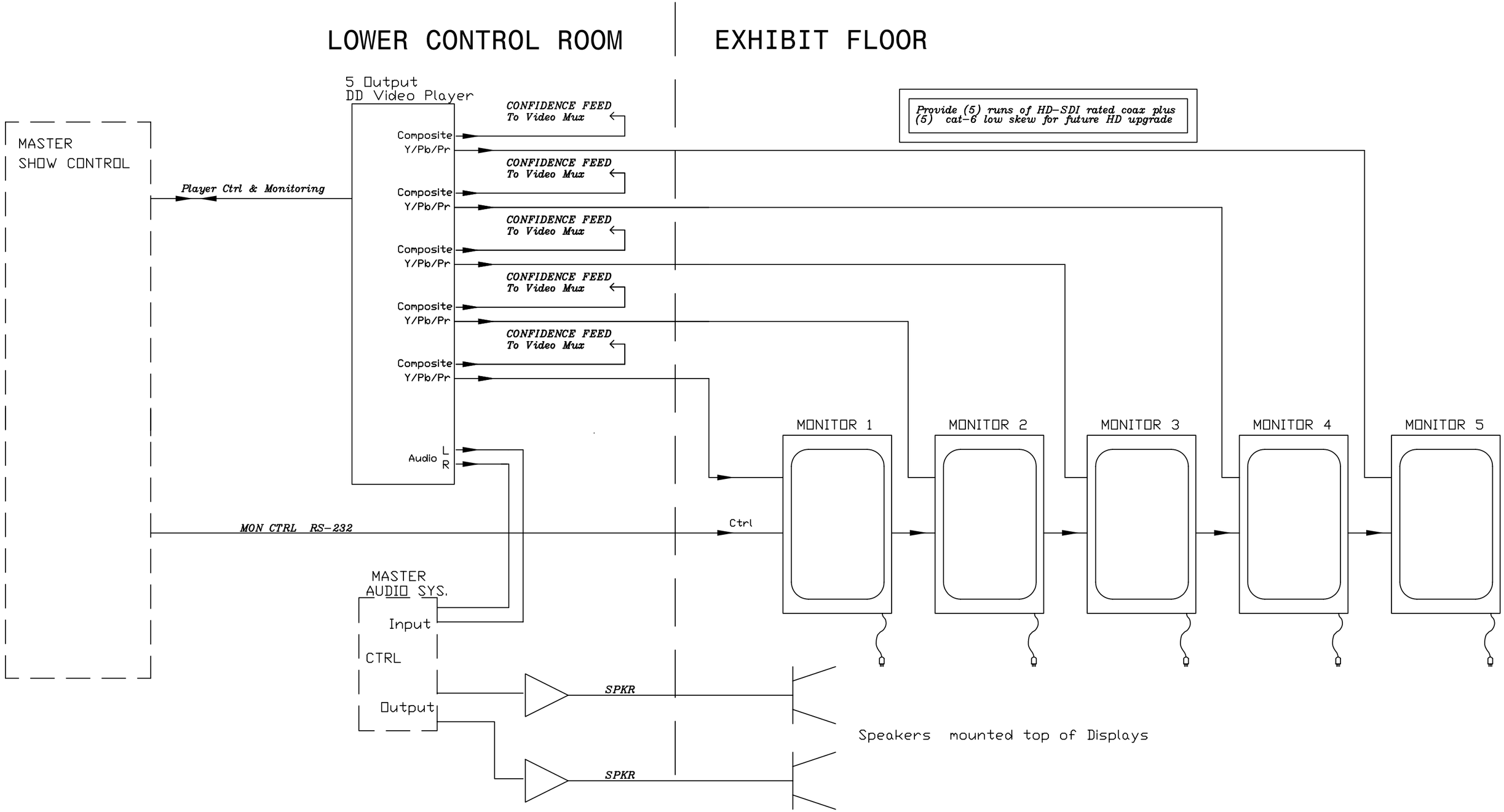
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-104

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

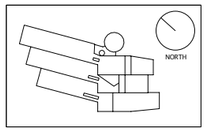


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title NV5.E06.av01

GENERATIONAL MEM

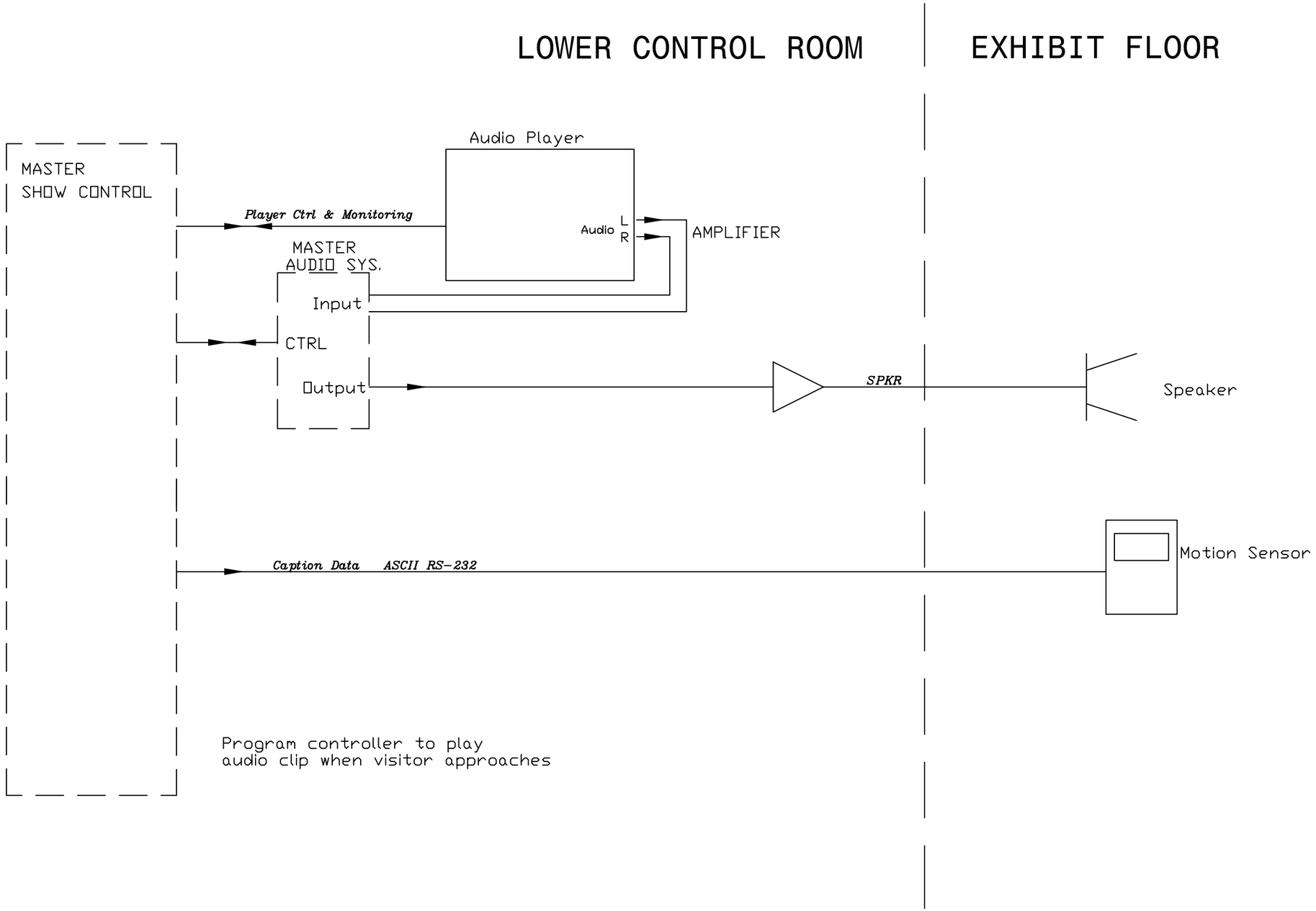
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-105

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

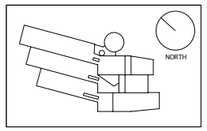


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title NV1.E01.av01

WELCOME

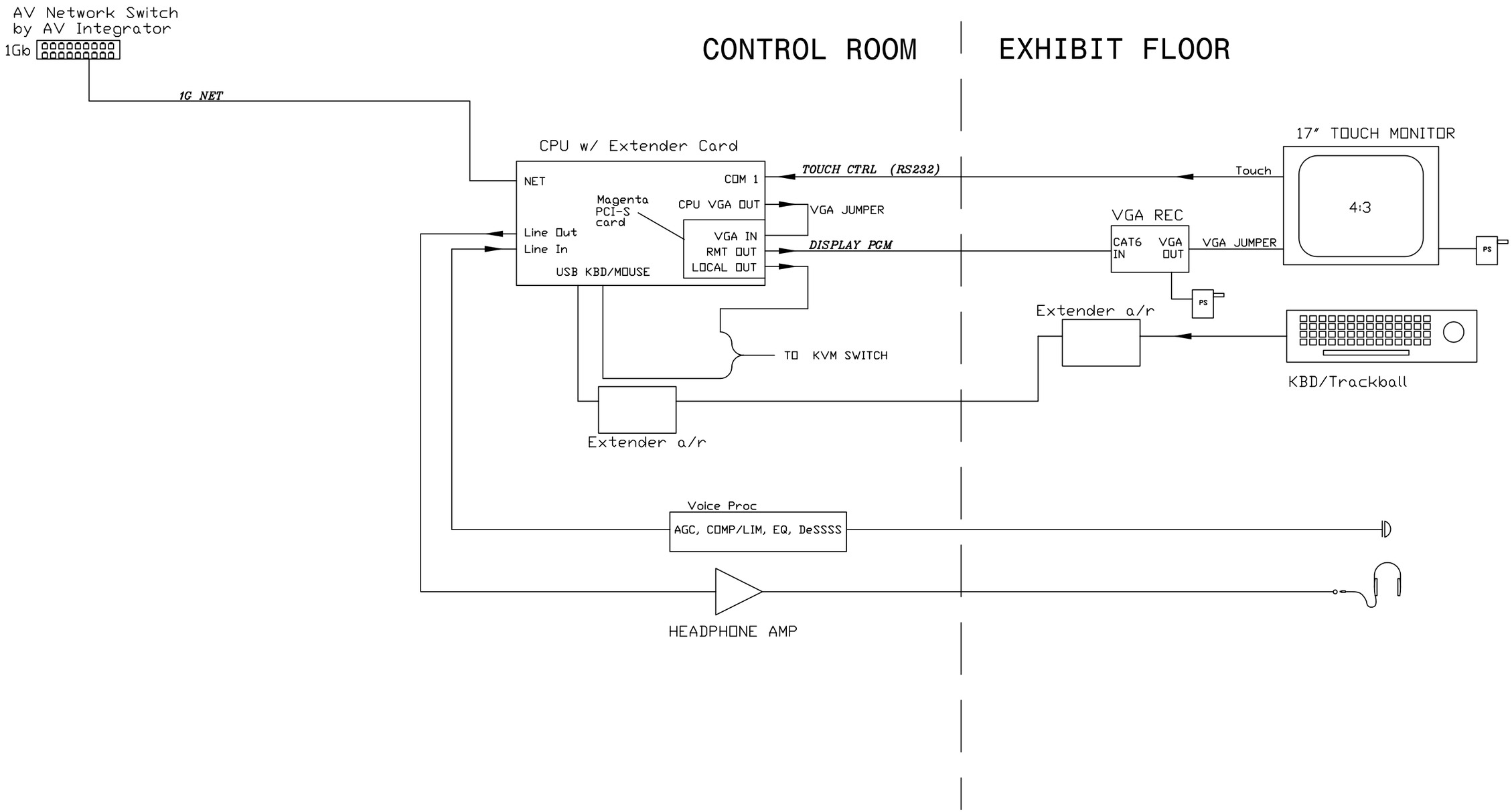
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-106

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

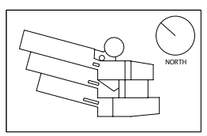


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title NV3.E01.av01

LANGUAGE

Date April 2, 2009

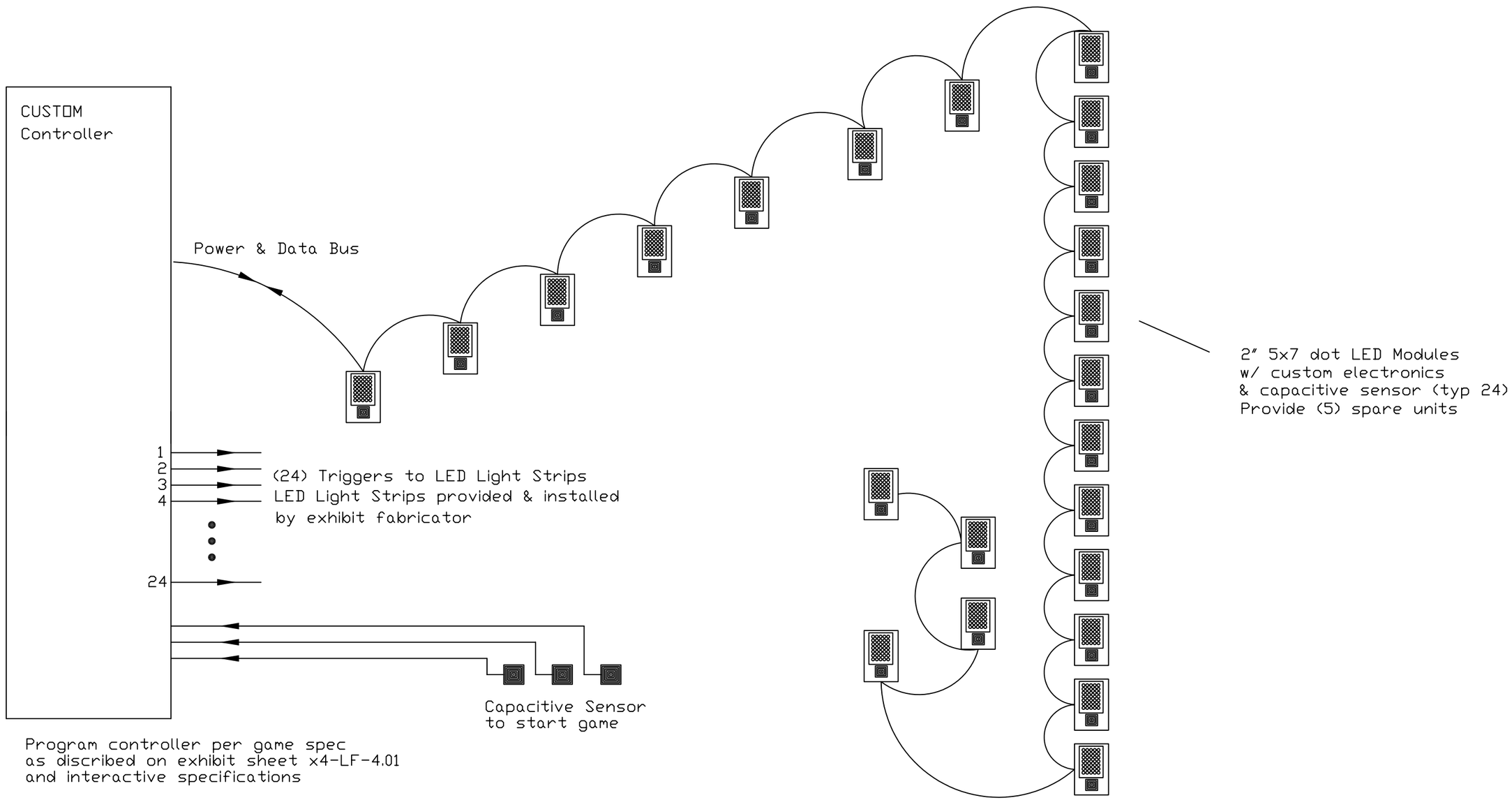
Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-107

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

EXHIBIT FLOOR



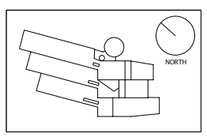
Program controller per game spec
as discribed on exhibit sheet x4-LF-4.01
and interactive specifications

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title LF2.E02.av01

KERITAN GAME

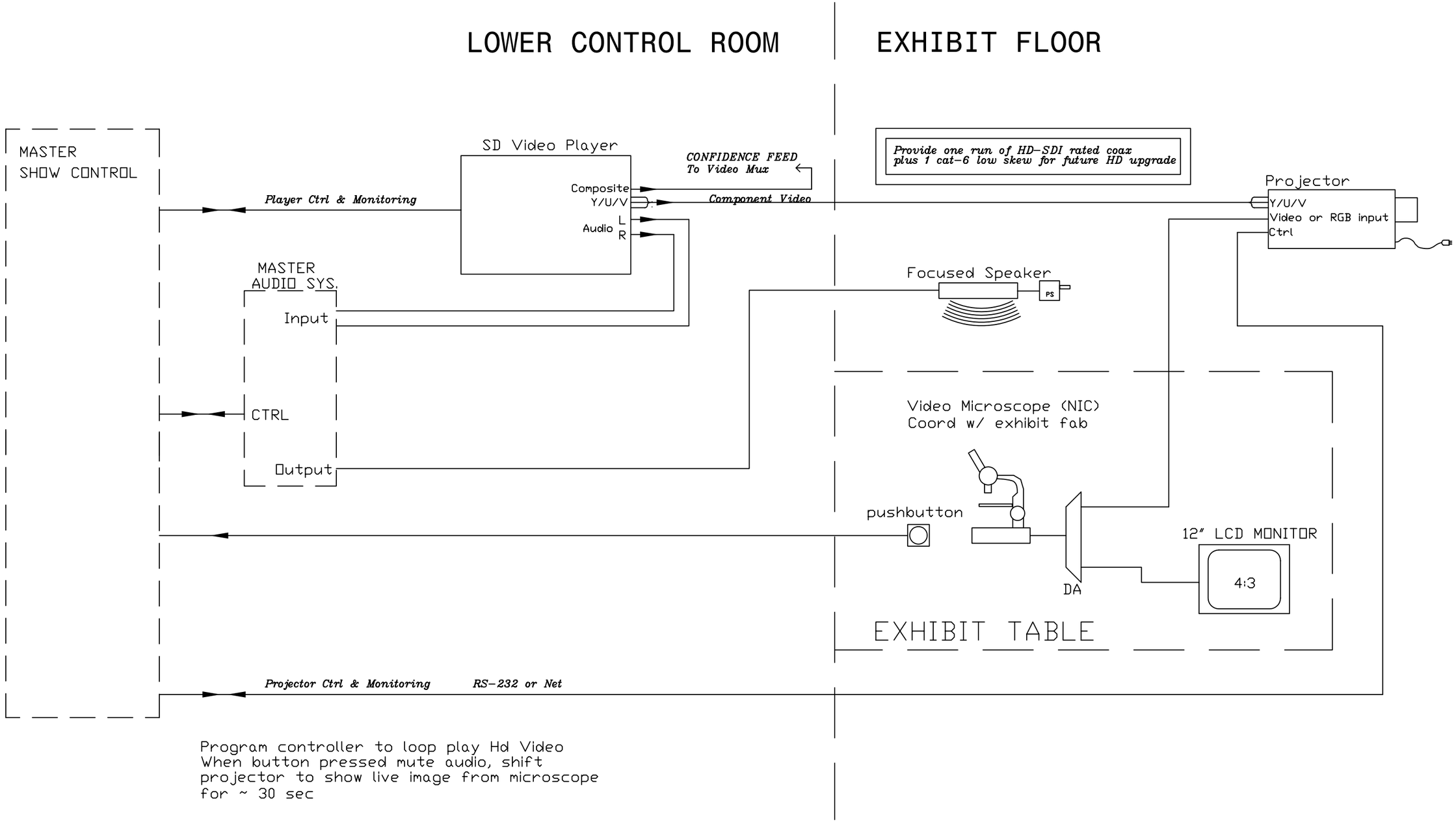
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-108

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

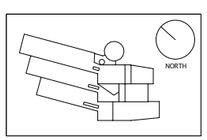


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title LF3.E02.av01

WHAT CELLS CAN DO

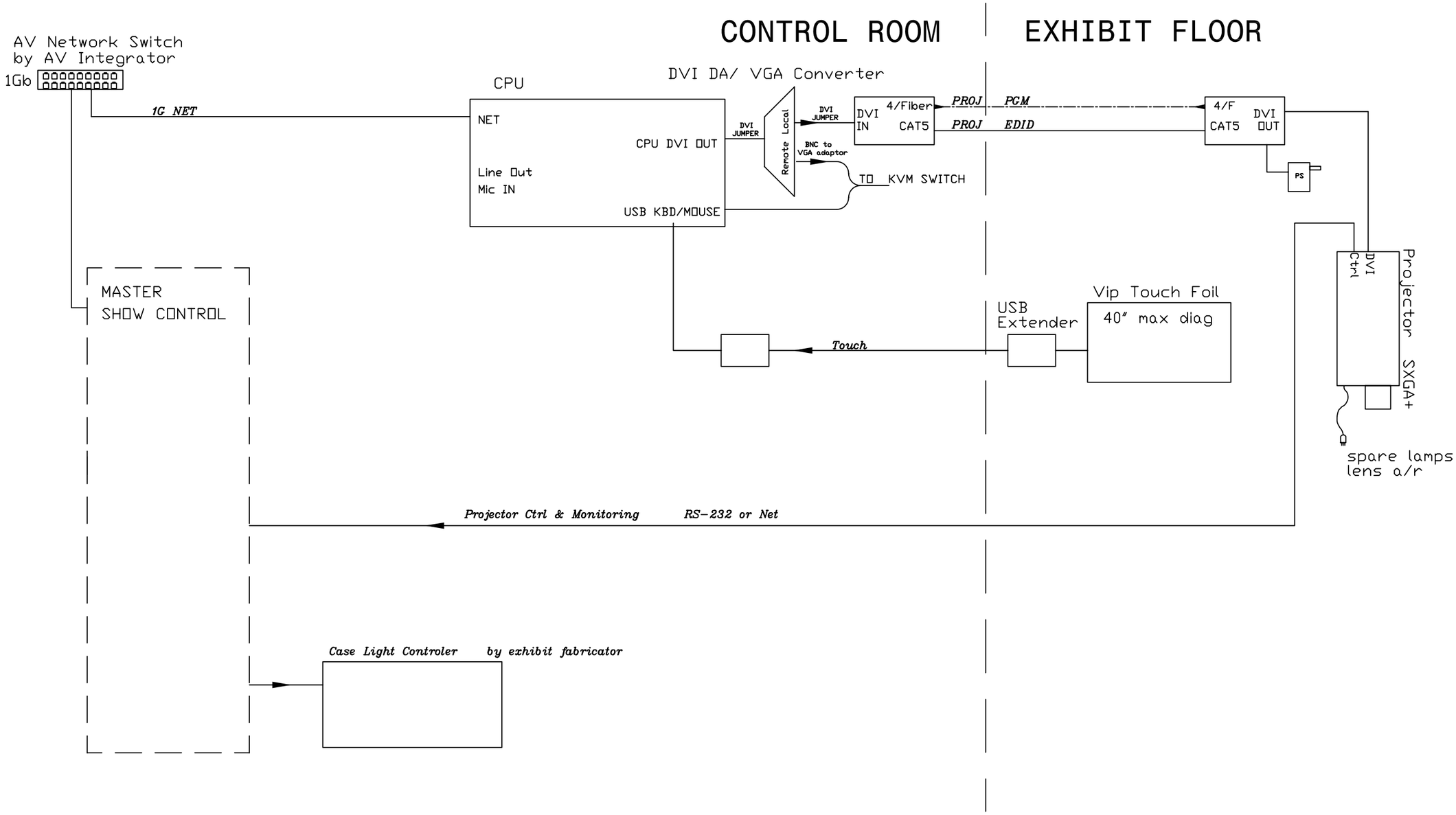
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-109

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
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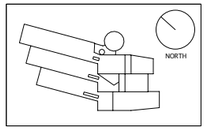


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title LF5.E02.av.01

POPULATIONS

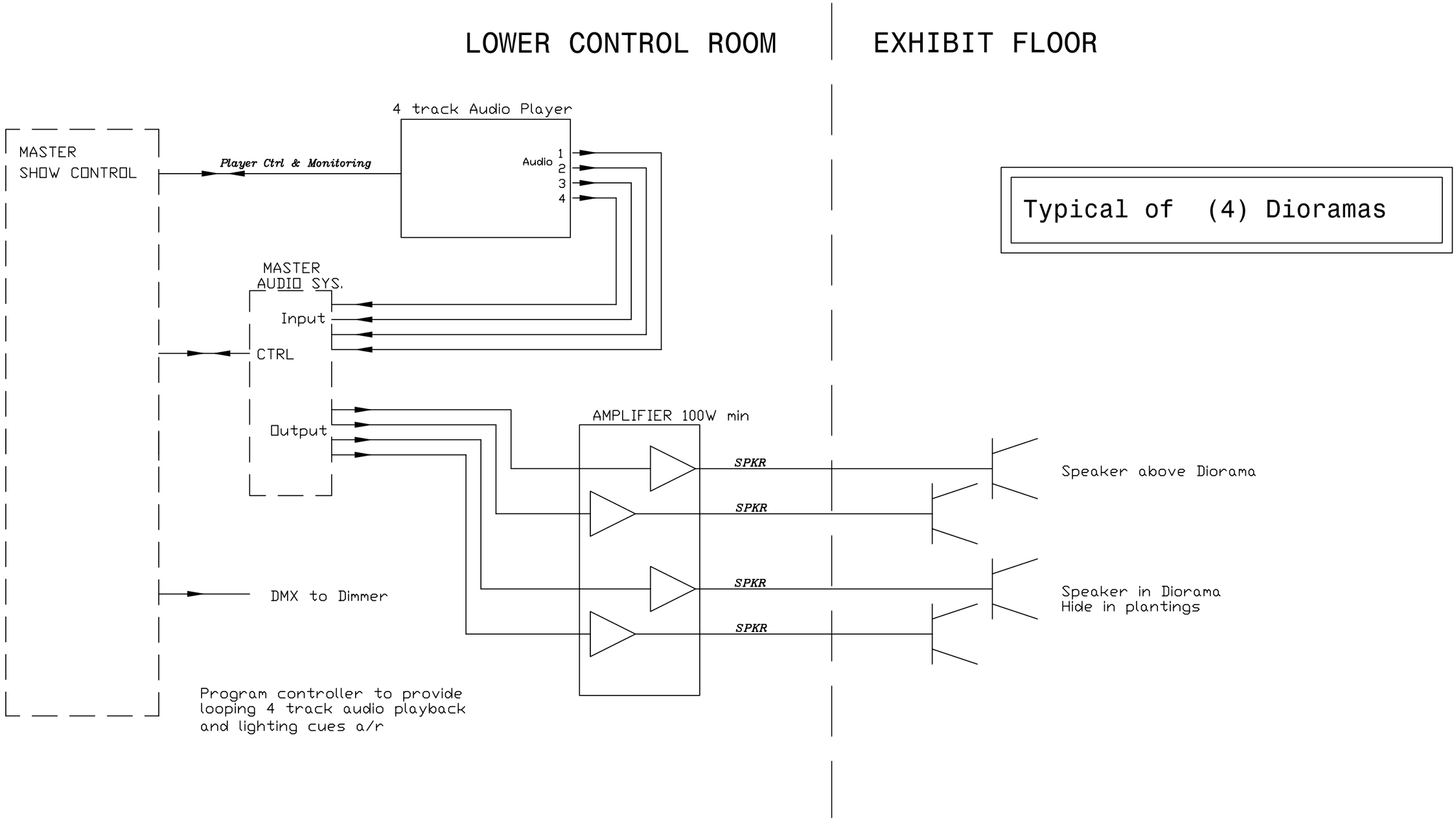
Date
April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-110

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
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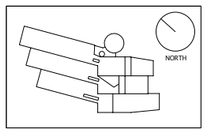


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title LF6.E01-04.av.01

ECOSYSTEMS

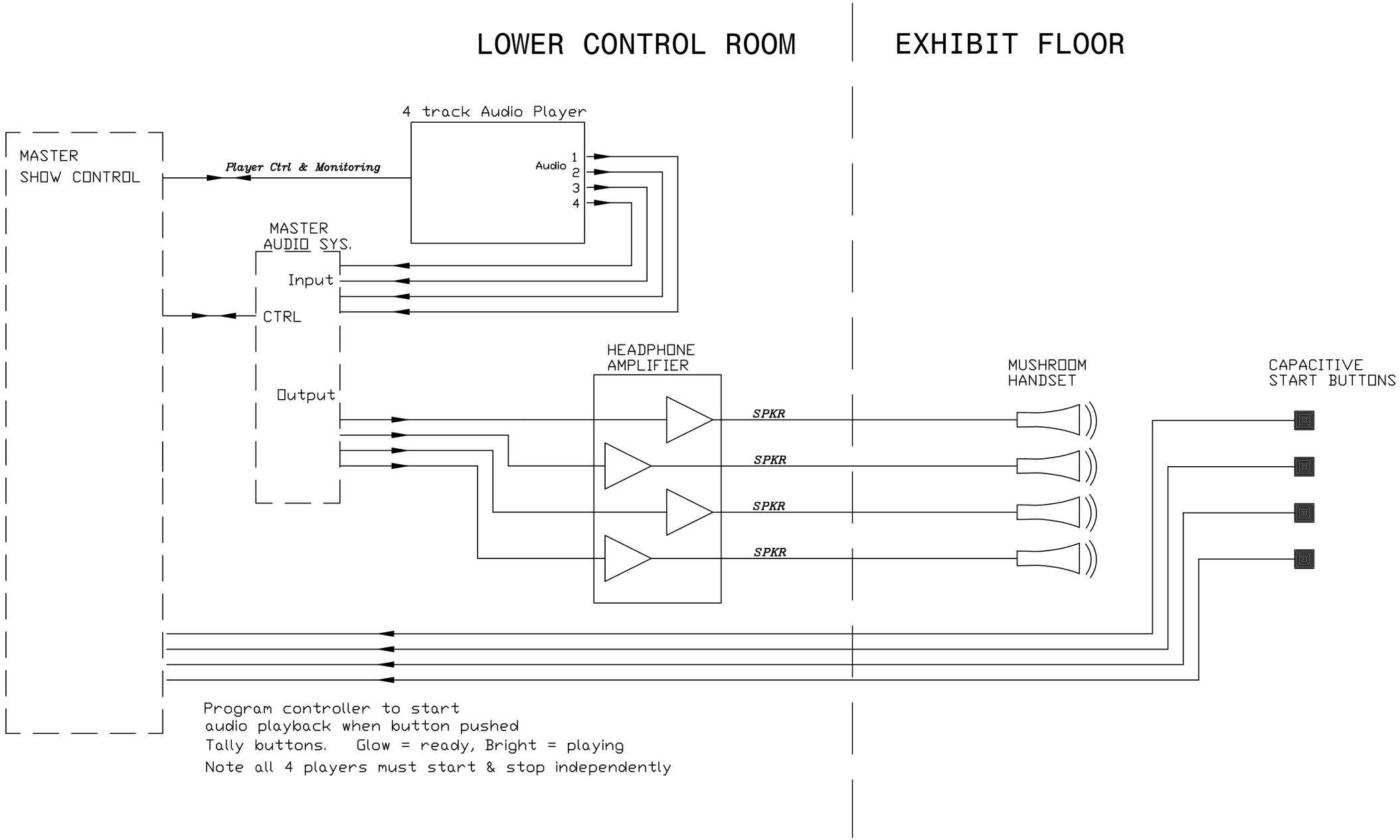
Date
April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-111

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.

Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title LF6.E05.av.01

HUMAN INT.

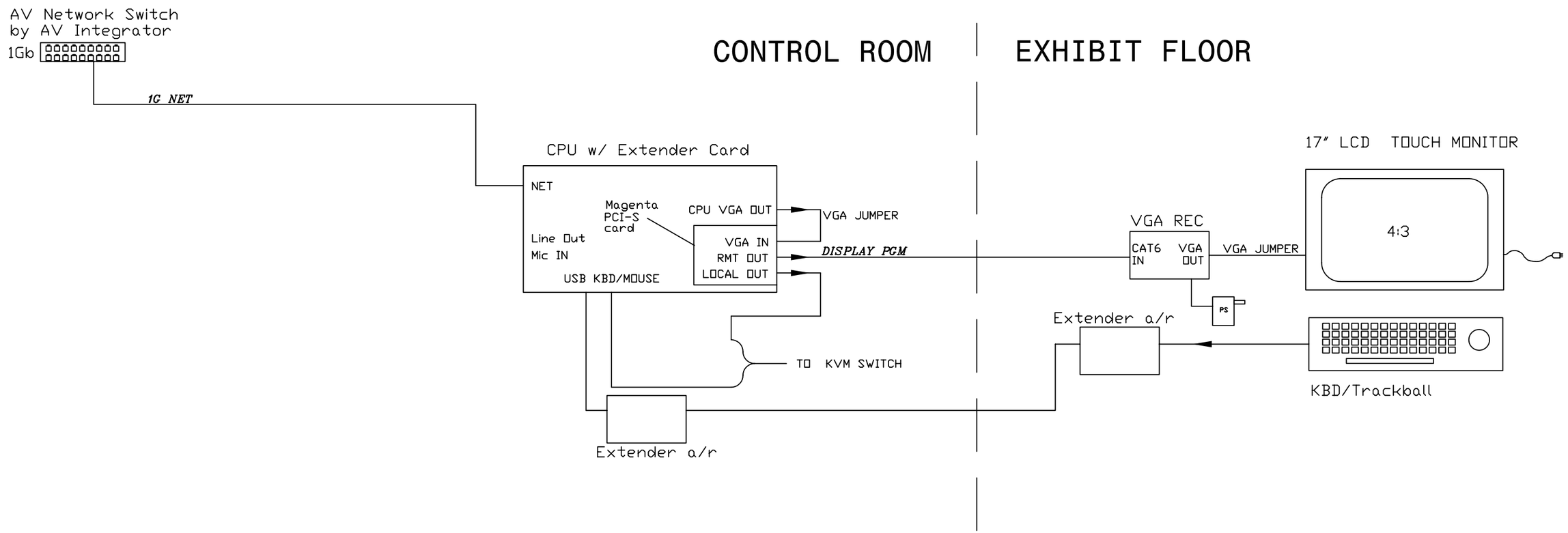
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-112

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

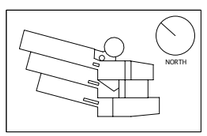


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title LF6.E05.av.02

TALKBACK

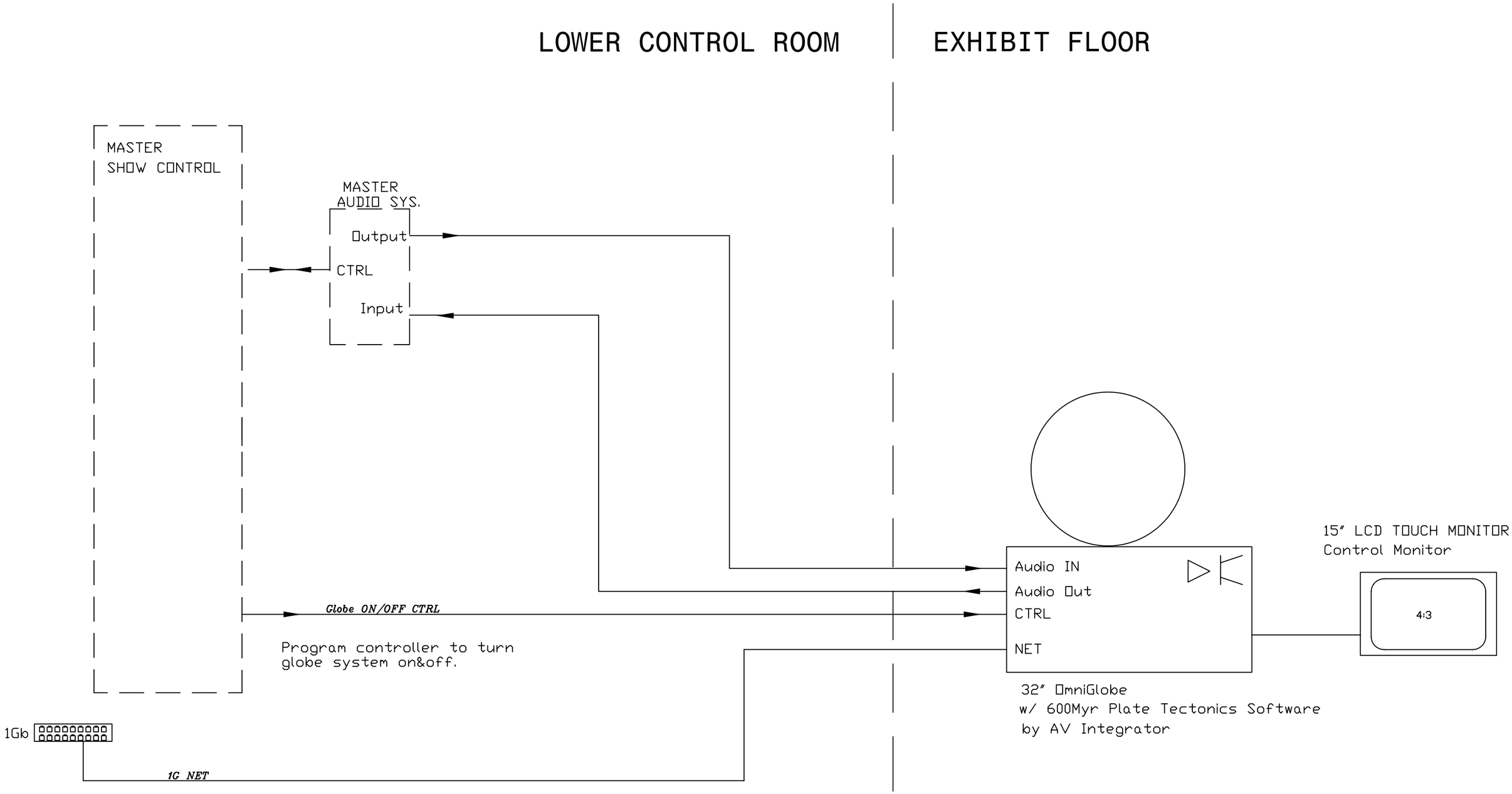
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-113

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

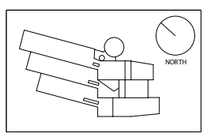


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title LD1.E03.av01

PLATE TECTONICS

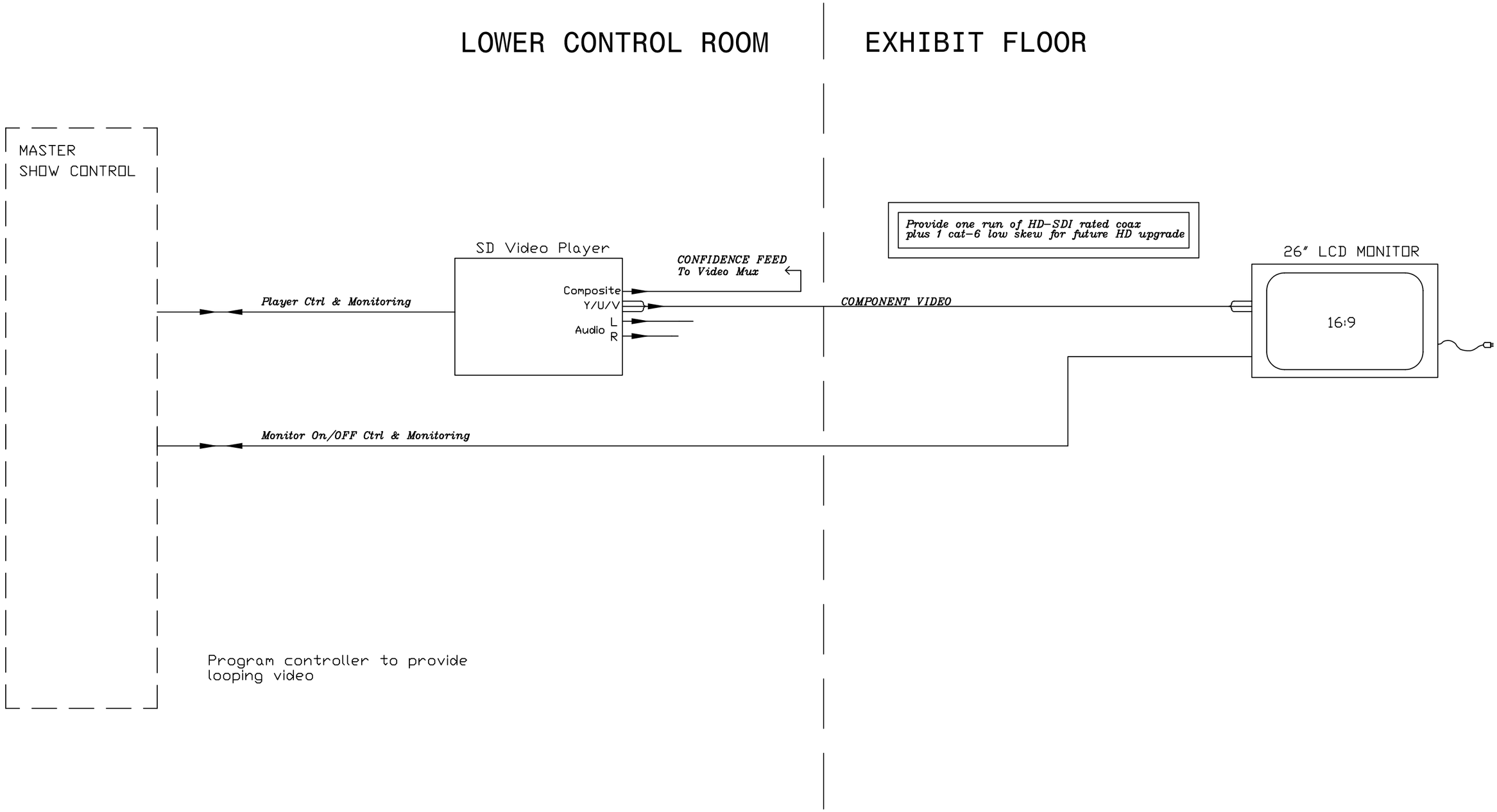
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-114

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

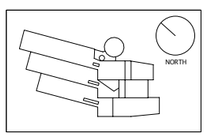


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title LD4.E08.av01

B+R BIOGEOGRAPHY

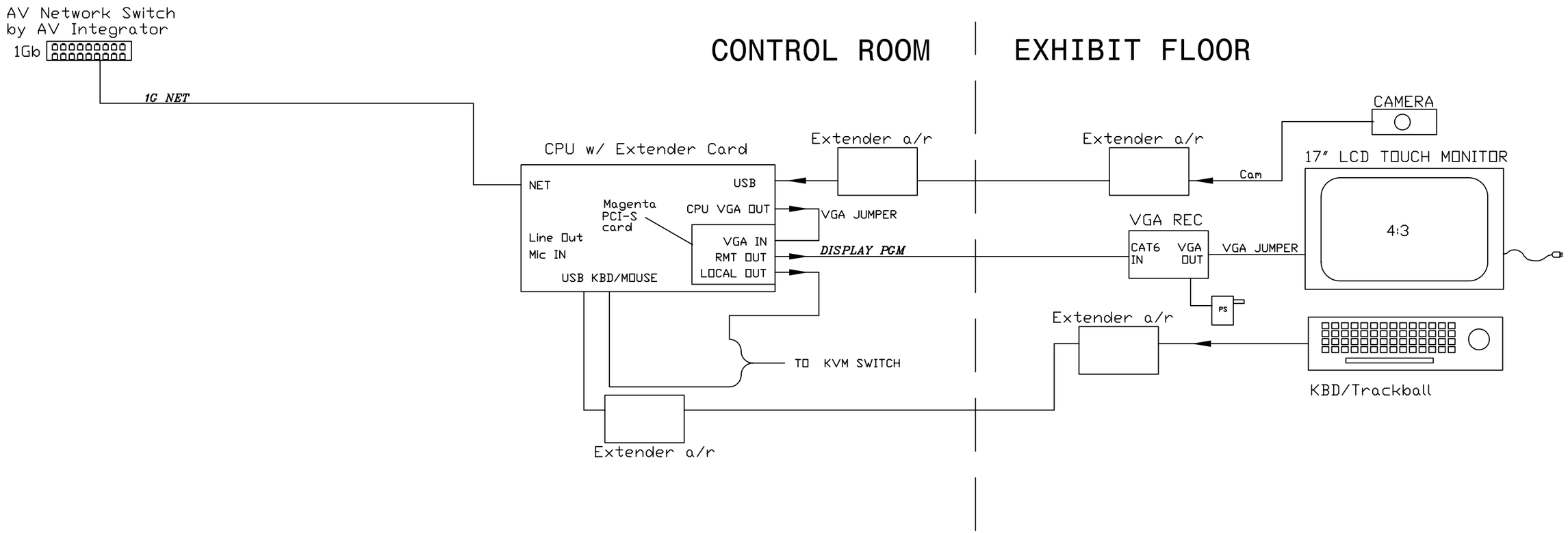
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-115

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

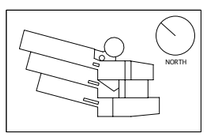


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title LD4.E04.av.01

TALKBACK

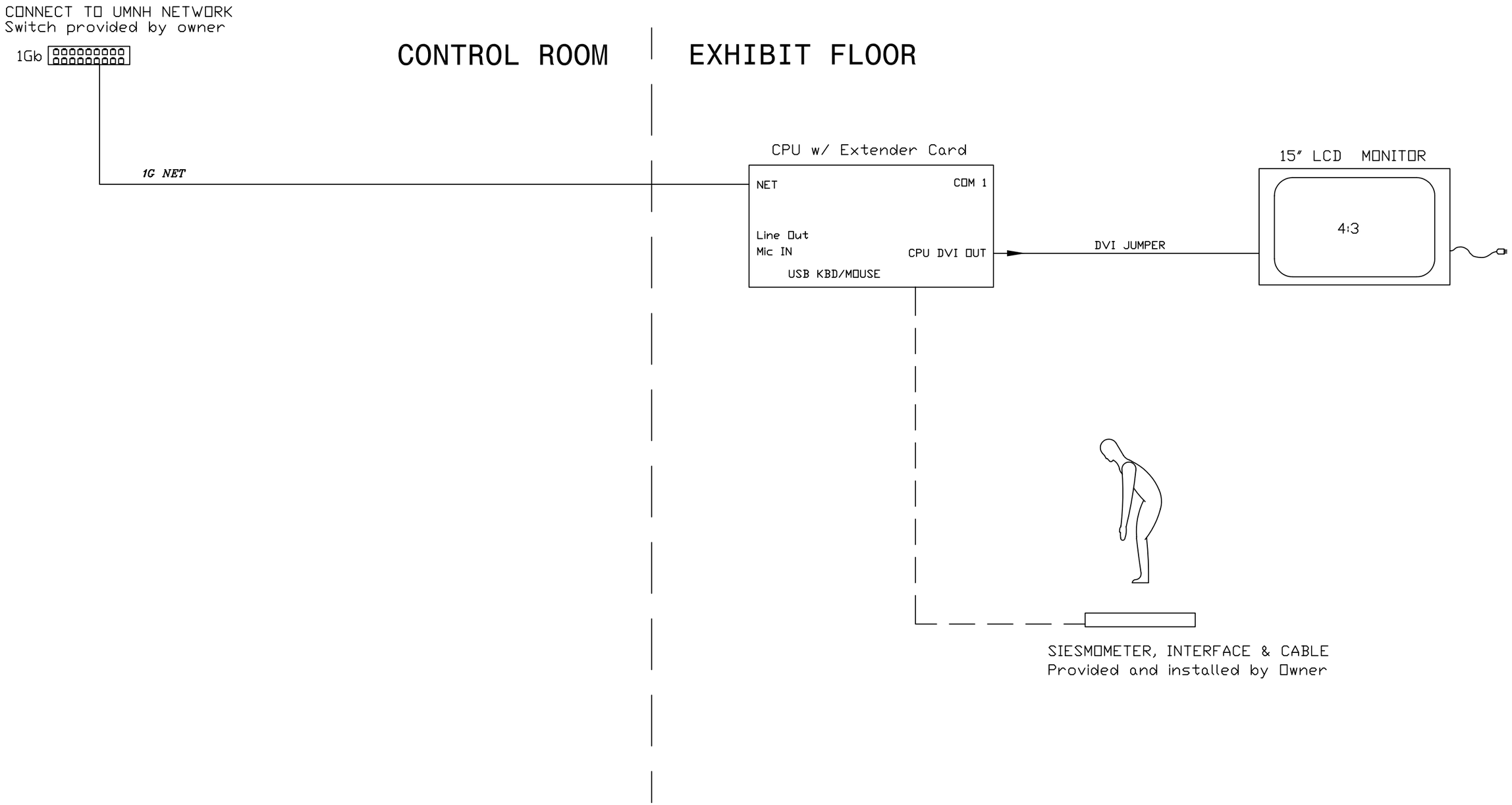
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-116

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

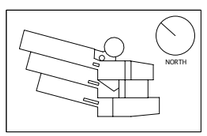


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title LD4.E03.av.01

SIESMOMETER

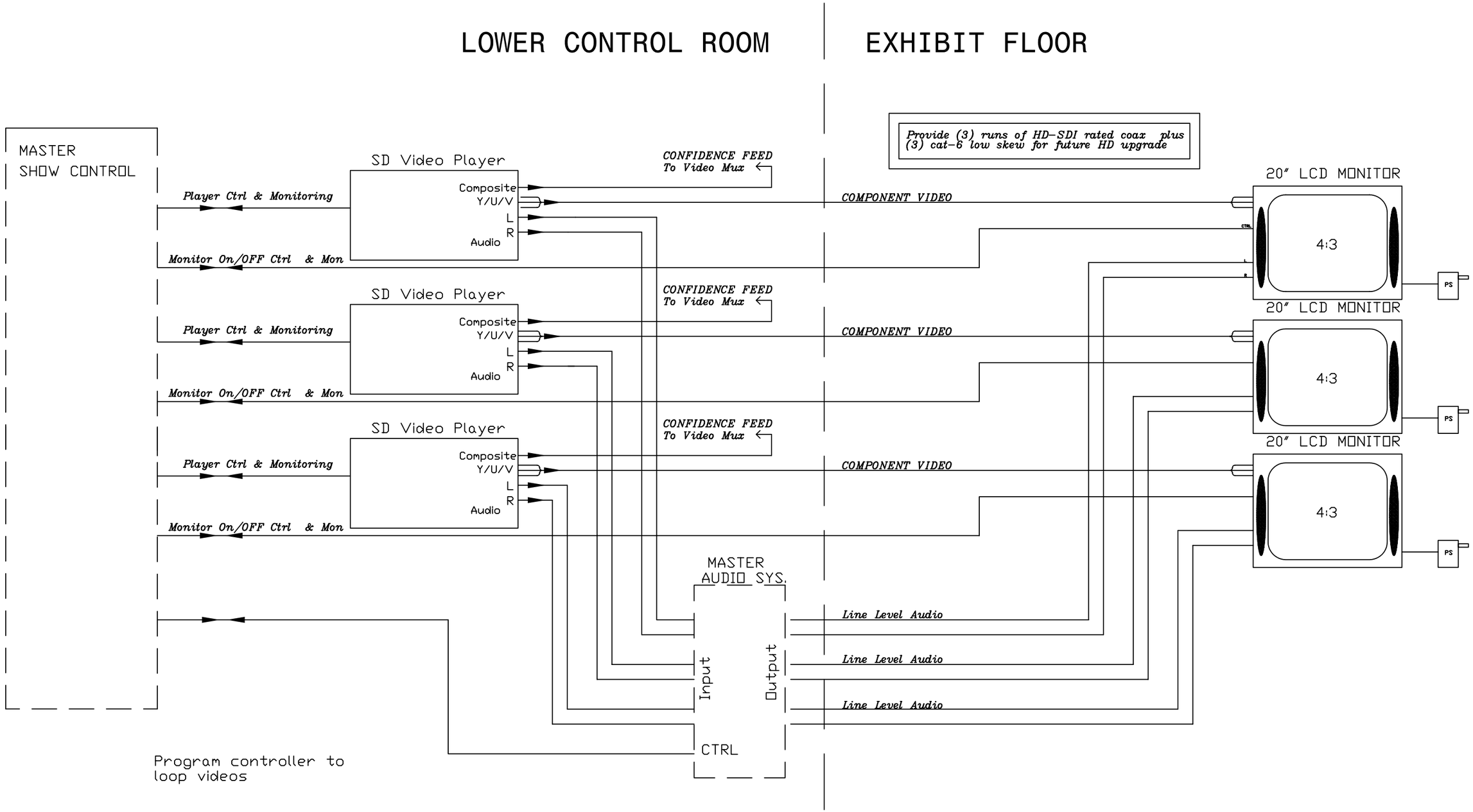
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-117

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

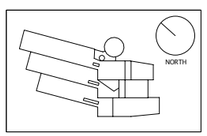


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title FP5.E02.av01

CERAMICS ETC.

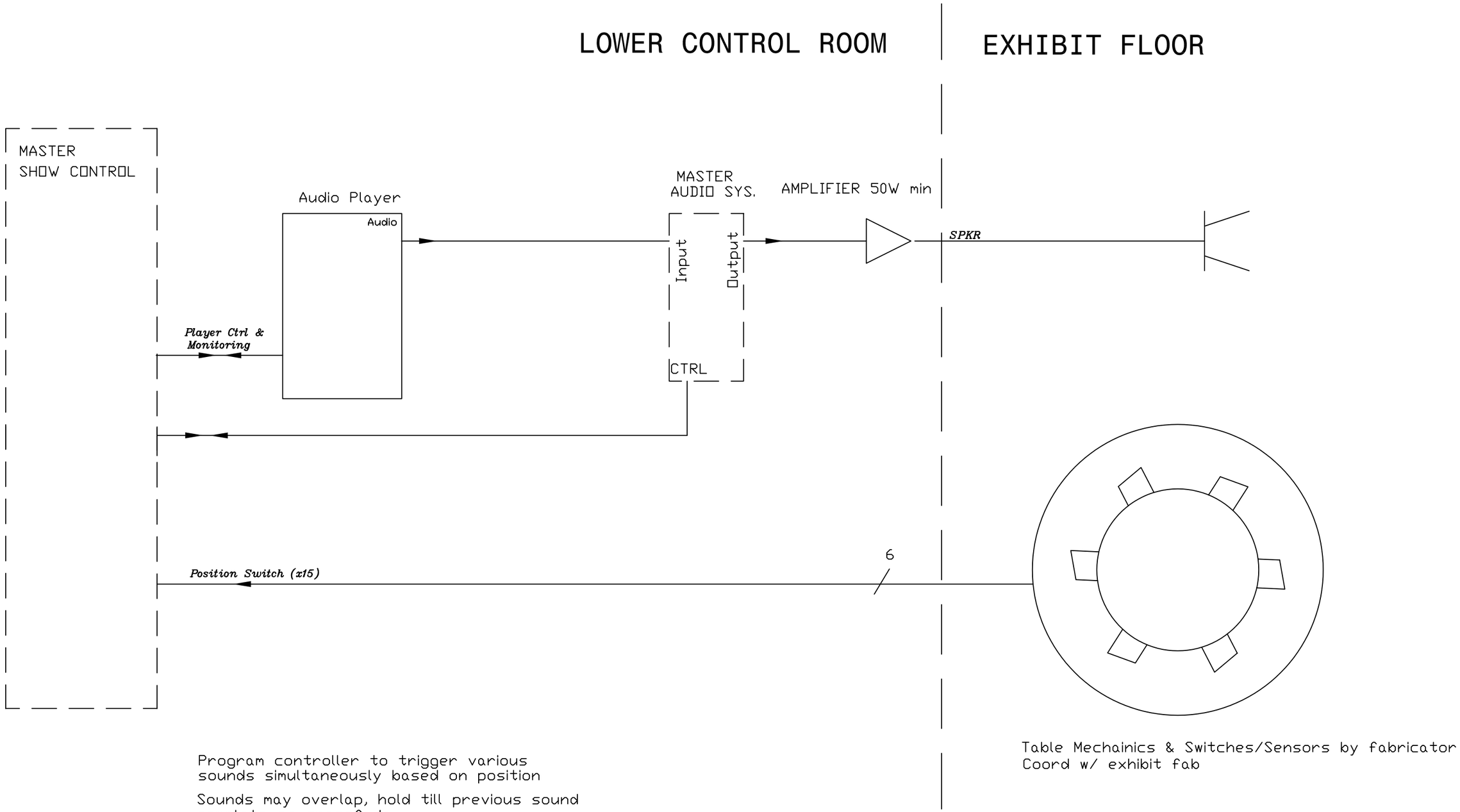
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-118

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	**Audio Visual**	Exhibition Planner and Designer
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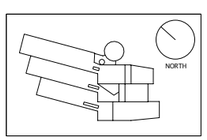


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title FP5.E06.in01

TOOL INTERACTIVE

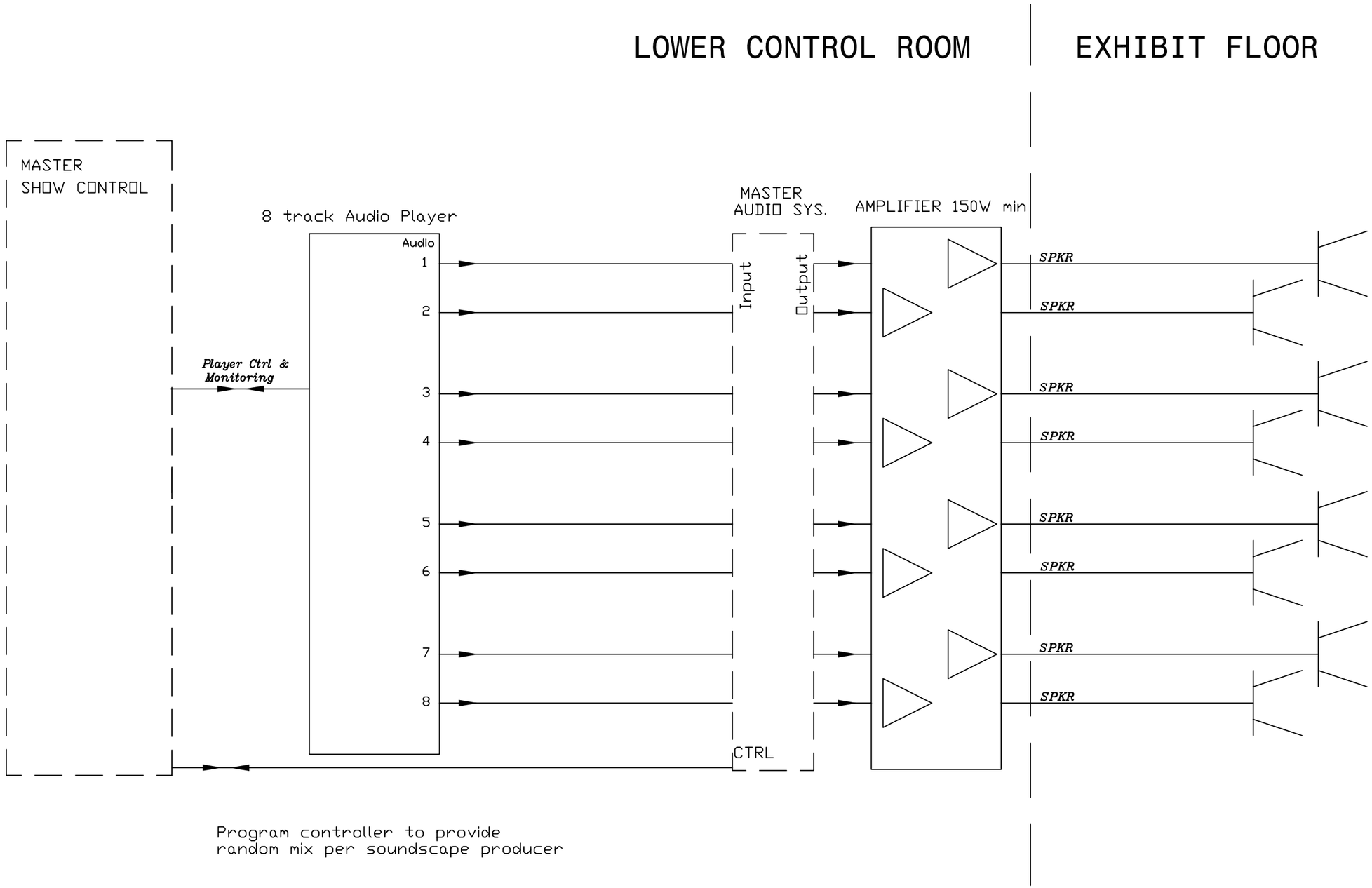
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-119

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

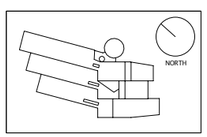


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	**Audio Visual**	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title LK2.E01.av01

SOUNDS of the LAKE

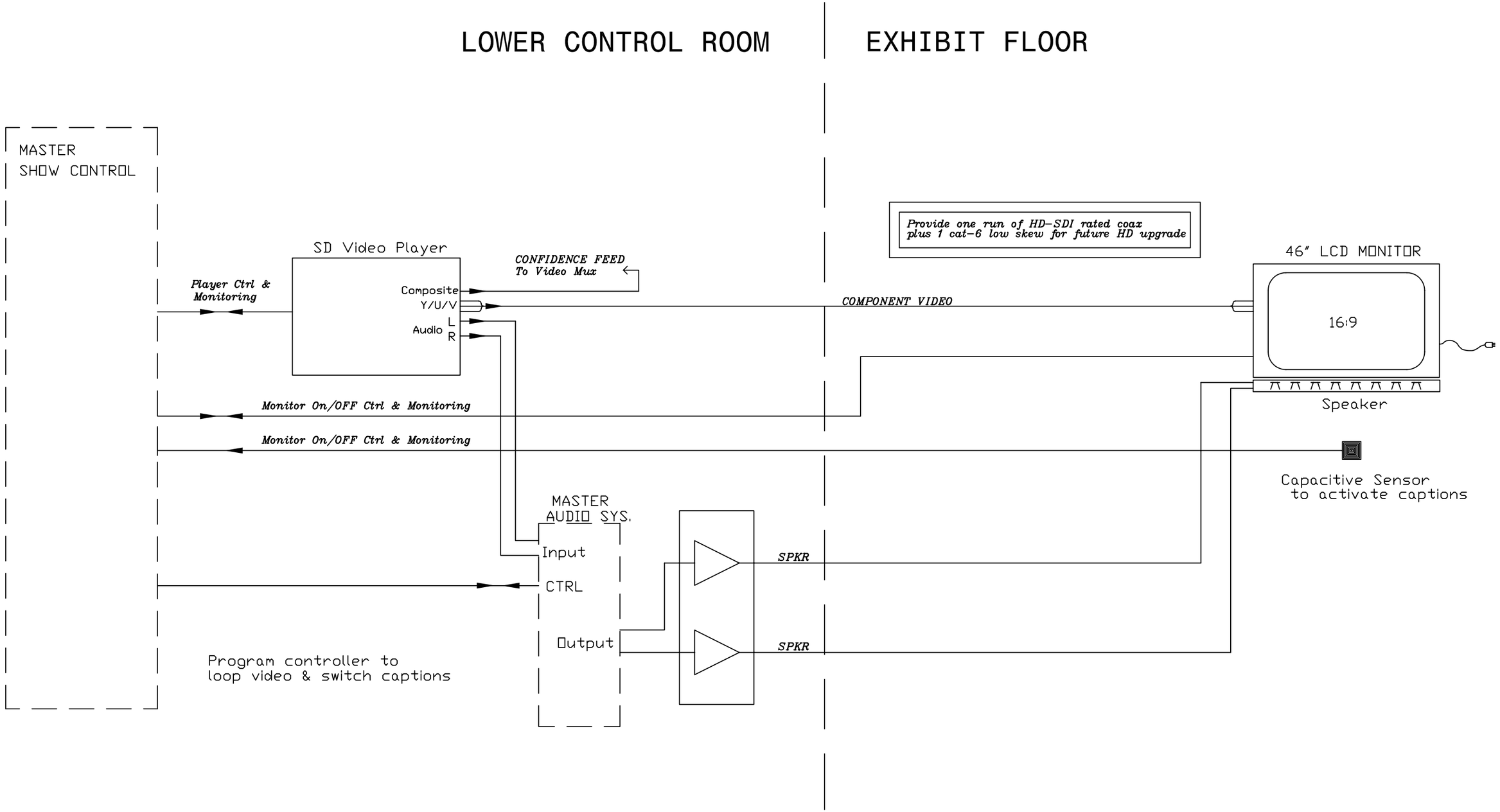
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-120

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

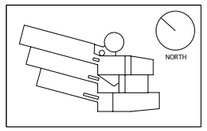


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title LK2.E06.av01

WATERSHED

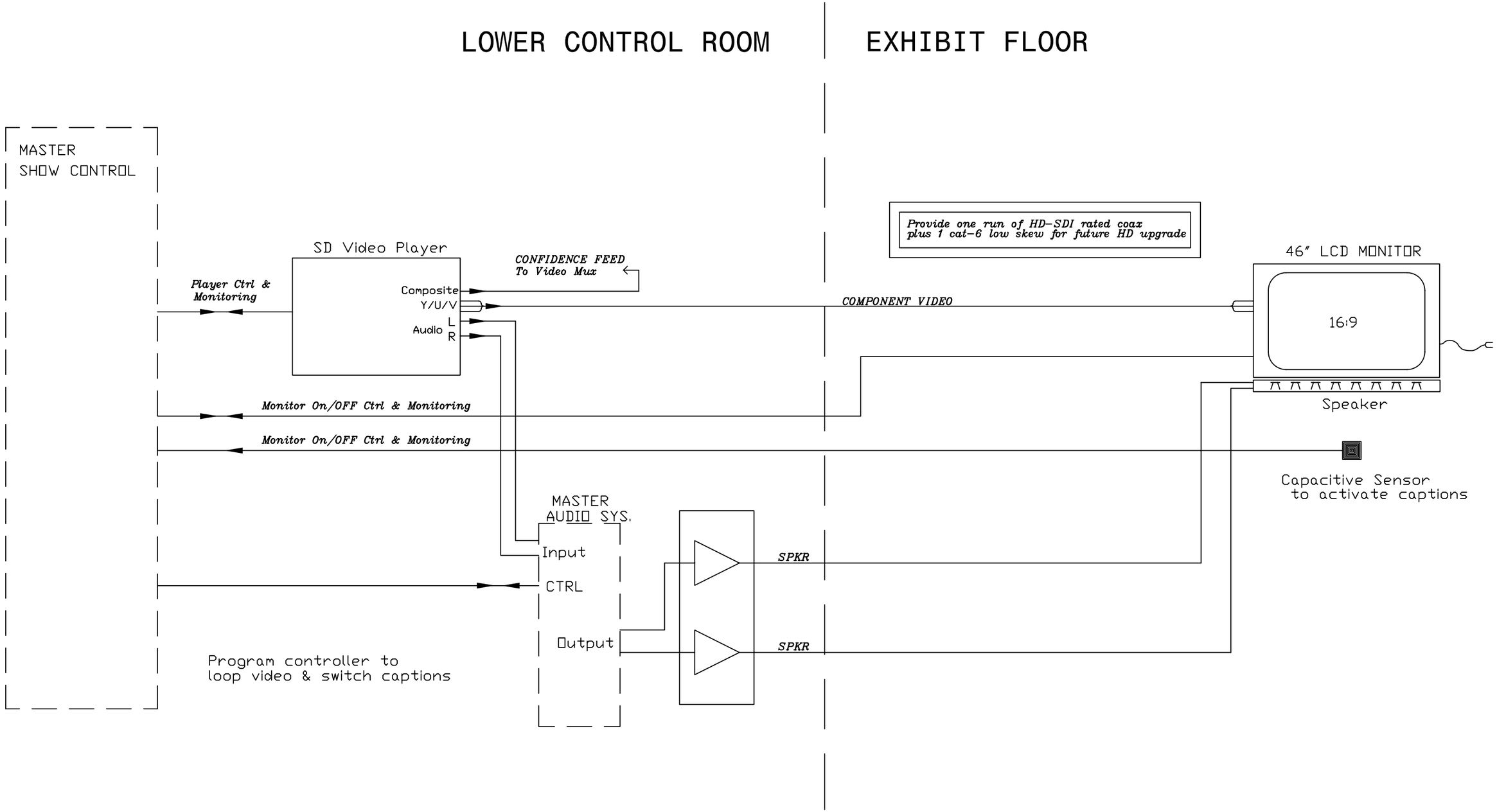
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-121

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

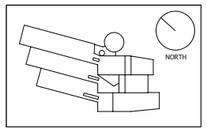


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title LK2.E05.av01

PEOPLE of the LAKE

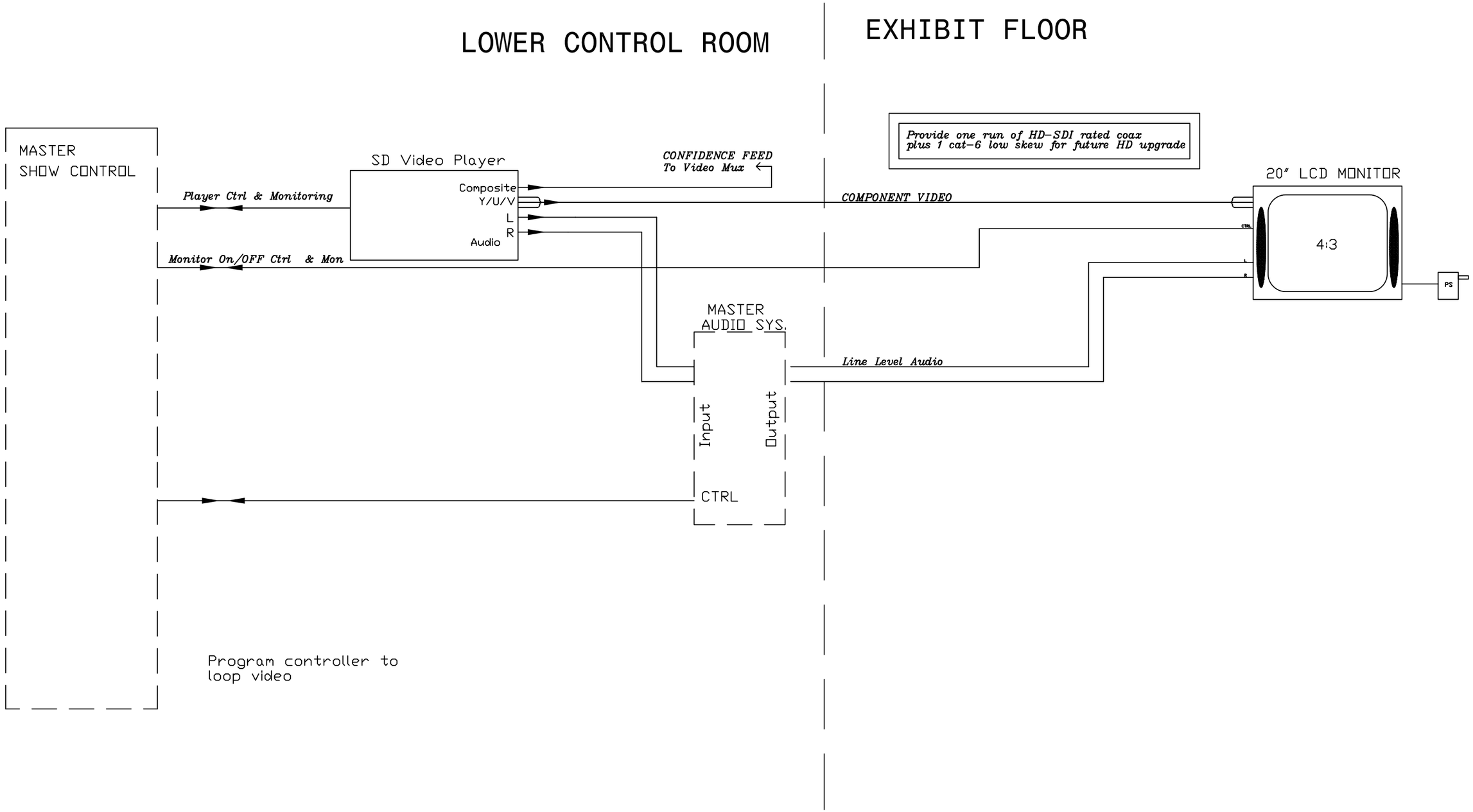
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-122

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

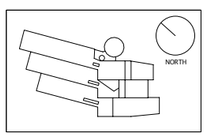


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title PW7.E01.av01

PALEO PREP

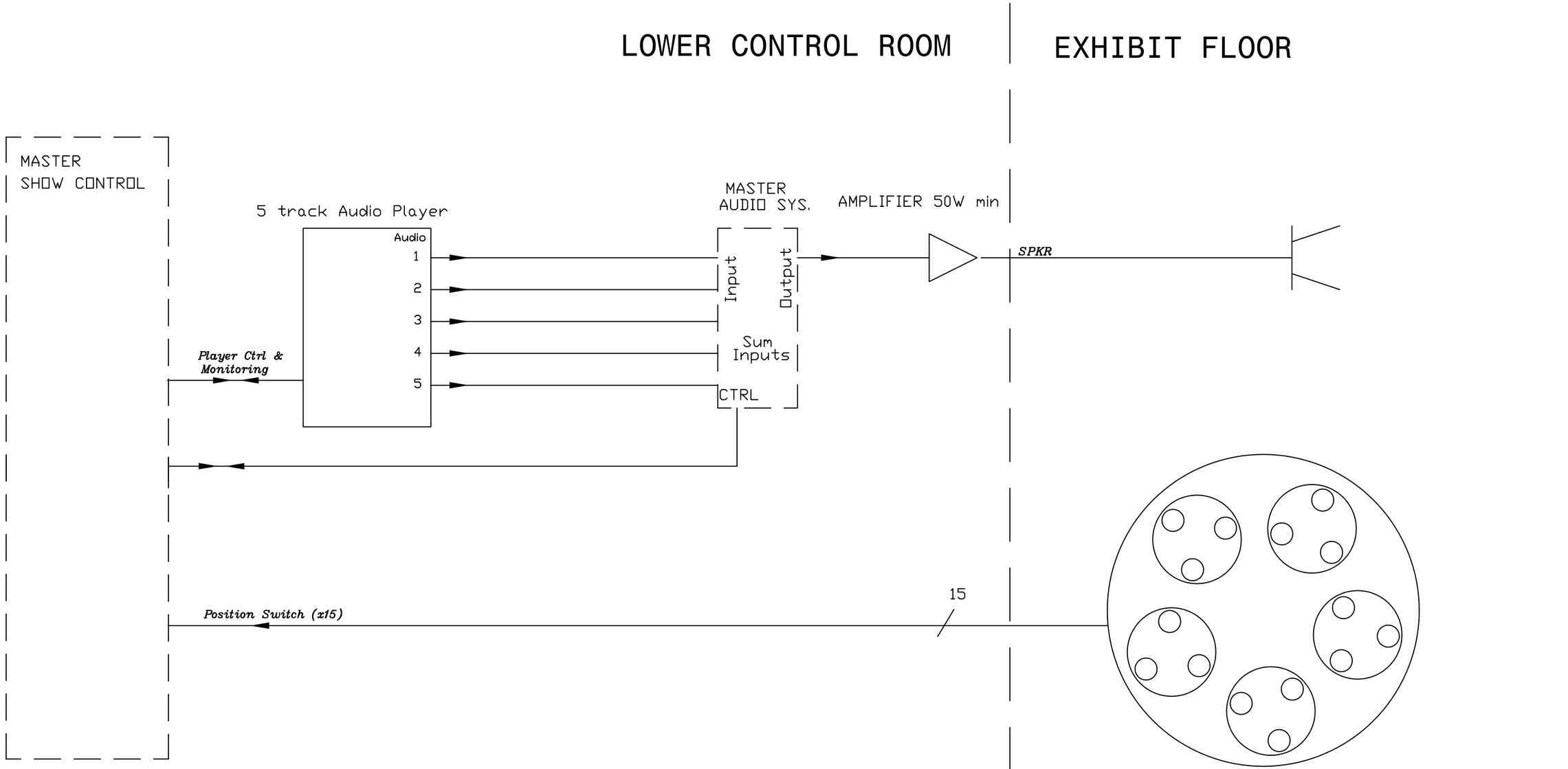
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-123

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



Program controller to trigger various sounds simultaneously based on position

Sounds may overlap, hold till previous sound complete or crossfade.

See interactive write up for more detail

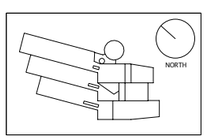
Table Mechainics & Switches/Sensors by fabricator
Coord w/ exhibit fab

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	**Audio Visual**	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title PW2.E04.av01

PLEISTOCENE DINNER

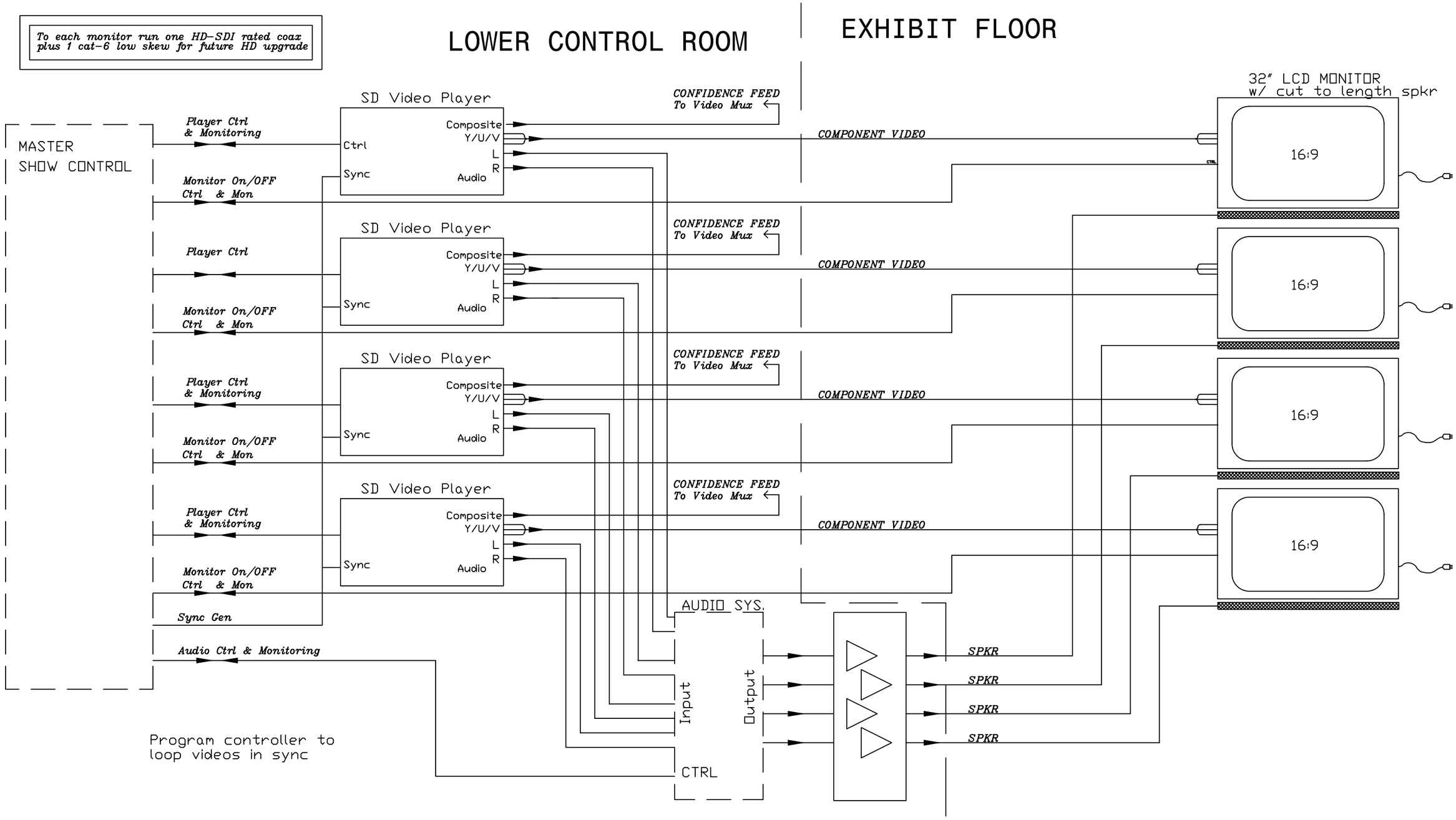
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-124

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.

Key Plan

No. / Issue Name / Date	No. / Issue Name / Date
	100% Final Design April 2, 2009

Sheet Title PW5.E03.av01

C.L. Quarry

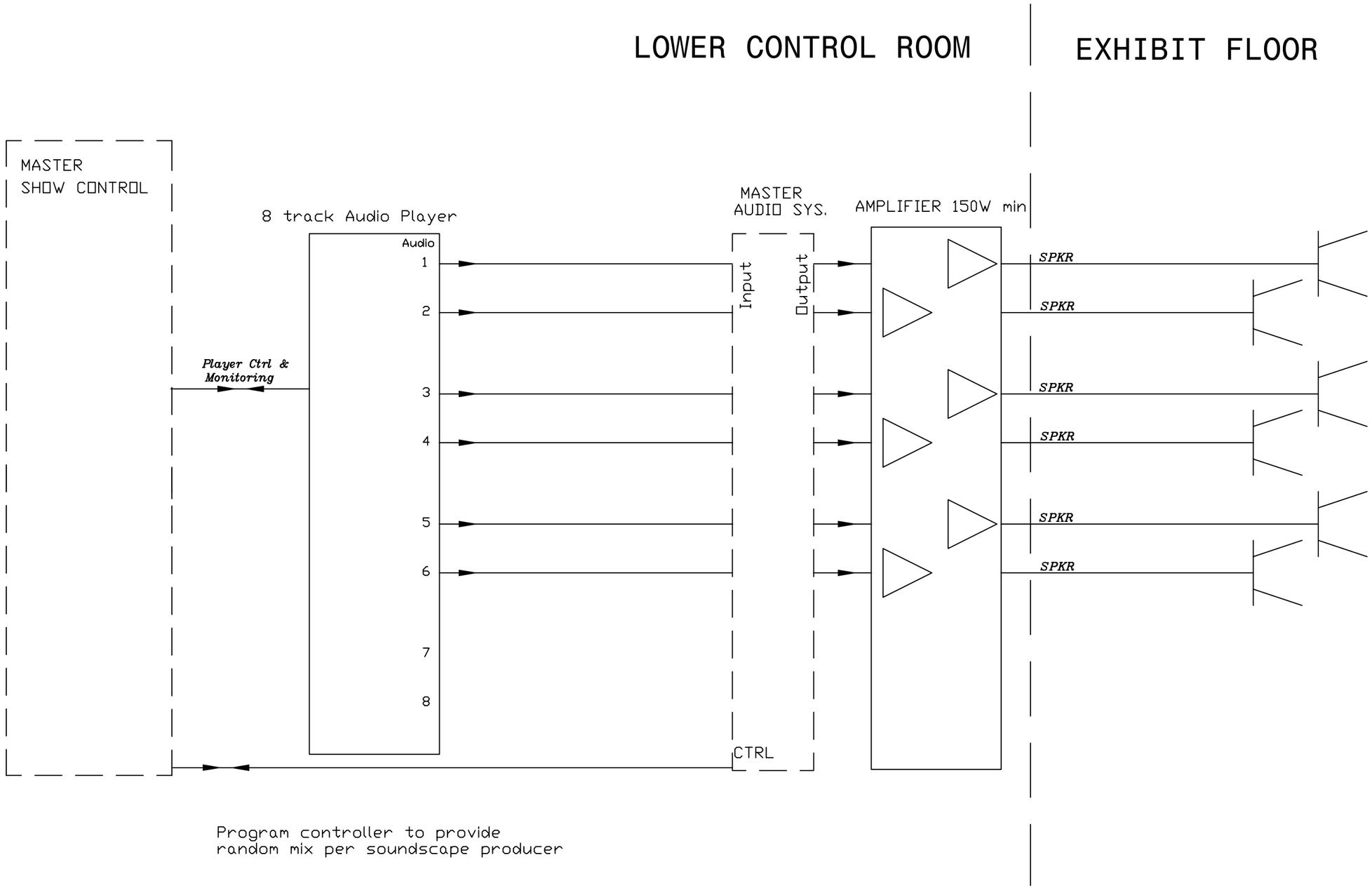
Date April 2, 2009

Scale*

RAA Project No. 0215
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-125

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

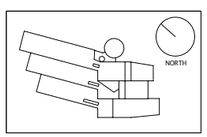


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	**Audio Visual**	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title PW4.E01.av01

LATE CRETACEOUS

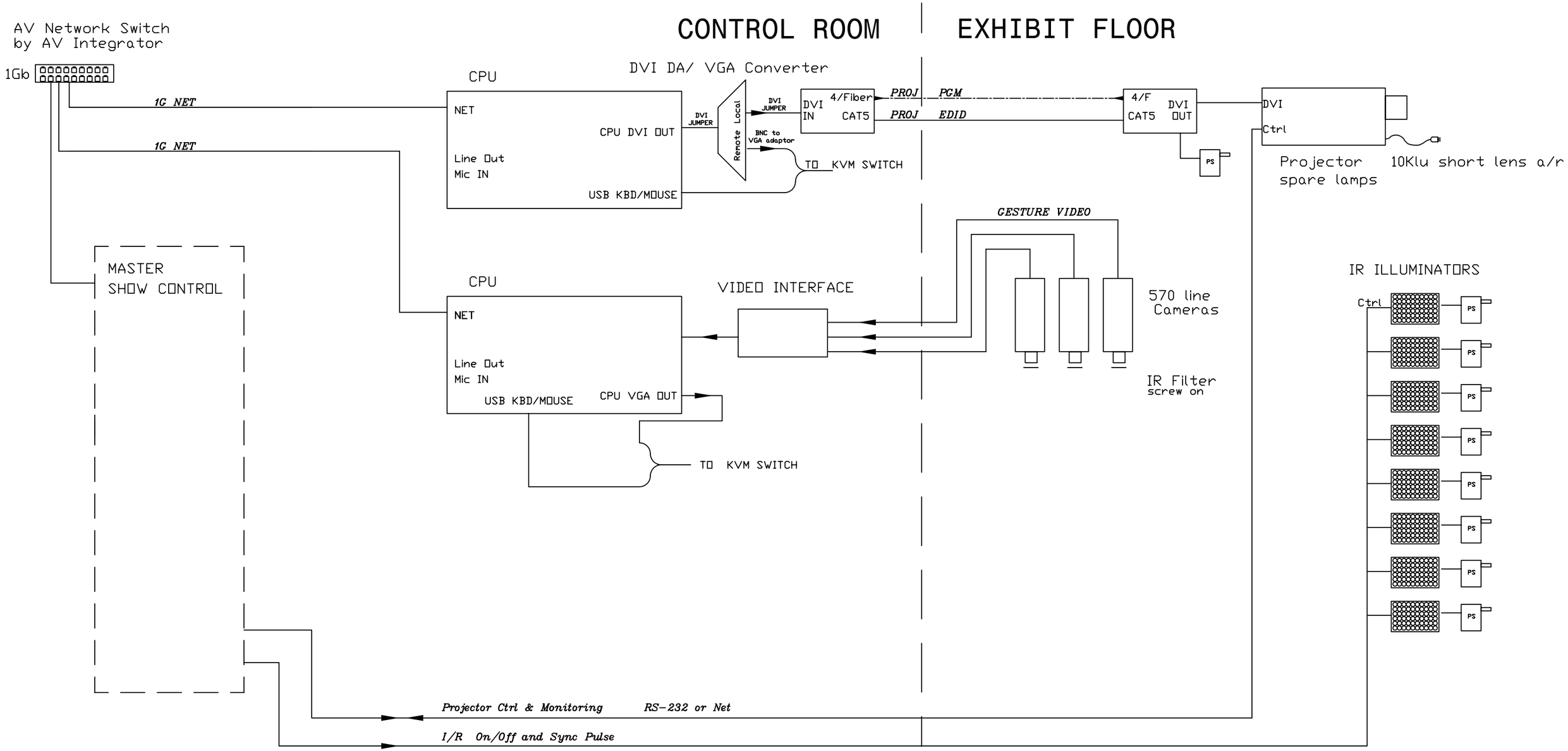
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-126

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

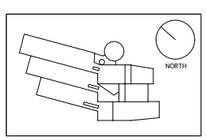


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title UF3.E01.av01

SUSTAINABILITY

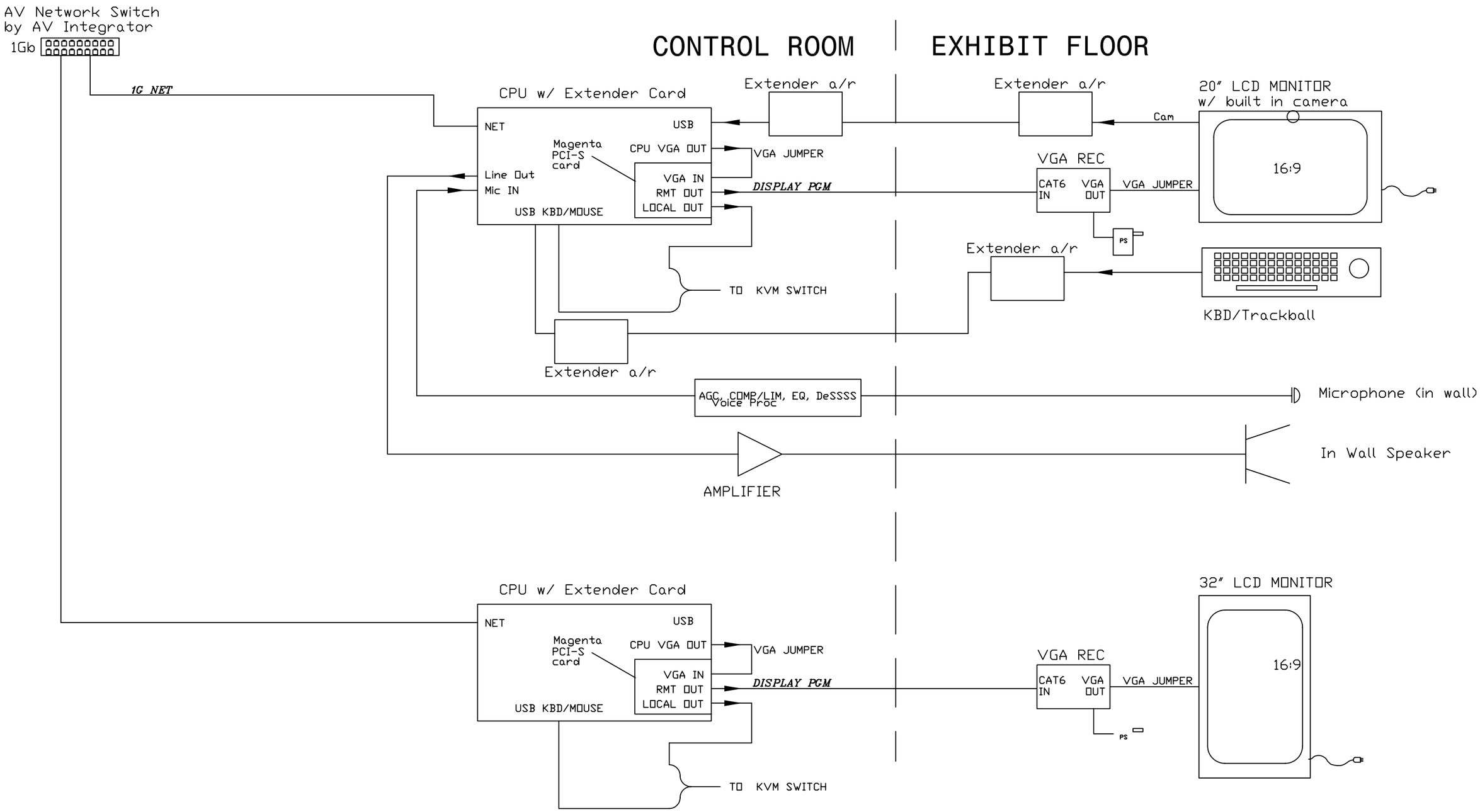
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-127

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

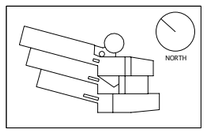


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title UF4.E01.av02

TALKBACK

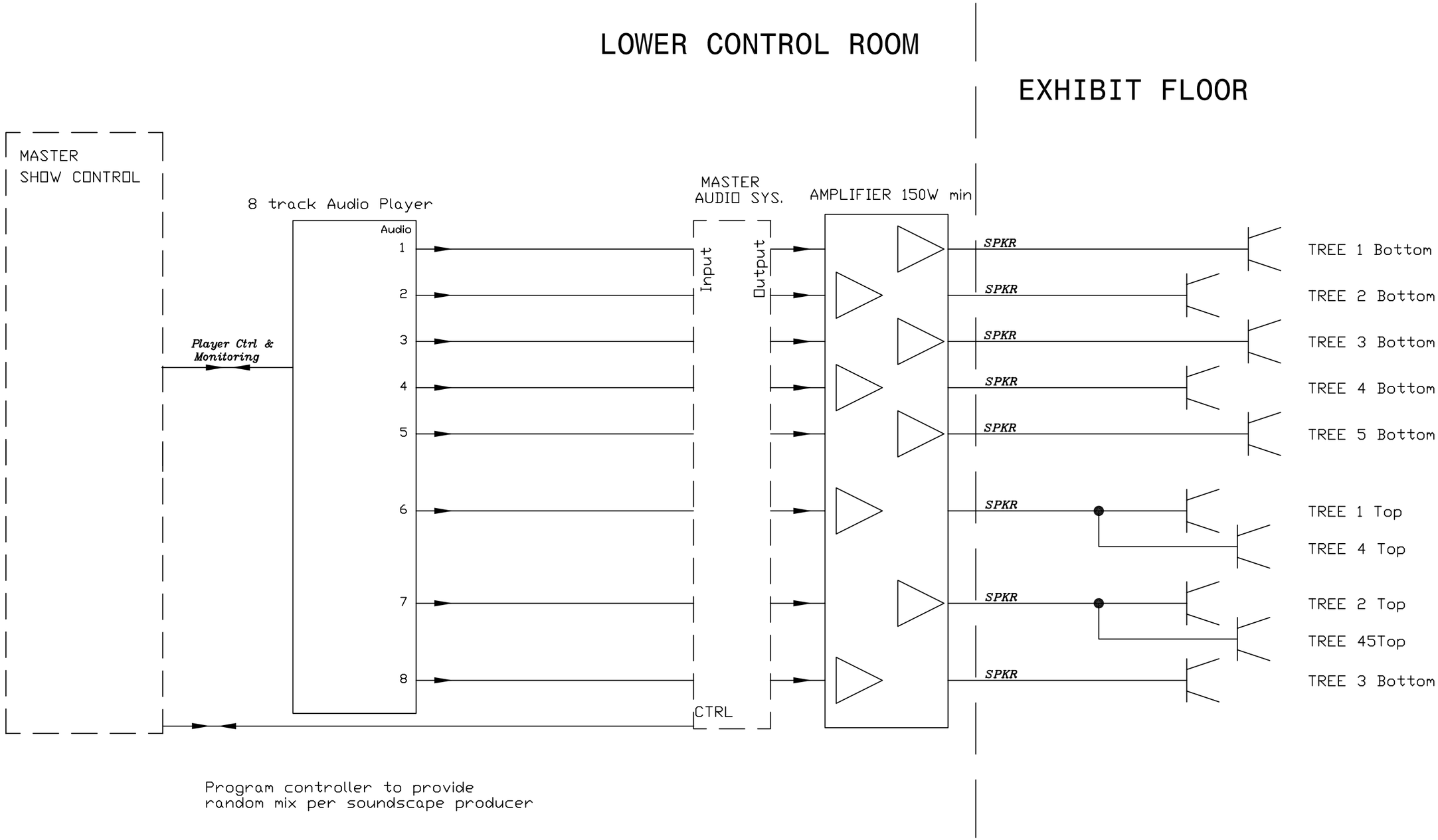
Date
April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-128

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

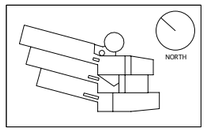


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title 0B2.E01.av01

BACKYARD SOUND

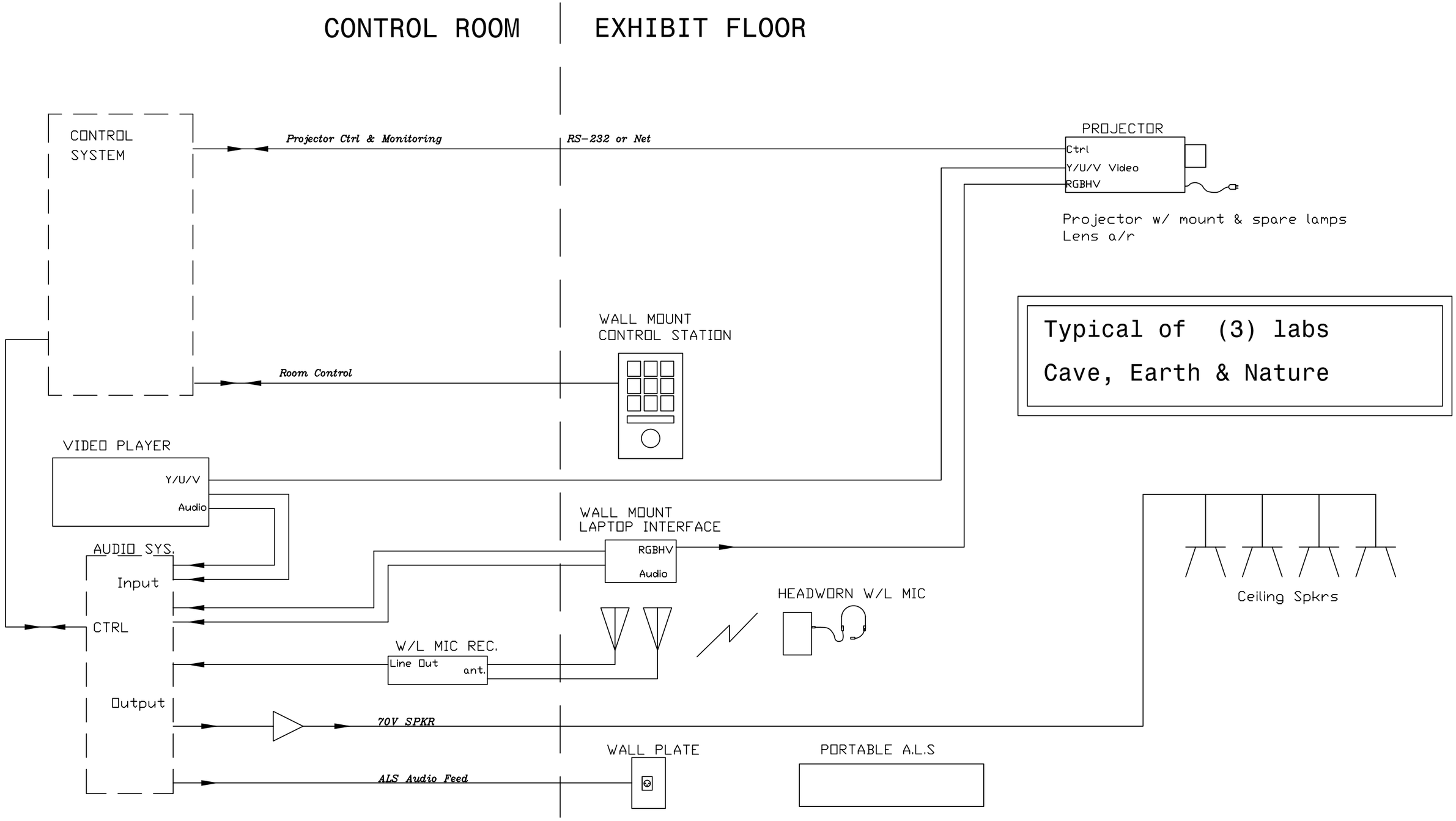
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-129

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

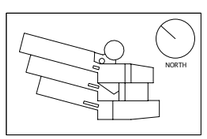


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

LABS

Date

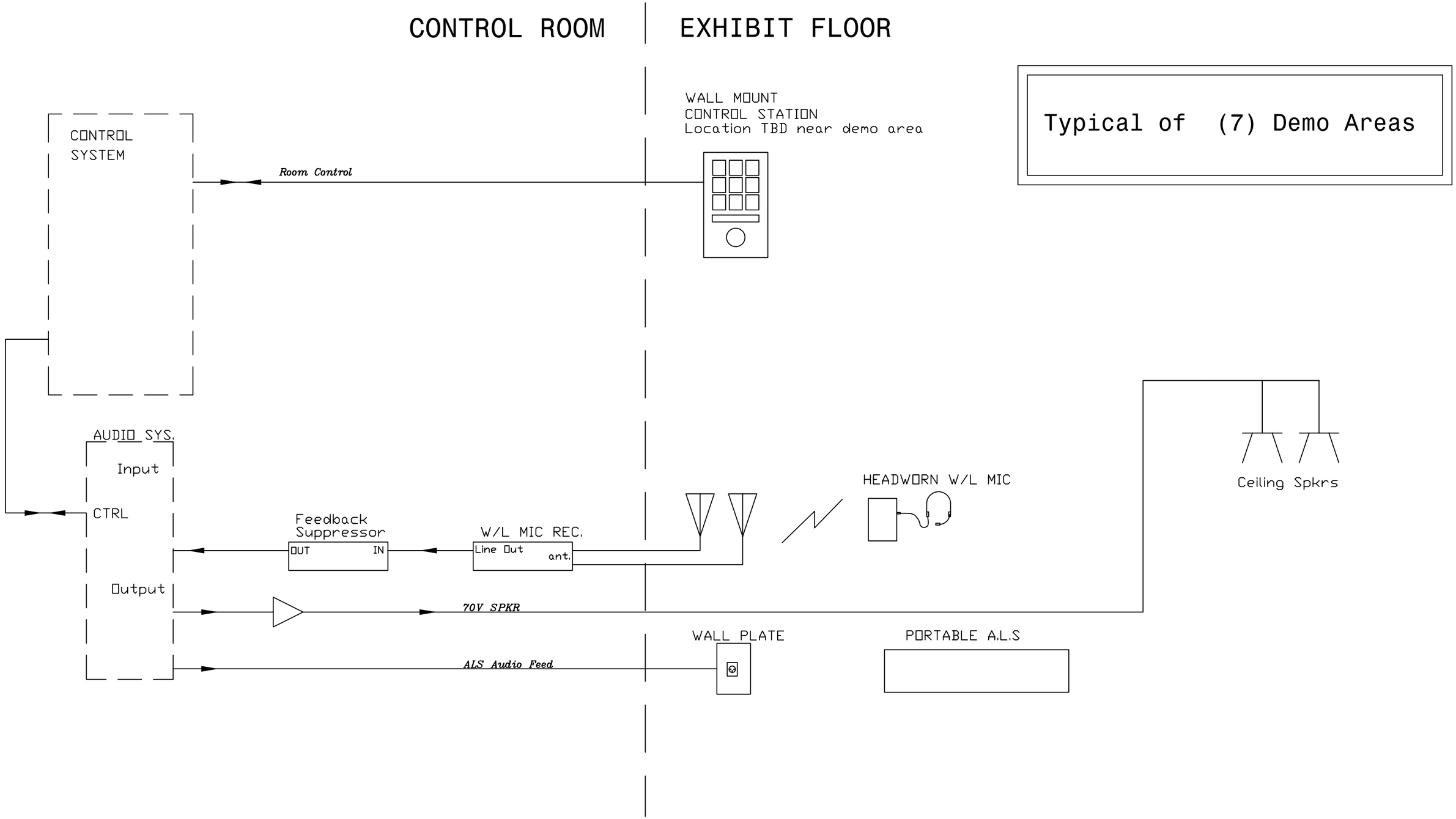
April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-130

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

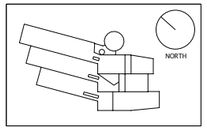


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

DEMO AREA

Date

April 2, 2009

Scale*

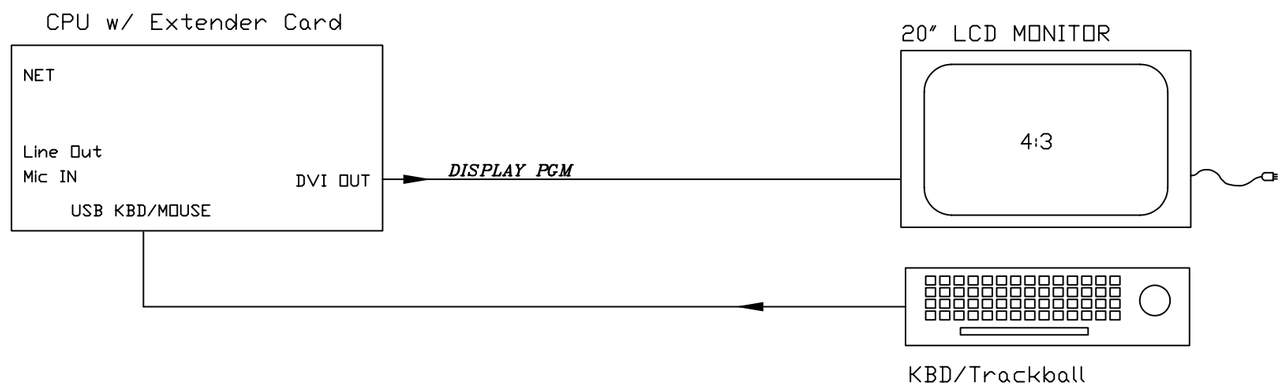
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-131

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

IN CART ON EXHIBIT FLOOR

Typical of (3) Carts

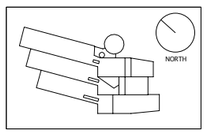


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title HN.AV01-AV03

Nat Hist Now

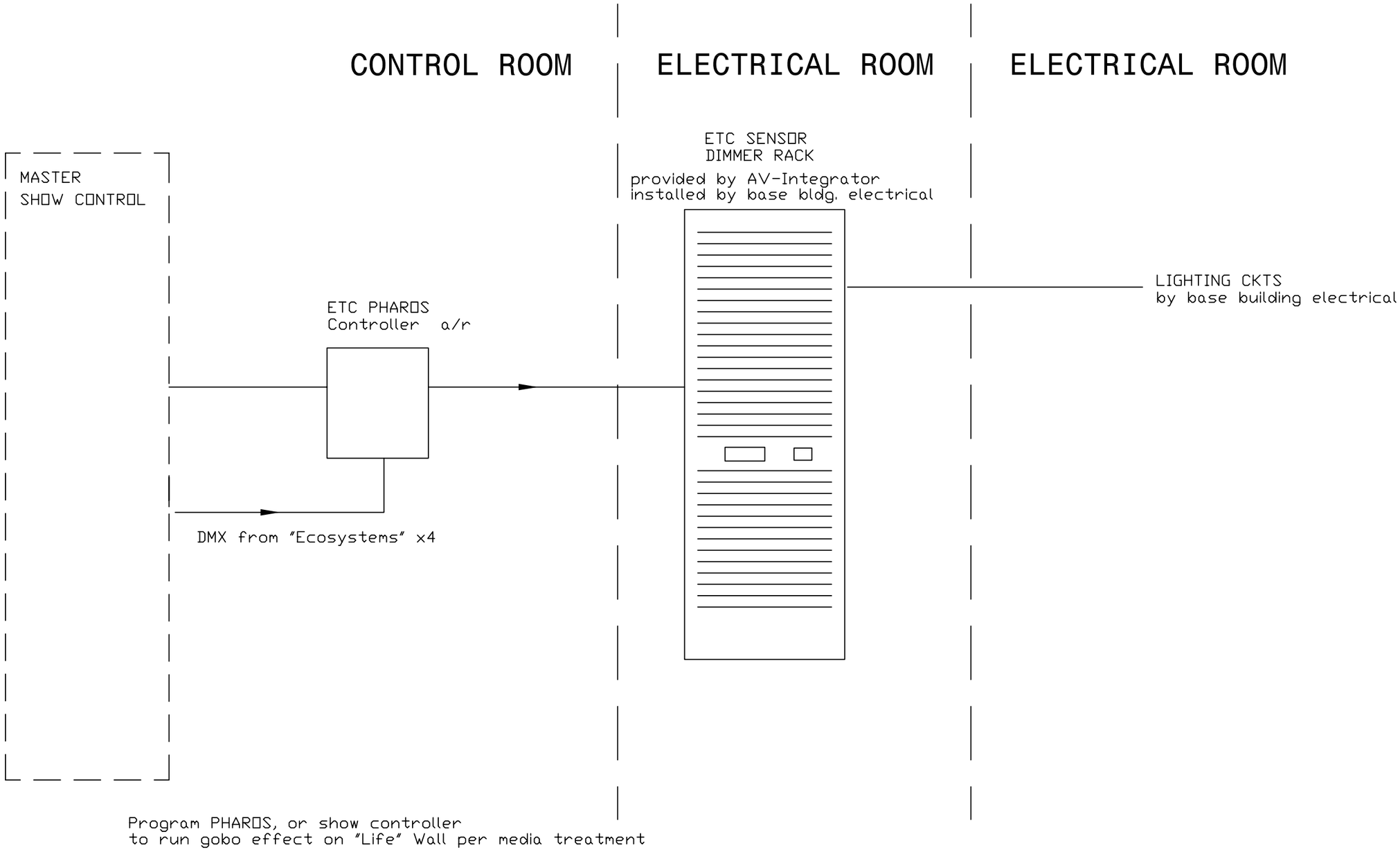
Date April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-132

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

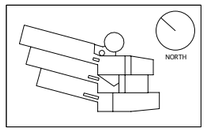


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

CENTRAL DIMMER

Date

April 2, 2009

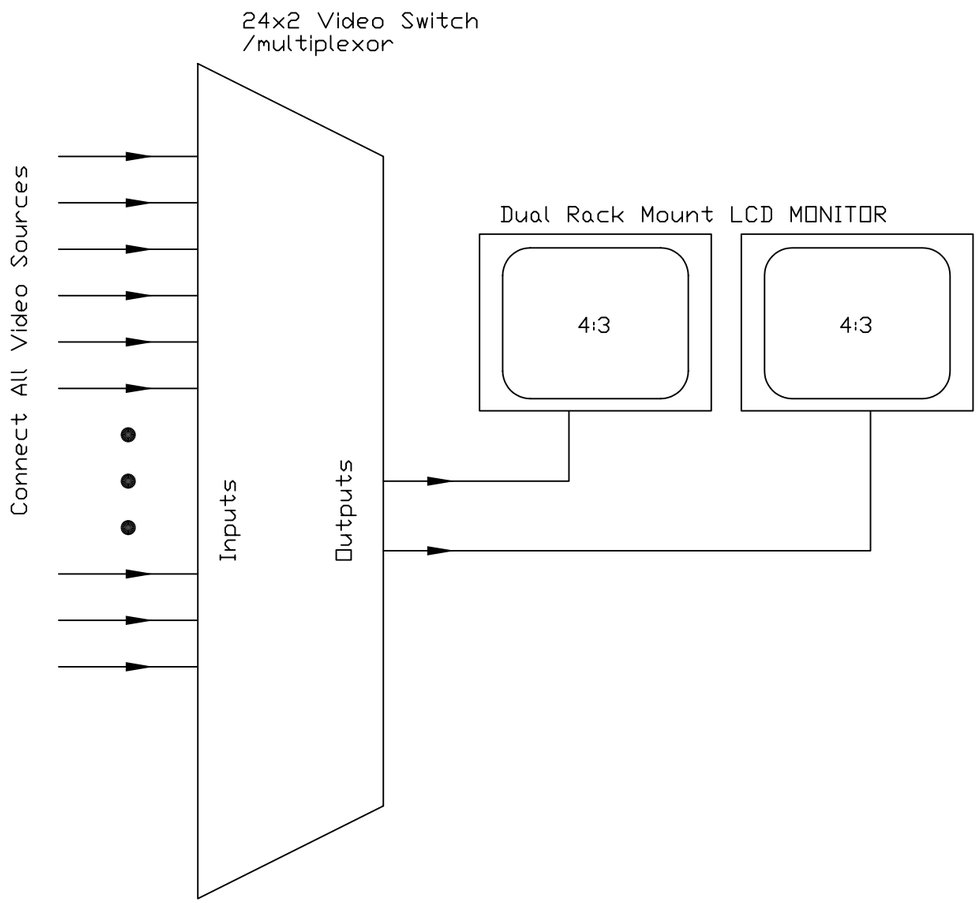
Scale*

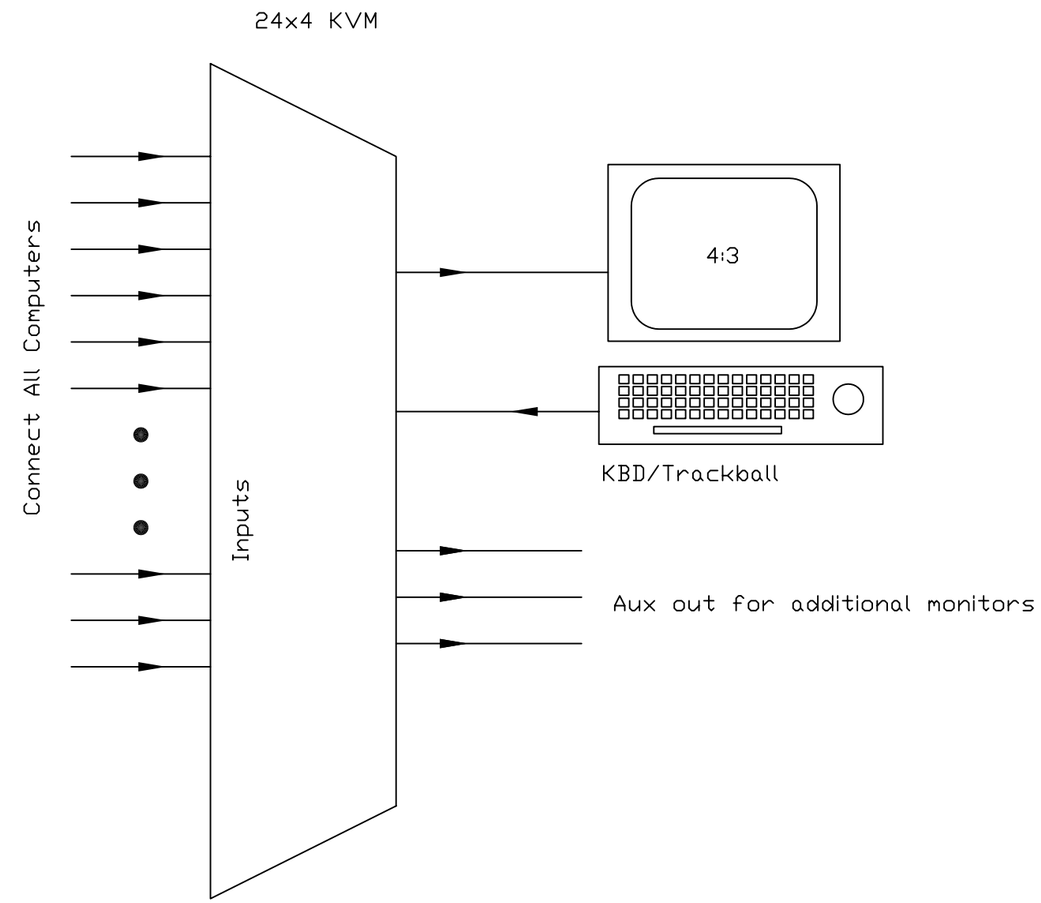
RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-133

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

CONTROL ROOM



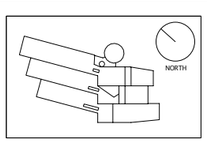


UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	**Audio Visual**	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, Utah 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	Branston Partnership 122 West 26th Street New York, NY 10001 212.924.4050 tel.	**BBI Engineering, Inc.** **241 Quint Street** **San Francisco, CA 94124** **415 685 9555 tel.**	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

MONITORING

Date

April 2, 2009

Scale*

RAA Project No. 0275
U. of U. Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

AV-134

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

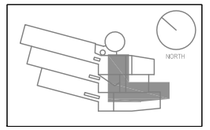
NOTE: XC lighting scope shown here - see gallery drawings for entire lighting design notes

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, UT 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	**Brandston Partnership Inc** **122 West 26th Street** **New York, New York 10001** **212.924.4050 tel.**	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415.685.9555 tel.	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

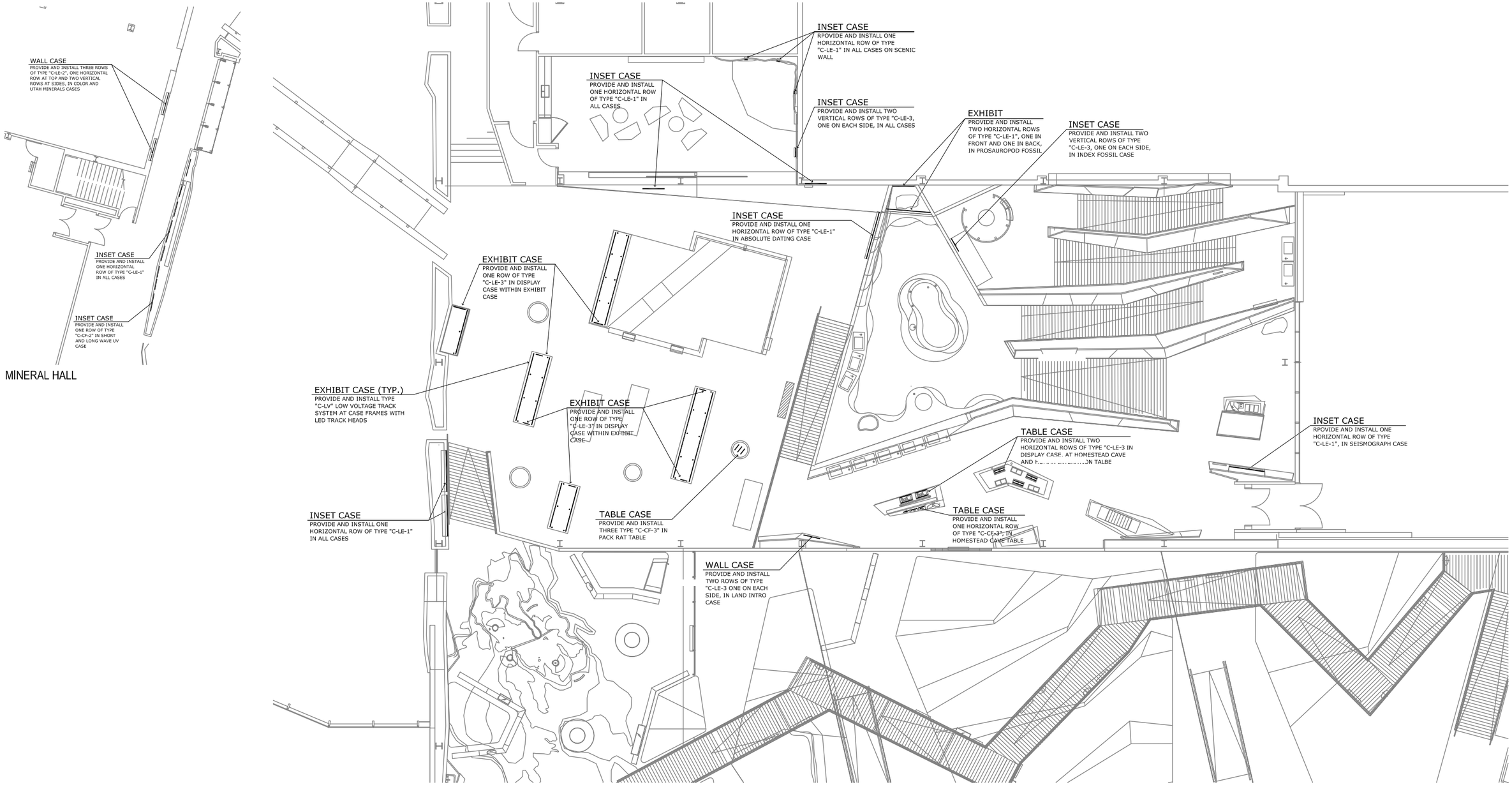
Sheet Title
Level 2 Lighting Plan

Date
April 2, 2009

Scale*
1/8"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX-L2-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



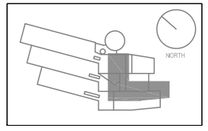
NOTE: XC lighting scope shown here - see gallery drawings for entire lighting design notes

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, UT 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	**Brandston Partnership Inc** **122 West 26th Street** **New York, New York 10001** **212.924.4050 tel.**	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415.685.9555 tel.	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

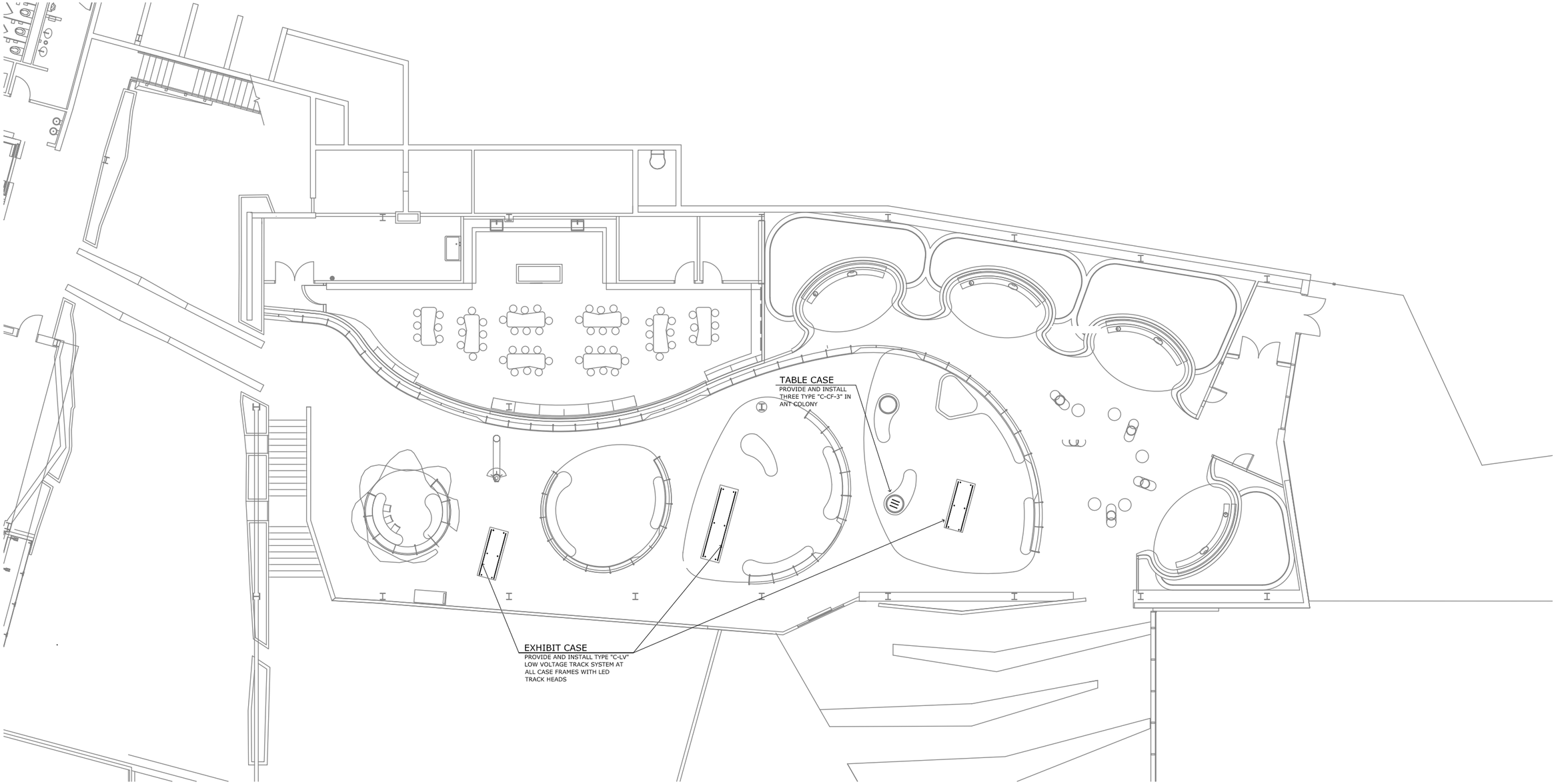
Sheet Title
Level 3 Lighting Plan

Date
April 2, 2009

Scale*
1/8"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX-L3-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



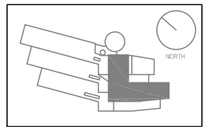
NOTE: XC lighting scope shown here - see gallery drawings for entire lighting design notes

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, UT 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	**Brandston Partnership Inc** **122 West 26th Street** **New York, New York 10001** **212.924.4050 tel.**	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415.885.9555 tel.	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

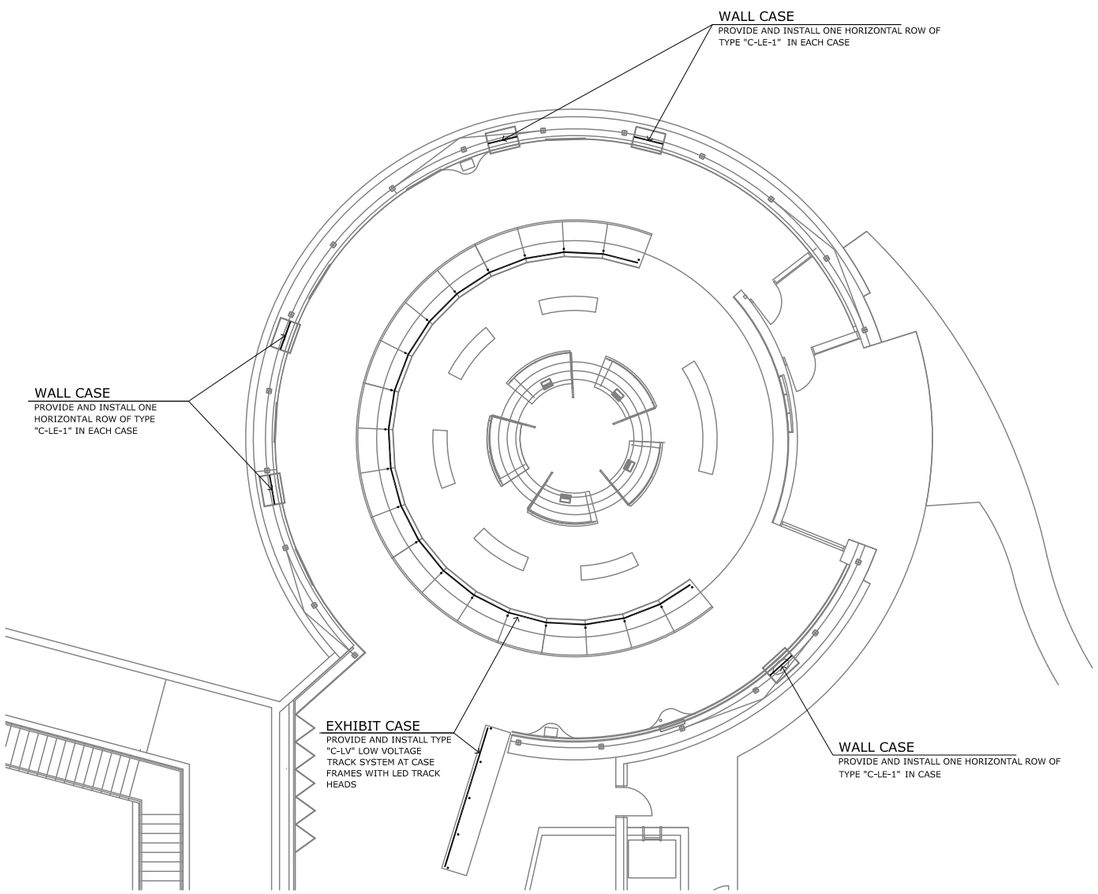
Sheet Title
Level 4 Lighting Plan

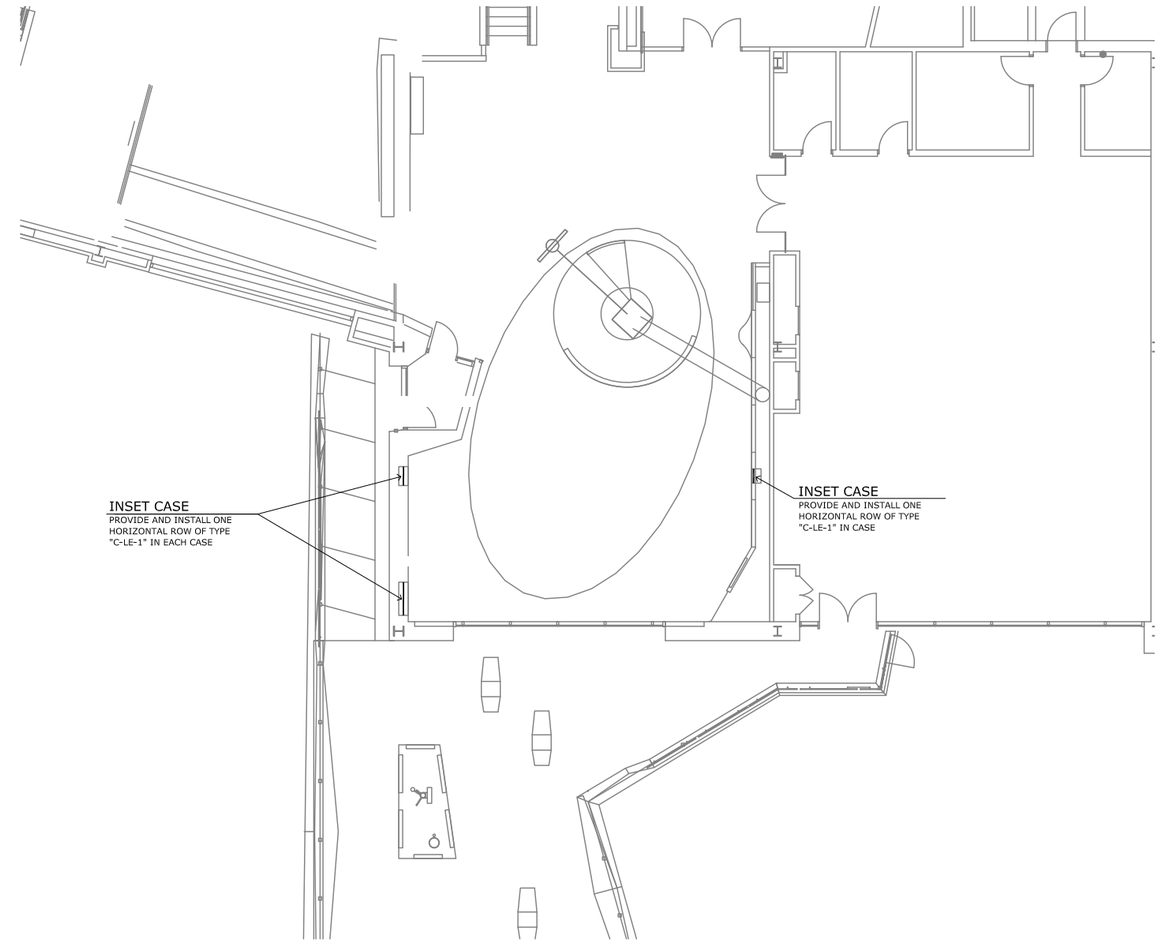
Date
April 2, 2009

Scale*
1/8"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX-L4-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")





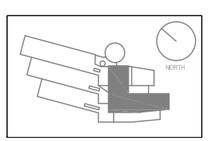
NOTE: XC lighting scope shown here - see gallery drawings for entire lighting design notes

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, UT 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	**Brandston Partnership Inc** **122 West 26th Street** **New York, New York 10001** **212.924.4050 tel.**	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415.685.9555 tel.	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

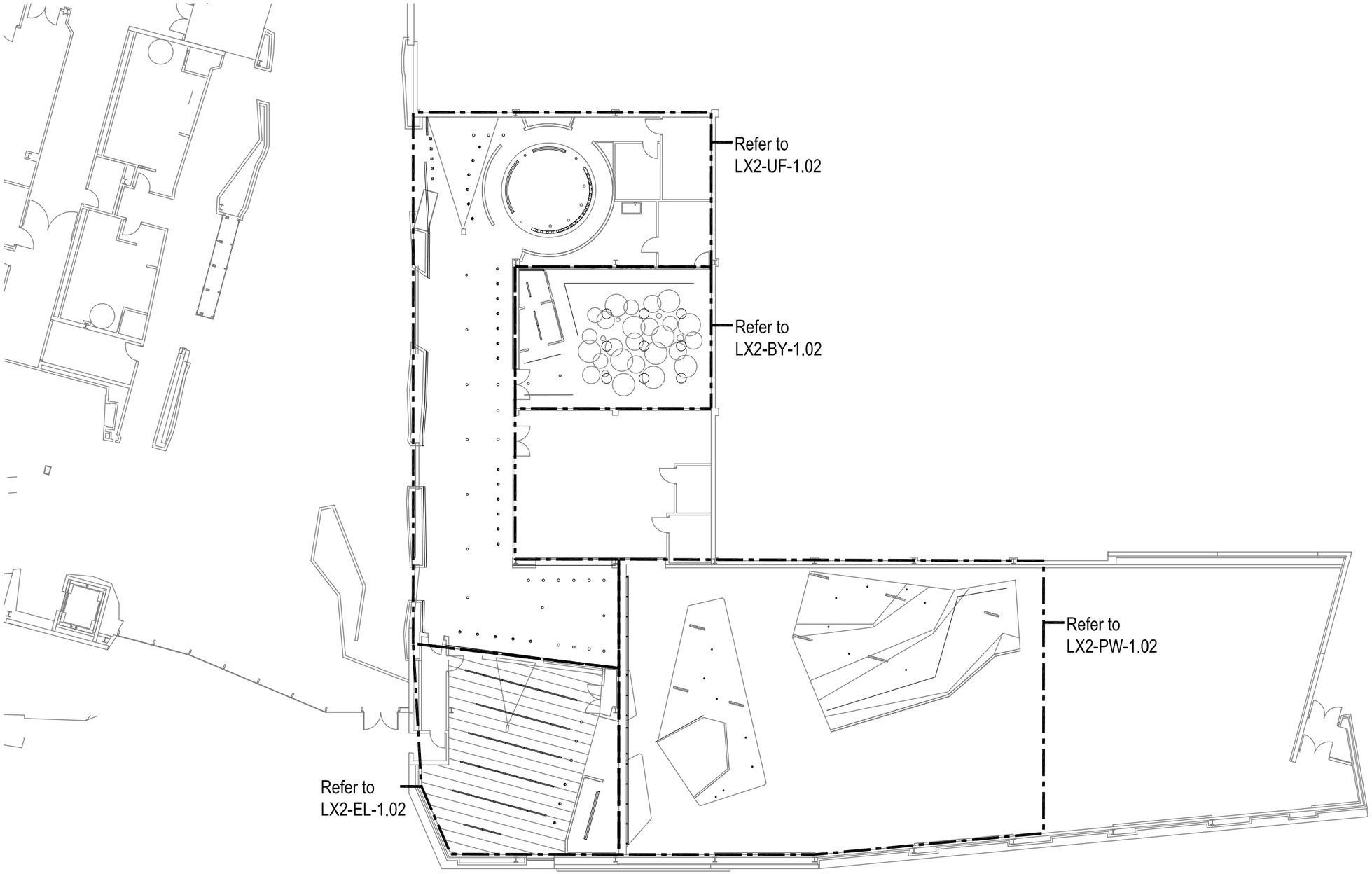
Sheet Title
Level 5 Lighting Plan

Date
April 2, 2009

Scale*
1/8"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX-L5-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



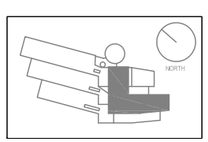
NOTE: All fixtures in RCP are in GC scope and are shown for reference only

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, UT 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	**Brandston Partnership Inc** **122 West 26th Street** **New York, New York 10001** **212.924.4050 tel.**	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415.685.9555 tel.	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

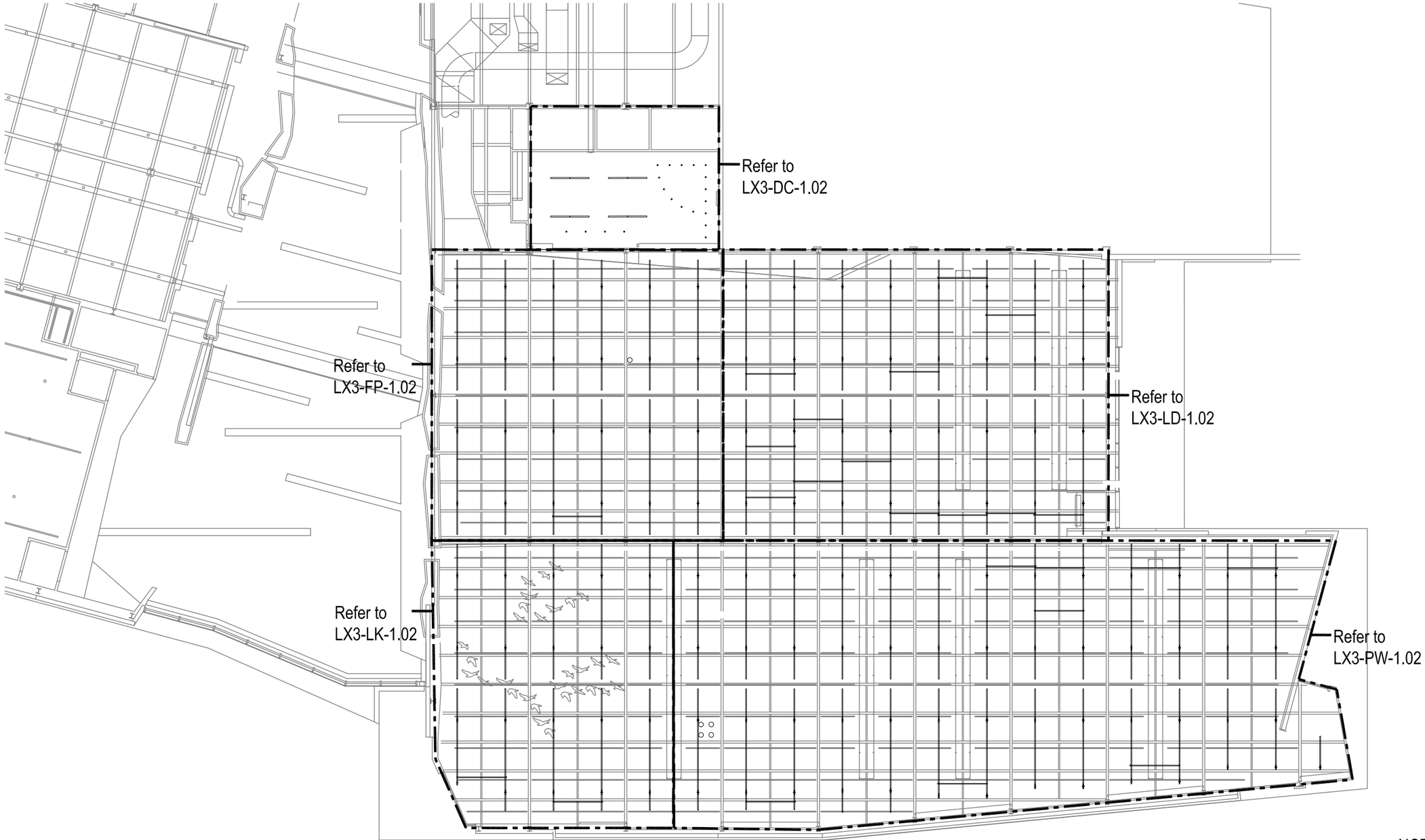
Sheet Title
Level 2 RCP - Key Plan

Date
April 2, 2009

Scale*
3/32"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX-L2-0.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



NOTE: All fixtures in RCP are in GC scope and are shown for reference only

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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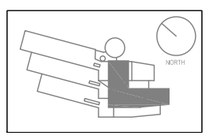
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, UT 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	**Brandston Partnership Inc** **122 West 26th Street** **New York, New York 10001** **212.924.4050 tel.**	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415.685.9555 tel.	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

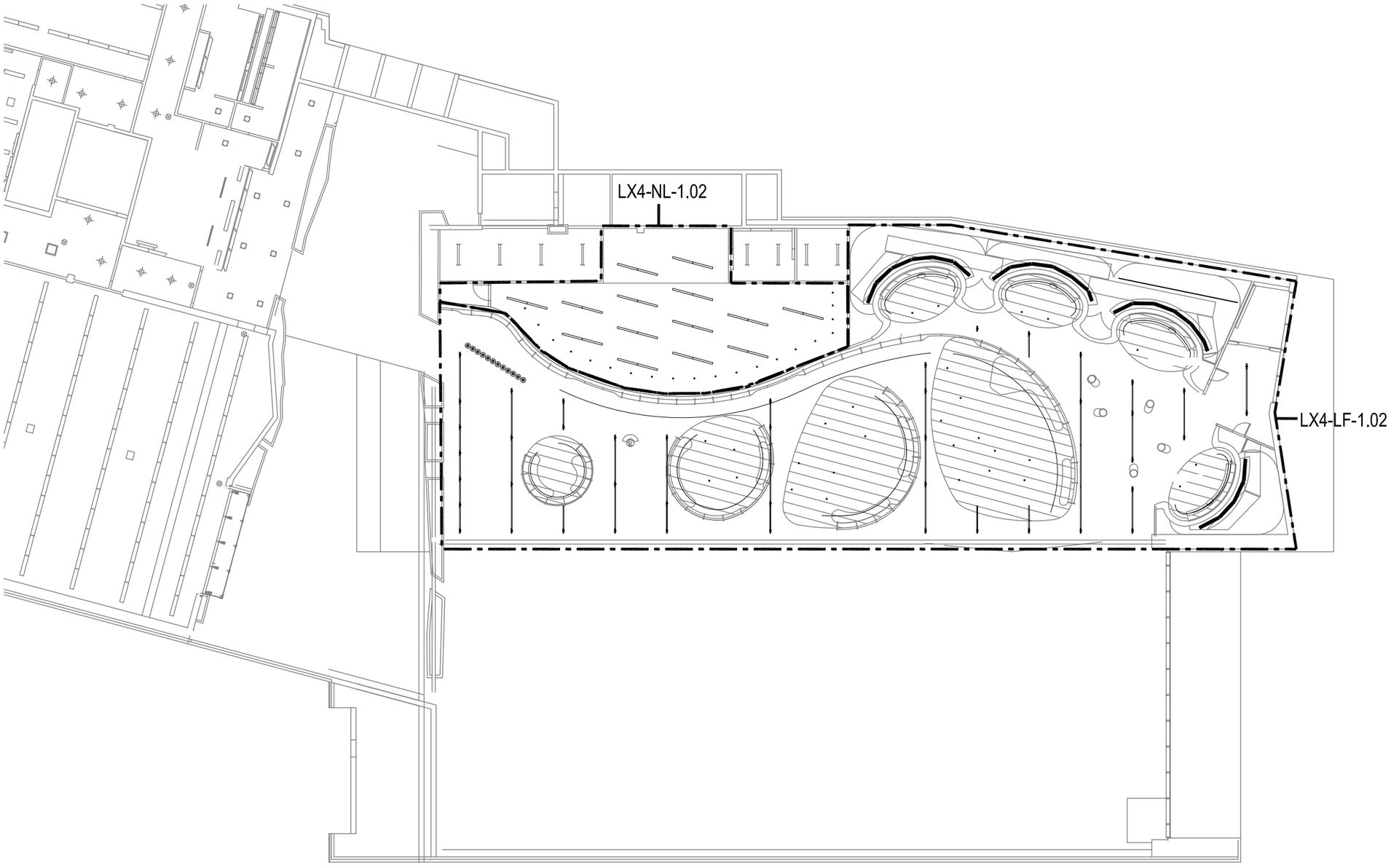
Sheet Title
Level 3 RCP - Key Plan

Date
April 2, 2009

Scale*
3/32"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX-L3-0.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



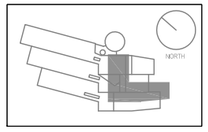
NOTE: All fixtures in RCP are in GC scope and are shown for reference only

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, UT 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	**Brandston Partnership Inc** **122 West 26th Street** **New York, New York 10001** **212.924.4050 tel.**	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415.685.9555 tel.	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

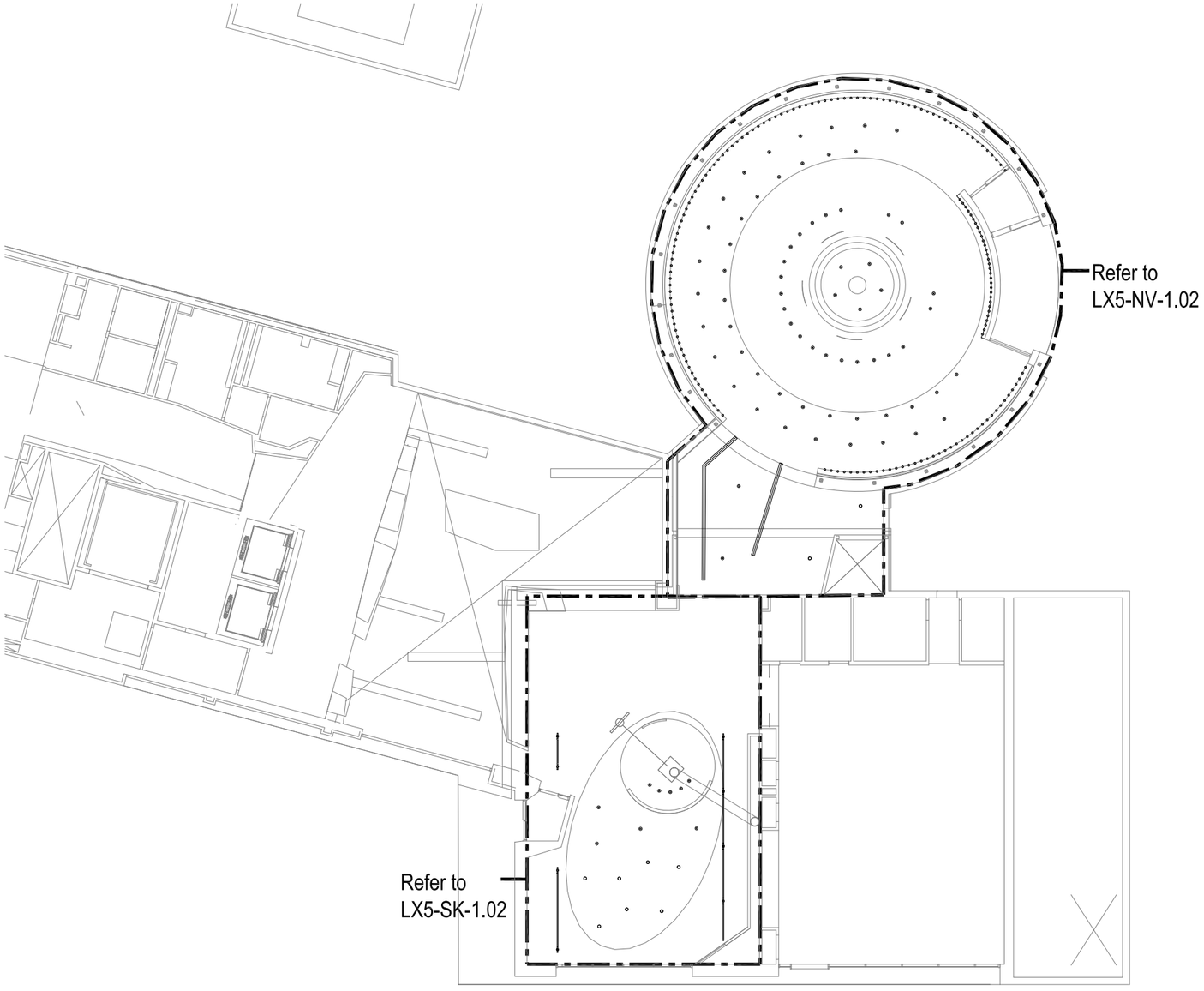
Sheet Title
Level 4 RCP - Key Plan

Date
April 2, 2009

Scale*
3/32"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX-L4-0.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



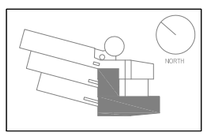
NOTE: All fixtures in RCP are in GC scope and are shown for reference only

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, UT 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	**Brandston Partnership Inc** **122 West 26th Street** **New York, New York 10001** **212.924.4050 tel.**	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415.885.9555 tel.	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

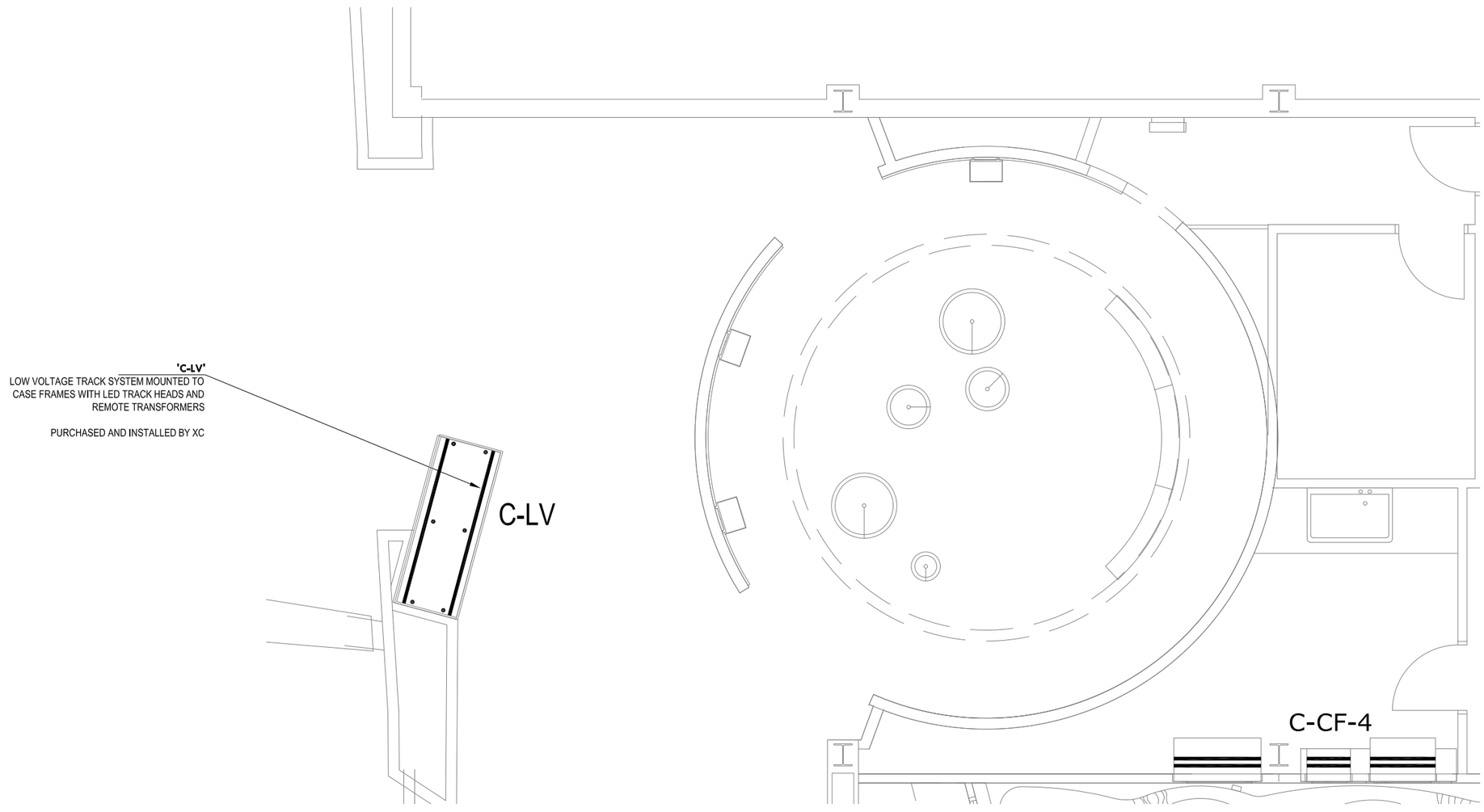
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Level 5 RCP - Key Plan

Date	RAA Project No. 0275
April 2, 2009	U. of U Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
3/32"=1'-0"	LX-L5-0.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



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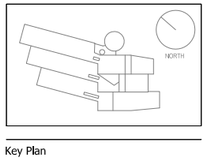


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

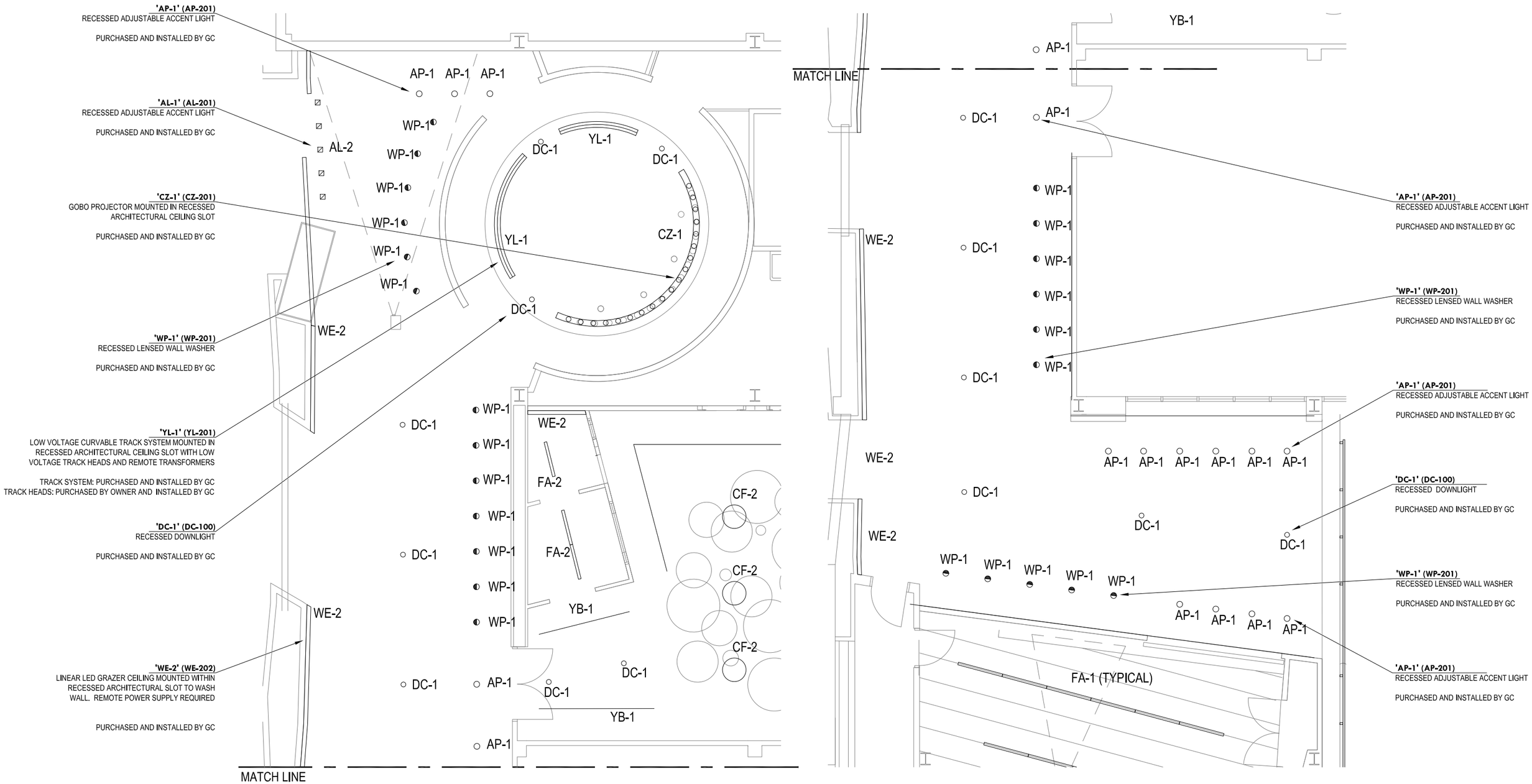
Level 2 Partial Plan:
Utah Futures Observatory/Mineral Hall

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX2-UF-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
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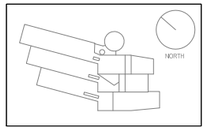


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

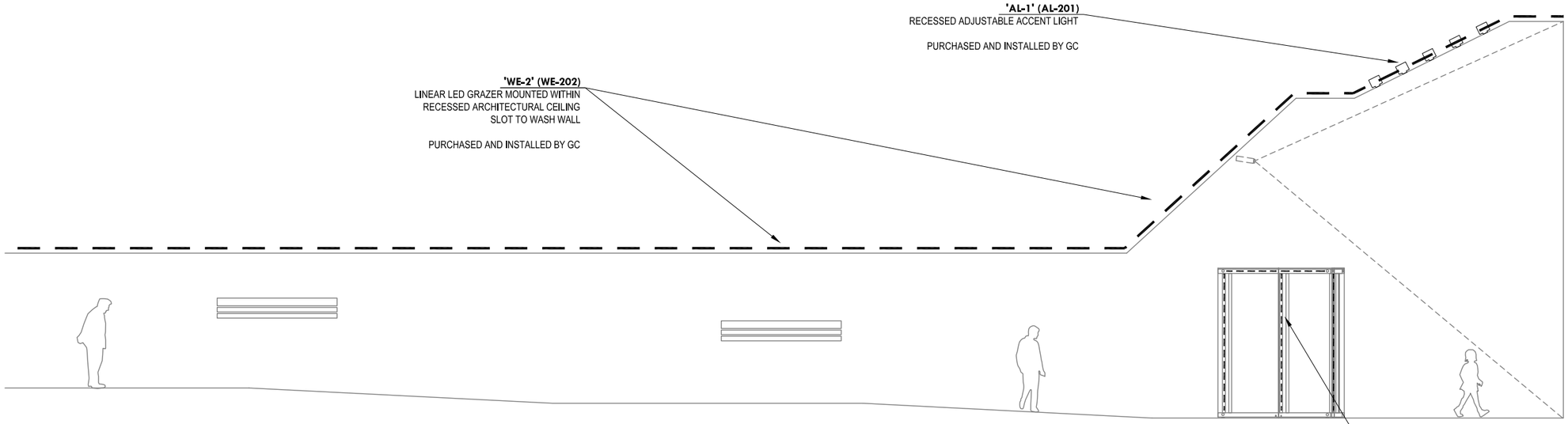
Sheet Title
Level 2 Partial RCP:
Utah Futures Observatory/Mineral Hall

Date
April 2, 2009

Scale*
1/8"=1'-0"

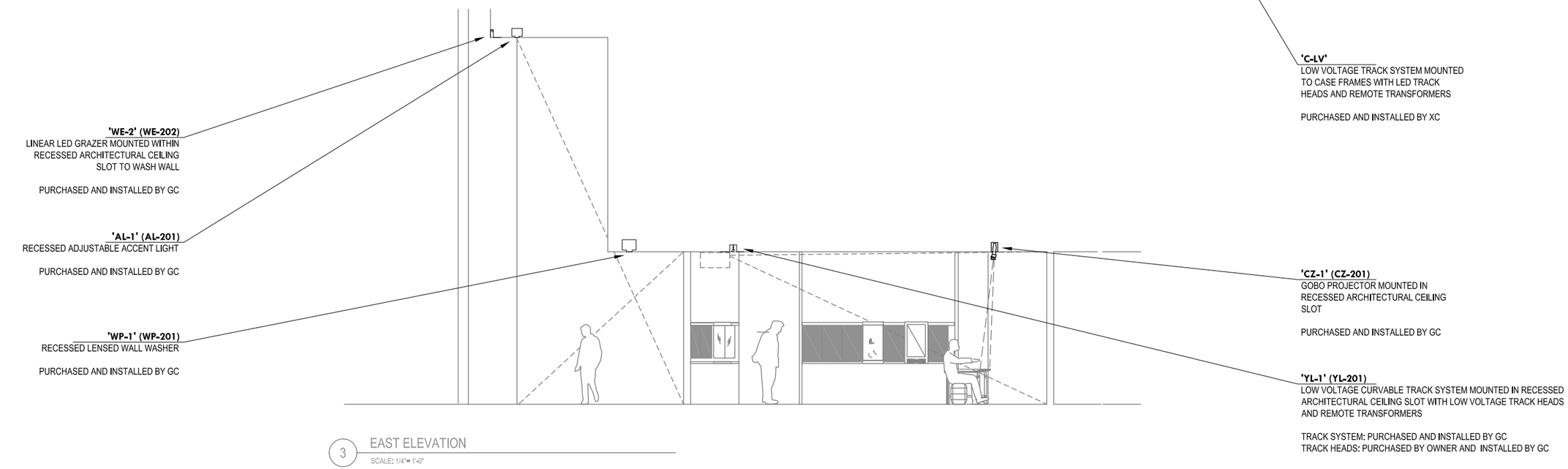
RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX2-UF-1.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



2 NORTH ELEVATION

SCALE: 1/4"= 1'-0"



3 EAST ELEVATION

SCALE: 1/4"= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner
UMNH
1390 East President's Circle
Salt Lake City, Utah 84112
801.581.6927 tel.

Design Architect
Polshek Partnership Architects LLP
320 West 13th Street
New York, New York
212.807.7171 tel.

Architect of Record
Gillies Stransky Brems Smith
375 West 200 South
Salt Lake City, Utah
801.521.8600 tel.

Exhibit Structural Engineer
Leslie E. Robertson Associates
30 Broad Street
New York, New York 10004
212.750.9000 tel.

Building Engineer
Dunn Associates
380 West 800 South, Suite 100
Salt Lake City, UT 84101
801.575.8877 tel.

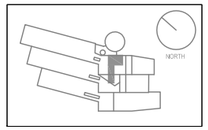
Mechanical/Plumbing/FP Engineer
Colvin Engineering Associates, Inc.
244 West 300 North
Salt Lake City, Utah 84103
801.322.2400 tel

Electrical/AV Engineer
Spectrum Engineers
175 South Main Street
Salt Lake City, Utah 84111
800.678.7077 tel

Lighting
Brandston Partnership Inc
122 West 26th Street
New York, New York 10001
212.924.4050 tel.

Audio Visual
BBI Engineering, Inc.
241 Quint Street
San Francisco, CA 94124
415.885.9555 tel.

Exhibition Planner and Designer
Ralph Appelbaum Associates
88 Pine Street
New York, New York 10005
212.334.8200 tel.



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

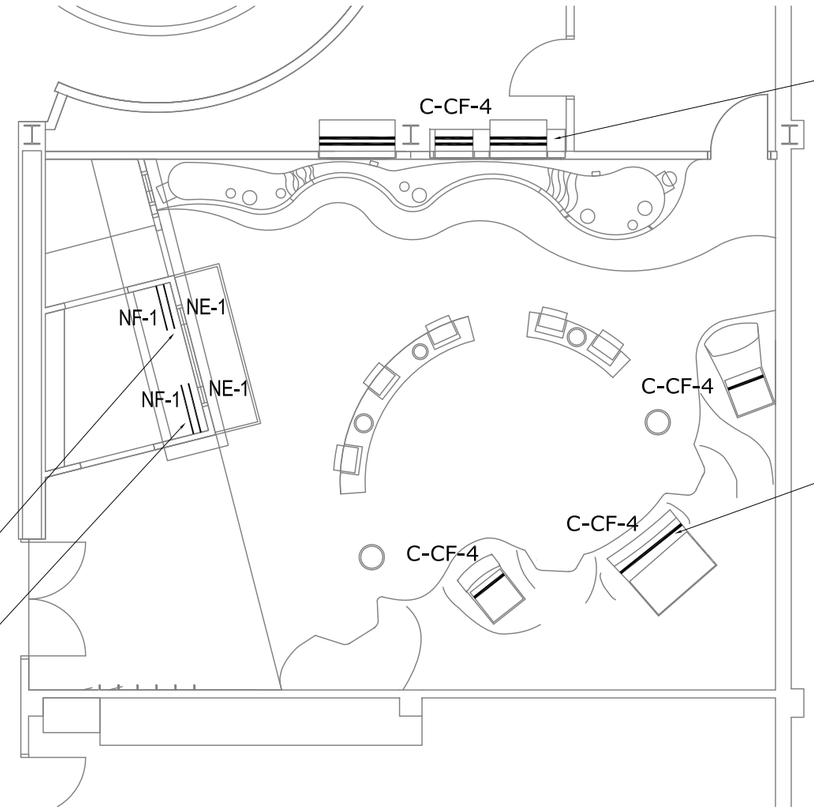
Sheet Title
Sections & Elevations:
Utah Futures Observatory

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX2-UF-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



'C-CF-4'
TWO HORIZONTAL ROWS OF FLUORESCENT CHANNELS MOUNTED IN ALL LIVE DISPLAY CASE

PURCHASED AND INSTALLED BY XC

'C-CF-4'
ONE HORIZONTAL ROW OF FLUORESCENT CHANNELS MOUNTED IN ALL LIVE DISPLAY CASE

PURCHASED AND INSTALLED BY XC

'NE-1' (NE-200)
LED CABINET LIGHT IN ALL SHELVES

PURCHASED AND INSTALLED BY GC

'NF-1' (NF-200)
FLUORESCENT UNDER CABINET LIGHT

PURCHASED AND INSTALLED BY GC

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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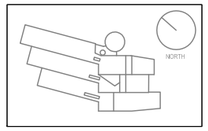


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

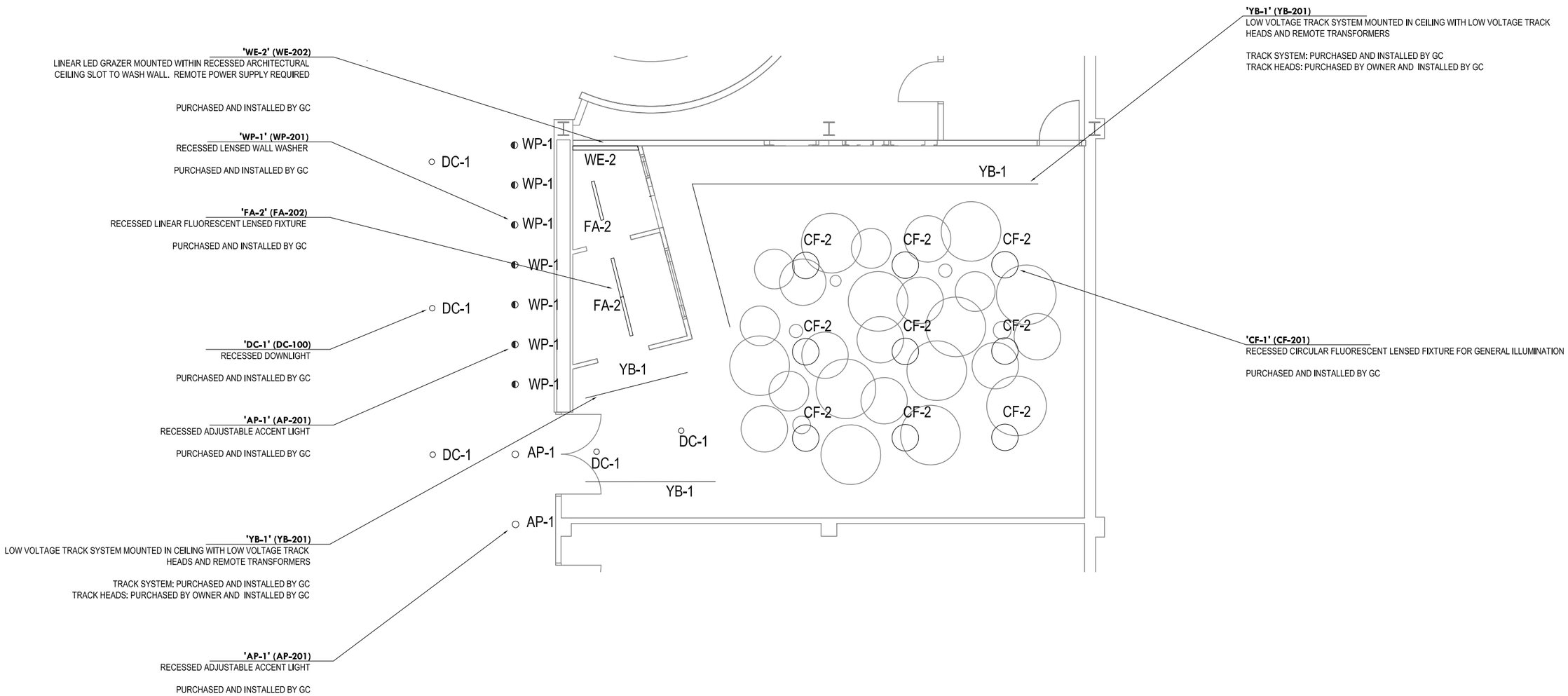
Sheet Title
Level 2 Partial Plan:
'Our Backyard'/Children's Gallery

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX2-BY-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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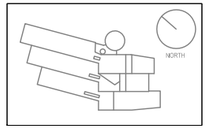


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

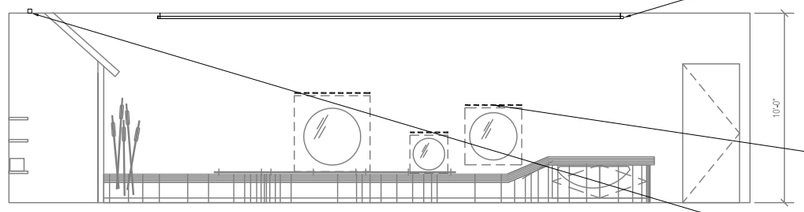
100% Final Design April 2, 2009

Sheet Title

Level 2 Partial RCP:
'Our Backyard'/Children's Gallery

Date	RAA Project No. 0275
April 2, 2009	U. of U Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	LX2-BY-1.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



YB-1' (YB-201)
LOW VOLTAGE TRACK SYSTEM MOUNTED IN CEILING WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS

TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

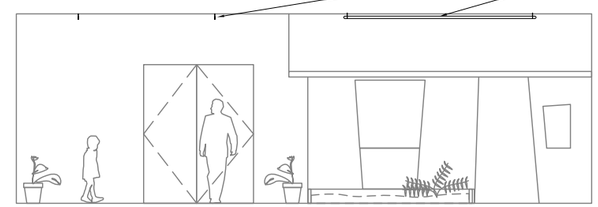
'C-CF-4'
TWO HORIZONTAL ROWS OF FLUORESCENT CHANNELS MOUNTED IN ALL LIVE DISPLAY CASES

PURCHASED AND INSTALLED BY XC

'FA-2' (FA-202)
RECESSED LINEAR FLUORESCENT LENSED FIXTURE

PURCHASED AND INSTALLED BY GC

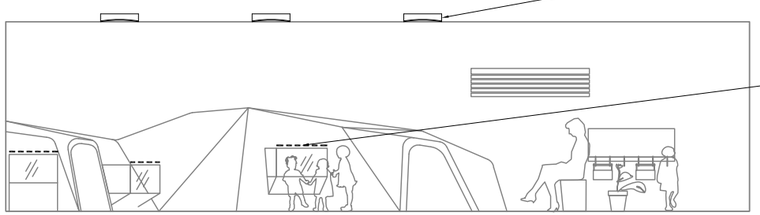
1 EAST ELEVATION
SCALE: 1/4"= 1'-0"



YB-1' (YB-201)
LOW VOLTAGE TRACK SYSTEM MOUNTED IN CEILING WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS

TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

2 NORTH ELEVATION
SCALE: 1/4"= 1'-0"



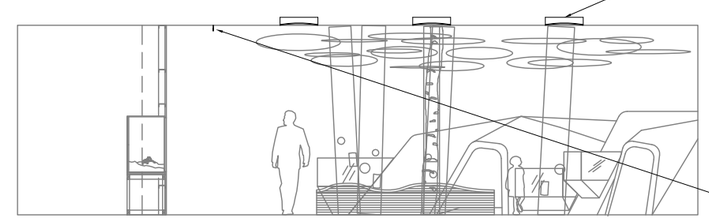
'CF-1' (CF-201)
RECESSED CIRCULAR FLUORESCENT LENSED FIXTURE FOR GENERAL ILLUMINATION

PURCHASED AND INSTALLED BY GC

'C-CF-4'
ONE HORIZONTAL ROW OF FLUORESCENT CHANNELS MOUNTED IN ALL LIVE DISPLAY CASES

PURCHASED AND INSTALLED BY XC

3 WEST ELEVATION
SCALE: 1/4"= 1'-0"



'CF-1' (CF-201)
RECESSED CIRCULAR FLUORESCENT LENSED FIXTURE FOR GENERAL ILLUMINATION

PURCHASED AND INSTALLED BY GC

YB-1' (YB-201)
LOW VOLTAGE TRACK SYSTEM MOUNTED IN CEILING WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS

TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

4 SOUTH ELEVATION
SCALE: 1/4"= 1'-0"

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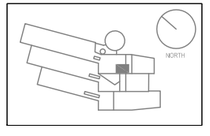


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

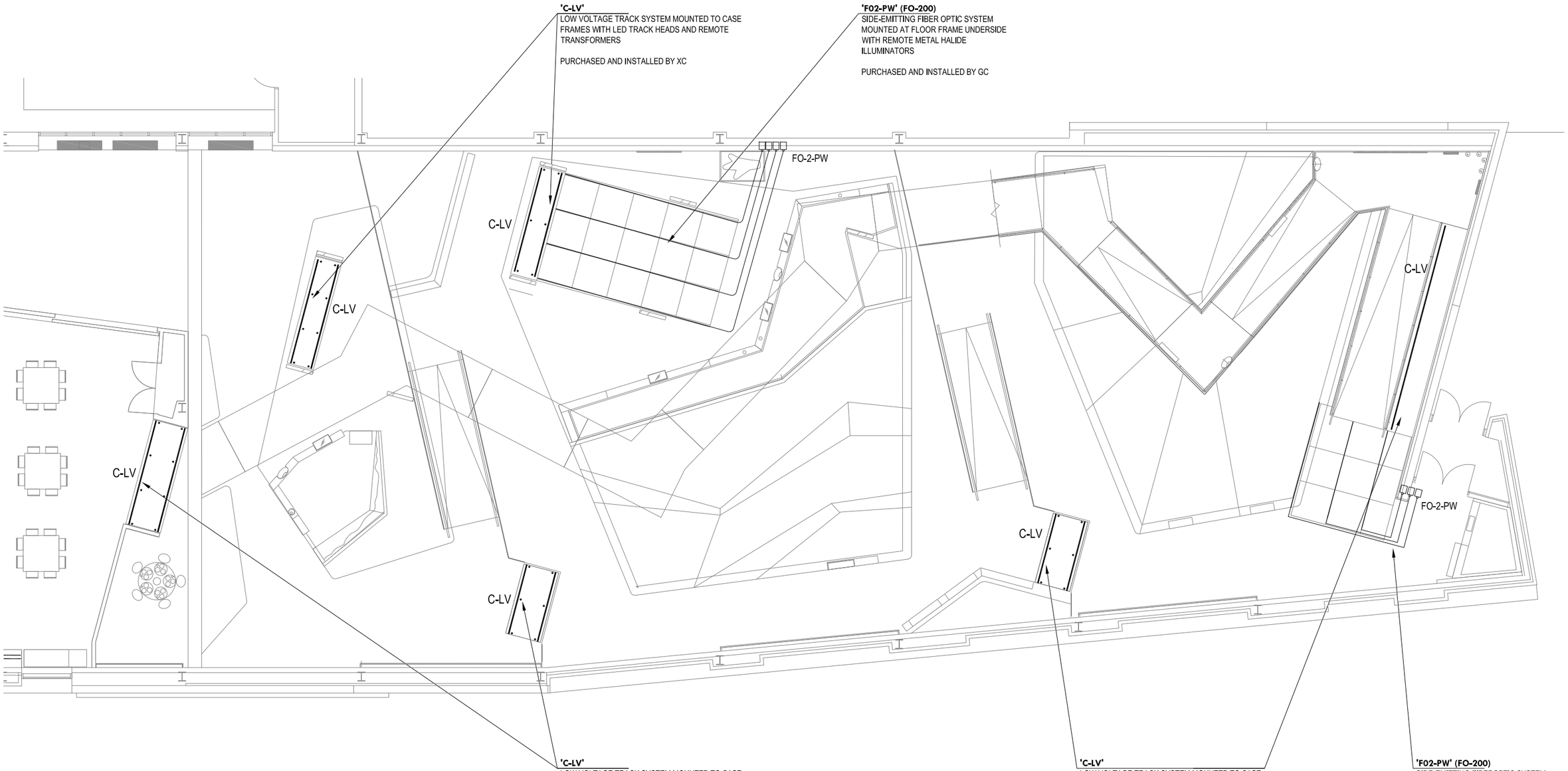
Sheet Title
Sections & Elevations:
'Our Backyard'/Children's Gallery

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX2-BY-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
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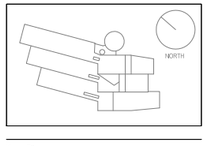


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title

Level 2 Partial Plan:
Past Worlds Observatory

Date
April 2, 2009

Scale*
3/16"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

LX2-PW-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

'YB-1' (YB-201)
LOW VOLTAGE TRACK SYSTEM MOUNTED TO PLATFORM FASCIA WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS

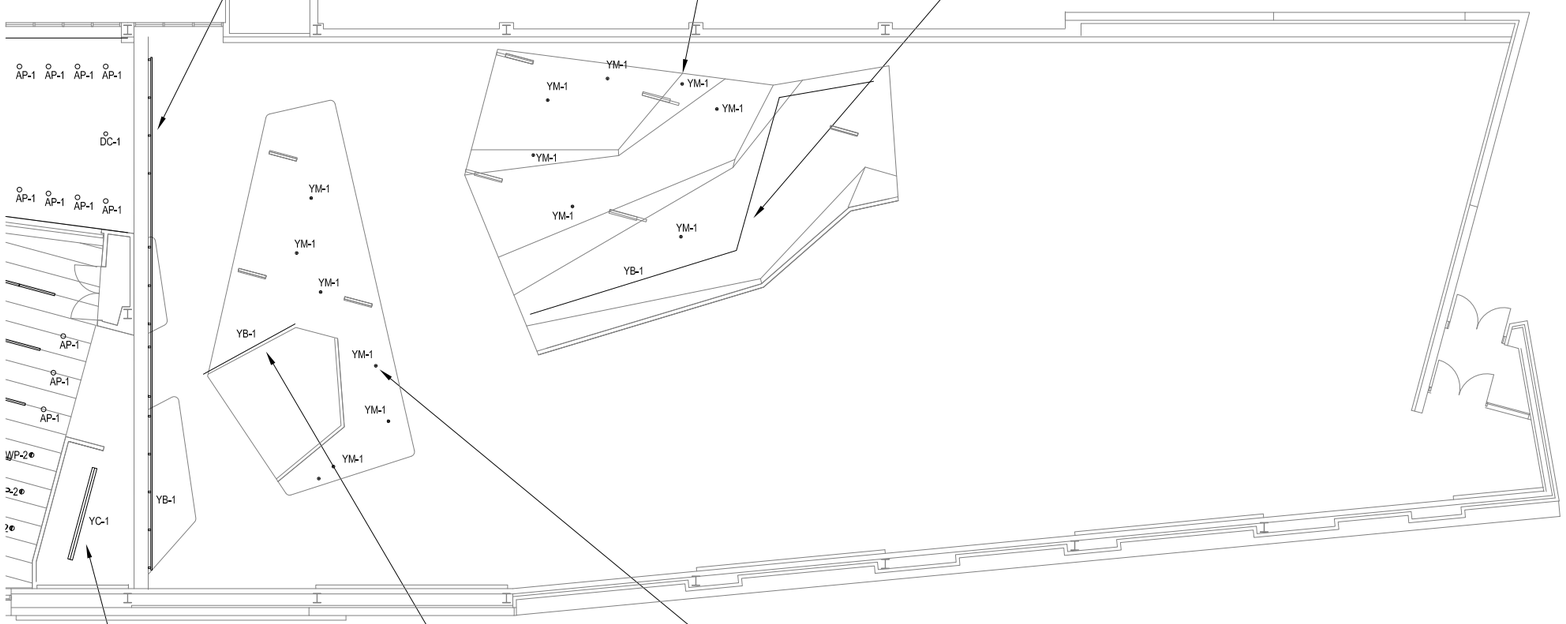
TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

'YM-1' (YM-201)
RECESSED LOW VOLTAGE MONOPOINT FOR A SINGLE TRACK HEAD (YL SERIES) OR A SHORT TRACK (YL-BR)

MONOPOINT: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

'YB-1' (YB-201)
LOW VOLTAGE TRACK SYSTEM MOUNTED TO CEILING WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS

TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC



'YC-1' (YC-201)
LOW VOLTAGE TRACK SYSTEM MOUNTED IN RECESSED ARCHITECTURAL CEILING SLOT WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS

TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

'YB-1' (YB-201)
LOW VOLTAGE TRACK SYSTEM MOUNTED TO UNDERSIDE OF PLATFORM EDGE WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS

TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

'YM-1' (YM-201)
RECESSED LOW VOLTAGE MONOPOINT FOR A SINGLE TRACK HEAD (YL SERIES) OR A SHORT TRACK (YL-BR)

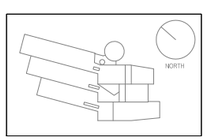
MONOPOINT: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, UT 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	**Brandston Partnership Inc** **122 West 26th Street** **New York, New York 10001** **212.924.4050 tel.**	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415.885.9555 tel.	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

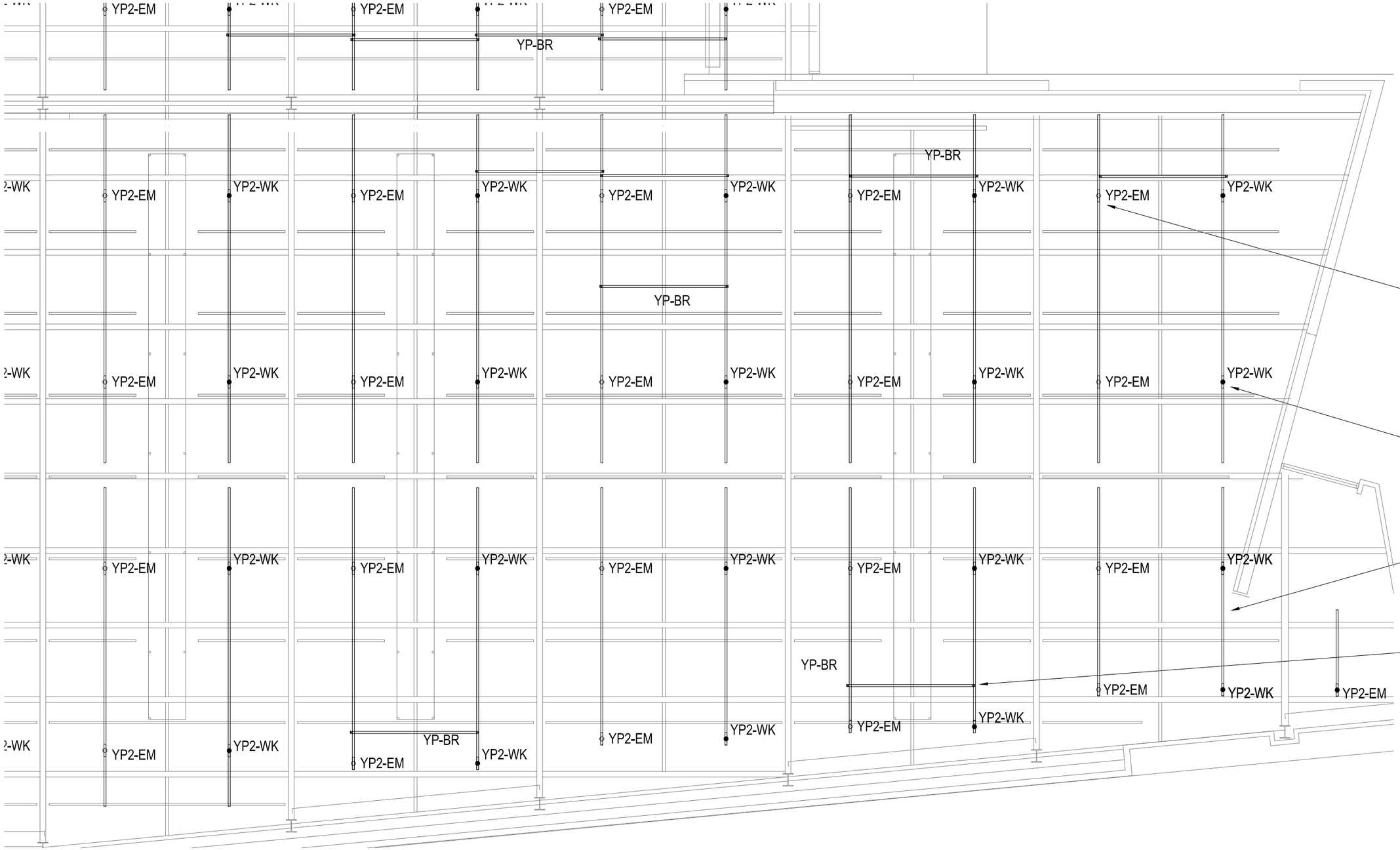
No. / Issue Name / Date

100% Final Design April 2, 2009
No. / Issue Name / Date

Sheet Title
Level 2 Partial RCP:
Past Worlds Observatory

Date	RAA Project No. 0275
April 2, 2009	U. of U Project No. 0872-9630
Scale*	DFCM Project No. 02243750
1/8"=1'-0"	Sheet No. LX2-PW-1.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



'YP2-EM' (YP-203)
15 INCH SEGMENTED TRACK WITH 100W HALOGEN FIXTURE FOR EMERGENCY LIGHTING. TRACK TO BE AT THE END OR IN LINE WITH YP-2 TRACK AND MOUNTED ON UNI-STRUT

PURCHASED AND INSTALLED BY GC

'YP2-WK' (YP-204)
15 INCH SEGMENT TRACK WITH 150W MH FIXTURE FOR WORK LIGHT. TRACK TO BE AT THE END OR IN LINE WITH YP-2 TRACK AND MOUNTED ON UNI-STRUT

PURCHASED AND INSTALLED BY GC

'YP-2' (YP-201)
SINGLE CIRCUIT TRACKS MOUNTED ON CONTINUOUS UNI-STRUT

PURCHASED AND INSTALLED BY GC

'YP-BR' (YP-202)
NOMINAL 10' LONG BRIDGE TRACK MOUNTED AT LOCATIONS AS REQUIRED

PURCHASED AND INSTALLED BY GC

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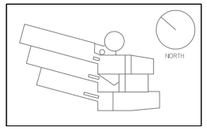


Key Plan

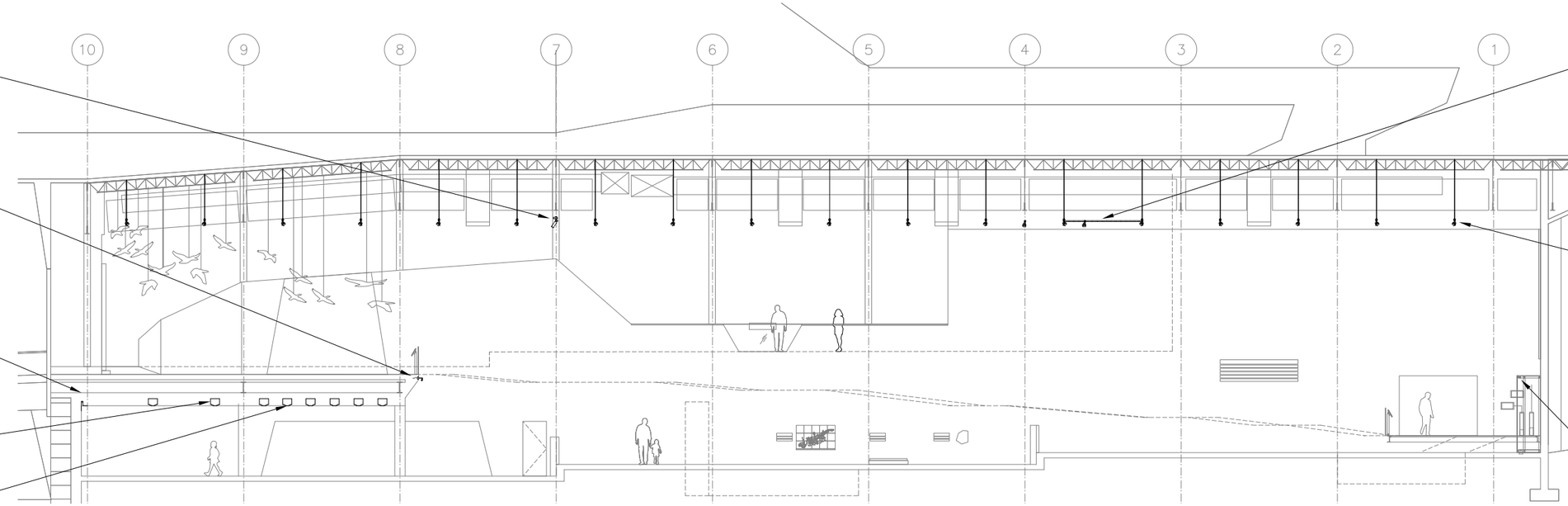
No. / Issue Name / Date

100% Final Design April 2, 2009
No. / Issue Name / Date

Sheet Title
Level 3 Partial RCP:
Past World

Date	RAA Project No. 0275
April 2, 2009	U. of U Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	LX3-PW-1.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



YP-3A (YP-301)
SPECIAL EFFECT GOBO/SHMMERING EFFECT PROJECTOR C-CLAMP MOUNTED TO IRON PIPE AND PERMENANTLY WIRED

PURCHASED AND INSTALLED BY GC

XC TO PROVIDE GOBO PATTERNS AND REQUIREMENTS TO GC

'YB-1' (YB-201)
LOW VOLTAGE TRACK SYSTEM WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS

TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

'WE-2' (WE-202)
LINEAR LED GRAZER MOUNTED WITHIN RECESSED ARCHITECTURAL CEILING SLOT TO WASH WALL

PURCHASED AND INSTALLED BY GC

'WP-1' (WP-201)
RECESSED LENSED WALL WASHER

PURCHASED AND INSTALLED BY GC

'AP-1' (AP-201)
RECESSED ADJUSTABLE ACCENT LIGHT

PURCHASED AND INSTALLED BY GC

'YP-BR' (YP-202)
NOMINAL 10' LONG BRIDGE TRACK MOUNTED WHERE REQUIRED

PURCHASED AND INSTALLED BY GC

'YP-2' (YP-201)
SINGLE CIRCUIT TRACKS MOUNTED ON CONTINUOUS UNI-STRUT

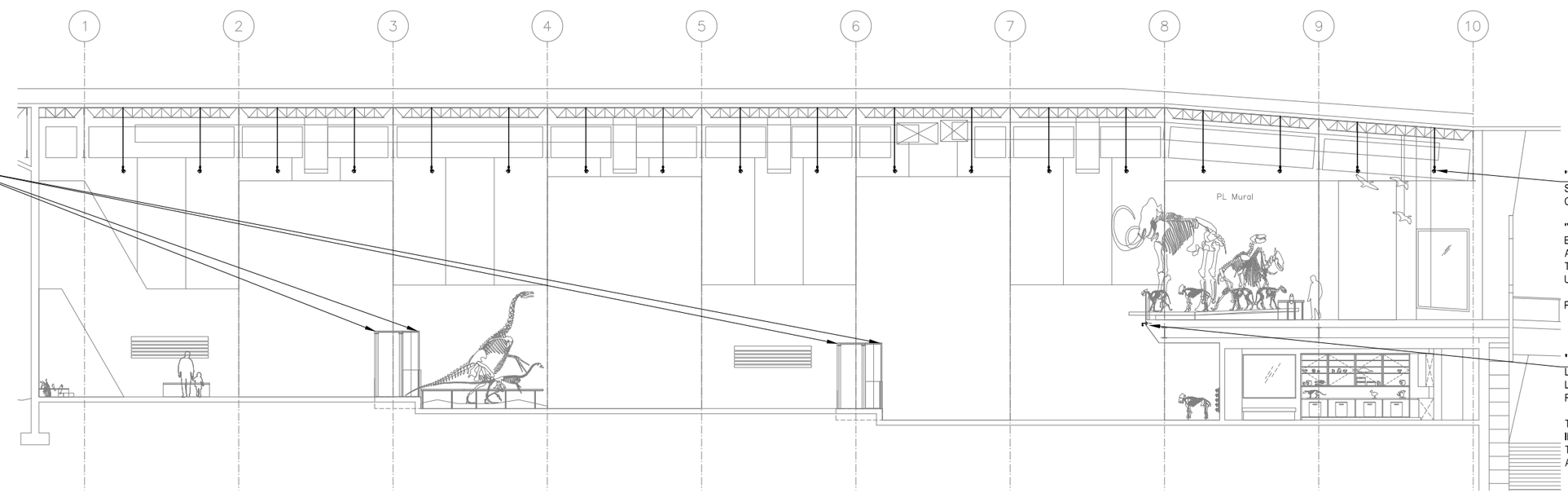
'YP2-EM' (YP-203) & YP2-WK(YP-204)
EMERGENCY LIGHT & WORK LIGHTS ARE AT THE END OR IN LINE WITH YP-2 TRACK, MOUNTED ON CONTINUOUS UNI-STRUT

PURCHASED AND INSTALLED BY GC

'C-LV'
LOW VOLTAGE TRACK SYSTEM MOUNTED TO CASE FRAMES WITH LED TRACK HEADS AND REMOTE TRANSFORMERS

PURCHASED AND INSTALLED BY XC

1 EAST ELEVATION
SCALE: 1/8"= 1'-0"



'C-LV'
LOW VOLTAGE TRACK SYSTEM MOUNTED TO CASE FRAMES WITH LED TRACK HEADS AND REMOTE TRANSFORMERS

PURCHASED AND INSTALLED BY XC

'YP-2' (YP-201)
SINGLE CIRCUIT TRACKS MOUNTED ON CONTINUOUS UNI-STRUT

'YP2-EM' (YP-203) & YP2-WK(YP-204)
EMERGENCY LIGHT & WORK LIGHTS ARE AT THE END OR IN LINE WITH YP-2 TRACK, MOUNTED ON CONTINUOUS UNI-STRUT

PURCHASED AND INSTALLED BY GC

'YB-1' (YB-201)
LOW VOLTAGE TRACK SYSTEM WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS

TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

3 WEST ELEVATION
SCALE: 1/8"= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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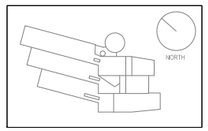


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009
No. / Issue Name / Date

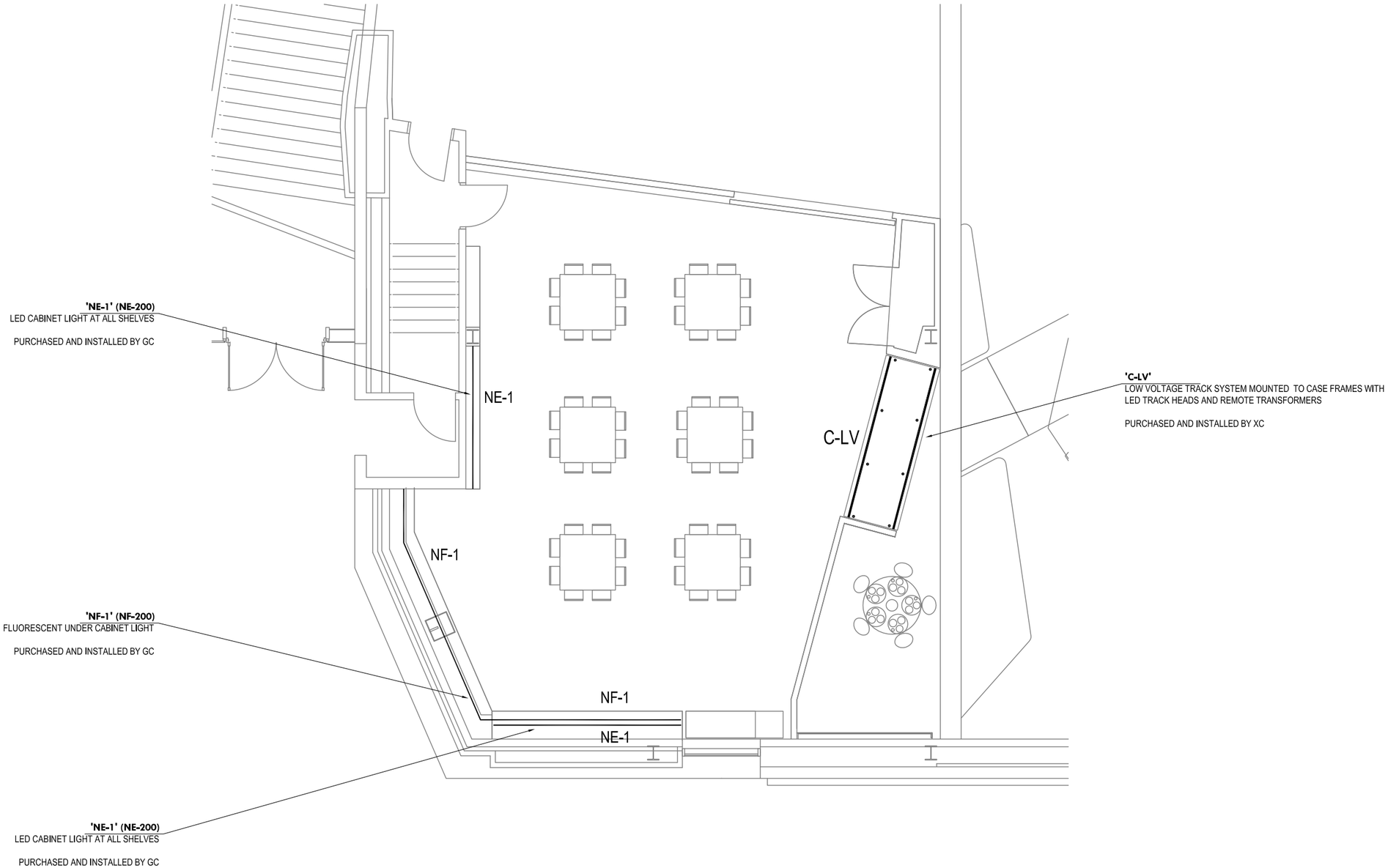
Sheet Title
Level 2 Partial Plan:
Past Worlds Observatory

Date
April 2, 2009

Scale*
1/8"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX2-PW-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



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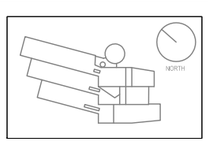


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Level 2 Partial Plan:
Earth Lab

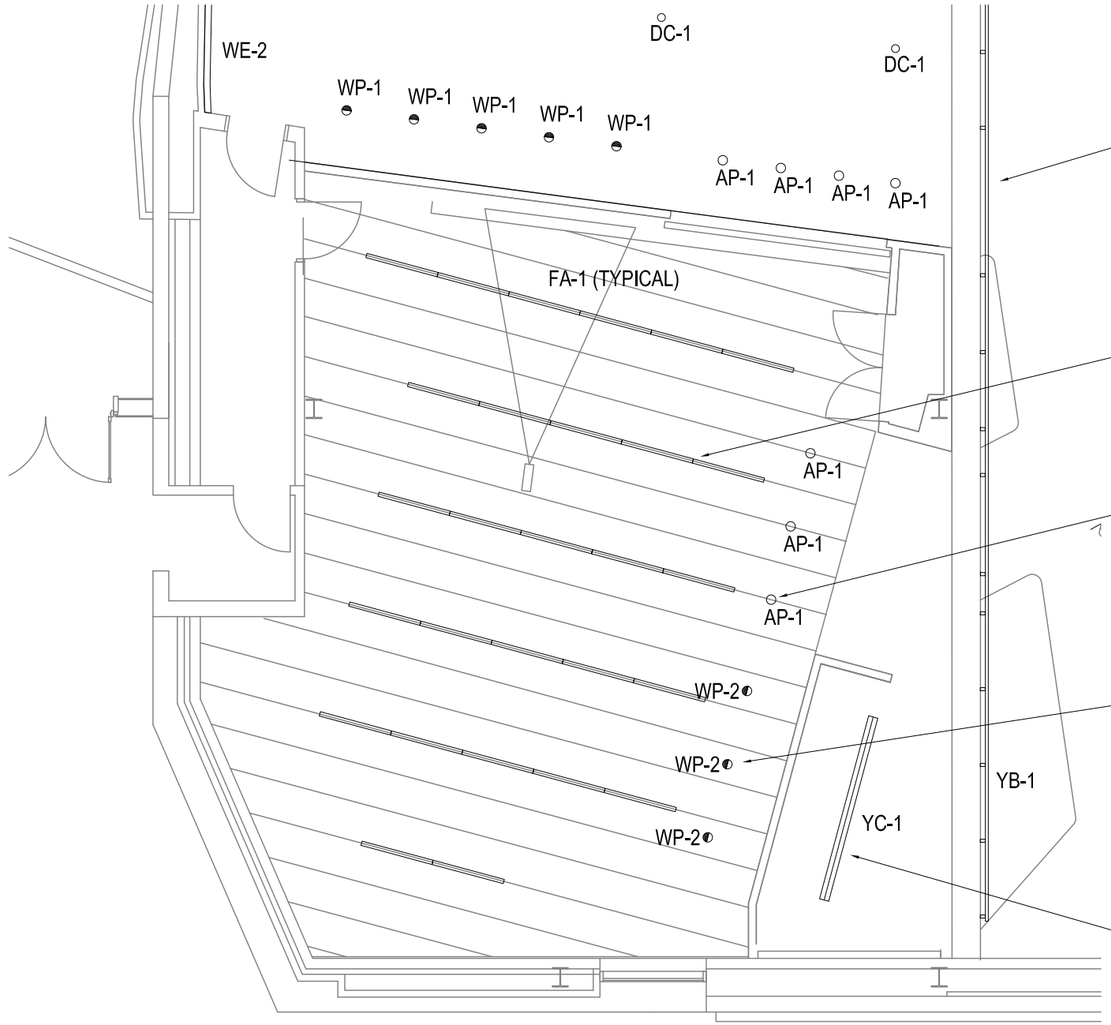
Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

LX2-EL-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



'YB-1' (YB-201)
LOW VOLTAGE TRACK SYSTEM MOUNTED TO PLATFORM FASCIA WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS

TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

'FA-1' (FA-201)
RECESSED DIMMABLE LINEAR FLUORESCENT LENSED FIXTURE

PURCHASED AND INSTALLED BY GC

'AP-1' (AP-201)
RECESSED ADJUSTABLE ACCENT LIGHT

PURCHASED AND INSTALLED BY GC

'WP-2" (WP-202)
RECESSED LENSED WALL WASHER

PURCHASED AND INSTALLED BY GC

'YC-1' (YC-201)
LOW VOLTAGE TRACK SYSTEM MOUNTED IN RECESSED ARCHITECTURAL CEILING SLOT WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS

TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

UTAH MUSEUM OF NATURAL HISTORY

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Exhibit Construction

Owner
UMNH
1390 East President's Circle
Salt Lake City, Utah 84112
801.581.6927 tel.

Design Architect
Polshek Partnership Architects LLP
320 West 13th Street
New York, New York
212.807.7171 tel.

Architect of Record
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375 West 200 South
Salt Lake City, Utah
801.521.8600 tel.

Exhibit Structural Engineer
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New York, New York 10004
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Building Engineer
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801.575.8877 tel.

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Salt Lake City, Utah 84103
801.322.2400 tel

Electrical/AV Engineer
Spectrum Engineers
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Salt Lake City, Utah 84111
800.678.7077 tel

Lighting
Brandston Partnership Inc
122 West 26th Street
New York, New York 10001
212.924.4050 tel.

Audio Visual
BBI Engineering, Inc.
241 Quint Street
San Francisco, CA 94124
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Exhibition Planner and Designer
Ralph Appelbaum Associates
88 Pine Street
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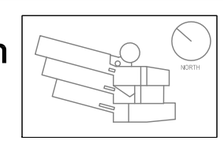


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

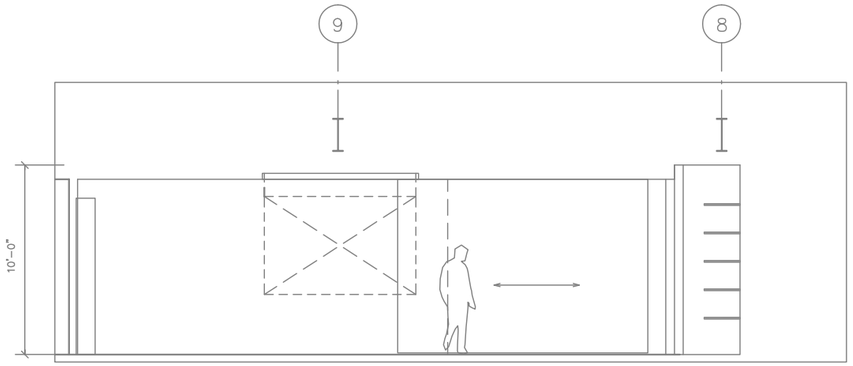
Sheet Title
Level 2 Partial RCP:
Earth Lab

Date
April 2, 2009

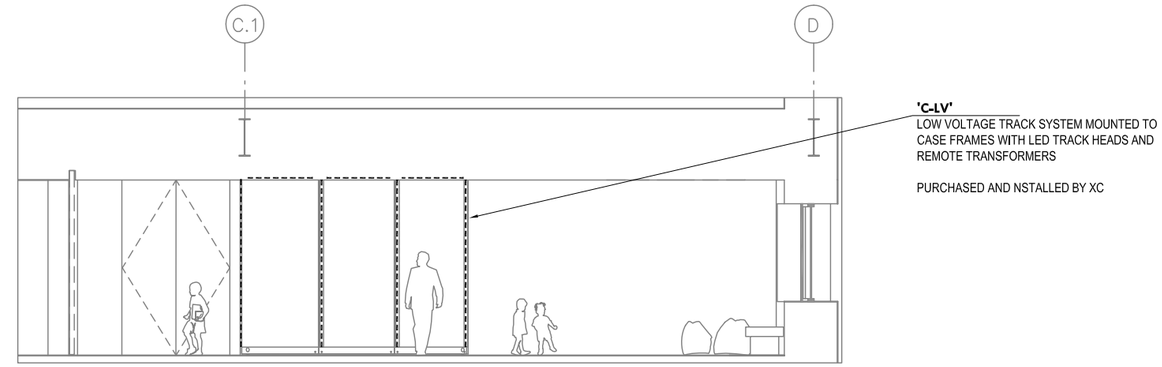
Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX2-EL-1.02

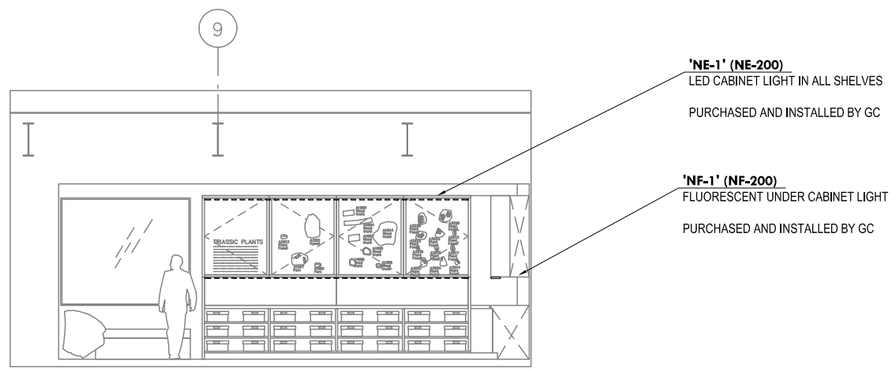
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



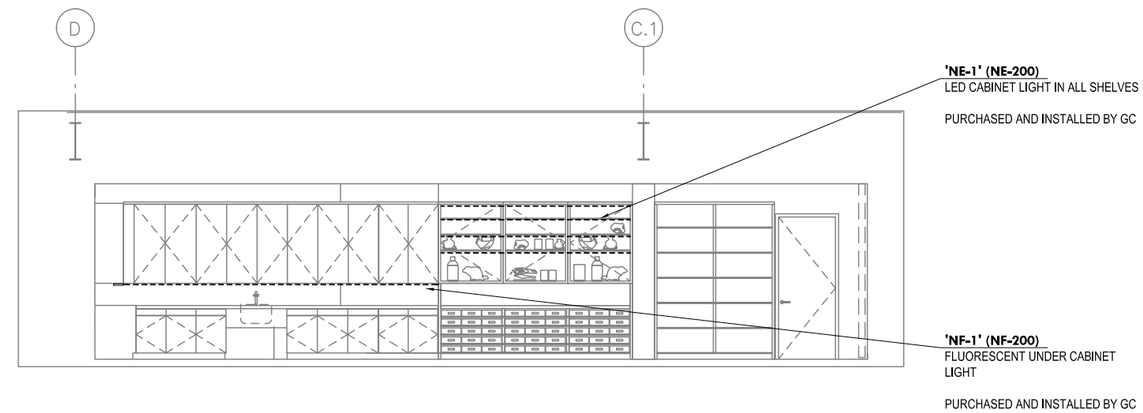
1 EAST ELEVATION
SCALE: 1/4"= 1'-0"



2 SOUTH ELEVATION
SCALE: 1/4"= 1'-0"



3 WEST ELEVATION
SCALE: 1/4"= 1'-0"



4 NORT ELEVATION
SCALE: 1/4"= 1'-0"

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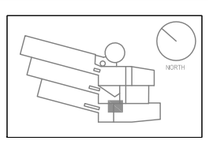


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009
No. / Issue Name / Date

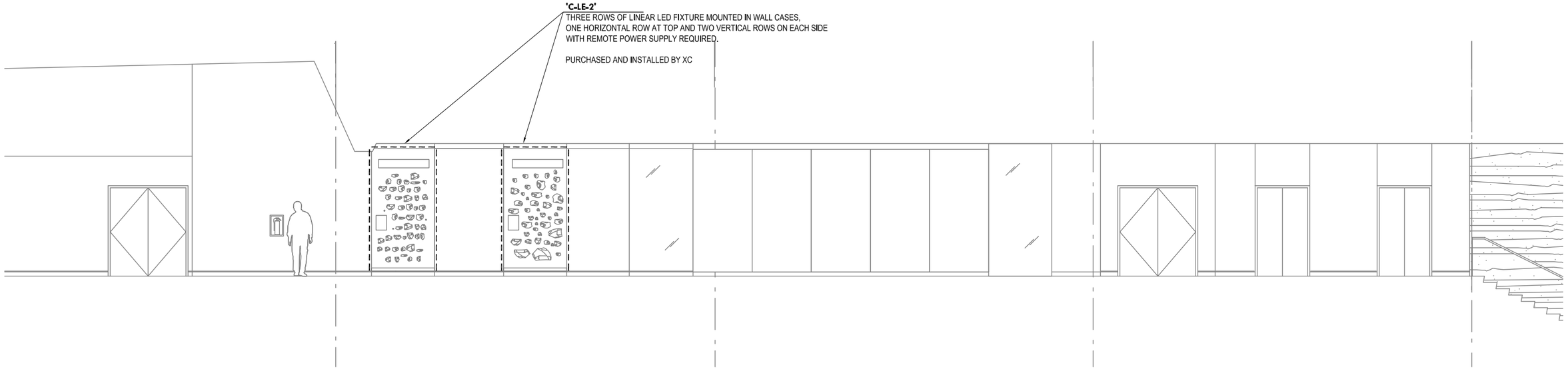
Sheet Title
Level 2 Partial Plan:
Earth Lab

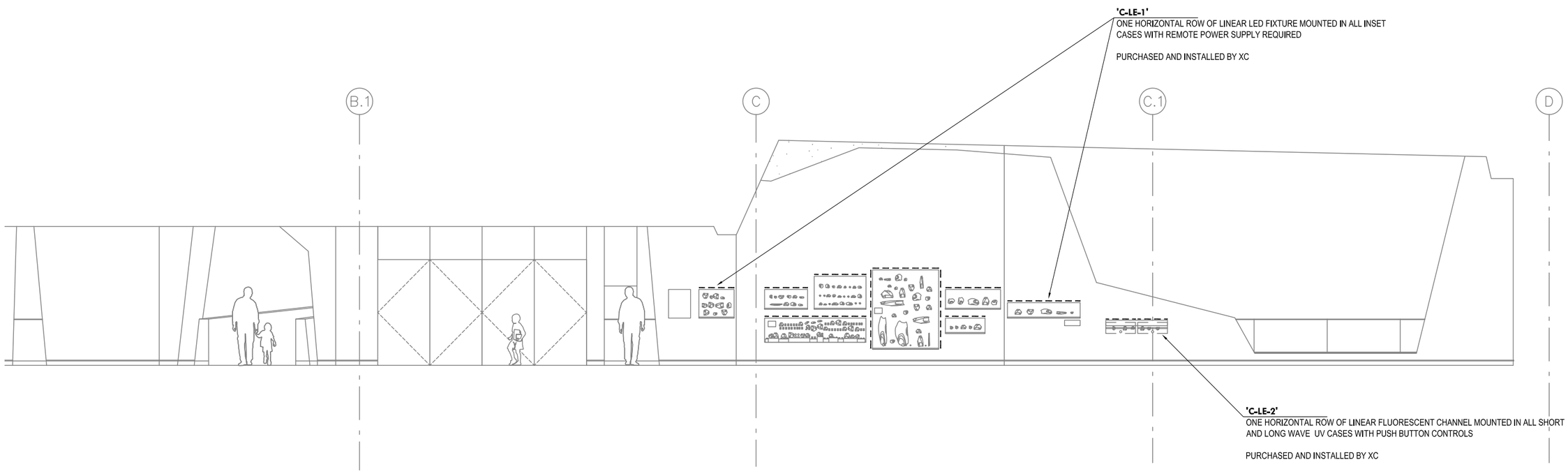
Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX2-EL-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")





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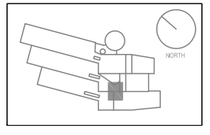

Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Sections & Elevations:
Mineral Hall

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX3-MH-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

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PURCHASED AND INSTALLED BY GC

'YP2-WK' (YP-204)
15 INCH SEGMENT TRACK WITH 150W MH FIXTURE FOR WORK LIGHT. TRACK TO BE AT THE END OR IN LINE WITH YP-2 TRACK AND MOUNTED ON UNI-STRUT

PURCHASED AND INSTALLED BY GC

'YP-2' (YP-201)
SINGLE CIRCUIT TRACKS MOUNTED ON CONTINUOUS UNI-STRUT

PURCHASED AND INSTALLED BY GC

'YP-BR' (YP-202)
NOMINAL 10' LONG BRIDGE TRACK MOUNTED AT LOCATIONS AS REQUIRED

PURCHASED AND INSTALLED BY GC

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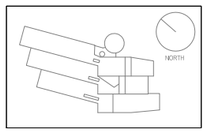


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

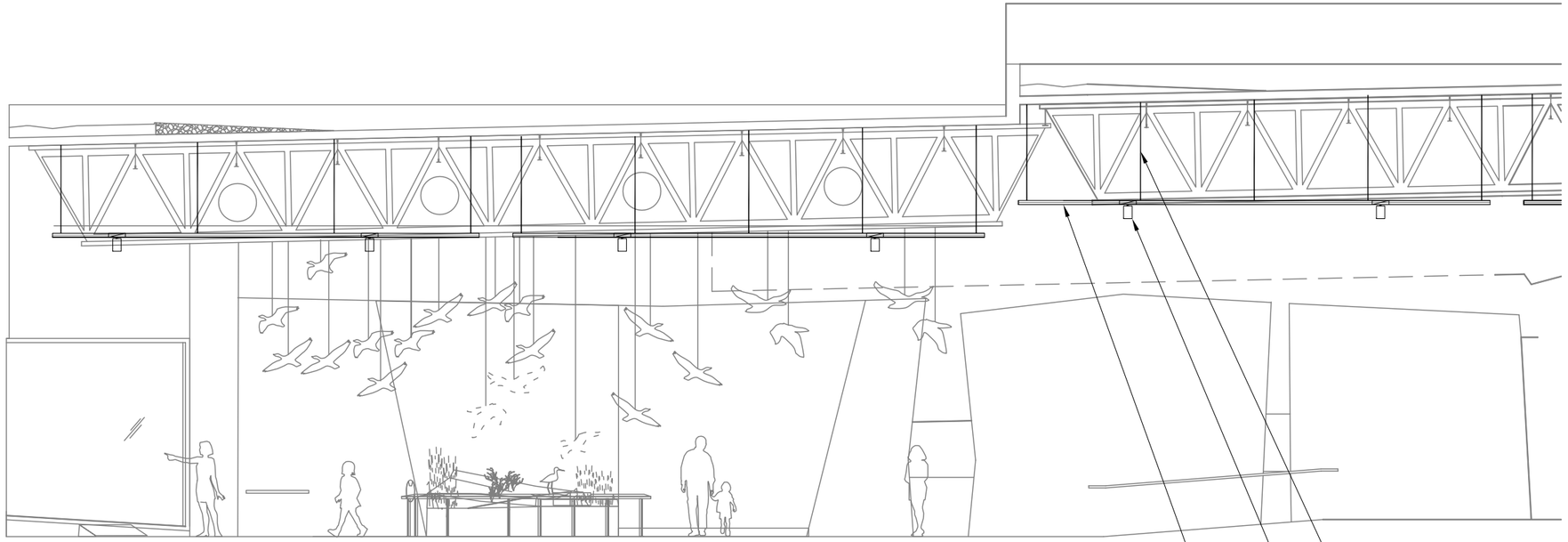
Sheet Title
Level 3 Partial RCP:
Lake Observatory

Date
April 2, 2009

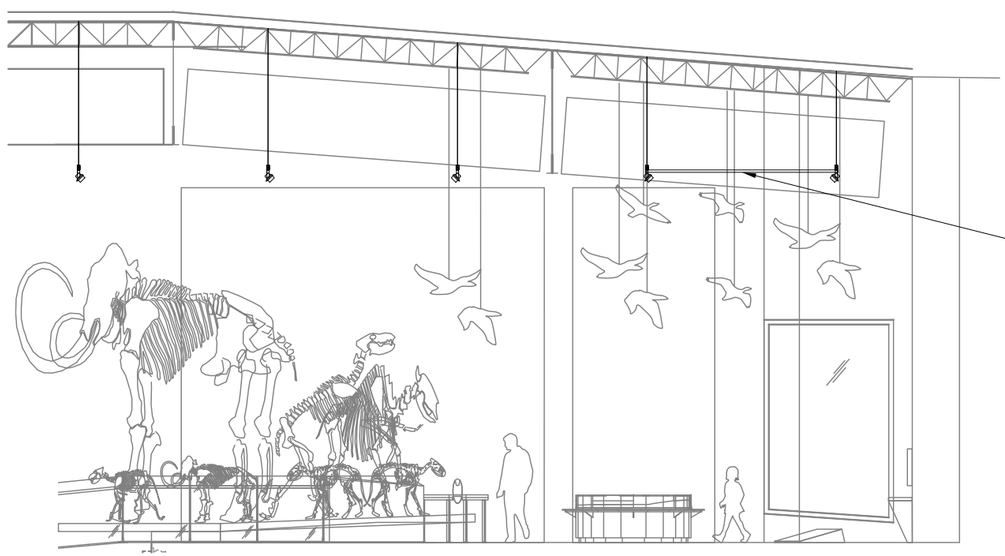
Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX3-LK-1.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 NORTH ELEVATION
SCALE: 1/4"= 1'-0"



2 WEST ELEVATION
SCALE: 1/4"= 1'-0"

MTG STEMS, POWER AS REQUIRED
GC TO COORDINATE.

'YP2-EM' (YP-203)
12 INCH SEGMENTED TRACK WITH PERMANETLY ATTACHED FIXTURE - AT THE END OF IN LINE WITH EXHIBIT TRACK, MTD ON UNI-STRUT

PURCHASED/INSTALLED BY GC
(BASE BUILDING BUDGET)

'YP2-WK' (YP-204)
12 INCH SEGMENT TRACK WITH 150W MH FIXTURE FOR WORK LIGHT. MTD ON UNI-STRUT

PURCHASED/INSTALLED BY GC
(BASE BUILDING BUDGET)

'YP-BR' (YP-202)
BRIDGE TRACK AS REQUIRED
TRACK: PURCHASED, INSTALLED BY GC
TRACK HEADS: PURCHASED, INSTALLED BY GC

'YP-2' (YP-201)
SIGLE CIRCUIT EXHIBIT TRACK, MTD AT UNI-STRUT.
TRACK: PURCHASED, INSTALLED BY GC
TRACK HEADS: PURCHASED, INSTALLED BY GC

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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Audio Visual
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415.885.9555 tel.

Exhibition Planner and Designer
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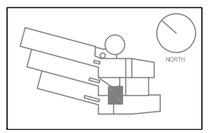
88 Pine Street
New York, New York 10005
212.334.8200 tel.



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009
No. / Issue Name / Date

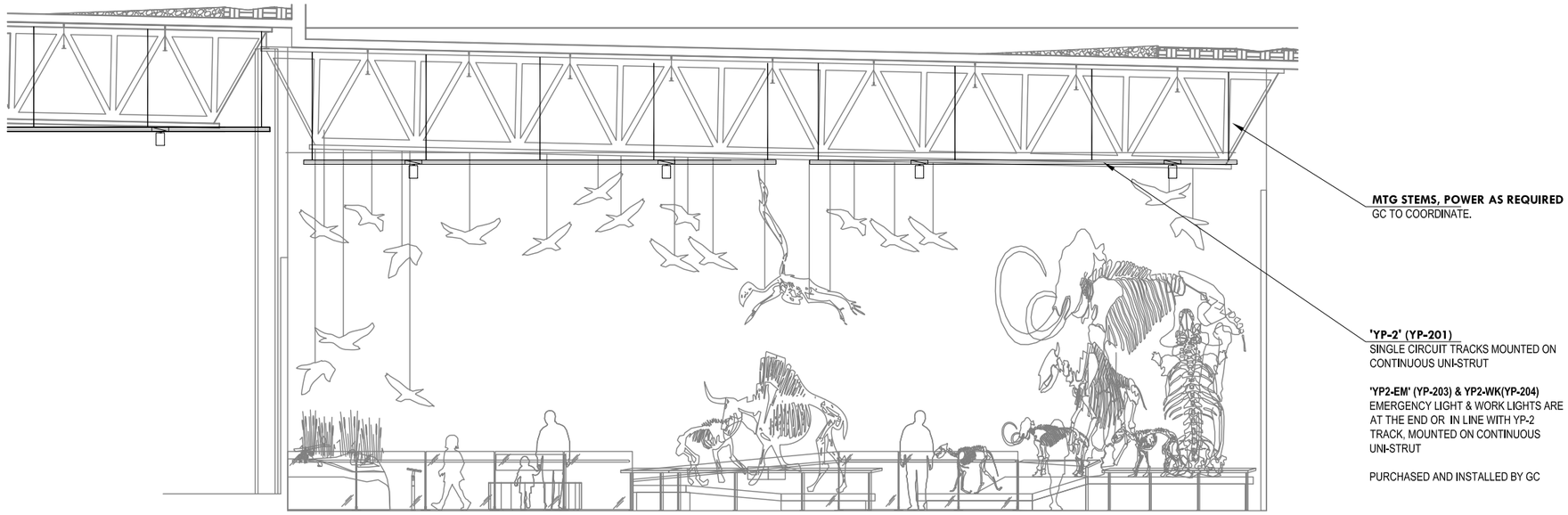
Sheet Title
Sections & Elevations:
Lake Observatory

Date
April 2, 2009

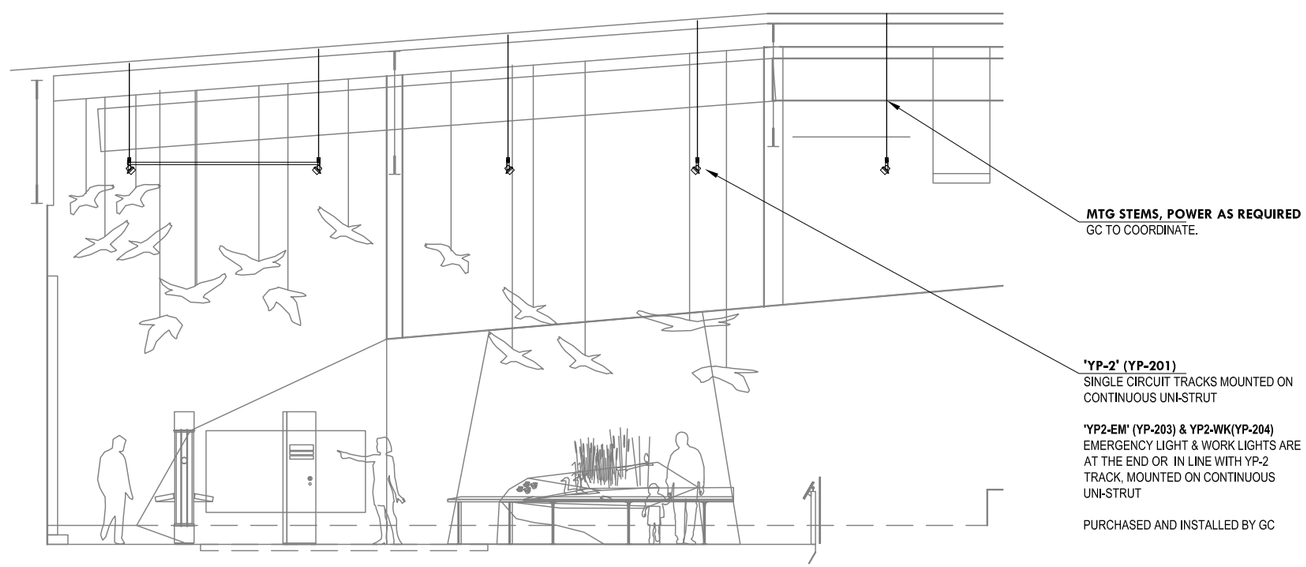
Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX3-LK-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 NORTH ELEVATION
SCALE: 1/4"= 1'-0"



2 WEST ELEVATION
SCALE: 1/4"= 1'-0"

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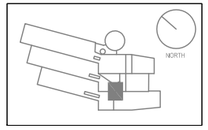


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

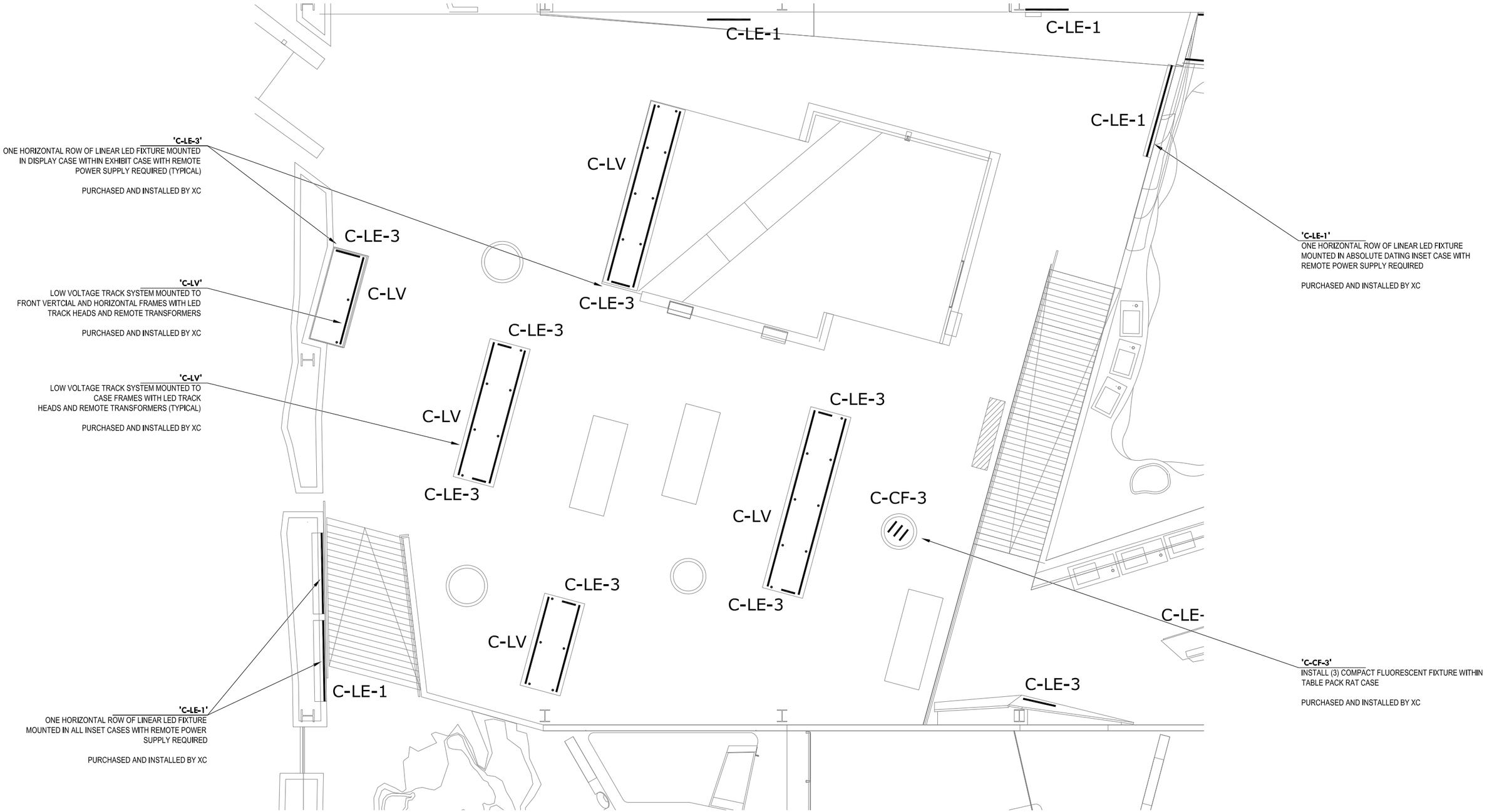
Sheet Title
Sections & Elevations:
Lake Observatory

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX3-LK-2.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



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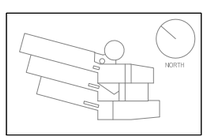

Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Level 3 Partial Plan:
First Peoples Observatory

Date	RAA Project No. 0275
April 2, 2009	U. of U Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	LX3-FP-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

'YP-3B' (YP-302)
SPECIAL EFFECT GOBO PROJECTOR C-CLAMP MOUNTED TO IRON PIPE AND PERMENANTLY WIRED

PURCHASED AND INSTALLED BY GC

'YP2-EM' (YP-203)
15 INCH SEGMENTED TRACK WITH 100W HALOGEN FIXTURE FOR EMERGENCY LIGHTING. TRACK TO BE AT THE END OR IN LINE WITH YP-2 TRACK AND MOUNTED ON UNI-STRUT

PURCHASED AND INSTALLED BY GC

'YP2-WK' (YP-204)
15 INCH SEGMENT TRACK WITH 150W MH FIXTURE FOR WORK LIGHT. TRACK TO BE AT THE END OR IN LINE WITH YP-2 TRACK AND MOUNTED ON UNI-STRUT

PURCHASED AND INSTALLED BY GC

'YP-BR' (YP-202)
NOMINAL 10' LONG BRIDGE TRACK MOUNTED AT LOCATIONS AS REQUIRED

PURCHASED AND INSTALLED BY GC

'YP-2' (YP-201)
SINGLE CIRCUIT TRACKS MOUNTED ON CONTINUOUS UNI-STRUT

PURCHASED AND INSTALLED BY GC

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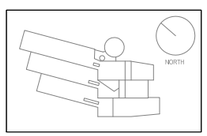


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

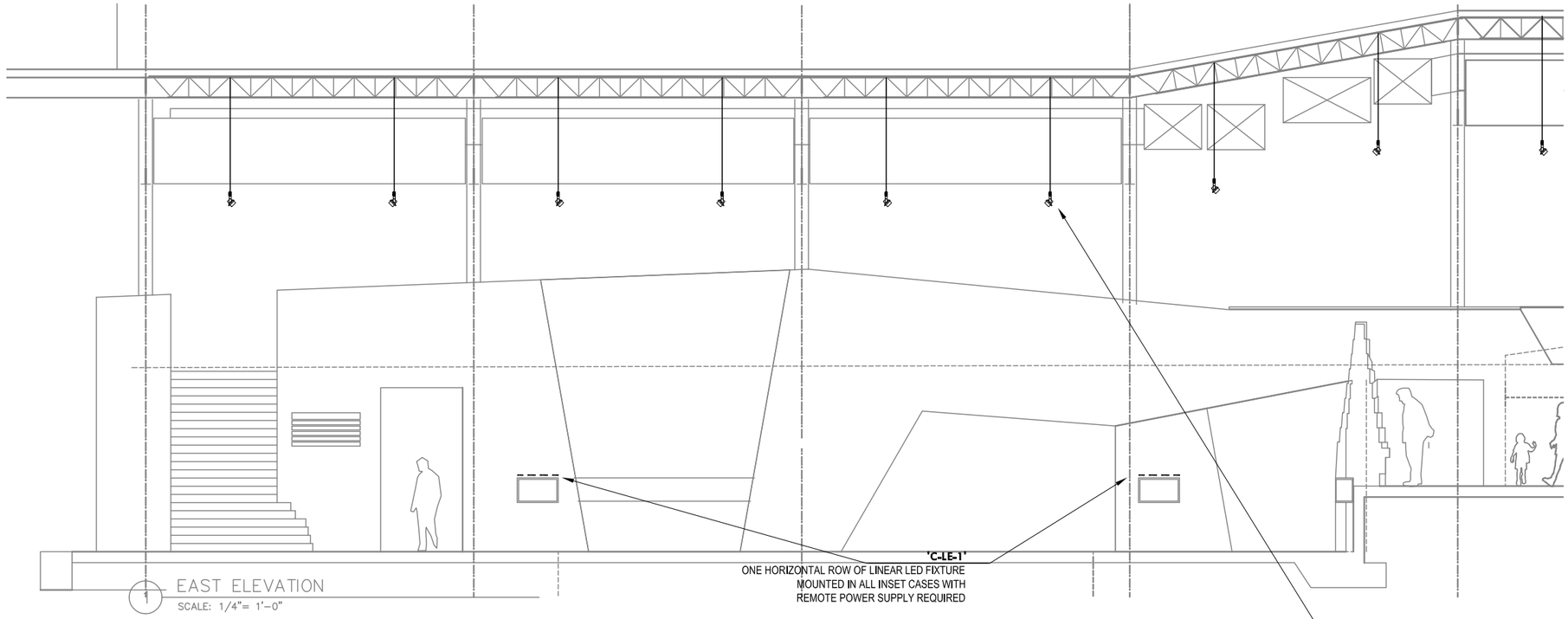
Sheet Title
Level 3 Partial RCP:
First Peoples Observatory

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX3-FP-1.02

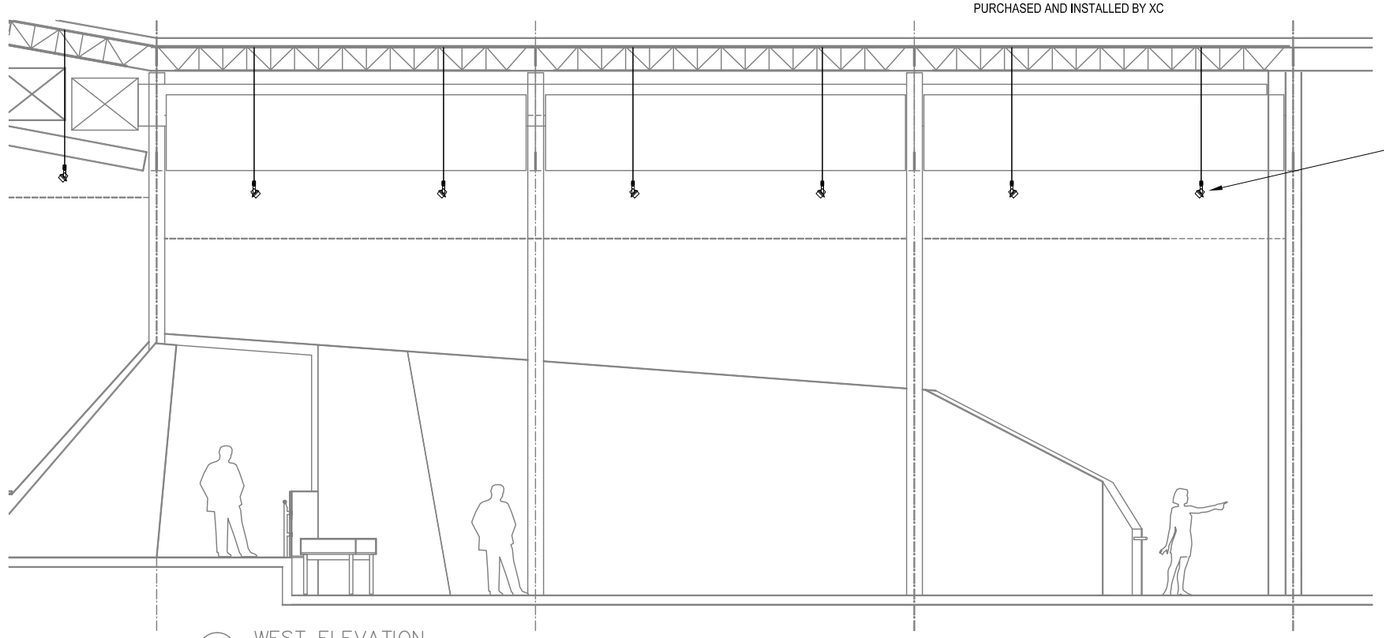
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 EAST ELEVATION
SCALE: 1/4"= 1'-0"

'C-LE-1'
ONE HORIZONTAL ROW OF LINEAR LED FIXTURE MOUNTED IN ALL INSET CASES WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC



2 WEST ELEVATION
SCALE: 1/4"= 1'-0"

'YP-2' (YP-201)
SINGLE CIRCUIT TRACKS MOUNTED ON CONTINUOUS UNI-STRUT

PURCHASED AND INSTALLED BY GC

'YP2-EM' (YP-203)
15 INCH SEGMENTED TRACK WITH 100W HALOGEN FIXTURE FOR EMERGENCY LIGHTING. TRACK TO BE AT THE END OR IN LINE WITH YP-2 TRACK AND MOUNTED ON UNI-STRUT

PURCHASED AND INSTALLED BY GC

'YP2-WK' (YP-204)
15 INCH SEGMENT TRACK WITH 150W MH FIXTURE FOR WORK LIGHT. TRACK TO BE AT THE END OR IN LINE WITH YP-2 TRACK AND MOUNTED ON UNI-STRUT

PURCHASED AND INSTALLED BY GC

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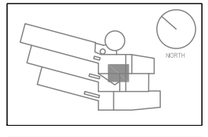


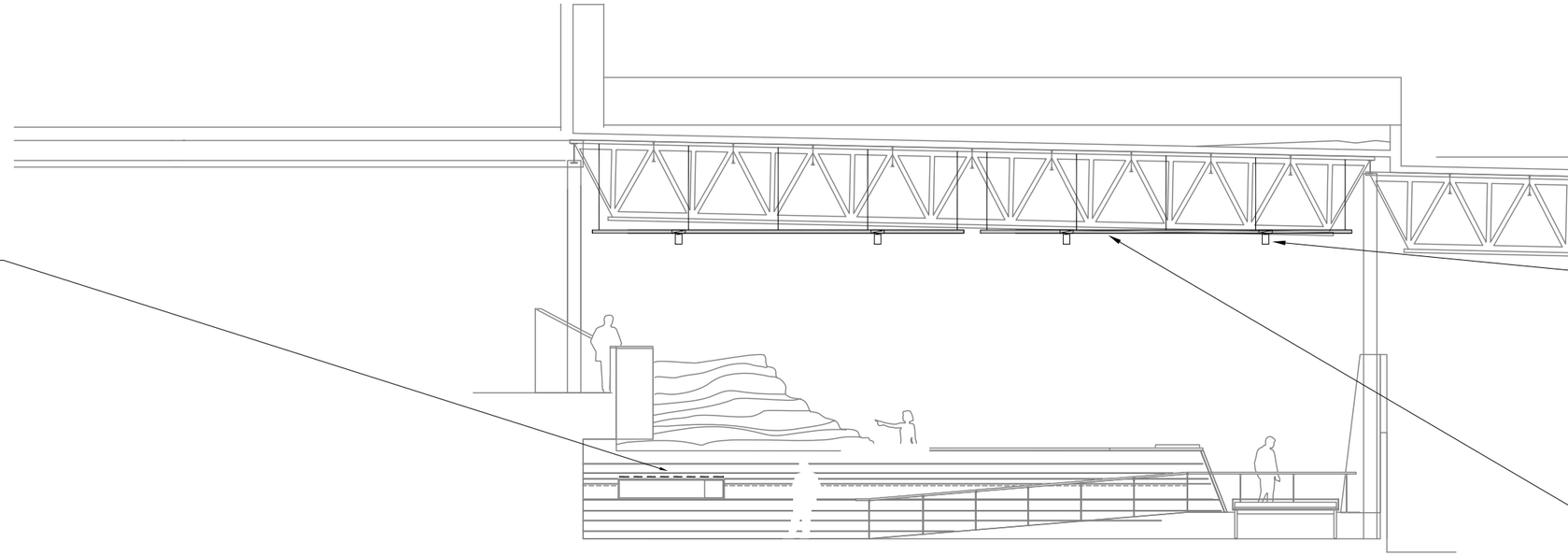
Key Plan

No. / Issue Name / Date	No. / Issue Name / Date
June 22, 2007	100% Final Design April 2, 2009

Sheet Title
Level 3 Sections & Elevations:
First Peoples Observatory

Date	RAA Project No. 0275
April 2, 2009	U. of U Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	LX3-FP-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



'C-LE-1'
ONE HORIZONTAL ROW OF LINEAR LED FIXTURE MOUNTED IN ABSOLUTE DATING CASE WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

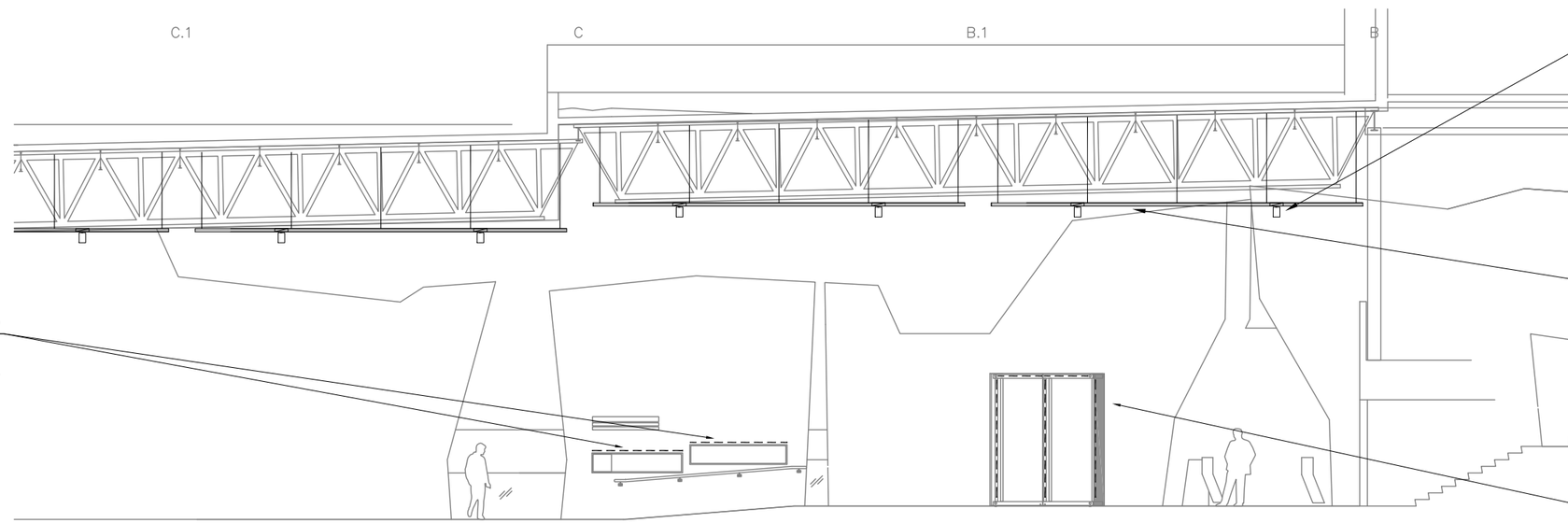
'YP2-EM' (YP-203)
12 INCH SEGMENTED TRACK WITH PERMANETLY ATTACHED FIXTURE - AT THE END OF IN LINE WITH EXHIBIT TRACK, MTD ON UNI-STRUT

PURCHASED/INSTALLED BY GC
(BASE BUILDING BUDGET)

'YP2-WK' (YP-204)
12 INCH SEGMENT TRACK WITH 150W MH FIXTURE FOR WORK LIGHT. MTD ON UNI-STRUT

PURCHASED/INSTALLED BY GC
(BASE BUILDING BUDGET)

'YP-2' (YP-201)
SIGLE CIRCUIT EXHIBIT TRACK, MTD AT UNI-STRUT.
TRACK: PURCHASED, INSTALLED BY GC
TRACK HEADS: PURCHASED, INSTALLED BY GC



'YP2-EM' (YP-203)
12 INCH SEGMENTED TRACK WITH PERMANETLY ATTACHED FIXTURE - AT THE END OF IN LINE WITH EXHIBIT TRACK, MTD ON UNI-STRUT

PURCHASED/INSTALLED BY GC
(BASE BUILDING BUDGET)

'YP2-WK' (YP-204)
12 INCH SEGMENT TRACK WITH 150W MH FIXTURE FOR WORK LIGHT. MTD ON UNI-STRUT

PURCHASED/INSTALLED BY GC
(BASE BUILDING BUDGET)

'YP-2' (YP-201)
SIGLE CIRCUIT EXHIBIT TRACK, MTD AT UNI-STRUT.
TRACK: PURCHASED, INSTALLED BY GC
TRACK HEADS: PURCHASED, INSTALLED BY GC

'C-LE-1'
ONE HORIZONTAL ROW OF LINEAR LED FIXTURE MOUNTED IN INSET CASES WITH REMOTE POWER SUPPLY REQUIRED.

PURCHASED AND INSTALLED BY XC

'C-LV'
LOW VOLTAGE TRACK SYSTEM MOUNTED TO CASE FRAMES WITH LED TRACK HEADS AND REMOTE TRANSFORMERS

PURCHASED AND NSTALLED BY XC

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UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
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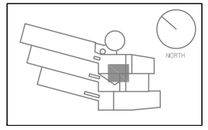


Key Plan

No. / Issue Name / Date	No. / Issue Name / Date
June 22, 2007	100% Final Design April 2, 2009

Sheet Title
Level 3 Sections & Elevations:
First Peoples Observatory

Date
April 2, 2009

Scale*
3/16"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX3-FP-2.01

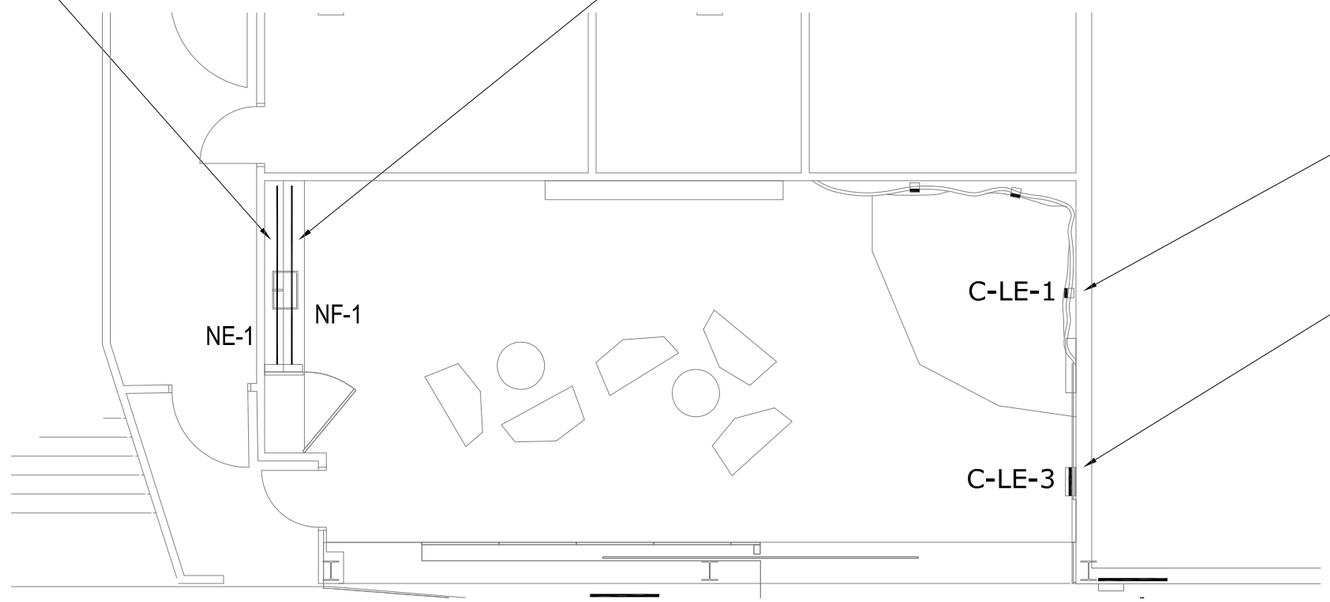
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

'NE-1' (NE-200)
FLUORESCENT UNDER CABINET LIGHT

PURCHASED AND INSTALLED BY GC

'NF-1' (NF-200)
FLUORESCENT UNDER CABINET LIGHT

PURCHASED AND INSTALLED BY GC



'C-LE-1'
ONE HORIZONTAL ROW OF LINEAR LED FIXTURE MOUNTED IN ALL INSET CASES ON SCENIC WALL WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

'C-LE-3'
TWO VERTICAL ROWS OF LINEAR LED FIXTURE MOUNTED IN INSET CASE, ONE ROW ON EACH SIDE, WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

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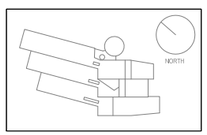


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

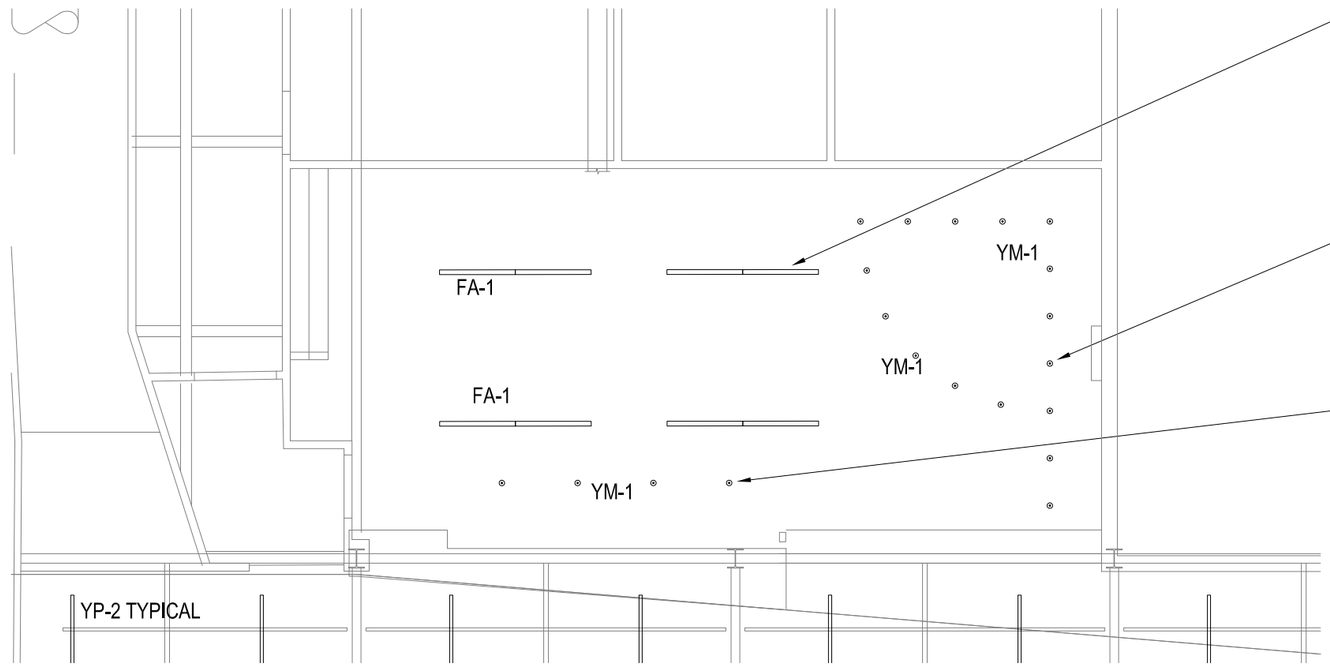
Sheet Title
Level 3 Partial Plan:
Dry Cave

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX3-DC-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



'FA-1' (FA-201)
RECESSED DIMMABLE LINEAR
FLUORESCENT LENSED FIXTURE

PURCHASED AND INSTALLED BY GC

'YM-1' (YM-201)
RECESSED LOW VOLTAGE MONOPOINT
FOR A SINGLE TRACK HEAD (YL SERIES)
OR A SHORT TRACK (YL-BR)

MONOPOINT: PURCHASED AND
INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER
AND INSTALLED BY GC

'YM-1' (YM-201)
RECESSED LOW VOLTAGE MONOPOINT
FOR A SINGLE TRACK HEAD (YL SERIES)
OR A SHORT TRACK (YL-BR)

MONOPOINT: PURCHASED AND
INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER
AND INSTALLED BY GC

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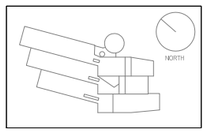
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, UT 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	**Brandston Partnership Inc** **122 West 26th Street** **New York, New York 10001** **212.924.4050 tel.**	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415.885.9555 tel.	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

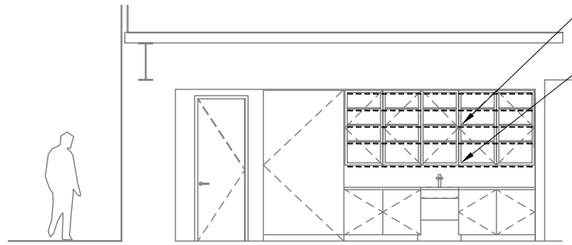
Sheet Title
Level 3 Partial RCP:
Dry Cave

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX3-DC-1.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



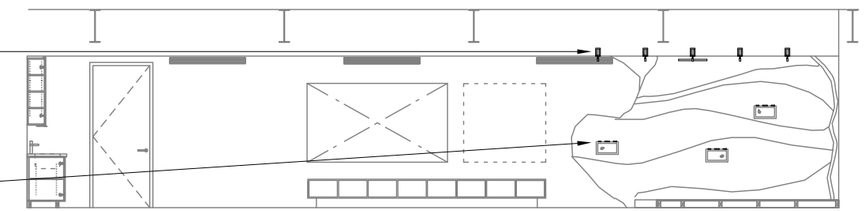
'NE-1' (NE-200)
LED CABINET LIGHT IN ALL SHELVES

PURCHASED AND INSTALLED BY GC

'NF-1' (NF-200)
FLUORESCENT UNDER CABINET LIGHT

PURCHASED AND INSTALLED BY GC

1 NORTH ELEVATION
SCALE: 1/4"= 1'-0"



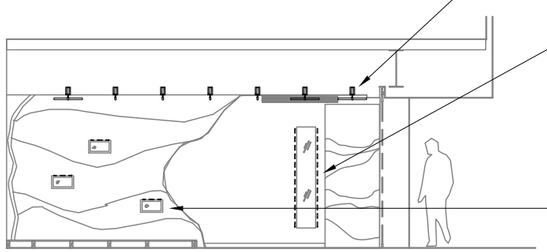
'YM-1' (YM-201)
RECESSED LOW VOLTAGE MONOPOINT FOR A SINGLE TRACK HEAD (YL SERIES) OR A SHORT TRACK (YL-BR)

MONOPOINT: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND NSTALLED BY GC

'C-LE-1'
ONE HORIZONTAL ROW OF LINEAR LED FIXTURES MOUNTED IN ALL INSET CASES ON SCENIC WALL WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

2 EAST ELEVATION
SCALE: 1/4"= 1'-0"



'YM-1' (YM-201)
RECESSED LOW VOLTAGE MONOPOINT FOR A SINGLE TRACK HEAD (yl SERIES) OR A SHORT TRACK (YL-BR)

MONOPOINT: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND NSTALLED BY GC

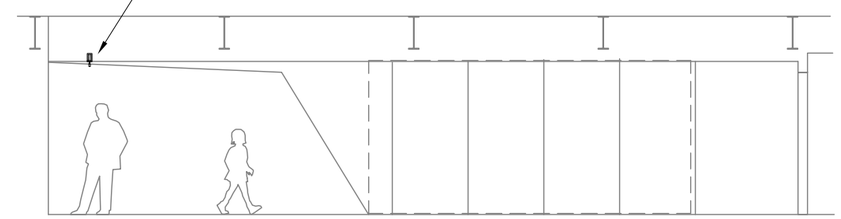
'C-LE-3'
TWO VERTICAL ROWS OF LINEAR LED FIXTURES MOUNTED IN INSET CASE, ONE ROW ON EACH SIDE, WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

'C-LE-1'
ONE HORIZONTAL ROW OF LINEAR LED FIXTURES MOUNTED IN ALL INSET CASES ON SCENIC WALL WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

3 SOUTH ELEVATION
SCALE: 1/4"= 1'-0"



'YM-1' (YM-201)
RECESSED LOW VOLTAGE MONOPOINT FOR A SINGLE TRACK HEAD (YL SERIES) OR A SHORT TRACK (YL-BR)

MONOPOINT: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND NSTALLED BY GC

4 WEST ELEVATION
SCALE: 1/4"= 1'-0"

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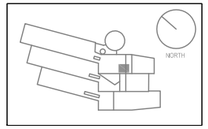


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009
No. / Issue Name / Date

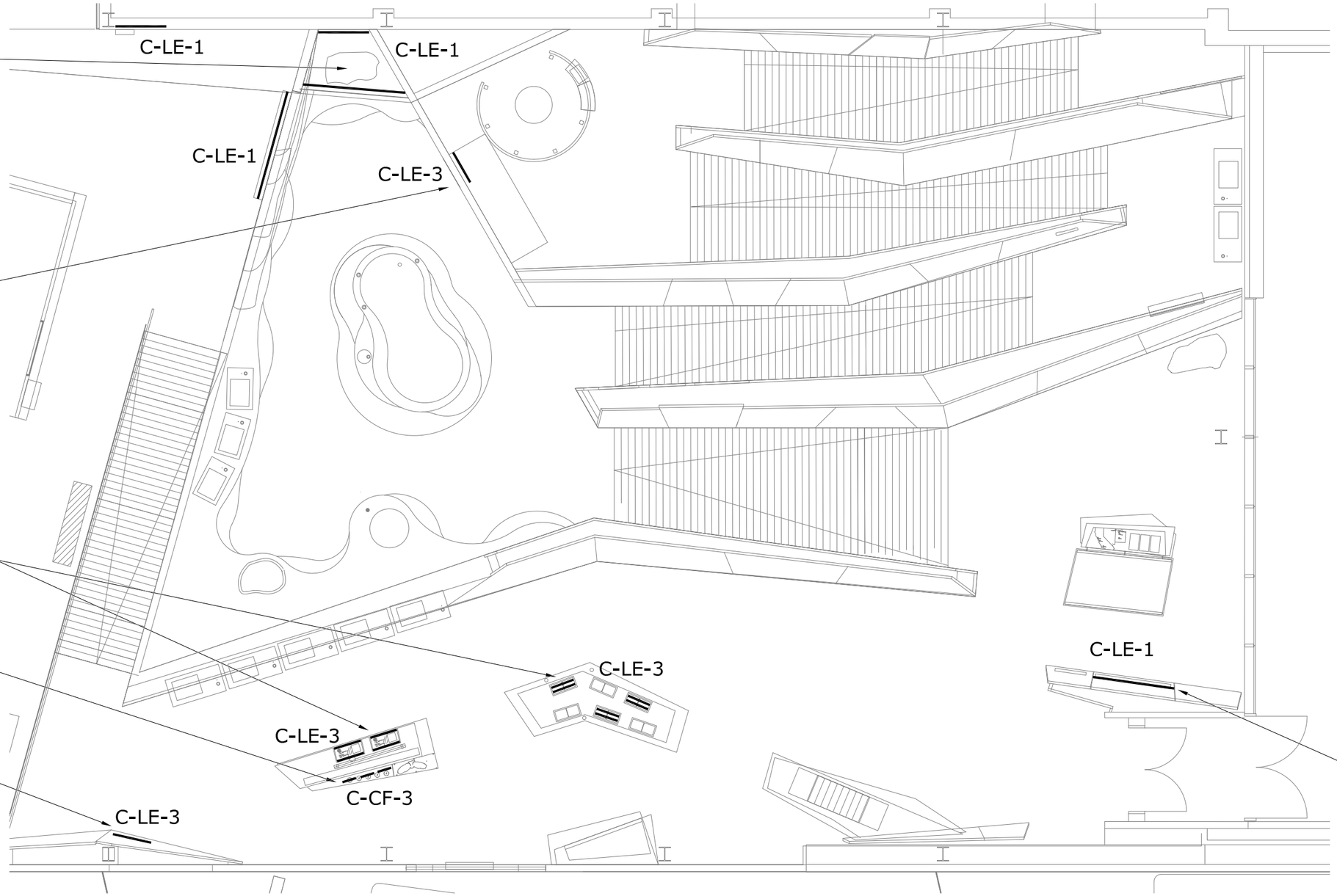
Sheet Title
Level 3 Elevations:
Dry Cave

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX3-DC-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



'C-LE-1'
TWO HORIZONTAL ROWS OF LINEAR LED FIXTURES MOUNTED IN PROSAUROPOD FOSSIL EXHIBIT, ONE ROW IN FRONT AND ONE AT BACK, WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

'C-LE-3'
TWO VERTICAL ROWS OF LINEAR LED FIXTURES MOUNTED IN INDEX FOSSIL CASE EXHIBIT, ONE ROW ON EACH SIDE, WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

'C-LE-3'
TWO HORIZONTAL ROWS OF LINEAR LED FIXTURES MOUNTED IN EACH TABLE EXHIBIT CASE IN HOMESTEAD CAVE AND HUMAN INTERACTIONS TABLES WITH REMOTE POWERSUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

'C-CF-3'
INSTALL (3) COMPACT FLUORESCENT FIXTURE WITHIN HOMESTEAD CAVE TABLE

PURCHASED AND INSTALLED BY XC

'C-LE-3'
TWO VERTICAL ROWS OF LINEAR LED FIXTURES MOUNTED IN LAND INTRO EXHIBIT CASE, ONE ROW ON EACH SIDE, WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

'C-LE-1'
ONE HORIZONTAL ROW OF LINEAR LED FIXTURES MOUNTED IN SEISMOGRAPH EXHIBIT CASE WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

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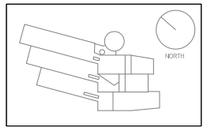


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

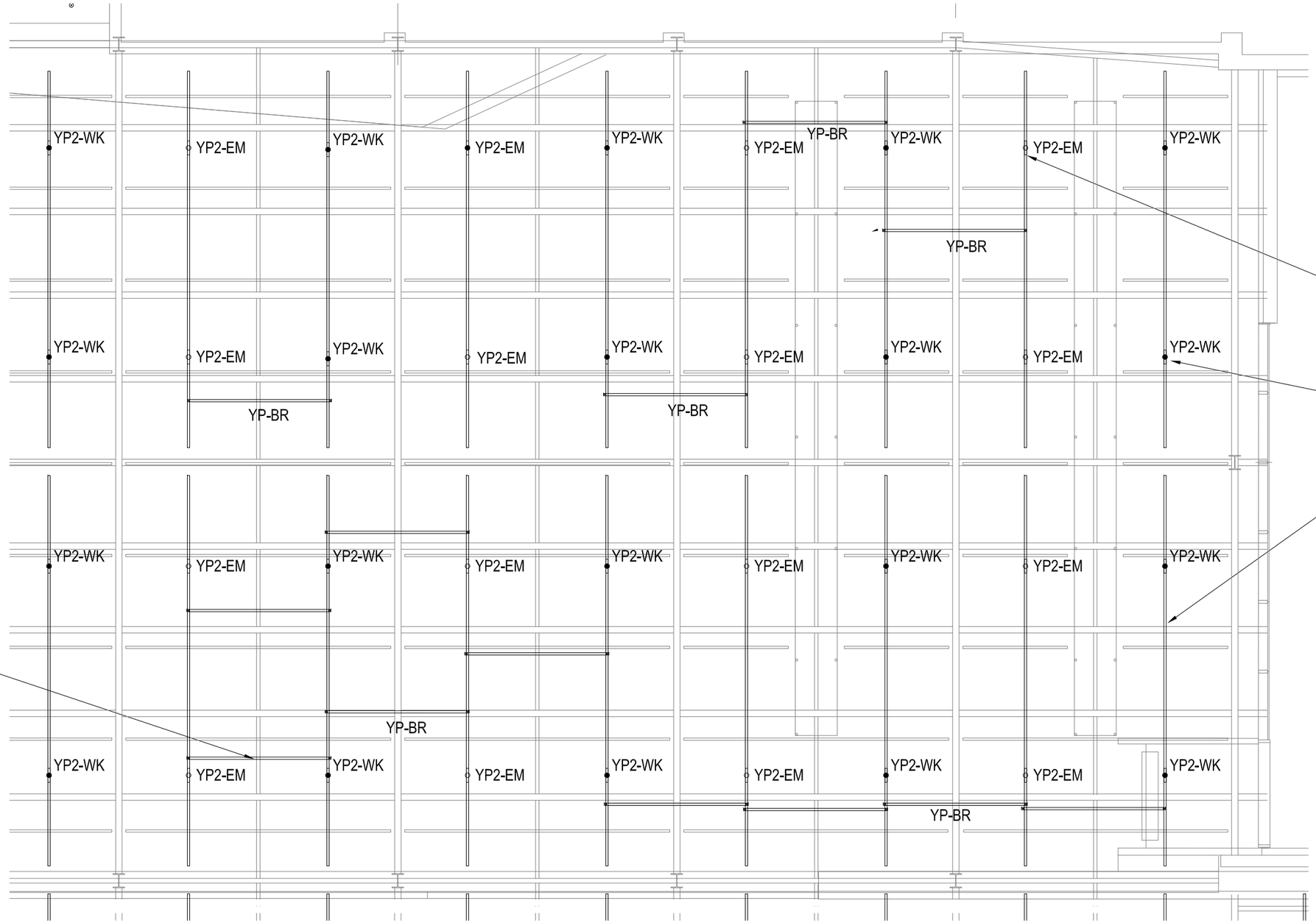
Sheet Title
Level 3 Partial Plan:
The Land Observatory

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX3-LD-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



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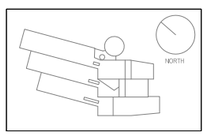

Key Plan

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100% Final Design April 2, 2009

Sheet Title
Level 3 Partial RCP:
The Land Observatory

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX3-LD-1.02

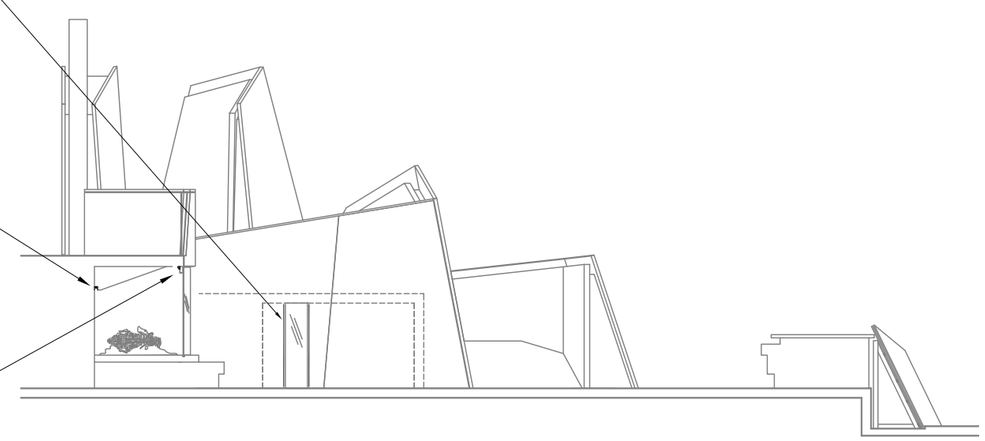
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

'C-LE-3'
TWO HORIZONTAL ROWS OF LINEAR LED FIXTURES MOUNTED IN INDEX FOSSIL INSET CASE, ONE ROW ON EACH SIDE, WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

'C-LE-1'
ONE HORIZONTAL ROW OF LINEAR LED FIXTURES MOUNTED IN THE BACK OF PROSAUROPOD EXHIBIT WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC



'C-LE-1'
ONE HORIZONTAL ROW OF LINEAR LED FIXTURES MOUNTED IN FRONT OF PROSAUROPOD EXHIBIT WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

1 NORTH ELEVATION COLORADO PLATEAU
SCALE: 1/4"= 1'-0"

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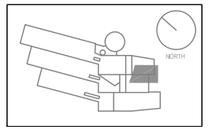


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

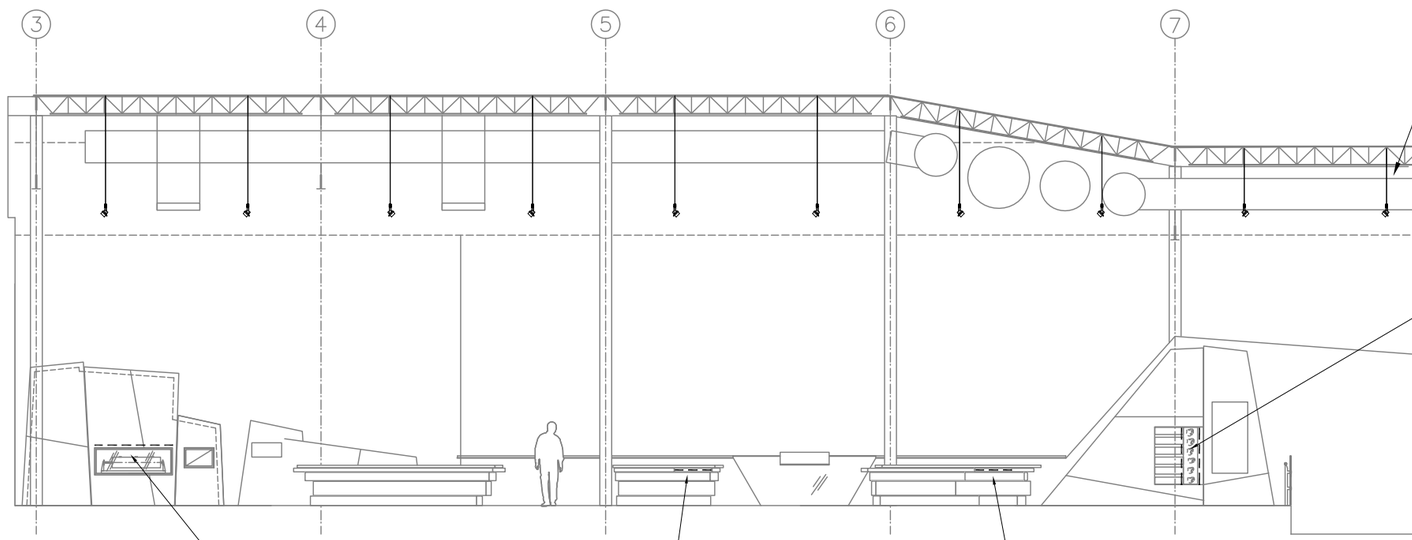
Sheet Title
Level 3 Sections & Elevations
The Land Observatory - CP

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX3-LD-2.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



'YP-2' (YP-201)
SINGLE CIRCUIT TRACKS MOUNTED ON CONTINUOUS UNI-STRUT

'YP2-EM' (YP-203) & YP2-WK(YP-204)
EMERGENCY LIGHT & WORK LIGHTS ARE AT THE END OR IN LINE WITH YP-2 TRACK, MOUNTED ON CONTINUOUS UNI-STRUT

PURCHASED AND INSTALLED BY GC

'C-LE-3'
TWO HORIZONTAL ROWS OF LINEAR LED FIXTURE MOUNTED IN LAND INTRO CASE, ONE ROW ON EACH SIDE, WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

'C-LE-1'
ONE HORIZONTAL ROW OF LINEAR LED FIXTURE MOUNTED IN SEISMOGRAPH CASE WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

'C-LE-3'
TWO HORIZONTAL ROWS OF LINEAR LED FIXTURE MOUNTED IN ALL DISPLAY CASES AT HUMAN INTERACTIONS WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

'C-LE-3' AND 'C-CF-3'
TWO HORIZONTAL ROWS OF C-LE-3, A LINEAR LED FIXTURE, MOUNTED IN ALL DISPLAY CASES AND THREE C-CF-3 AT HOMESTEAD CAVE TABLES WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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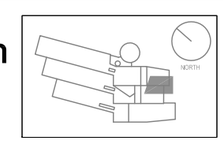

Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009
No. / Issue Name / Date

Sheet Title
Level 3 Sections & Elevations
The Land Observatory

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX3-LD-2.03

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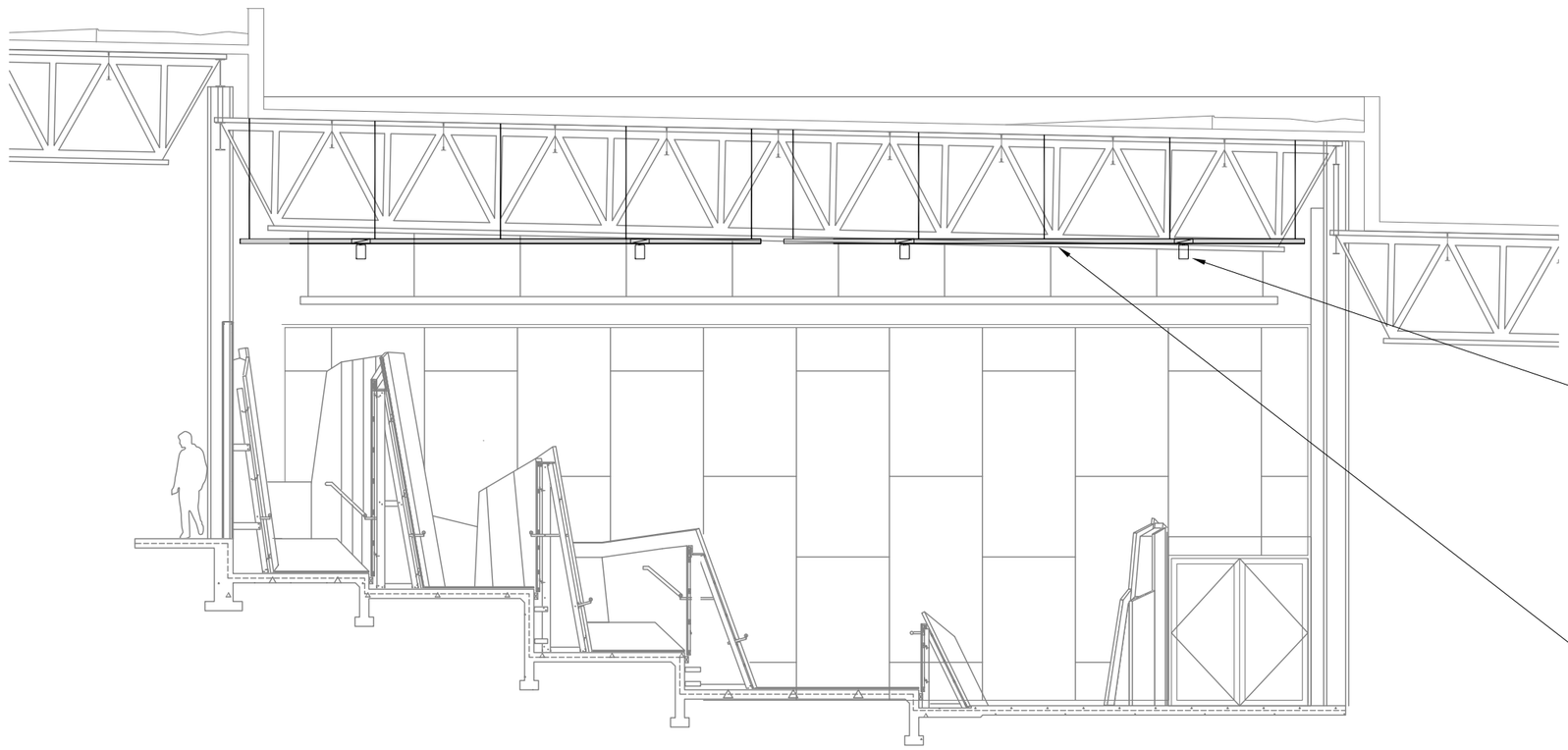

'YP2-EM' (YP-203)
12 INCH SEGMENTED TRACK WITH PERMANETLY ATTACHED FIXTURE - AT THE END OF IN LINE WITH EXHIBIT TRACK, MTD ON UNI-STRUT

PURCHASED/INSTALLED BY GC
(BASE BUILDING BUDGET)

'YP2-WK' (YP-204)
12 INCH SEGMENT TRACK WITH 150W MH FIXTURE FOR WORK LIGHT. MTD ON UNI-STRUT

PURCHASED/INSTALLED BY GC
(BASE BUILDING BUDGET)

'YP-2' (YP-201)
SIGLE CIRCUIT EXHIBIT TRACK, MTD AT UNI-STRUT.
TRACK: PURCHASED, INSTALLED BY GC
TRACK HEADS: PURCHASED, INSTALLED BY GC

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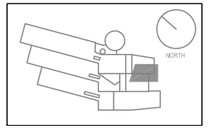

Key Plan

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100% Final Design April 2, 2009
No. / Issue Name / Date

Sheet Title
Level 3 Sections & Elevations
The Land Observatory - CP

Date
April 2, 2009

Scale*
1/4"=1'-0"

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DFCM Project No. 02243750
Sheet No.
LX3-LD-3.00

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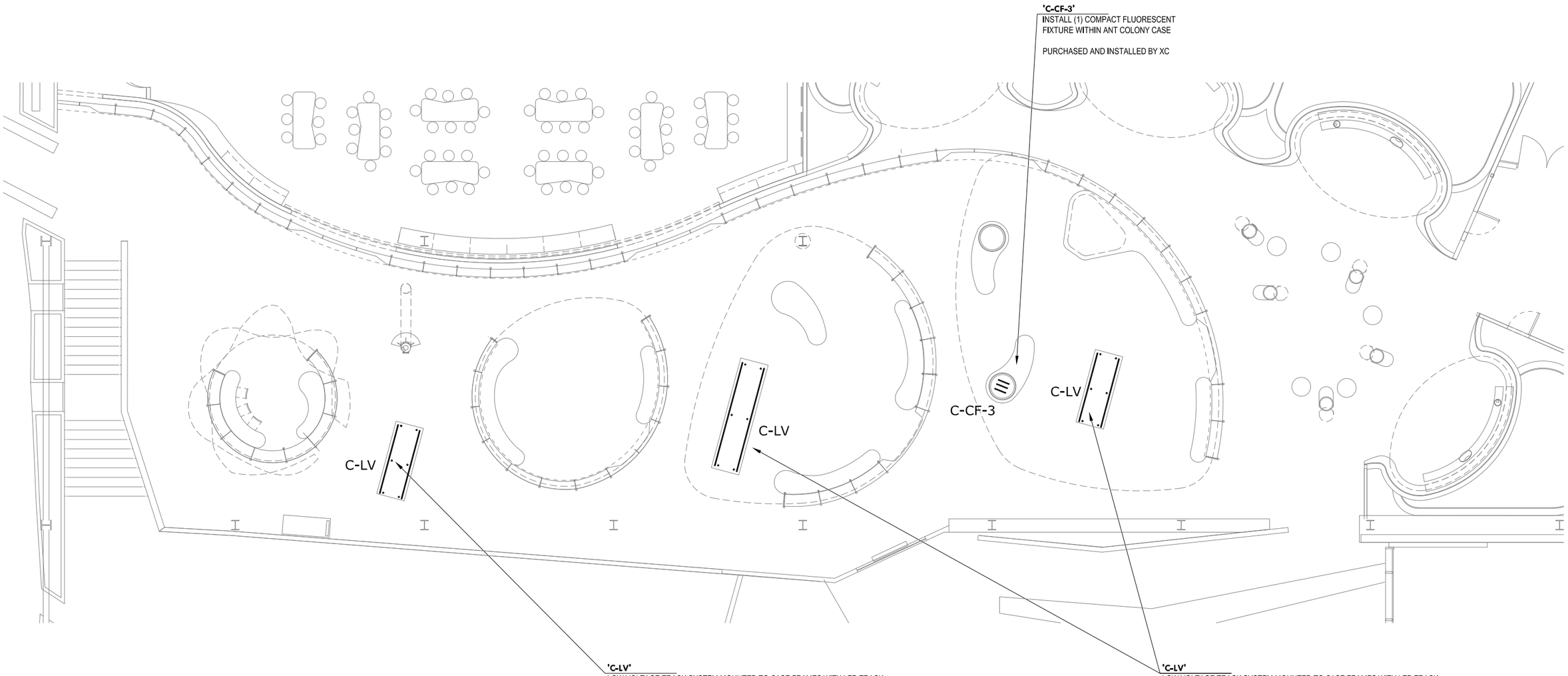

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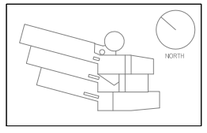


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Level 4 Partial Plan:
Life Observatory

Date	RAA Project No. 0275
April 2, 2009	U. of U Project No. 0872-9630
Scale*	DFCM Project No. 02243750
1/8"=1'-0"	Sheet No.

LX4-LF-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

"YZ-1" (YZ-200)
SPECIAL EFFECT GOBO PROJECTOR C-CLAMP MOUNTED TO IRON PIPE AND PERMENANTLY WIRED

PURCHASED AND INSTALLED BY GC

'YK-1" (YK-201)
LOW VOLTAGE CURVABLE TRACK SYSTEM SUSPENDED FROM CEILING WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS

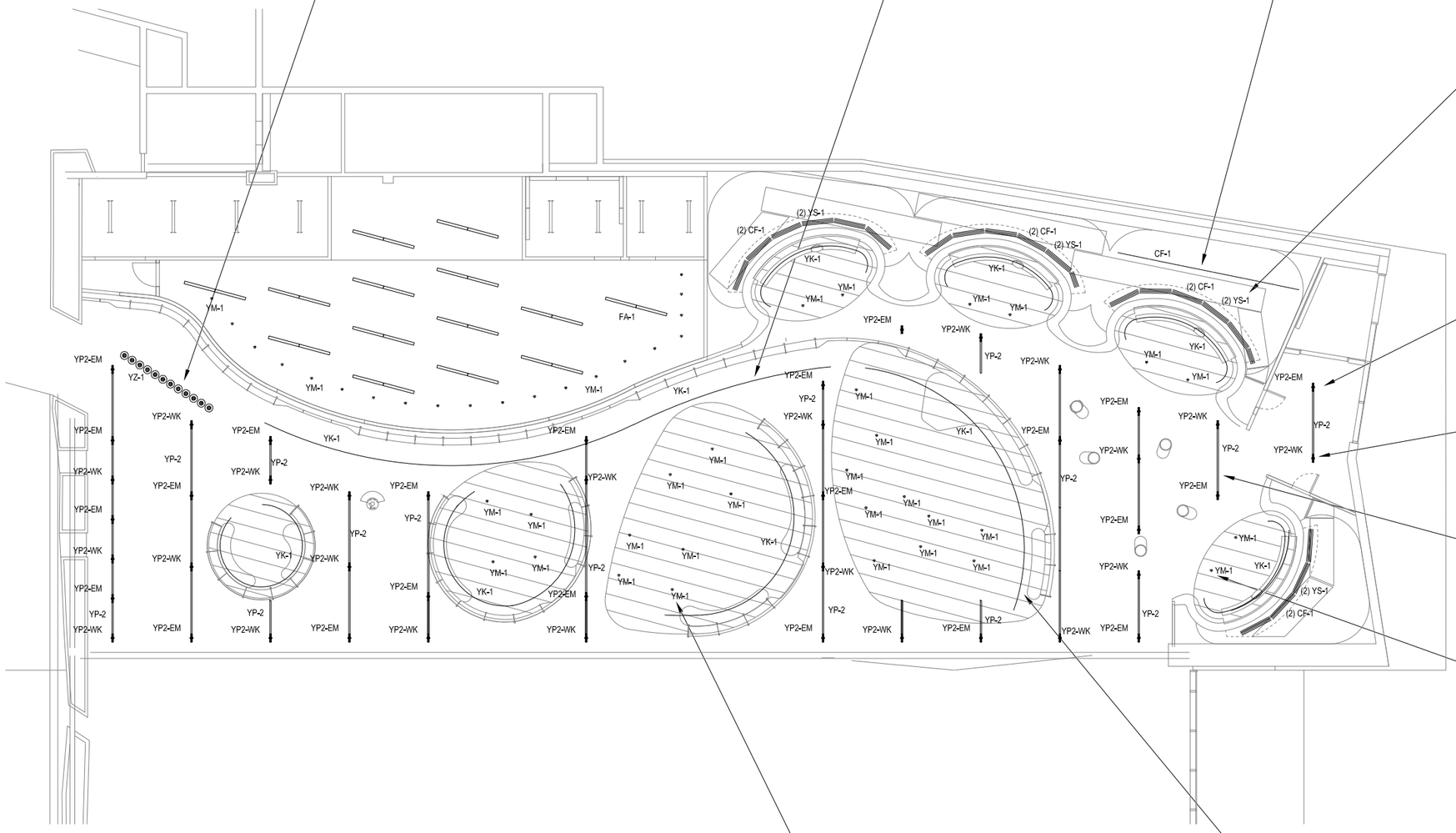
TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

'CF-1' (CF-201)
2-LAMP FLUORESCENT STRIPLIGHT WITH DIMMING BALLAST MOUNTED AT TOP OF DIORAMA (TYPCIAL)

PURCHASED AND INSTALLED BY GC

'YS-1' (YS-201)
(2) ROWS OF SINGLE CIRCUIT TRACK MOUNTED AT DIORAMA (TYPICAL)

TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC



'YP2-EM' (YP-203)
15 INCH SEGMENTED TRACK WITH 100W HALOGEN FIXTURE FOR EMERGENCY LIGHTING. TRACK TO BE AT THE END OR IN LINE WITH YP-2 TRACK AND MOUNTED ON UNI-STRUT

PURCHASED AND INSTALLED BY GC

'YP2-WK' (YP-204)
15 INCH SEGMENT TRACK WITH 150W MH FIXTURE FOR WORK LIGHT. TRACK TO BE AT THE END OR IN LINE WITH YP-2 TRACK AND MOUNTED ON UNI-STRUT

PURCHASED AND INSTALLED BY GC

'YP-2' (YP-201)
SINGLE CIRCUIT TRACKS MOUNTED ON CONTINUOUS UNI-STRUT

PURCHASED AND INSTALLED BY GC

'YM-1' (YM-201)
RECESSED LOW VOLTAGE MONOPOINT FOR A SINGLE TRACK HEAD (YL SERIES) OR A SHORT TRACK (YL-BR)

MONOPOINT; PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND NSTALLED BY GC

'YM-1' (YM-201)
RECESSED LOW VOLTAGE MONOPOINT FOR A SINGLE TRACK HEAD (YL SERIES) OR A SHORT TRACK (YL-BR) - TYPCIAL IN ALL CELLS

MONOPOINT: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND NSTALLED BY GC

'YK-1" (YK-201)
LOW VOLTAGE CURVABLE TRACK SYSTEM SUSPENDED FROM CEILING WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS (TYPCIAL IN ALL CELLS)

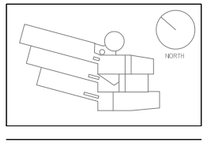
TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner	Design Architect	Architect of Record	Exhibit Structural Engineer	Building Engineer	Mechanical/Plumbing/FP Engineer	Electrical/AV Engineer	Lighting	Audio Visual	Exhibition Planner and Designer
UMNH 1390 East President's Circle Salt Lake City, Utah 84112 801.581.6927 tel.	Polshek Partnership Architects LLP 320 West 13th Street New York, New York 212.807.7171 tel.	Gillies Stransky Brems Smith 375 West 200 South Salt Lake City, Utah 801.521.8600 tel.	Leslie E. Robertson Associates 30 Broad Street New York, New York 10004 212.750.9000 tel.	Dunn Associates 380 West 800 South, Suite 100 Salt Lake City, UT 84101 801.575.8877 tel.	Colvin Engineering Associates, Inc. 244 West 300 North Salt Lake City, Utah 84103 801.322.2400 tel	Spectrum Engineers 175 South Main Street Salt Lake City, Utah 84111 800.678.7077 tel	**Brandston Partnership Inc** **122 West 26th Street** **New York, New York 10001** **212.924.4050 tel.**	BBI Engineering, Inc. 241 Quint Street San Francisco, CA 94124 415.885.9555 tel.	Ralph Appelbaum Associates 88 Pine Street New York, New York 10005 212.334.8200 tel.



Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Level 4 Partial RCP:
Life Observatory

Date	RAA Project No. 0275
April 2, 2009	U. of U Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/8"=1'-0"	LX4-LF-1.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

"YZ-1" (YZ-200)
SPECIAL EFFECT GOBO PROJECTOR C-CLAMP MOUNTED TO IRON PIPE AND PERMENANTLY WIRED

PURCHASED AND INSTALLED BY GC

XC TO PROVIDE GOBO PATTERNS AND REQUIREMENTS TO GC

'YM-1' (YM-201)
RECESSED LOW VOLTAGE MONOPOINT FOR A SINGLE TRACK HEAD (YL SERIES) OR A SHORT TRACK (YL-BR) - TYPICAL IN ALL CELLS

MONOPOINT: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND NSTALLED BY GC

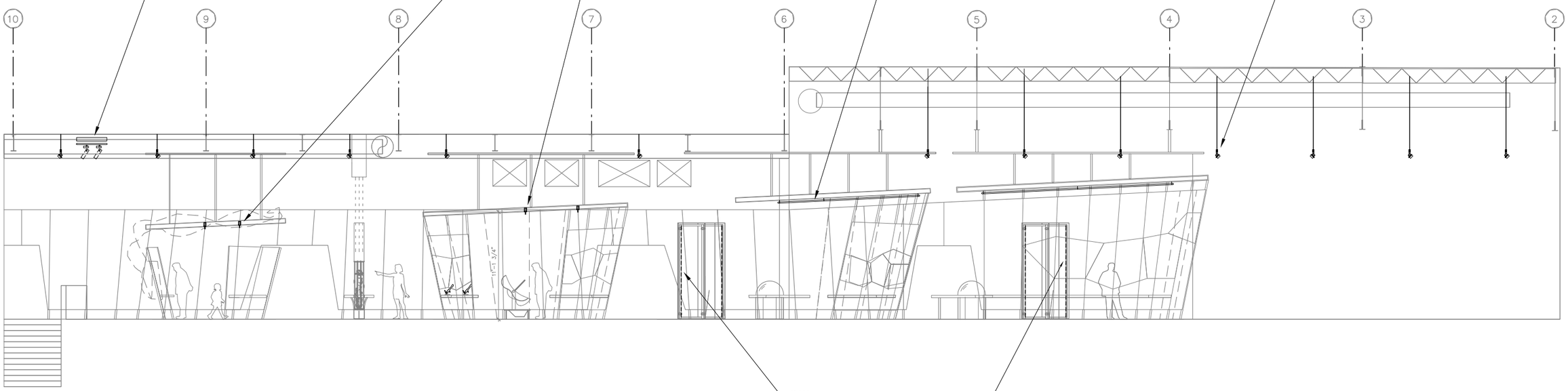
'YK-1" (YK-201)
LOW VOLTAGE CURVABLE TRACK SYSTEM SUSPENDED FROM CEILING WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS - TYPICAL IN ALL CELLS

TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

'YP-2' (YP-201)
SINGLE CIRCUIT TRACKS MOUNTED ON CONTINUOUS UNI-STRUT

'YP2-EM' (YP-203) & YP2-WK(YP-204)
EMERGENCY LIGHT & WORK LIGHTS ARE AT THE END OR IN LINE WITH YP-2 TRACK, MOUNTED ON CONTINUOUS UNI-STRUT

PURCHASED AND INSTALLED BY GC



'C-LV'
LOW VOLTAGE TRACK SYSTEM MOUNTED TO CASE FRAMES WITH LED TRACK HEADS AND REMOTE TRANSFORMERS

PURCHASED AND INSTALLED BY XC

1 EAST SECTION
SCALE: 1/4"= 1'-0"

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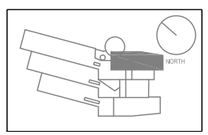

Key Plan

No. / Issue Name / Date

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100% Final Design April 2, 2009

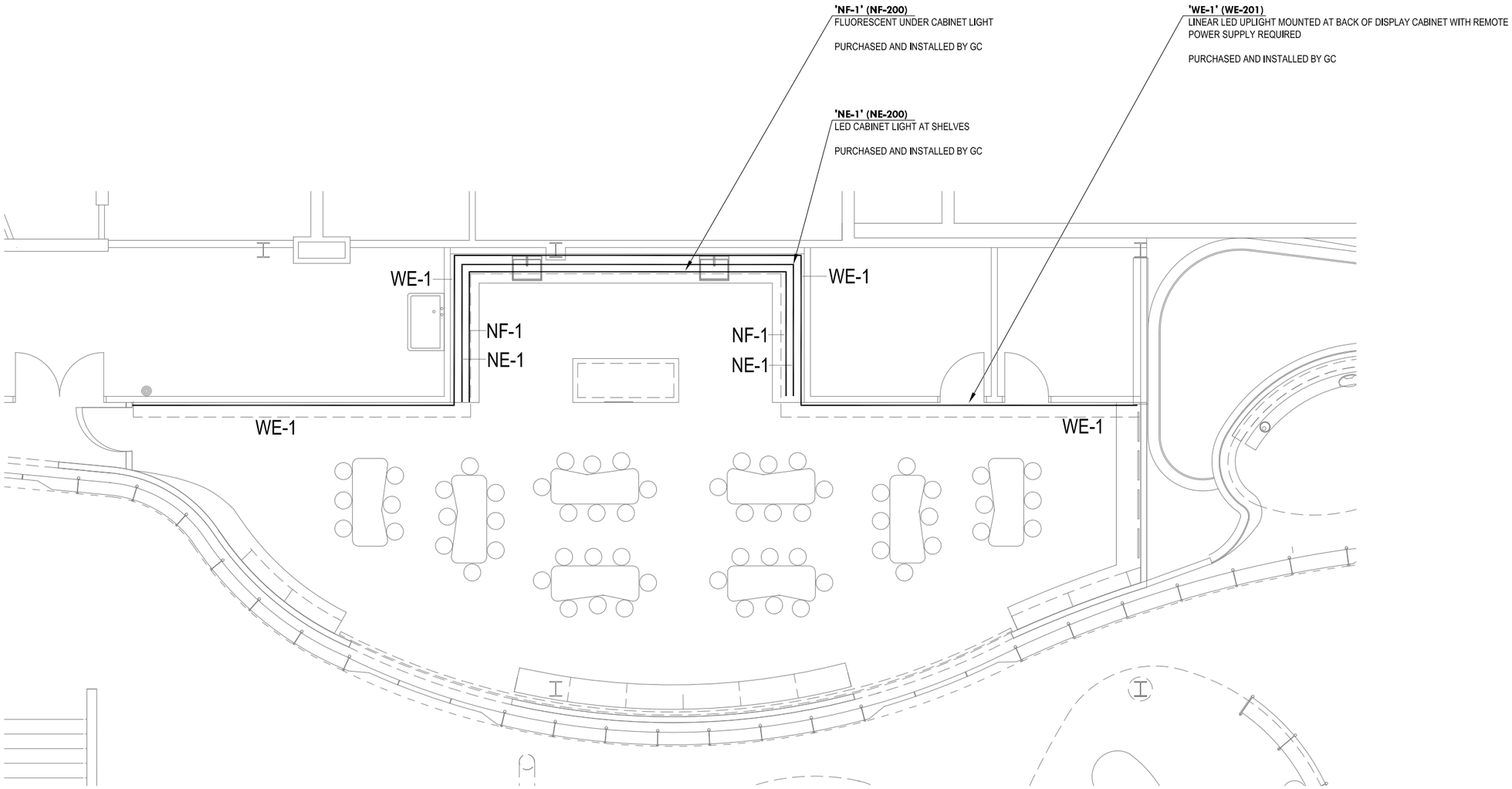
Sheet Title
Sections & Elevations
Life Observatory

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX4-LF-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



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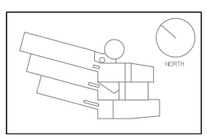


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Level 4 Partial Plan:
Naturalist Lab

Date	RAA Project No. 0275
April 2, 2009	U. of U Project No. 0872-9630 DFCM Project No. 02243750
Scale*	Sheet No.
1/4"=1'-0"	LX4-NL-1.00

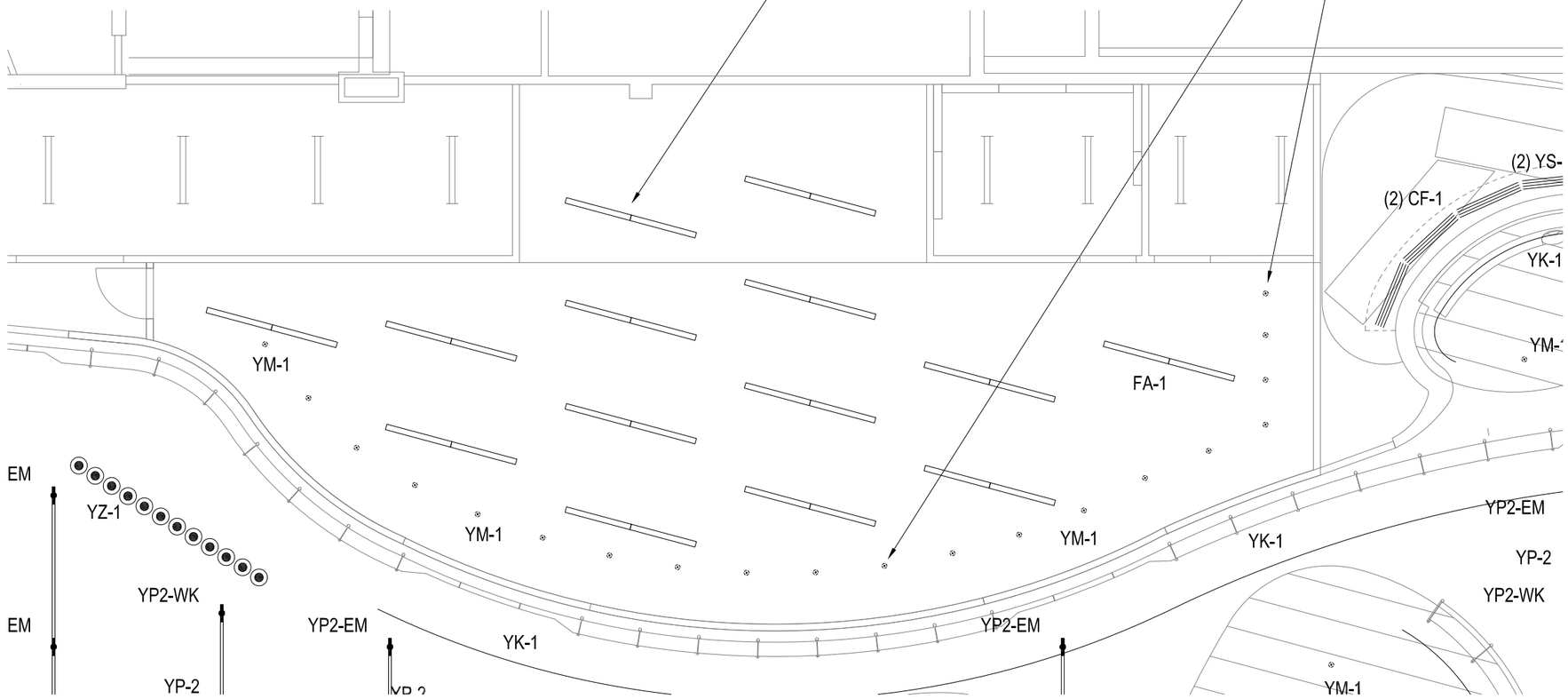
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

'FA-1' (FA-201)
RECESSED DIMMABLE LINEAR FLUORESCENT LENSED FIXTURE

PURCHASED AND INSTALLED BY GC

'YM-1' (YM-201)
RECESSED LOW VOLTAGE MONOPOINT FOR A SINGLE TRACK HEAD (YL SERIES) OR A SHORT TRACK (YL-BR)

MONOPOINT: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND NSTALLED BY GC



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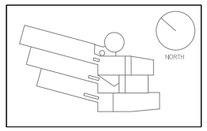


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009
No. / Issue Name / Date

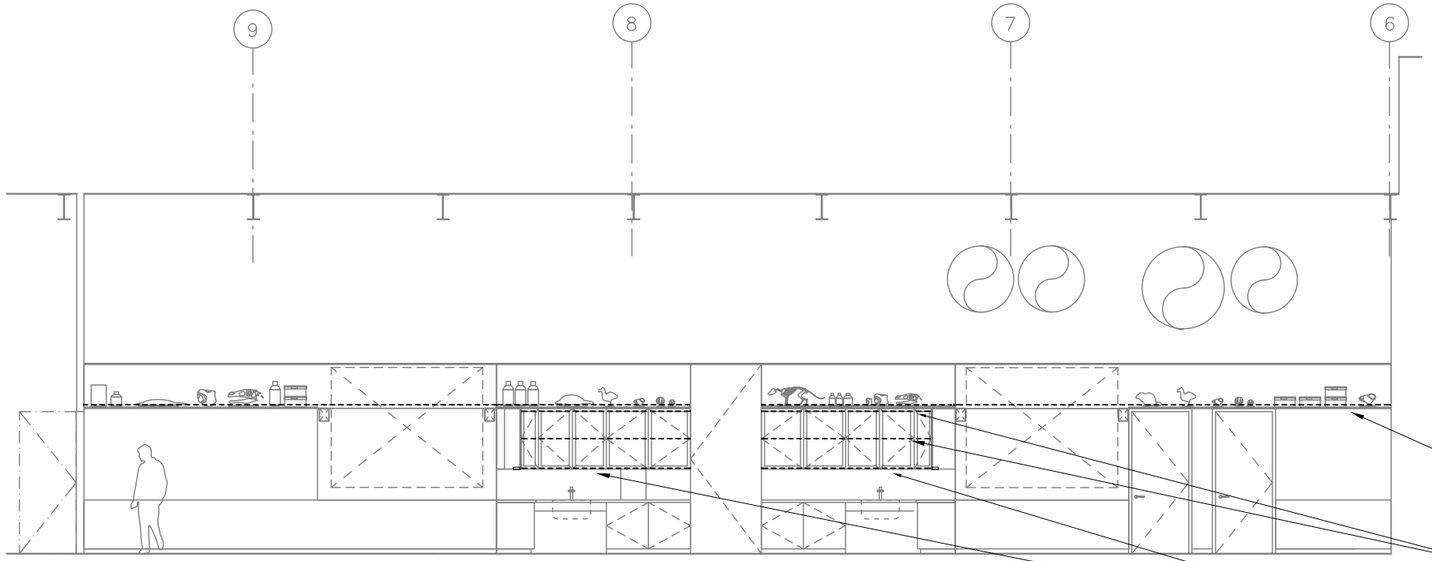
Sheet Title
Level 4 Partial RCP:
Naturalist Lab

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX4-NL-1.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



1 EAST ELEVATION – LEARNING LAB
SCALE: 1/4"= 1'-0"

'YK-1' (YK-201)
SUSPENDED LOW VOLTAGE TRACK SYSTEM WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS

TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

'YM-1' (YM-201)
RECESSED LOW VOLTAGE MONOPOINT FOR A SINGLE TRACK HEAD (YL SERIES) OR A SHORT TRACK (YL-BR)

MONOPOINT: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND NSTALLED BY GC

'WE-1' (WE-201)
LINEAR LED CHANNEL MOUNTED AT BACK OF CABINET WITHREMOTE TRANSFORMERS

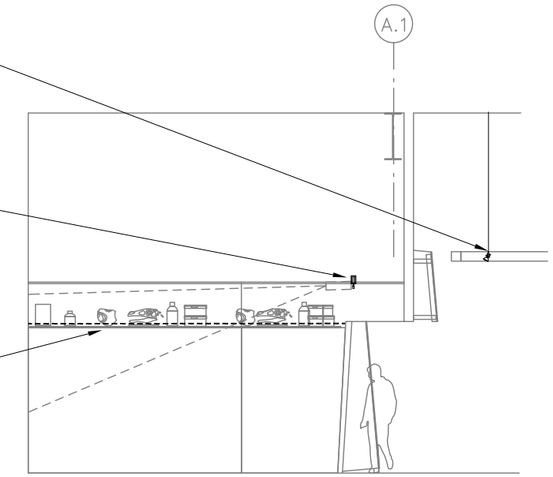
PURCHASED AND INSTALLED BY GC

'NE-1' (NE-200)
LED CABINET LIGHT IN ALL SHELVES

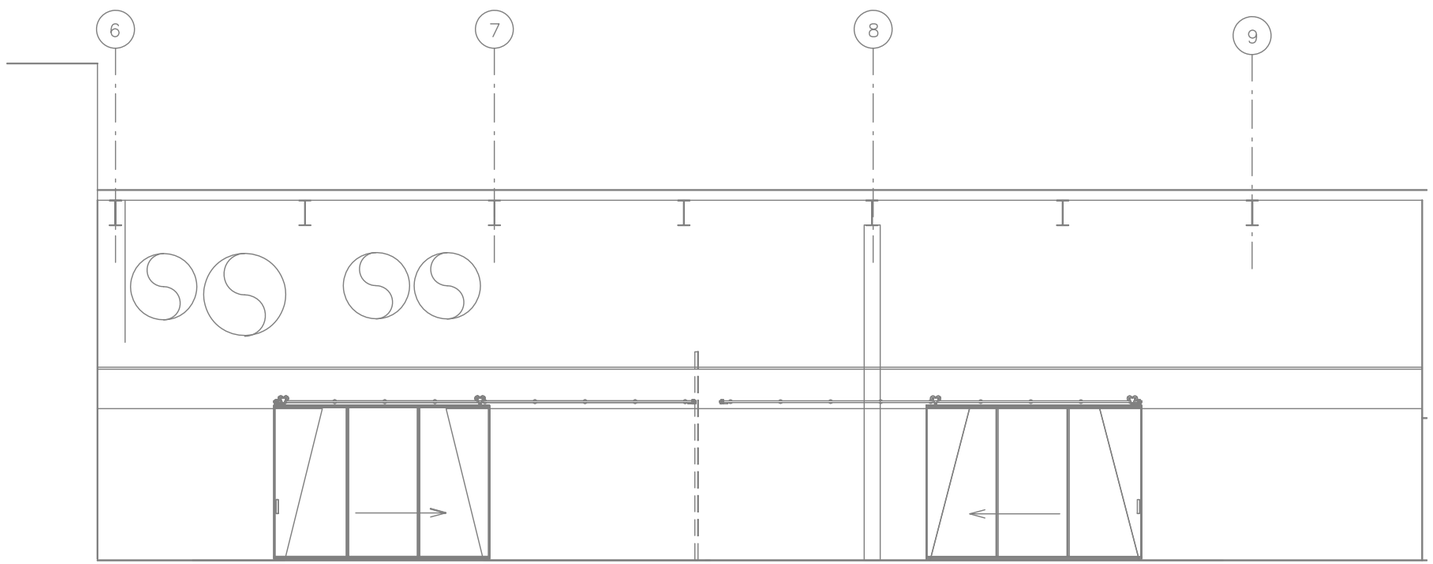
PURCHASED AND INSTALLED BY GC

'NF-1' (NF-200)
FLUORESCENT UNDER CABINET LIGHT

PURCHASED AND INSTALLED BY GC



3 LEARNING LAB SECTION ALONG COLUMN LINE 7
SCALE: 1/4"= 1'-0"



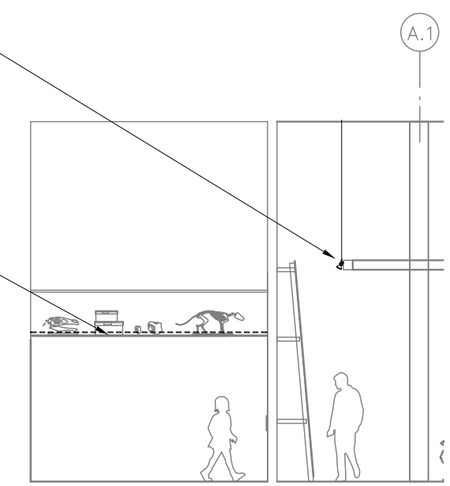
2 WEST ELEVATION – LEARNING LAB
SCALE: 1/4"= 1'-0"

'YK-1' (YK-201)
SUSPENDED LOW VOLTAGE TRACK SYSTEM WITH LOW VOLTAGE TRACK HEADS AND REMOTE TRANSFORMERS

TRACK SYSTEM: PURCHASED AND INSTALLED BY GC
TRACK HEADS: PURCHASED BY OWNER AND INSTALLED BY GC

'WE-1' (WE-201)
LINEAR LED CHANNEL MOUNTED AT BACK OF CABINET WITHREMOTE TRANSFORMERS

PURCHASED AND INSTALLED BY GC



4 SOUTH ELEVATION – LEARNING LAB
SCALE: 1/4"= 1'-0"

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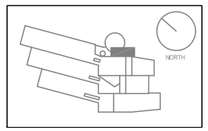


Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009
No. / Issue Name / Date

Sheet Title
Naturalist Lab
Sections/Elevations

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX4-NL-2.00

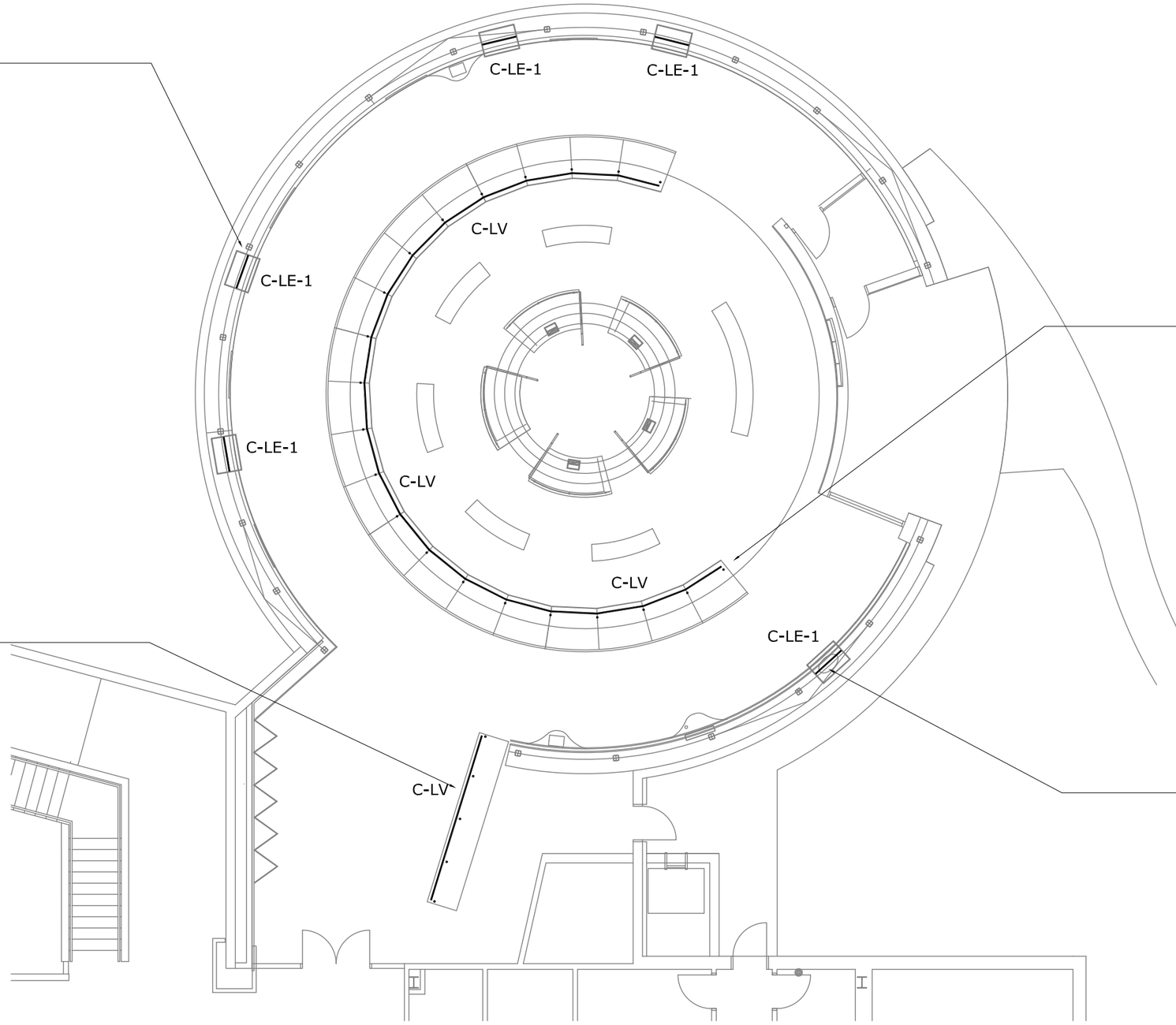
*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

'C-LE-1'
ONE HORIZONTAL ROW OF LINEAR LED FIXTURE MOUNTED IN INSET CASE WITH REMOTE POWER SUPPLY REQUIRED (TYPICAL)

PURCHASED AND INSTALLED BY XC

'C-LV'
LOW VOLTAGE TRACK SYSTEM MOUNTED TO CASE FRAMES WITH LED TRACK HEADS AND REMOTE TRANSFORMERS

PURCHASED AND INSTALLED BY XC



'C-LV'
LOW VOLTAGE TRACK SYSTEM MOUNTED TO CASE FRAMES WITH LED TRACK HEADS AND REMOTE TRANSFORMERS

PURCHASED AND INSTALLED BY XC

'C-LE-1'
ONE HORIZONTAL ROW OF LINEAR LED FIXTURE MOUNTED IN INSET CASE WITH REMOTE POWER SUPPLY REQUIRED

PURCHASED AND INSTALLED BY XC

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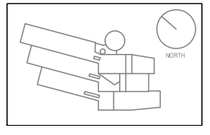


Key Plan

No. / Issue Name / Date

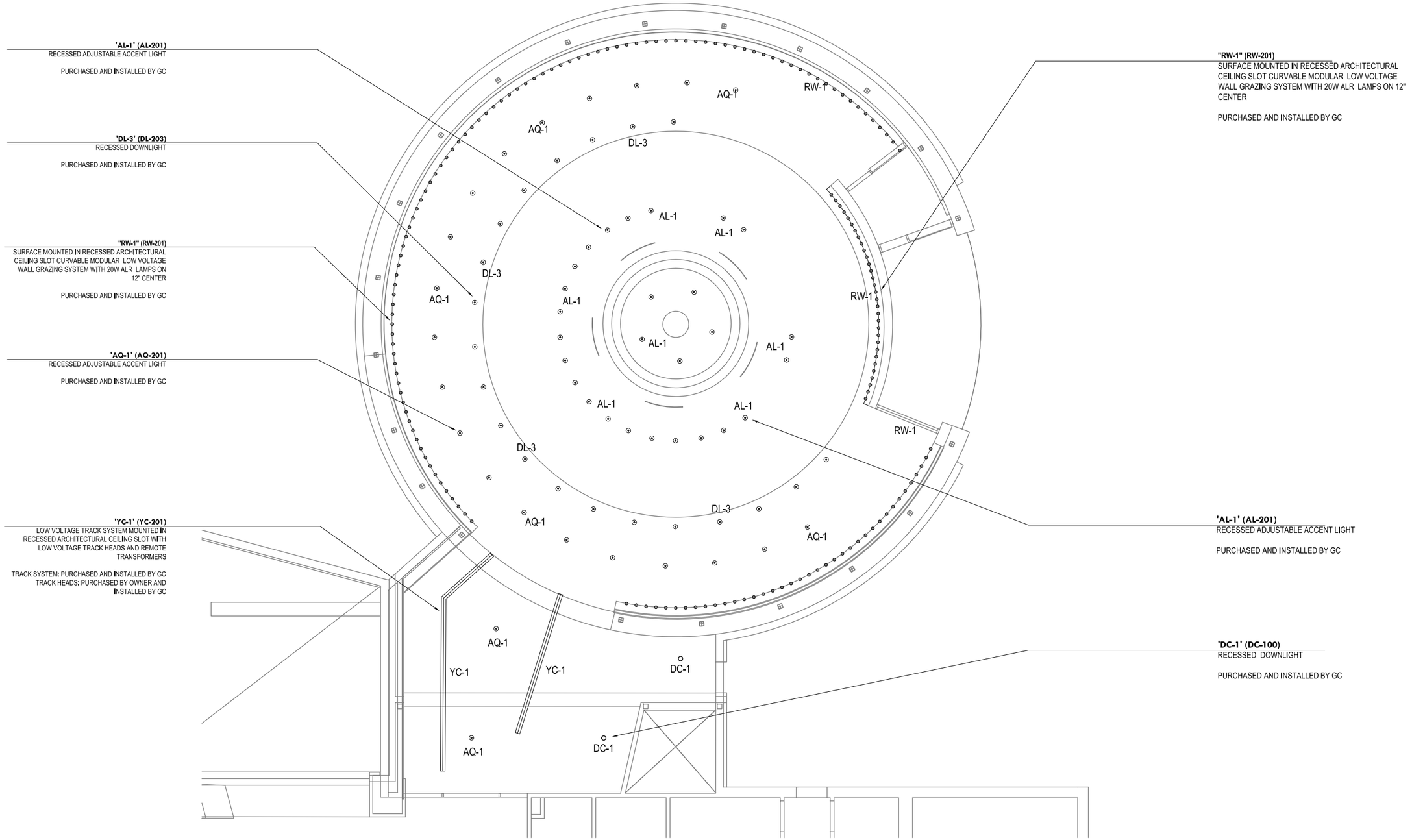
No. / Issue Name / Date

100% Final Design April 2, 2009

Sheet Title
Level 5 Partial Plan:
Native Voices Observatory

Date	RAA Project No. 0275
April 2, 2009	U. of U Project No. 0872-9630
	DFCM Project No. 02243750
Scale*	Sheet No.
3/16"=1'-0"	LX5-NV-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



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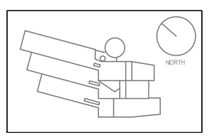

Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title

Level 5 Partial RCP:
Native Voices Observatory

Date
April 2, 2009

Scale*
3/16"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.

LX5-NV-1.02

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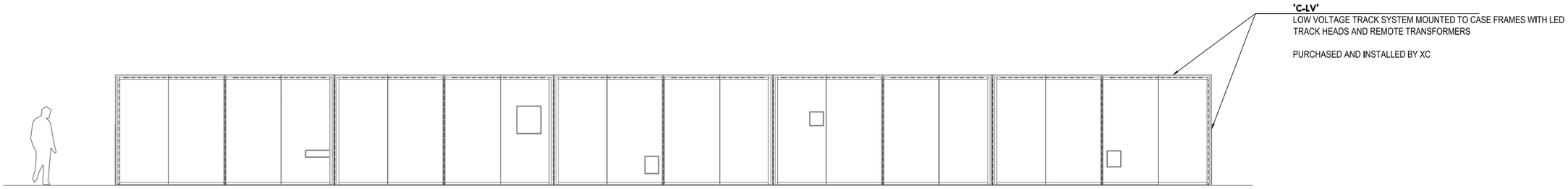
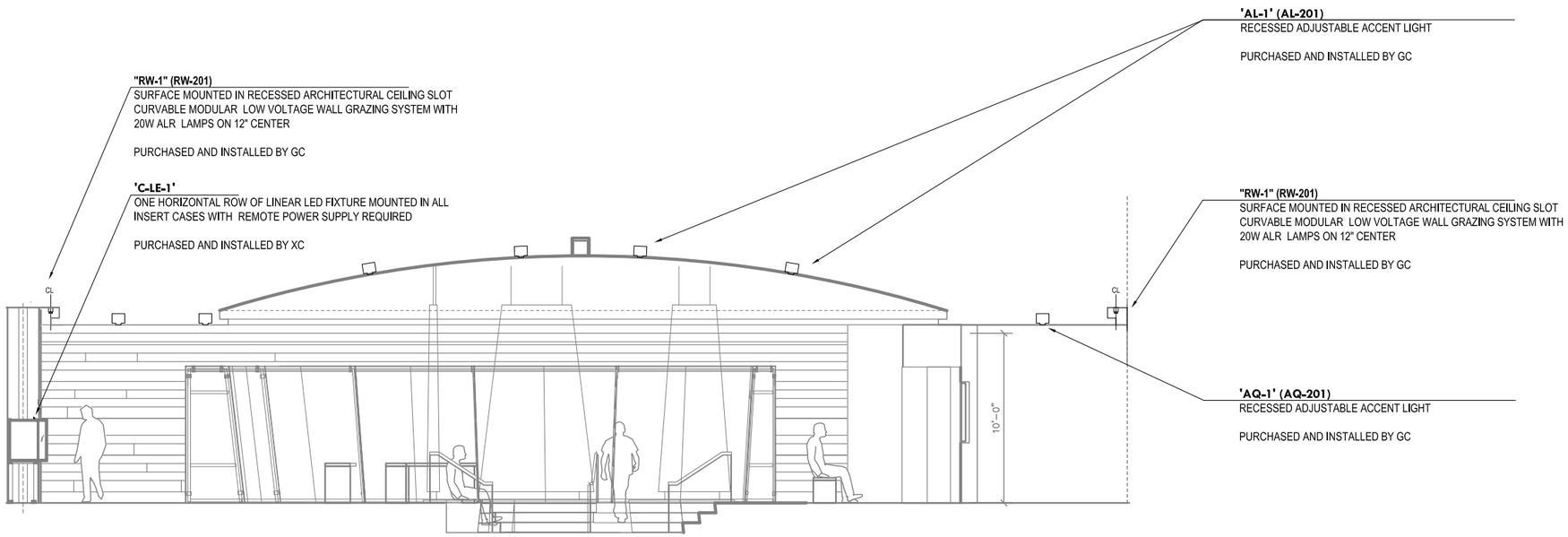


1 DEVELOPED ELEVATION: EXHIBIT CASES
SCALE: 1/4= 1'-0"



3 SECTION: STORYTELLING
SCALE: 1/4= 1'-0"

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

Owner
UMNH
1390 East President's Circle
Salt Lake City, Utah 84112
801.581.6927 tel.

Design Architect
Polshek Partnership Architects LLP
320 West 13th Street
New York, New York
212.807.7171 tel.

Architect of Record
Gillies Stransky Brems Smith
375 West 200 South
Salt Lake City, Utah
801.521.8600 tel.

Exhibit Structural Engineer
Leslie E. Robertson Associates
30 Broad Street
New York, New York 10004
212.750.9000 tel.

Building Engineer
Dunn Associates
380 West 800 South, Suite 100
Salt Lake City, UT 84101
801.575.8877 tel.

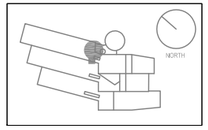
Mechanical/Plumbing/FP Engineer
Colvin Engineering Associates, Inc.
244 West 300 North
Salt Lake City, Utah 84103
801.322.2400 tel

Electrical/AV Engineer
Spectrum Engineers
175 South Main Street
Salt Lake City, Utah 84111
800.678.7077 tel

Lighting
Brandston Partnership Inc
122 West 26th Street
New York, New York 10001
212.924.4050 tel.

Audio Visual
BBI Engineering, Inc.
241 Quint Street
San Francisco, CA 94124
415.685.9555 tel.

Exhibition Planner and Designer
Ralph Appelbaum Associates
88 Pine Street
New York, New York 10005
212.334.8200 tel.



Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

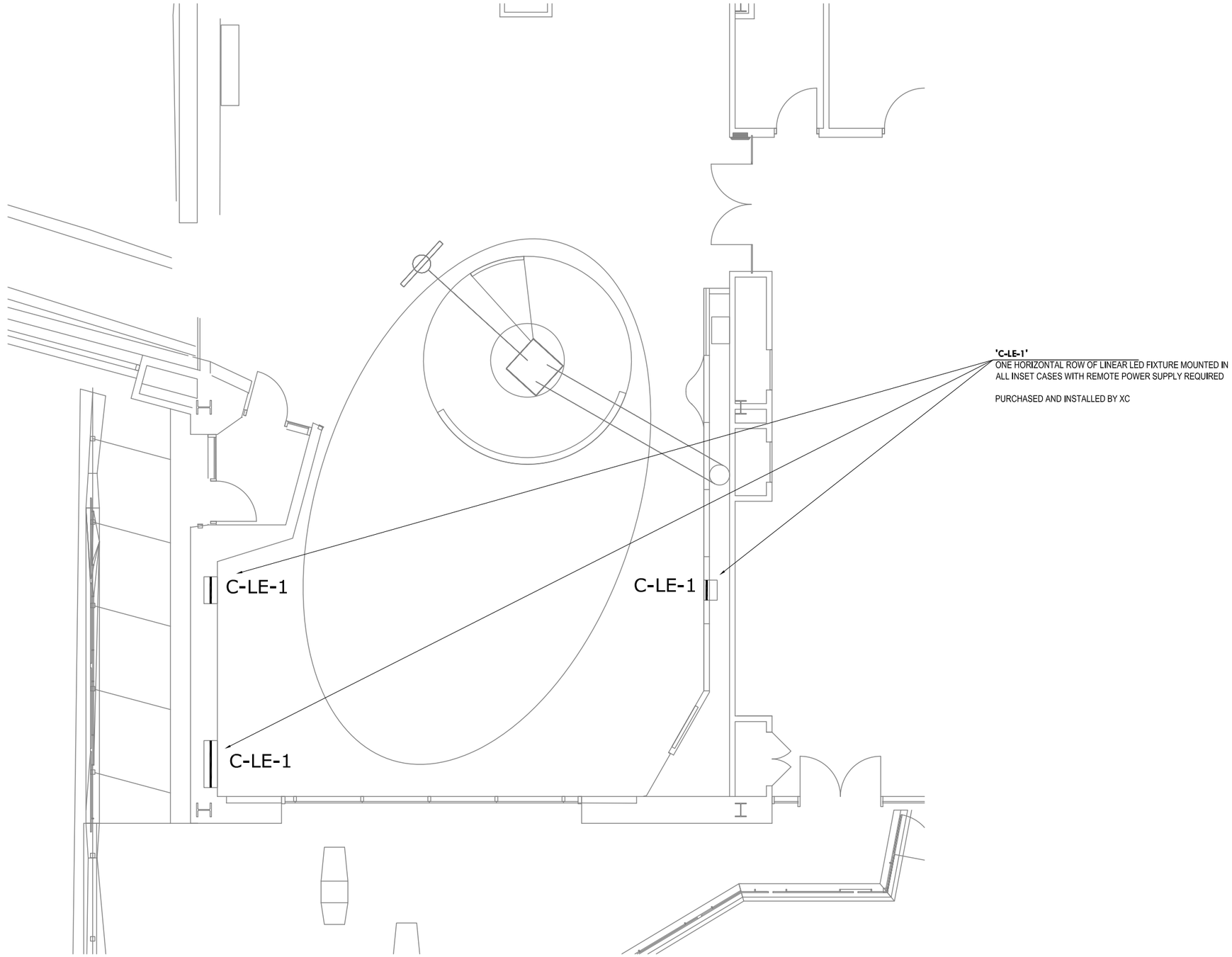
Sheet Title
Sections & Elevations:
Native Voices Observatory

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX5-NV-2.01

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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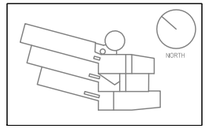


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

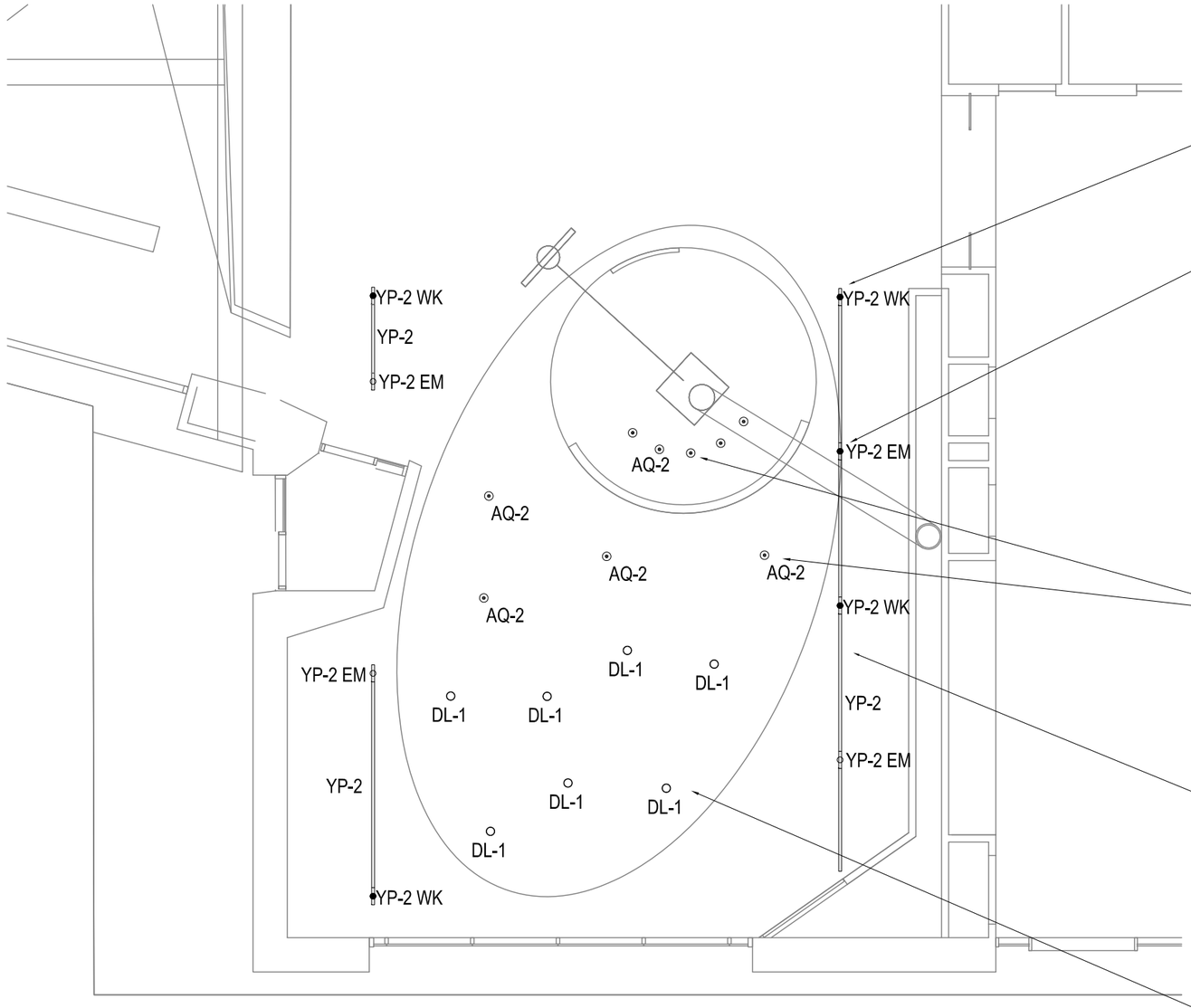
Sheet Title
Level 5 Partial Plan:
Sky Observatory

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX5-SK-1.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")



'YP2-WK' (YP-204)
15 INCH SEGMENT TRACK WITH 150W MH FIXTURE FOR WORK LIGHT. TRACK TO BE AT THE END OR IN LINE WITH YP-2 TRACK AND MOUNTED ON UNI-STRUT

PURCHASED AND INSTALLED BY GC

'YP2-EM' (YP-203)
15 INCH SEGMENTED TRACK WITH 100W HALOGEN FIXTURE FOR EMERGENCY LIGHTING. TRACK TO BE AT THE END OR IN LINE WITH YP-2 TRACK AND MOUNTED ON UNI-STRUT

PURCHASED AND INSTALLED BY GC

'AQ-1' (AQ-201)
RECESSED ADJUSTABLE ACCENT LIGHT

PURCHASED AND INSTALLED BY GC

'YP-2' (YP-201)
SINGLE CIRCUIT TRACKS MOUNTED ON CONTINUOUS UNI-STRUT

PURCHASED AND INSTALLED BY GC

'DL-1' (DL-201)
RECESSED LOW VOLTAGE DOWNLIGHT

PURCHASED AND INSTALLED BY GC

UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

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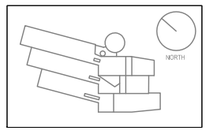


Key Plan

No. / Issue Name / Date

No. / Issue Name / Date

100% Final Design April 2, 2009

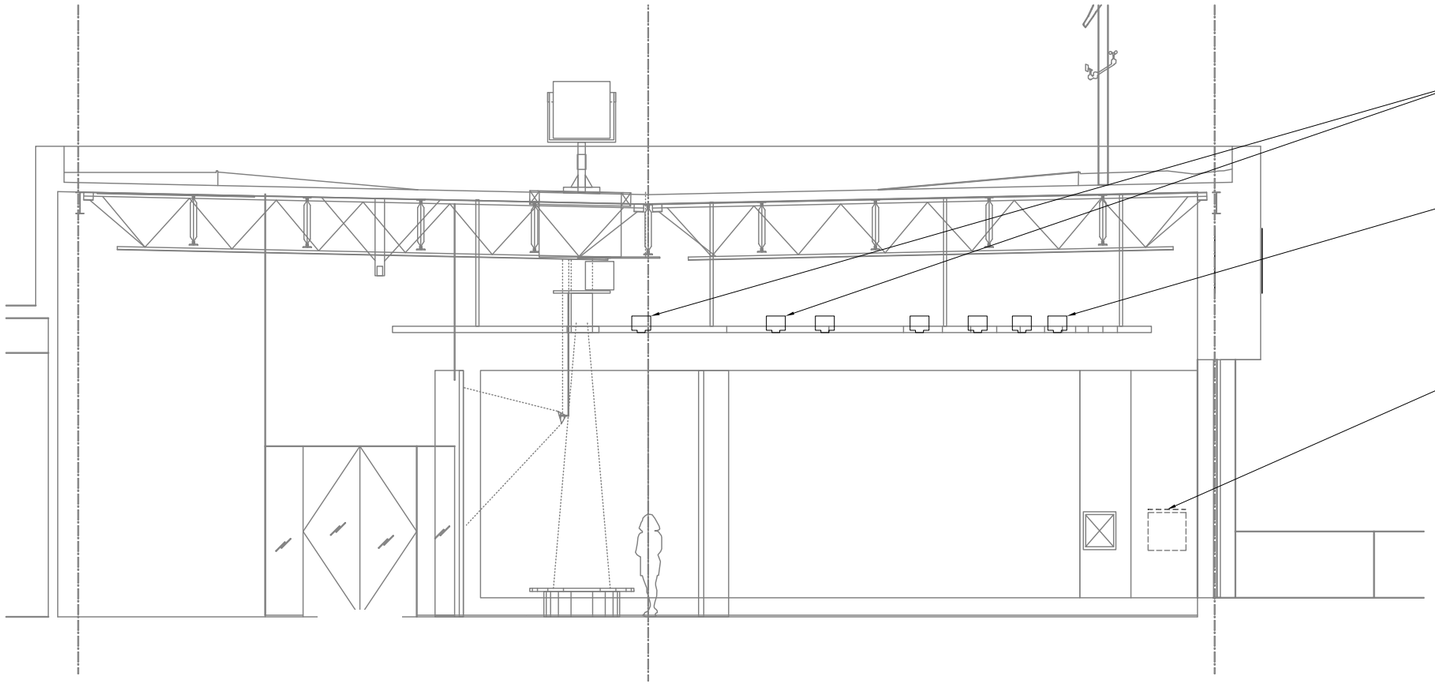
Sheet Title
Level 5 Partial RCP:
Sky Observatory

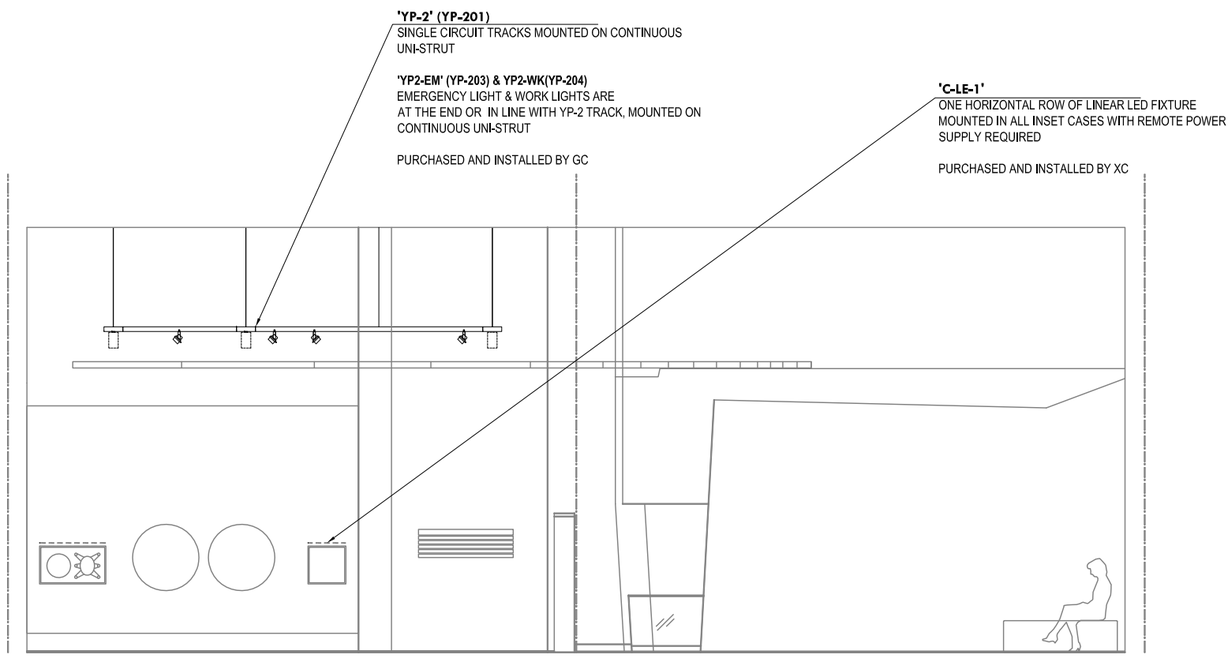
Date
April 2, 2009

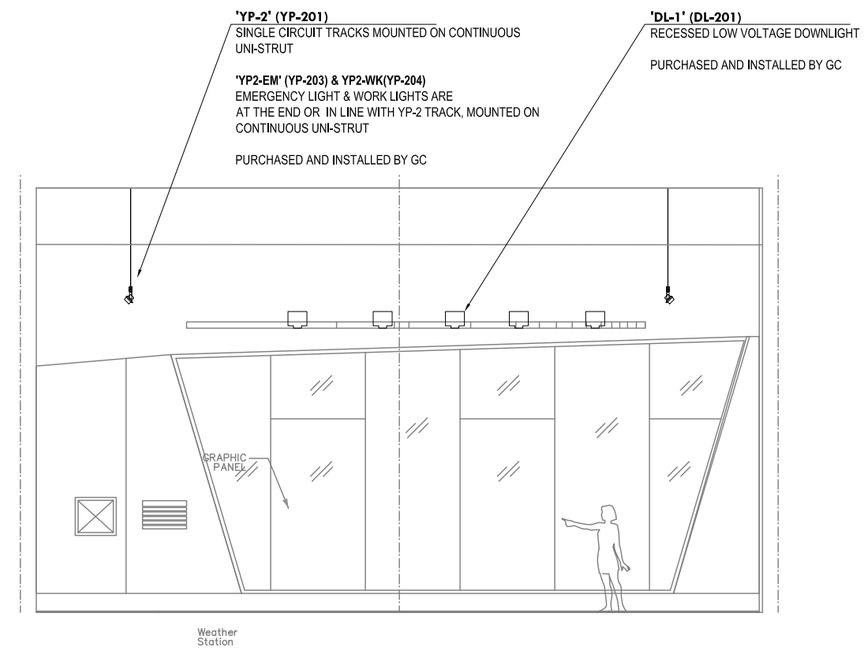
Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX5-SK-1.02

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")







UTAH MUSEUM OF NATURAL HISTORY

UNIVERSITY OF UTAH, SALT LAKE CITY, UTAH

Exhibit Construction

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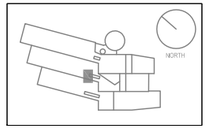

Key Plan

No. / Issue Name / Date

100% Final Design April 2, 2009

No. / Issue Name / Date

Sheet Title
Sections & Elevations
Sky Observatory

Date
April 2, 2009

Scale*
1/4"=1'-0"

RAA Project No. 0275
U. of U Project No. 0872-9630
DFCM Project No. 02243750
Sheet No.
LX5-SK-2.00

*Note: Scale Given for Full Size Drawing Sheet (22" x 34")

UTAH MUSEUM OF NATURAL HISTORY

GRAPHIC PACKAGE

100% FINAL DESIGN DOCUMENTS
PREPARED BY RALPH APPELBAUM ASSOCIATES
SUBMITTED APRIL 2, 2009

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5-12	[CN] CANYON
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21-28	[OB] OUR BACKYARD
29-60	[PW] PAST WORLDS
	LEVEL 3
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81-102	[FP] FIRST PEOPLES
103-124	[LD] LAND
	LEVEL 4
125-154	[LF] LIFE
	LEVEL 5
155-174	[NV] NATIVE VOICES
175-184	[SK] SKY
185-234	**PANEL SCHEDULE**

NOTE Graphic elevations illustrated in this package are intended for Contractor's use in pricing only. Images, text, colors, quantities and arrangements of design elements in the graphic elevations are subject to revision pending final script and images. Final production artwork will be issued to the Contractor after fabrication has been contracted.

Ralph Appelbaum Associates *Project No. 0275*
University of Utah *Project No. 0872-9630*
Division of Facilities Construction Management *Project No. 02243750*

CODE ANATOMY

gallery
exhibit area
exhibit
graphic element

FP6.E01.pm01 ---------- [1] **CONTENT CODE** › refer to *Interpretive Outline* for detailed information and to *Panel Schedule* for sizes and techniques

DS-1 ---------- [2] **GRAPHIC TECHNIQUE**

FP6.E01.ms01 ---------- [3] **SUB-CONTENT CODE** › content found within [1] above

GRAPHIC ELEMENT CODES

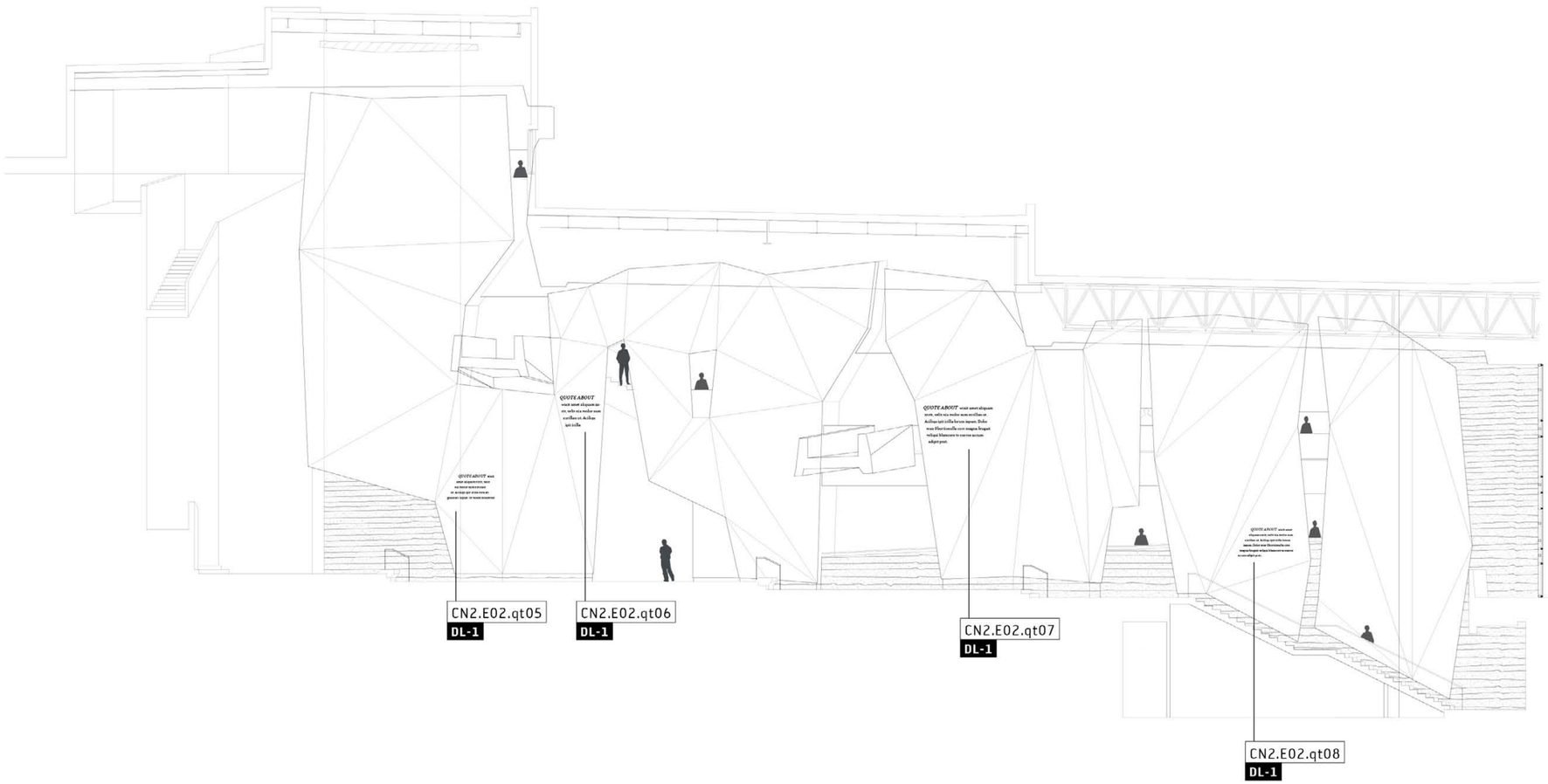
ip	Introductory Panel	**pm**	Photomural	**gr**	Graphic Rail
si	Section Introduction	**gi**	Graphic Image	**tt**	Table Top
ct	Case Title	**gc**	Graphic Caption	**ap**	Activity Prompts
ms	Mindset	**gp**	Graphic Panel	**sp**	Story Panel
fp	Focus Panel	**ar**	Artifact Label	**fl**	Family Label
qt	Quote	**id**	Id Label		

GRAPHIC TECHNIQUES

FINISH CODE	DESCRIPTION	SPECIFICATIONS	USAGE
LG-1	High-pressure laminated graphic	iZone or Folia Cashmere finish, 1/8" thick 3M mounting tape to 1" Paperstone *unless otherwise noted*	Graphic rails, ID wheels, and tabletops
DP-1	Digital print on fabric	Evergreen fabric jet text Wrapped on 1/4" substrate -OR- adhered to GWB UV Clear coating	Large format images (photomurals)
IJ-1	Inkjet print	High quality, large format printer Matte finish Wrapped on 1/8" acrylic panel UV Clear coating	Small and medium format images (on vertical surfaces and in casework)
IJ-2	Inkjet print	High quality, large format printer Adhered to second surface of acrylic	Lake section intros, Dry Caves Stratigraphy
DS-1	Direct to substrate print	Durst Rho flat bed printer Quadro® Array Technology ink UV Clear coating	
SS-1	Silkscreen	Oil-based matte enamel	
VY-1	Cut vinyl letters	High performance premium vinyl 2mil or thinner Matte finish Extra-strength adhesive Adhered to wall surface	Gallery and section intros, quotes, mindsets and activity prompts
DL-1	Dimensional letters	Painted aluminum letters 1/2" thick Applied to wall surface or substrate	Gallery and section intro titles, quotes
DL-2	Cut vinyl letters	3M safety walk, white slip resistant tape with mineral particles	Land floor graphic
RT-1	CNC Rout wood	Titles: 1/2" deep Subtitles: 1/4" deep	Land section intros
SB-1	Sandblast stone	Titles: 1/2" deep Mindset: text 1/8" deep	Land intro
AS-1	Acid-Etch and fill	Fill with acrylic polyeurathane ink	Past Worlds section intros, outdoor panels
WJ-1	Water jet cut metal		Past Worlds section intros

[CN] CANYON

	LEVEL 2
7	SOUTH ELEVATION
8	NORTH ELEVATION
9	COLLECTIONS WALL
11	TRAILHEAD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CN2.E02.qt06
DL-1
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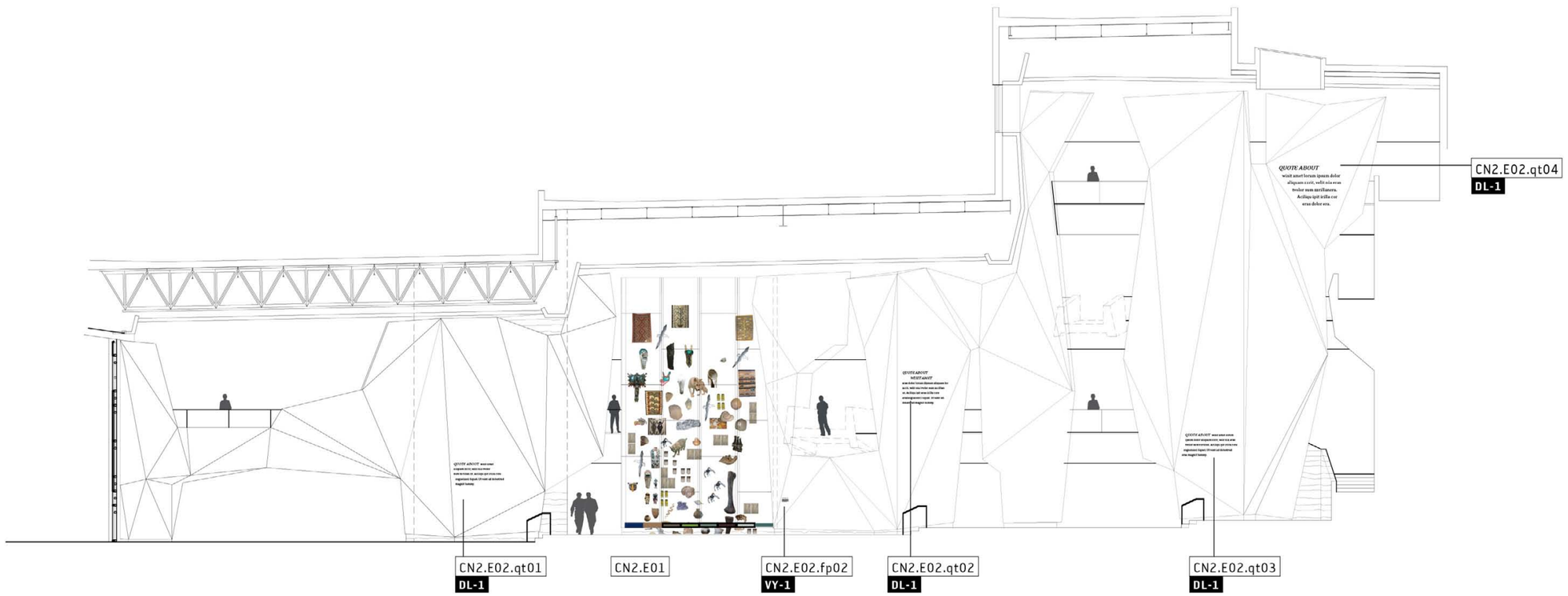
DL-1
CN2.E02.qt08
DL-1

[CN] NORTH ELEVATION

CANYON / LEVEL 2



MINERAL HALL
(behind)
GENERAL
COLLECTIONS
ORGANIZED
COLLECTIONS
ORIENTATION
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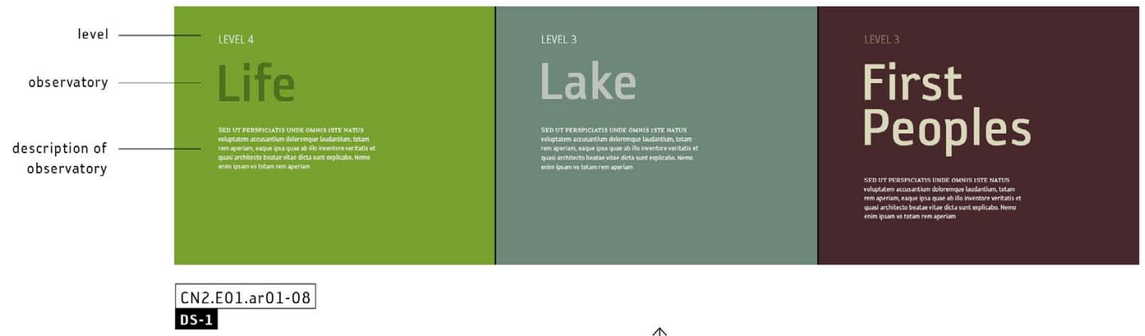
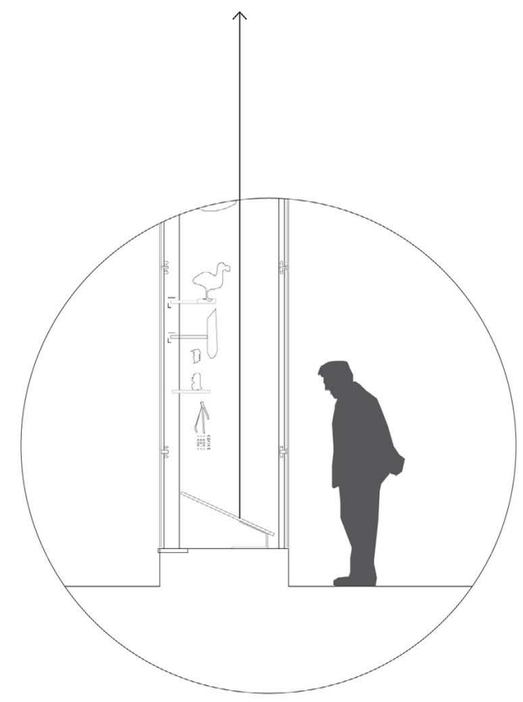
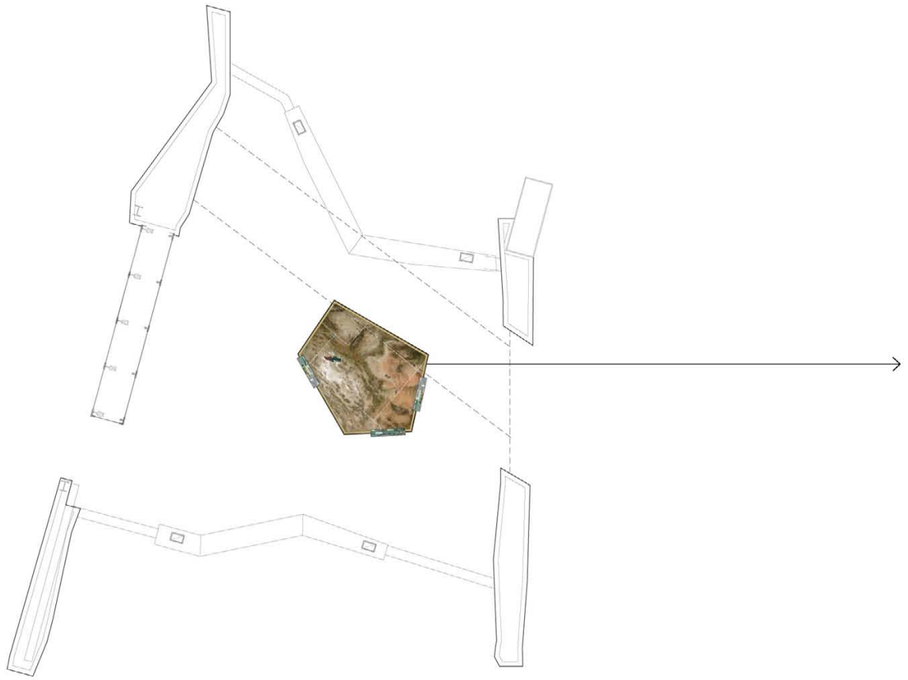
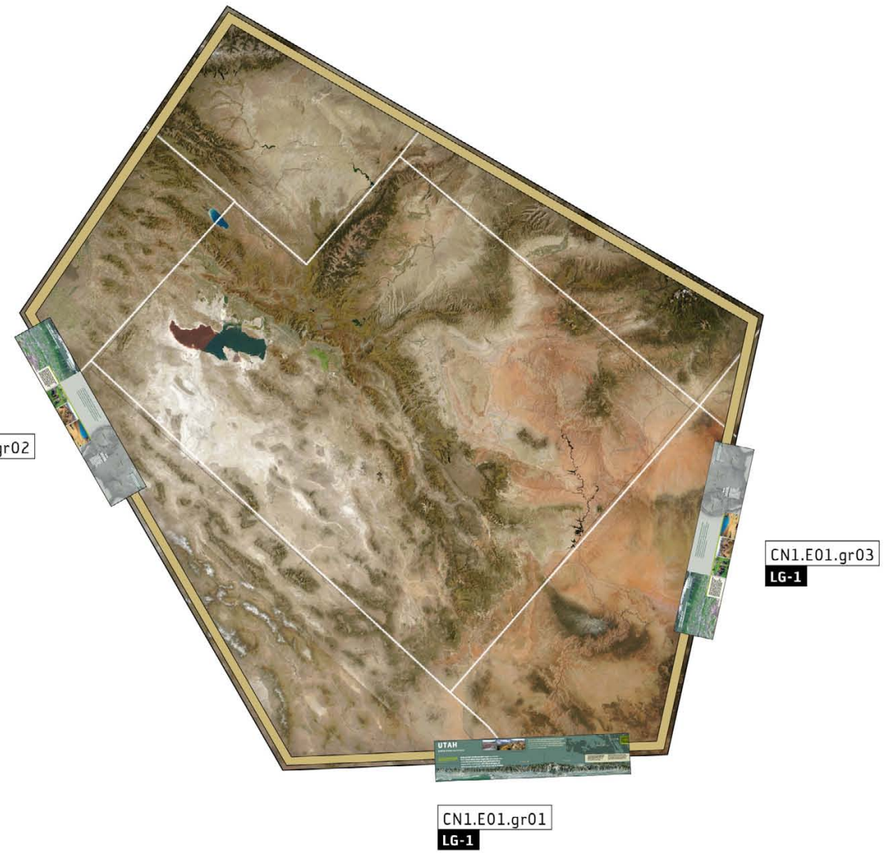

level
observatory
description of
observatory
LEVEL 4
Life
LEVEL 3
Lake
LEVEL 3
First
Peoples
CN2.E01.ar01-08
DS-1



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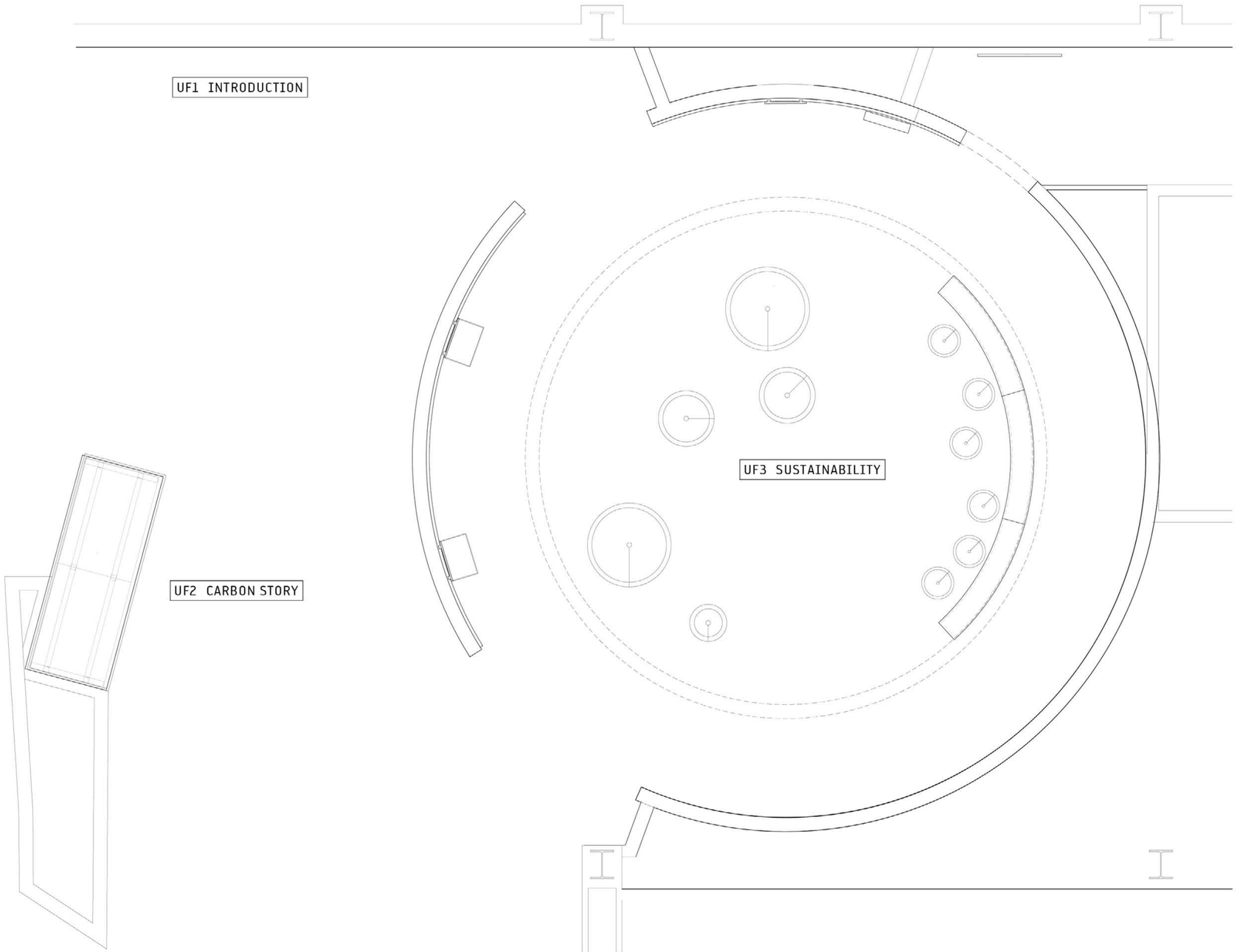
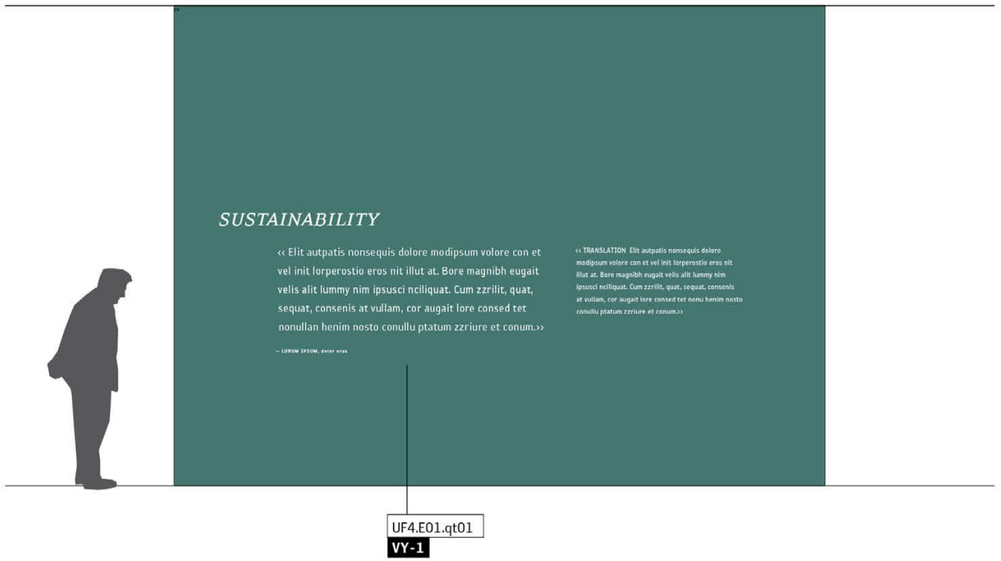
CN1.E01.gr03
LG-1
CN1.E01.gr01
LG-1



[UF] UTAH FUTURES

	LEVEL 2
15	INNER ELEVATION
16	NORTH AND SOUTH ELEVATIONS
17	EAST ELEVATION: SUSTAINABILITY
18	SUSTAINABILITY GAME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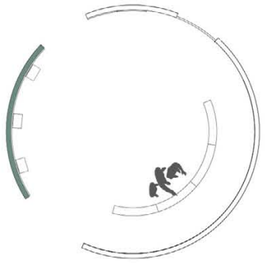
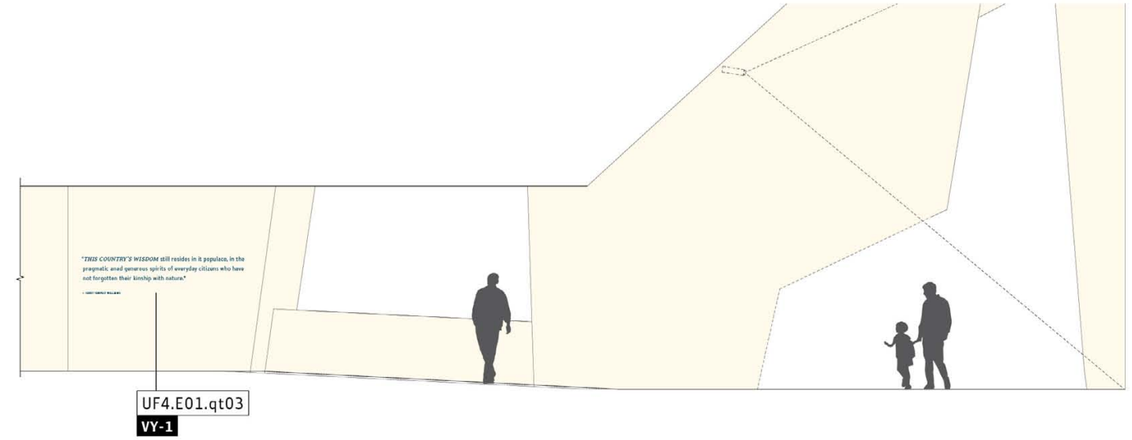
– LOREM IPSUM, dolor eros
<< TRANSLATION Elit autpatis nonsequis dolore modipsum volore con et vel init lorperostio eros nit illut at. Bore magnibh eugait velis alit lummy nim ipsusci nciliquat. Cum zzrilit, quat, sequat, consenis at vullam, cor augait lore consed tet nonu henim nosto conullu ptatum zzriure et conum.>>
UF4.E01.qt01
VY-1

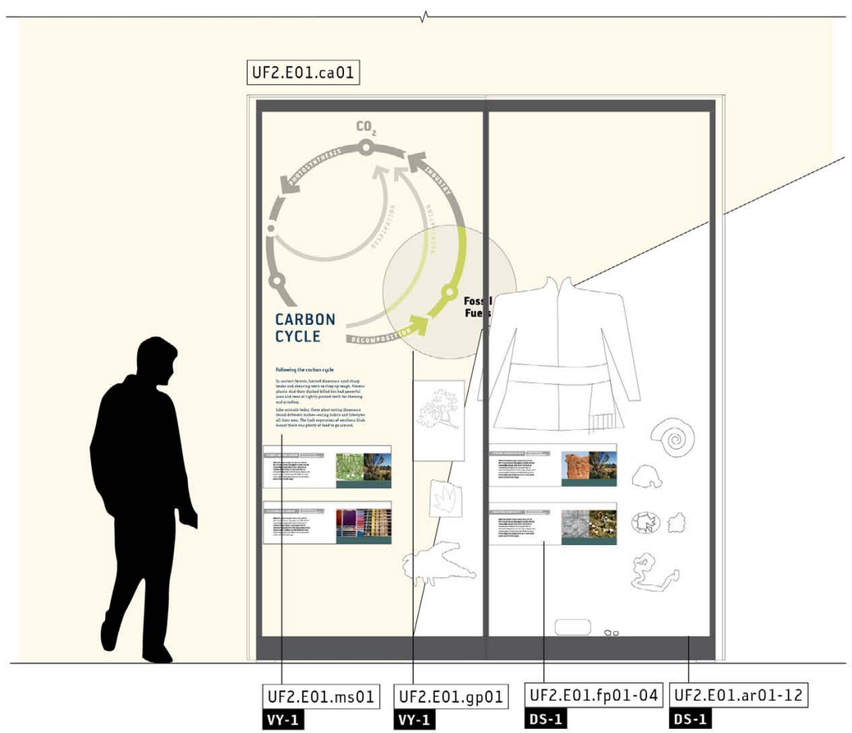


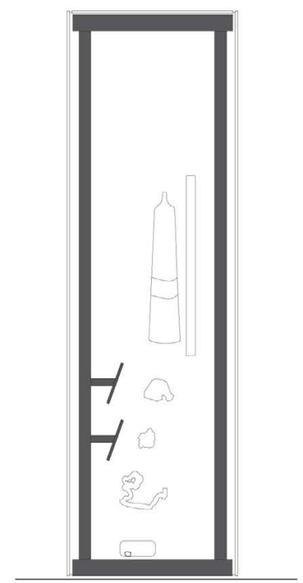
UTAH
FUTURES
Liquatue rcillupta moder
doloboreetue feugait acilliquat
COMMUNITY <<Suscin hendio oliquat
lum velit lore con et, quam, vulput lio eu
faccum lipusm eros dolor?
UF1.E01.ip01
DL-1
VY-1

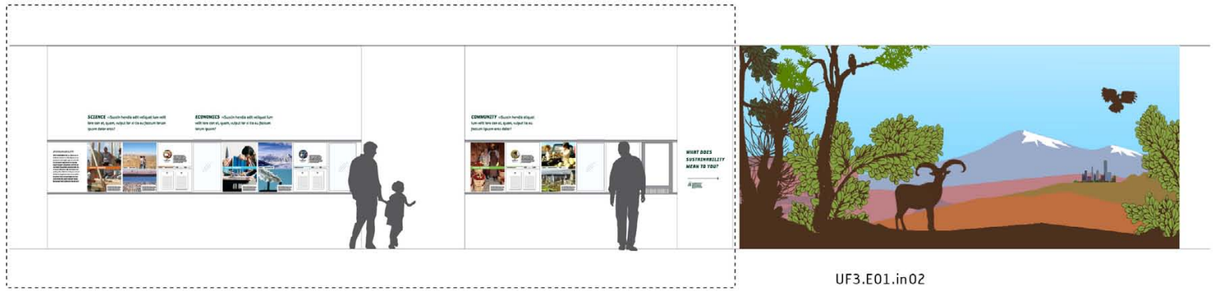
[UF] NORTH AND SOUTH ELEVATIONS

UTAH FUTURES / LEVEL 2

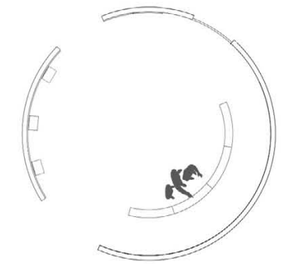


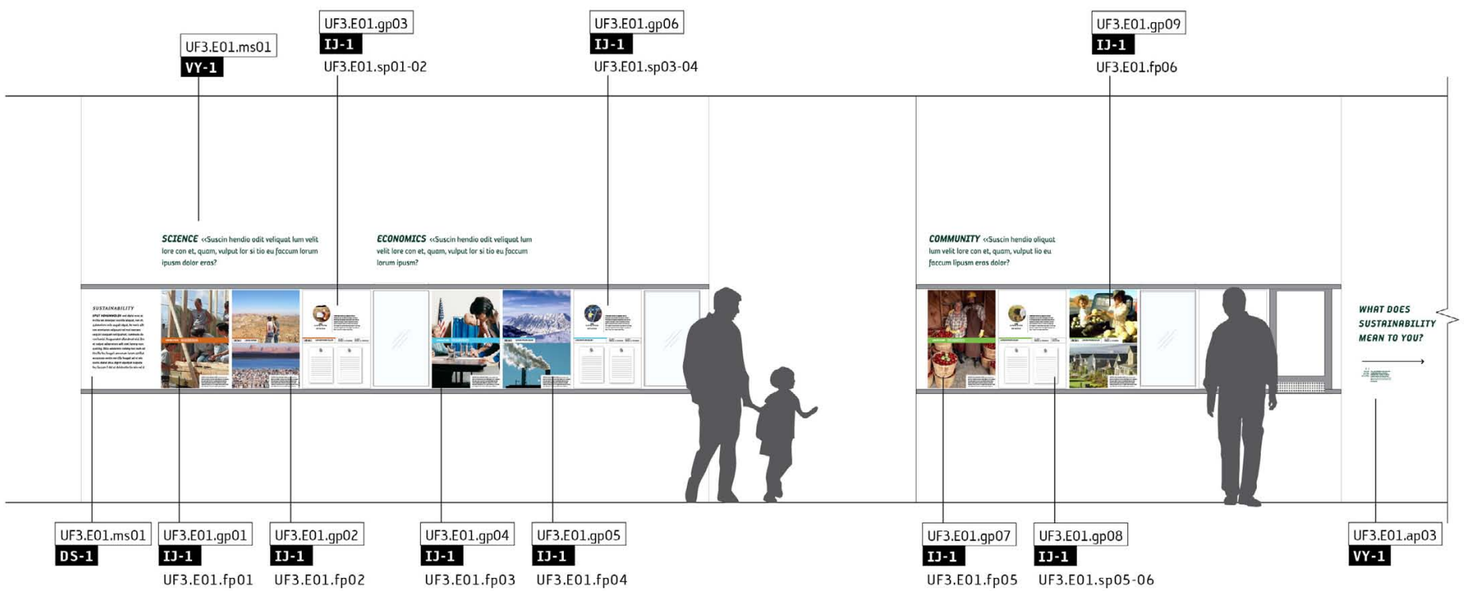





SCIENCE
ECONOMICS
COMMUNITY
WHAT DOES SUSTAINABILITY MEAN TO YOU?

UF3.E01.in02

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VY-1
UF3.E01.gp03
IJ-1
UF3.E01.sp01-02
UF3.E01.gp06
IJ-1
UF3.E01.sp03-04
UF3.E01.gp09
IJ-1
UF3.E01.fp06
SCIENCE «Suscin hendio odit veliquat lum velit lore con et, quam, vulput lor si tio eu foccum lorum ipusm dolor eros?
ECONOMICS «Suscin hendio odit veliquat lum velit lore con et, quam, vulput lor si tio eu foccum lorum ipusm?
COMMUNITY «Suscin hendio oliquat lum velit lore con et, quam, vulput lio eu foccum lipusm eros dolor?
WHAT DOES SUSTAINABILITY MEAN TO YOU?
UF3.E01.ms01
DS-1
UF3.E01.gp01
IJ-1
UF3.E01.fp01
UF3.E01.gp02
IJ-1
UF3.E01.fp02
UF3.E01.gp04
IJ-1
UF3.E01.fp03
UF3.E01.gp05
IJ-1
UF3.E01.fp04
UF3.E01.gp07
IJ-1
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IJ-1
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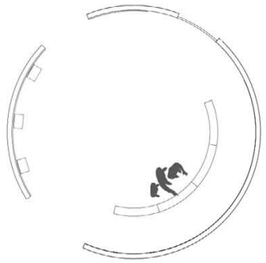
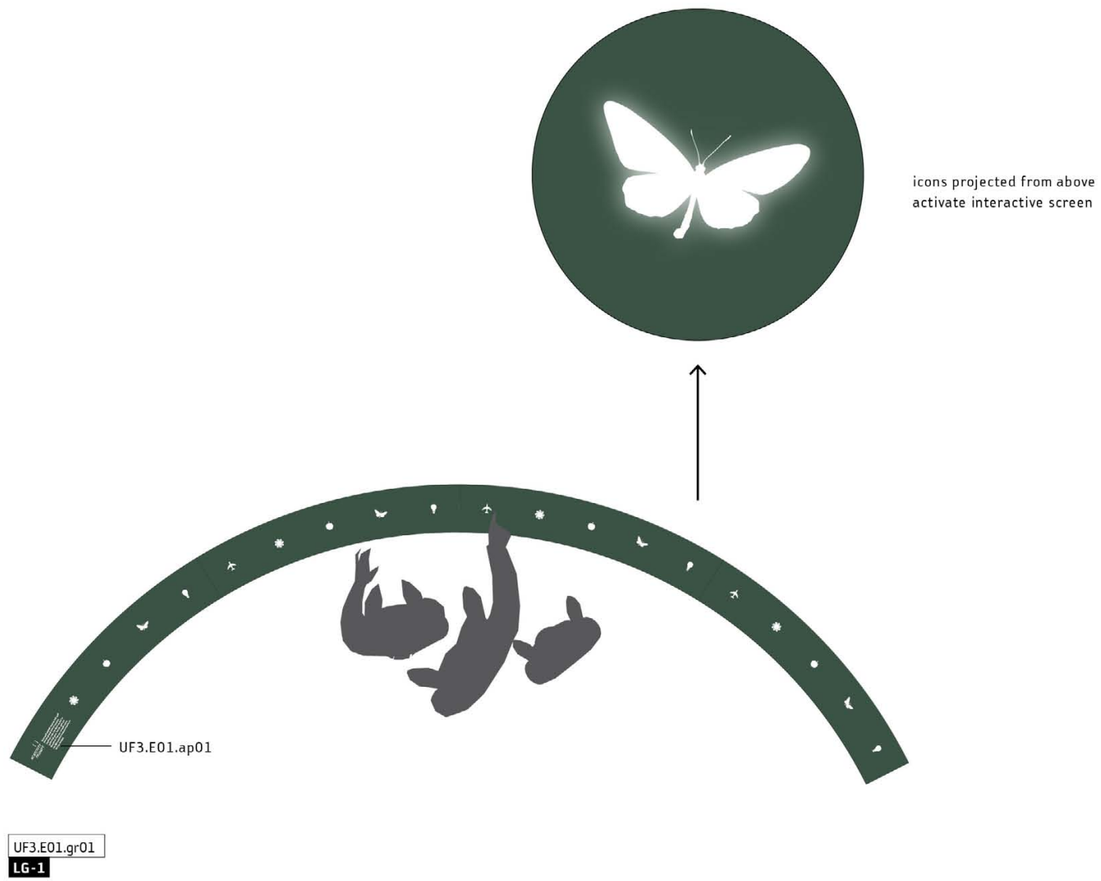
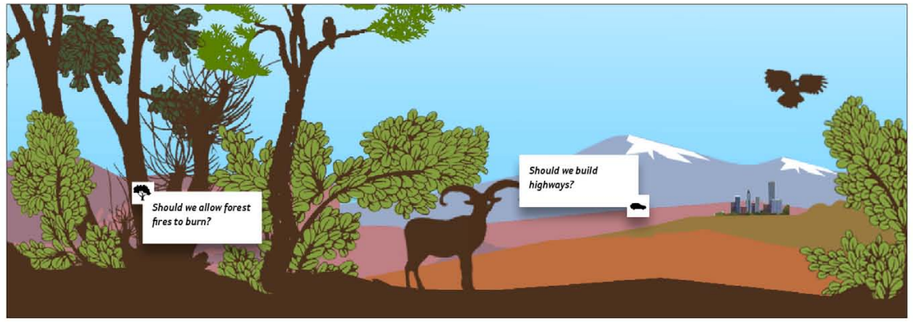
UF3.E01.ap03
VY-1




icons projected from above
activate interactive screen
UF3.E01.ap01
UF3.E01.gr01
LG-1

VISITOR A SELECTION:

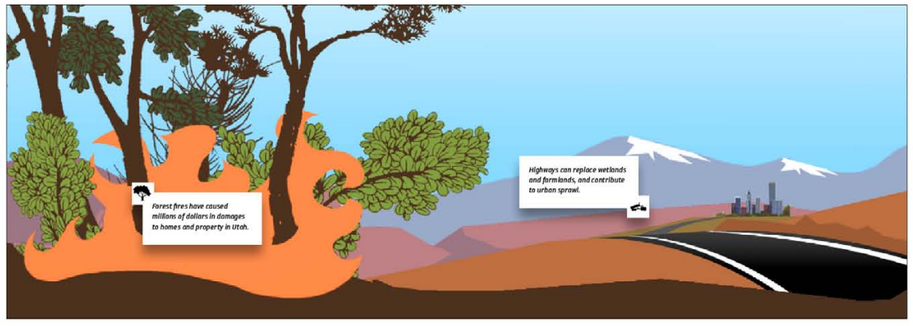
Should we allow forest fires to burn?



Should we build highways?

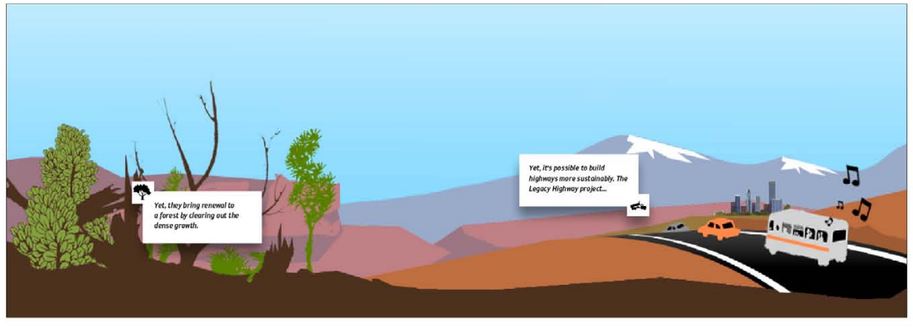
VISITOR B SELECTION

Forest fires have caused millions of dollars in damages to homes and property in Utah.



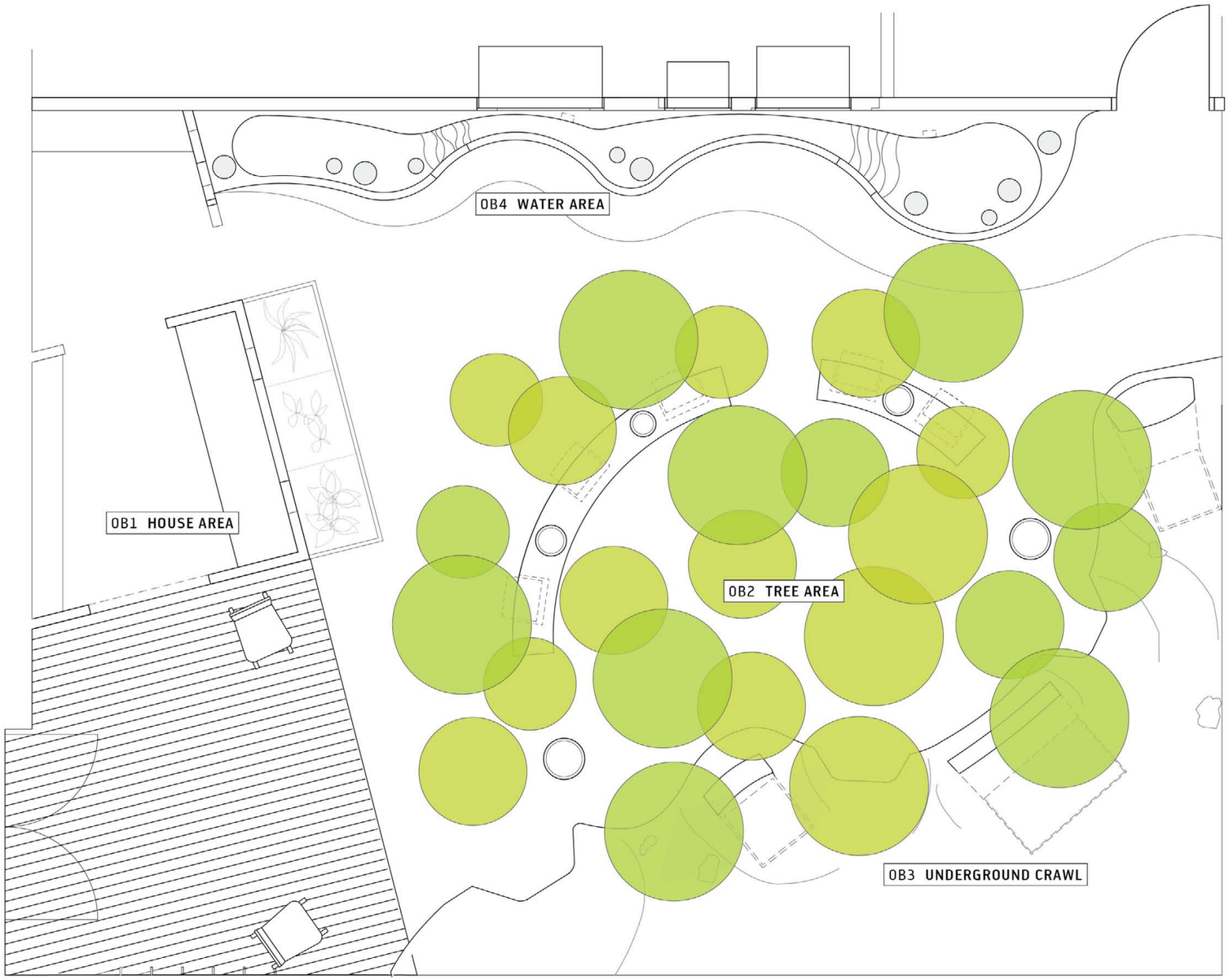
Highways can replace wetlands and farmlands, and contribute to urban sprawl and development.

Yet, they bring renewal to a forest by clearing out the dense growth.



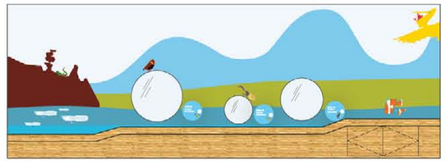
Yet, it's possible to build highways more sustainably. The Legacy Highway project includes environmental measures such as a narrow footprint, reduced speed limit, restrictions on truck traffic and billboards, and a land purchase to help protect the wetlands.

UF3.E01.in02



[OB] OUR BACKYARD

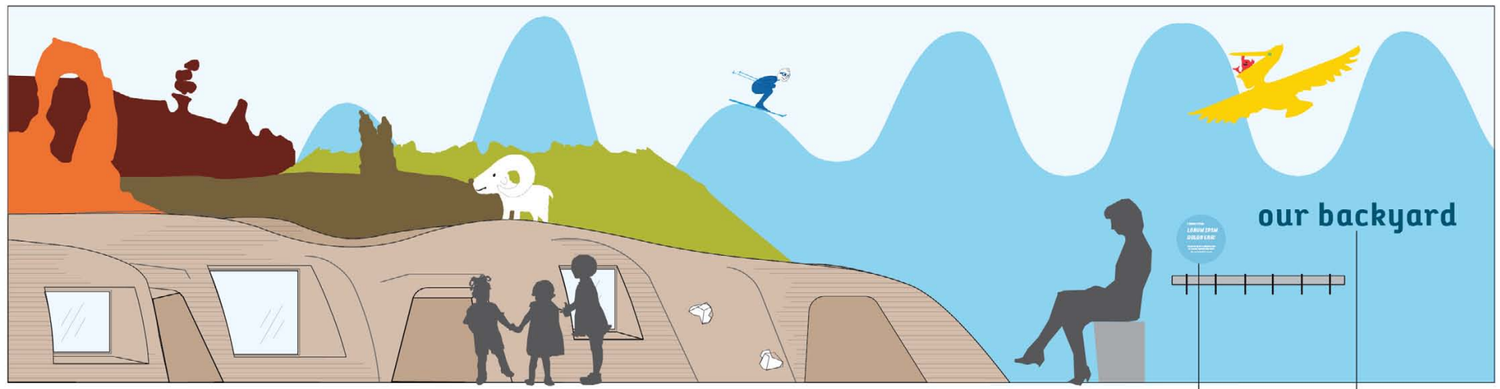
	LEVEL 2
23	WEST AND SOUTH ELEVATIONS
24	UNDERGROUND CRAWL
25	EAST ELEVATION
26	TREE AREA
27	HOUSE INTERIOR



OB4.E01.pm01

OB3.E01.pm01

OB2.E01.pm01

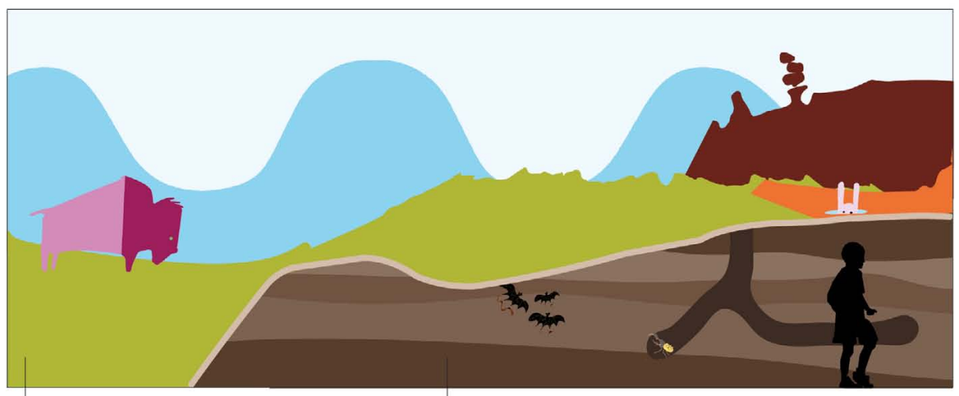


OB2.E01.pm01
DP-1

OB1.E01.ap01
LG-1

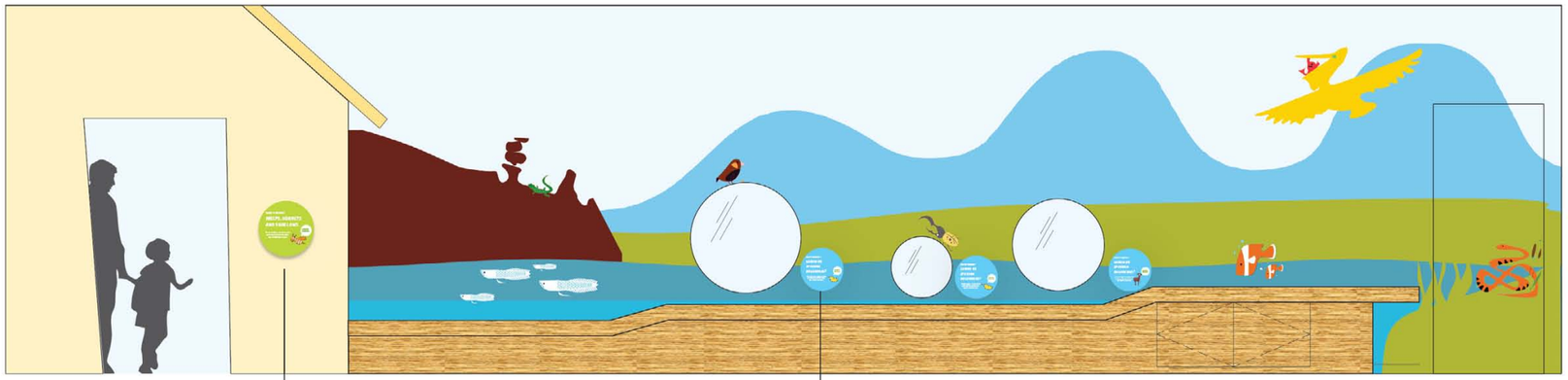
OB1.E01.ip01
DL-1

OB3.E01.pm01
DP-1



0B3.E01.pm01
DP-1

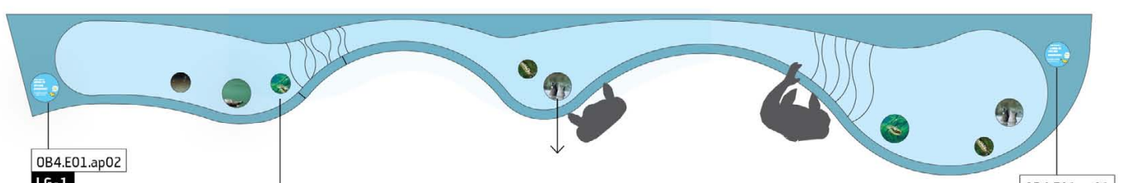
0B3.E01.pm02
DP-1



OB4.E01.gp02-gp04
LG-1

OB4.E01.pm01
DP-1

OB1.E01.gp01
LG-1



OB4.E01.ap02
LG-1

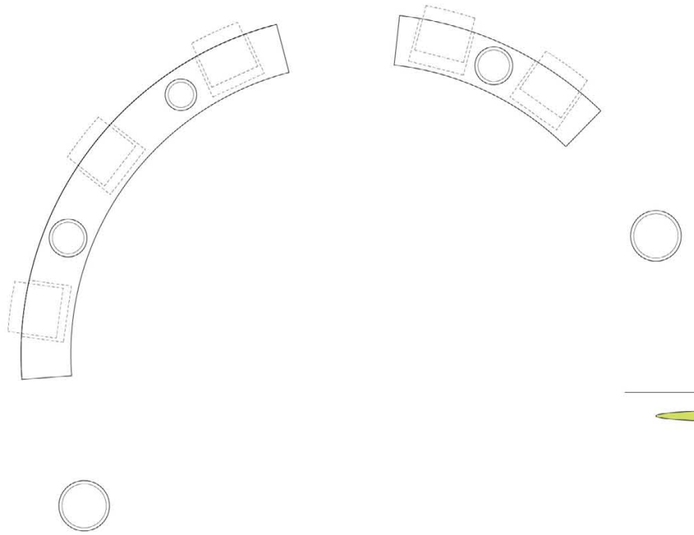
OB4.E01.ap01
LG-1

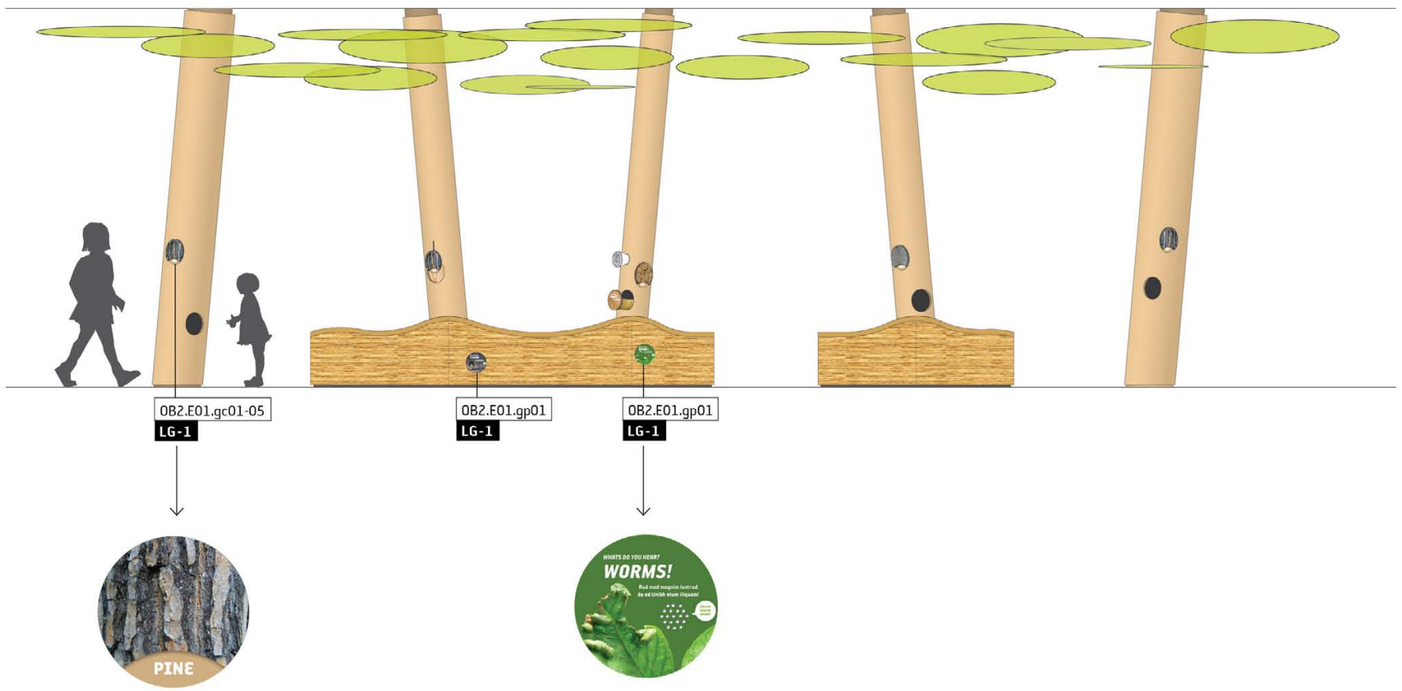
OB4.E01.gi01-06
LG-1

OB4.E01.gi07-08
LG-1

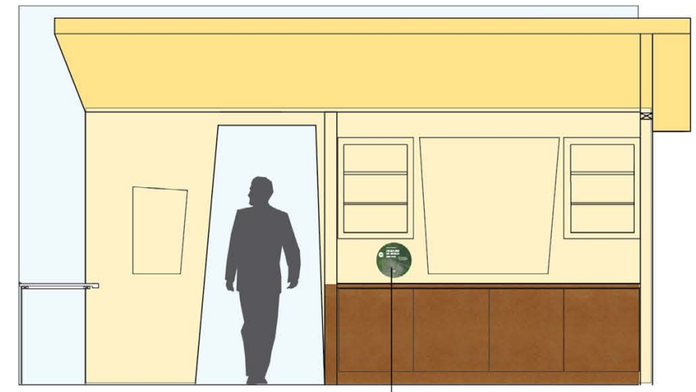
[UF] TREE AREA

OUR BACKYARD / LEVEL 2

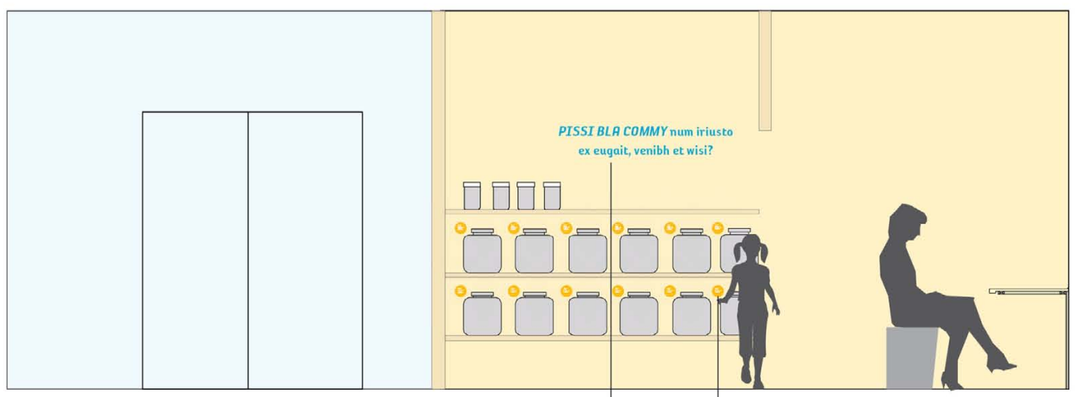




OB1.E03.gp01
DS-1



OB1.E02.gp01
LG-1

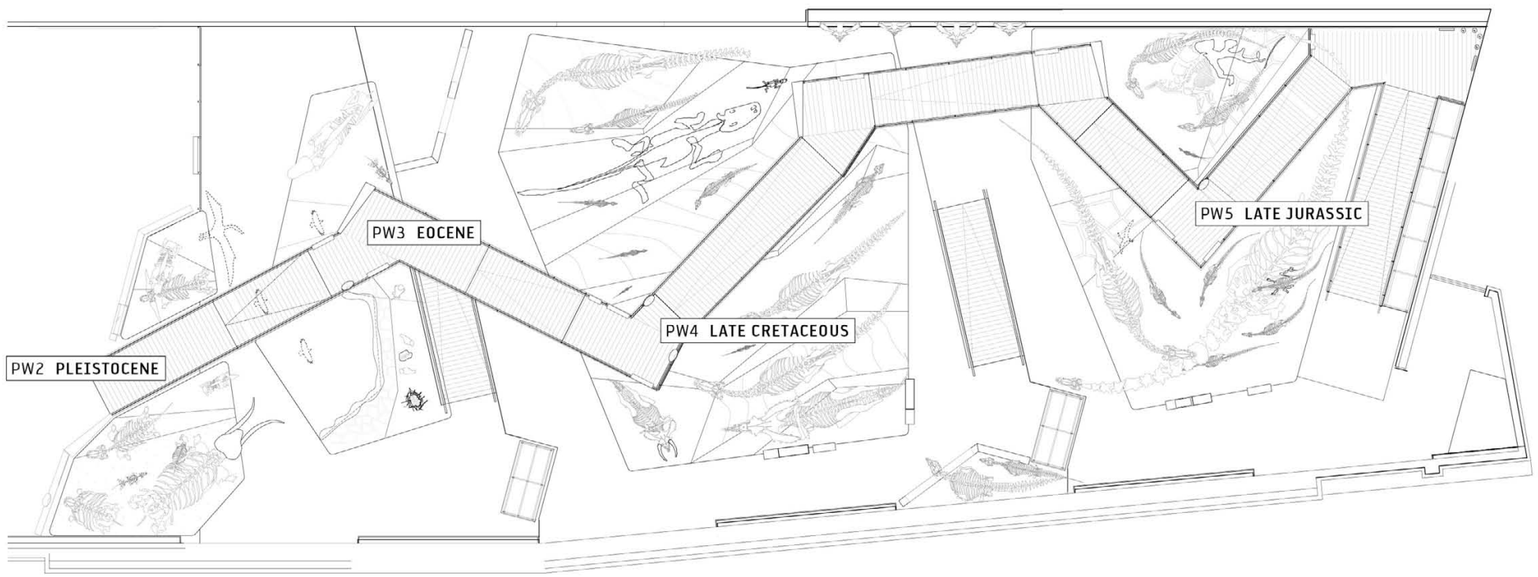


OB1.E02.qt01
VY-1

OB1.E04.ar01-ar12
LG-1

OB1.E04.qt01
VY-1

OB1.E04.pm01
DP-1



[PW] PAST WORLDS

LEVEL 2

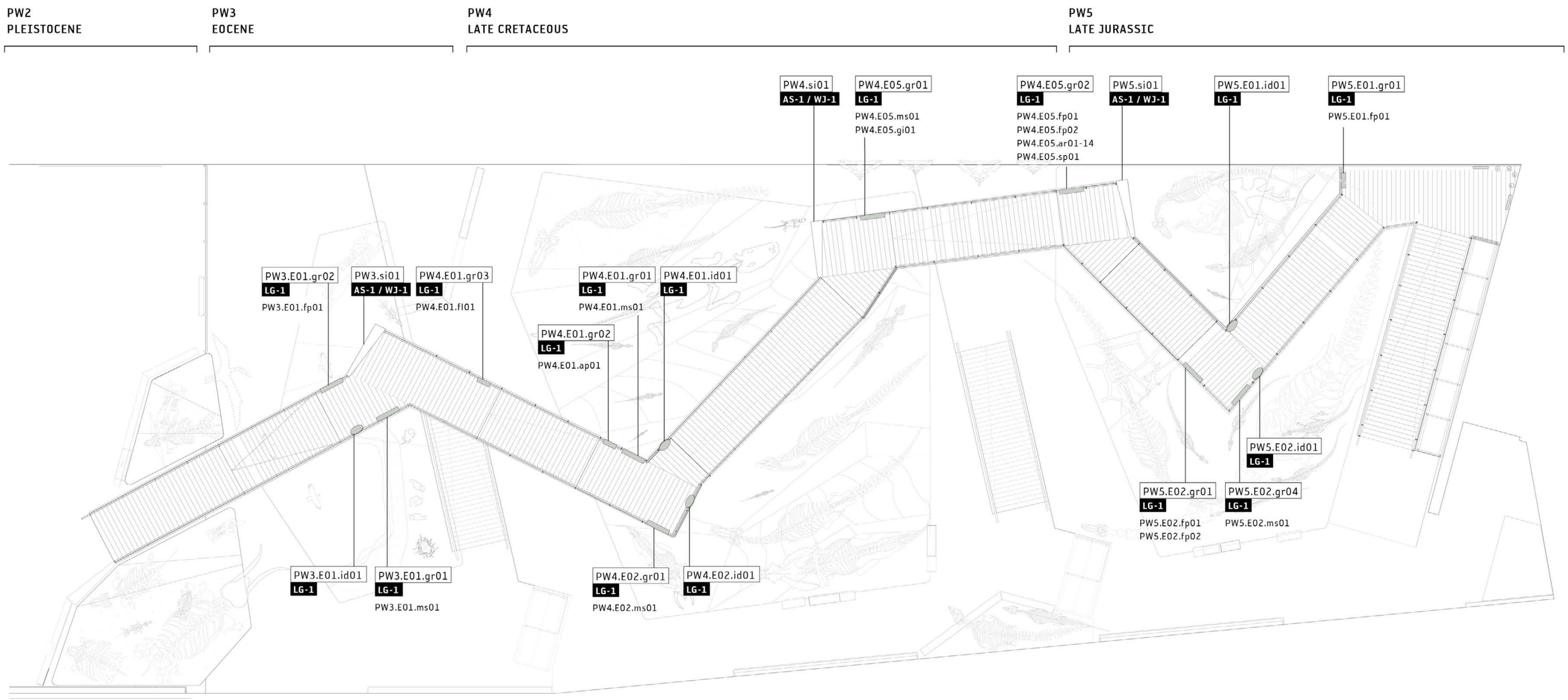
31 INTRO IN LAKE
32 UPPER WALKWAY RAILS
33 TYPICALS: SECTION INTRO PANEL AND ID WHEEL
34 TYPICALS: PRIMARY AND SECONDARY RAIL
35 TYPICAL: IMBEDDED RAIL CASE
37 PLEISTOCENE RAILS
38 PLEISTOCENE MAMMALS CASE
39 NORTH ELEVATION
41 EOCENE TABLEAU
42 LATE CRETACEOUS PLATFORM
43 LATE CRETACEOUS TABLEAU
44 KAIPAROWITS DIVERSITY
45 SOUTH AND EAST ELEVATION
47 EAST ELEVATION DETAIL
48 CEDAR MOUNTAIN FORMATION
49 DINOSAUR DIG INTERACTIVE
50 NORTH HORN CASE
51 GREEN RIVER CASE
52 LATE JURASSIC RAILS
53 CLEVELAND-LLOYD QUARRY
54 CLEVELAND-LLOYD QUARRY EAST ELEVATION
55 CLEVELAND-LLOYD QUARRY CASE
56 INTRO AT LEARNING LAB
57 WINDOW TO PALEO-PREP LABS
59 EARTH LAB

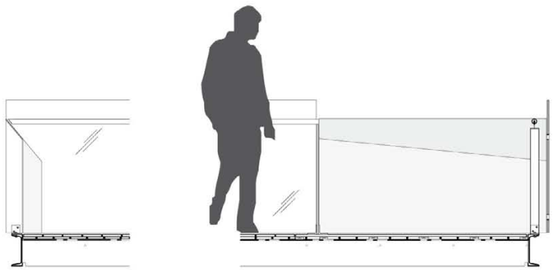
PW1.E01.ip01
DL-1
VY-1

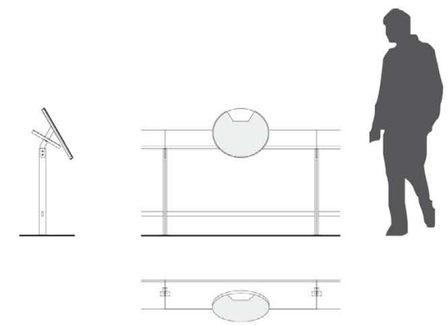
PW1.E01gi01
VY-1

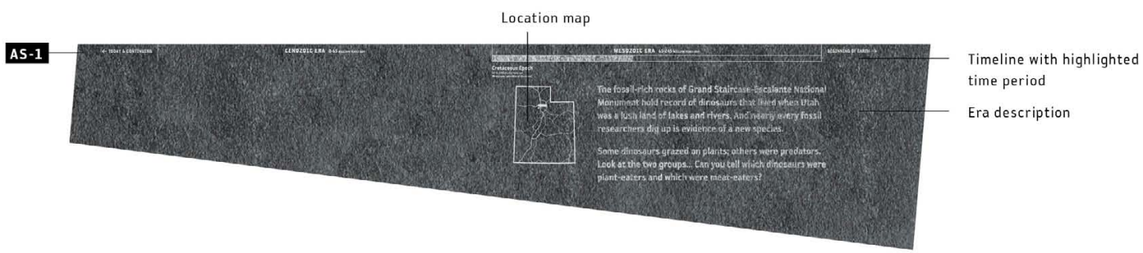
[PW] UPPER WALKWAY RAILS

PAST WORLDS / LEVEL 2

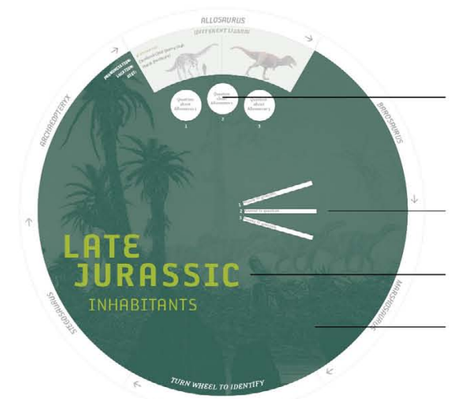






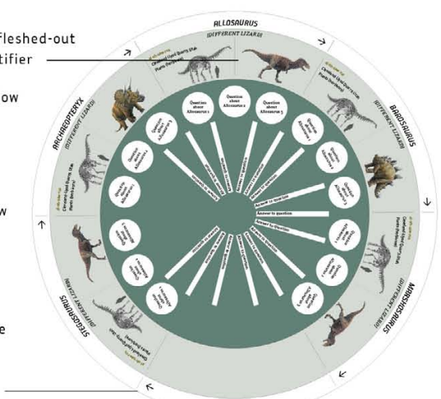


SECTION INTRO PANEL



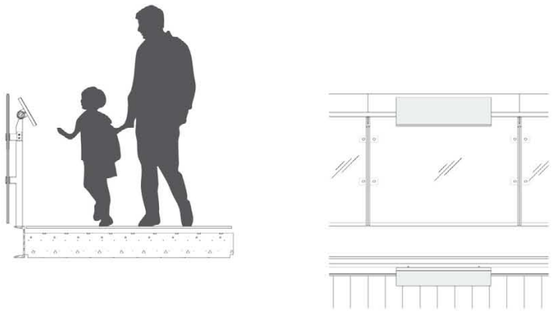
ID WHEEL - FRONT

LG-1



ID WHEEL - GRAPHIC UNDERLAY

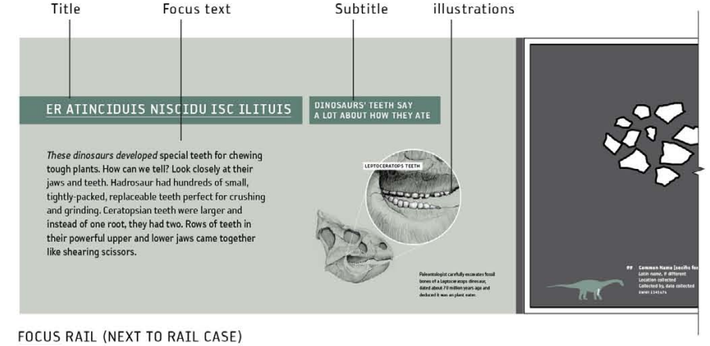
LG-1



Timeline | Title | Subtitle | Mindset text | Duotone image of scene | Quote or fact

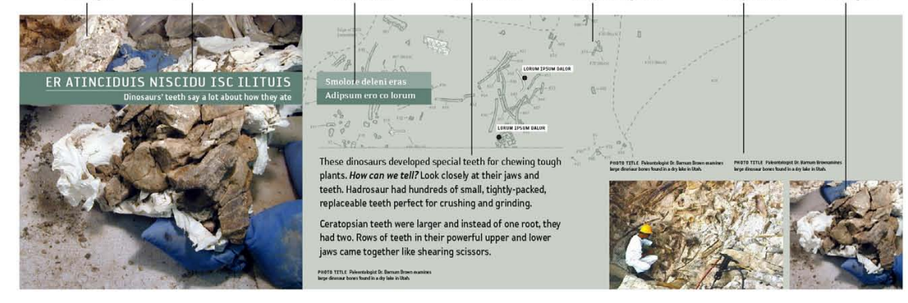
MINDSET RAIL
LG-1

Title | Focus text | Subtitle | Diagrams/ illustrations

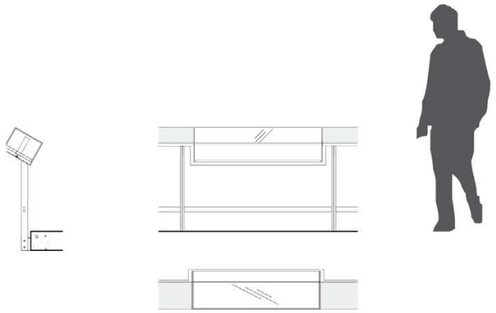


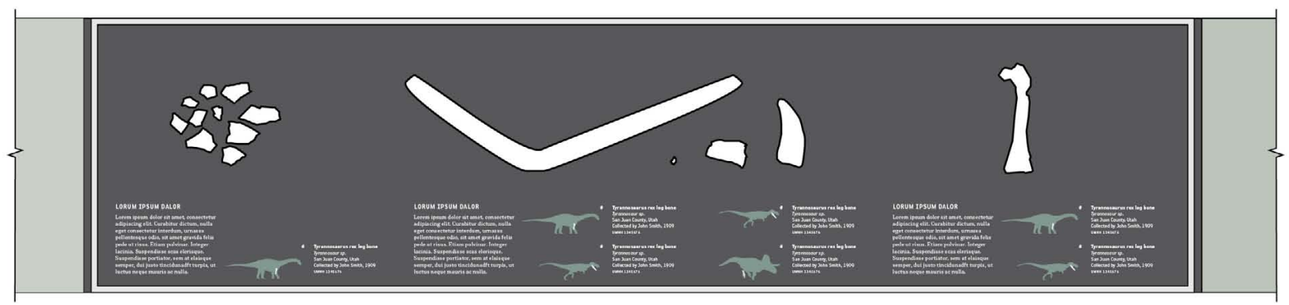
FOCUS RAIL (NEXT TO RAIL CASE)
DS-1

Image | Title | Subtitle | Focus text | Map/diagram | Captions | Images

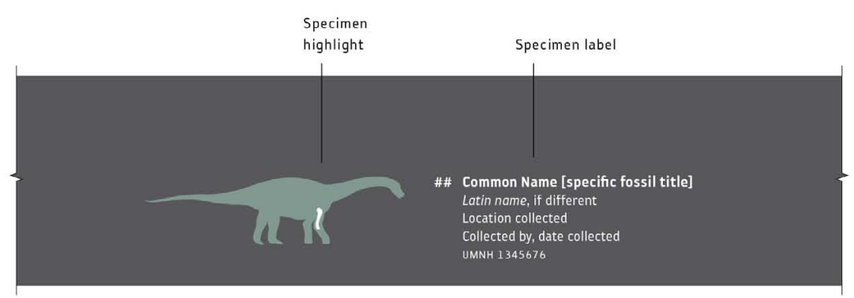


FOCUS RAIL
LG-1

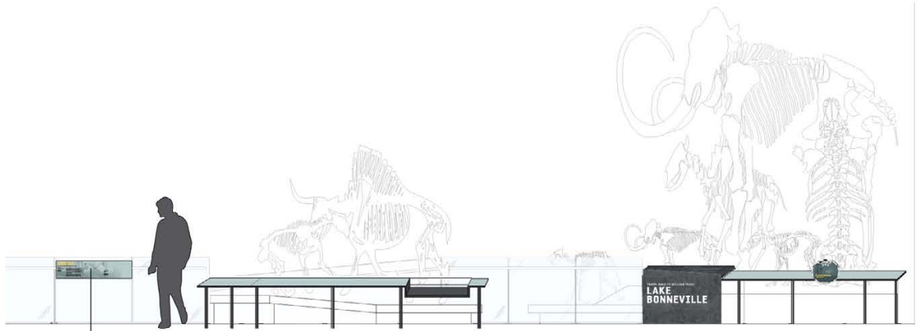




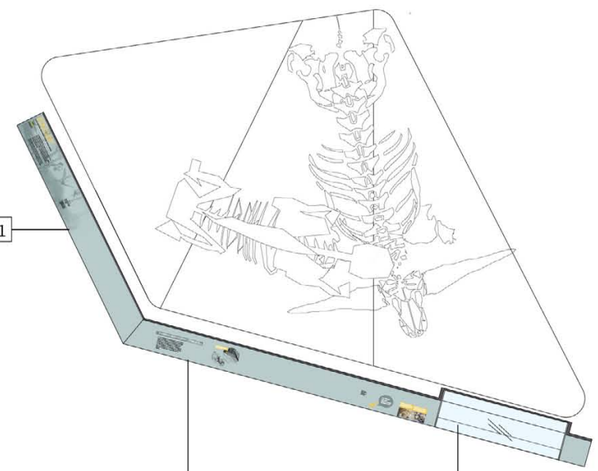
SAMPLE RAIL CASE OBJECT LABELS
DS-1



DETAIL



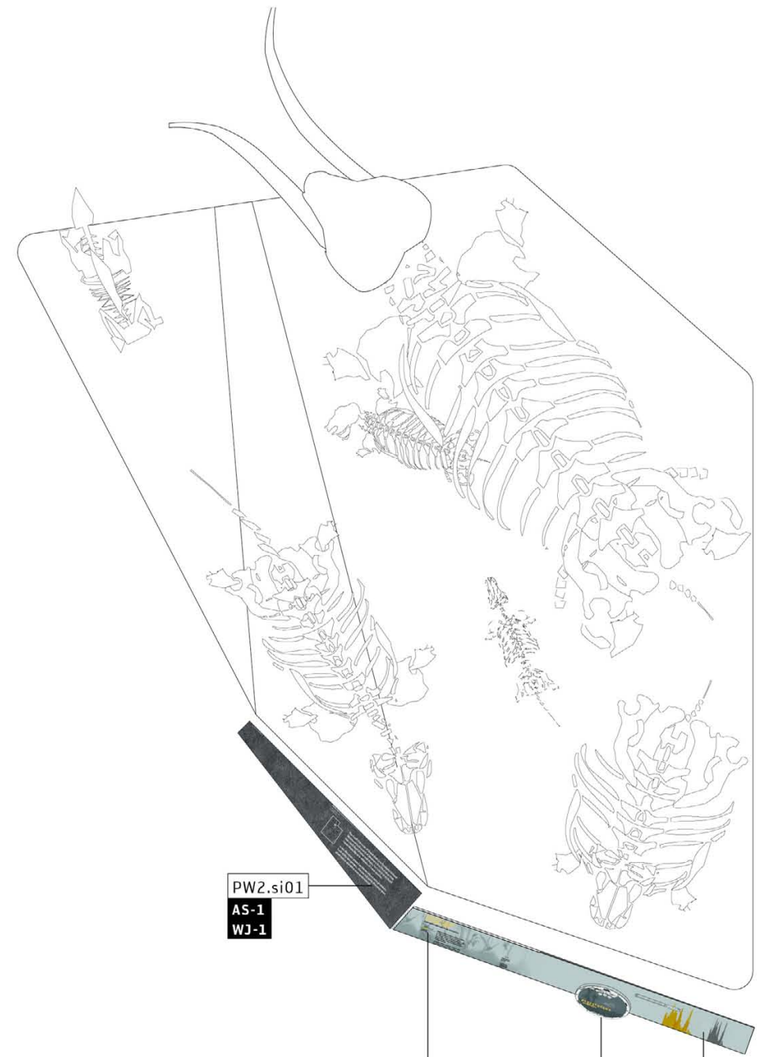
PW2.E05.gr01
LG-1
PW2.E05.ms01
PW2.E05.ar01



PW2.E02.gr01
LG-1
PW2.E02.ms01

PW2.E02.gr02
LG-1
PW2.E02.fp02
PW2.E02.fl01

PW2.E02.rc01
LG-1
PW2.E02.ar01-04



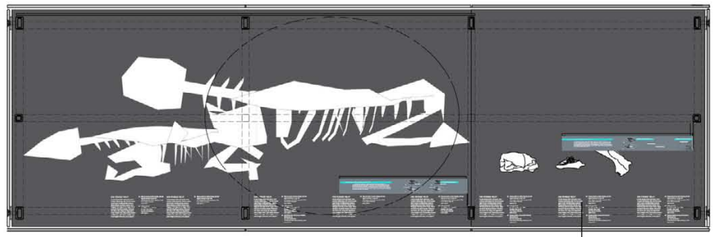
PW2.si01
AS-1
WJ-1

PW2.E01.gr01
LG-1
PW2.E01.ms01

PW2.E01.id01
LG-1

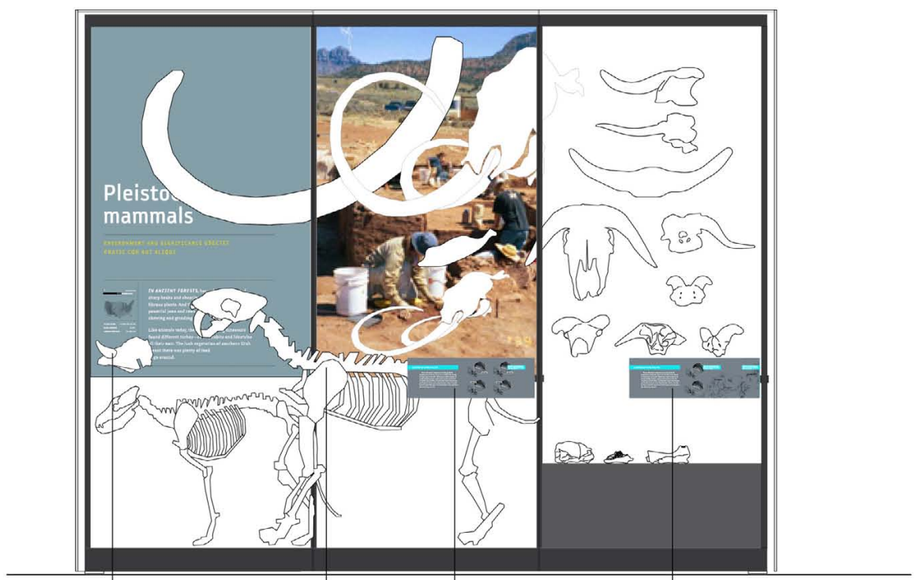
PW2.E01.gc01
PW2.E01.gc02

NOTE
Please see typical rail layouts on pages 34-35.



PW2.E03.ar01-19
DS-1

PW2.E03.ca01

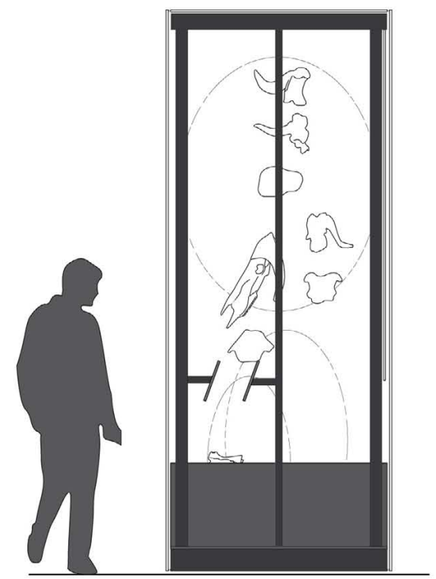


PW2.E03.ms01
DS-1

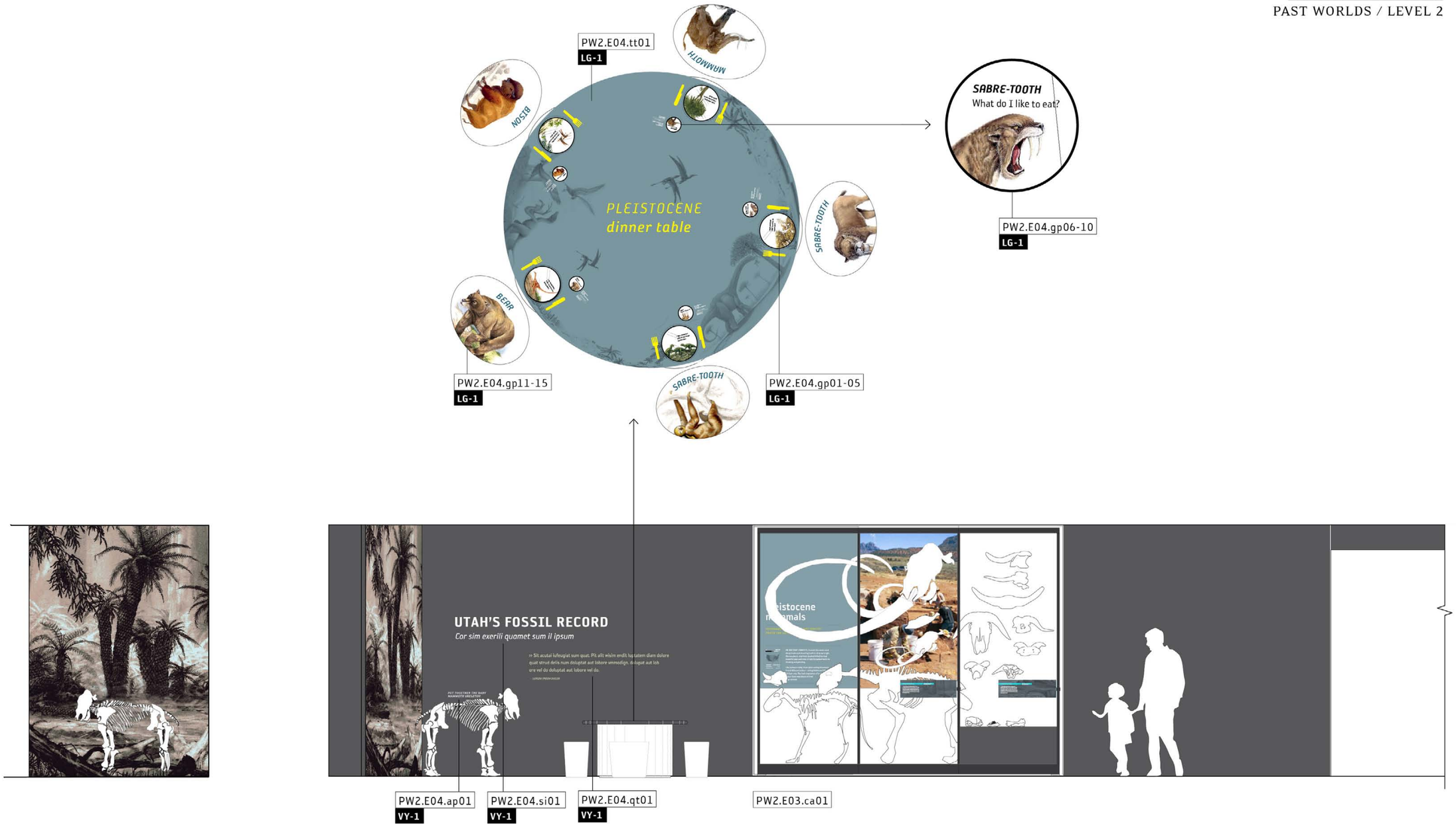
PW2.E03.gi01
IJ-1

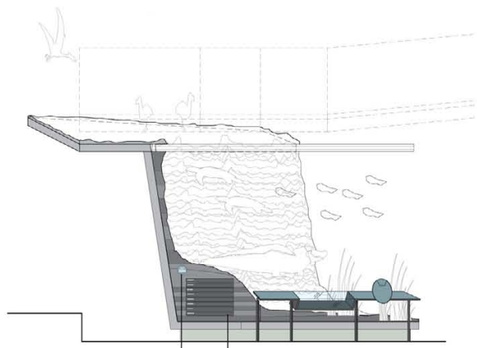
PW2.E03.fp02
DS-1

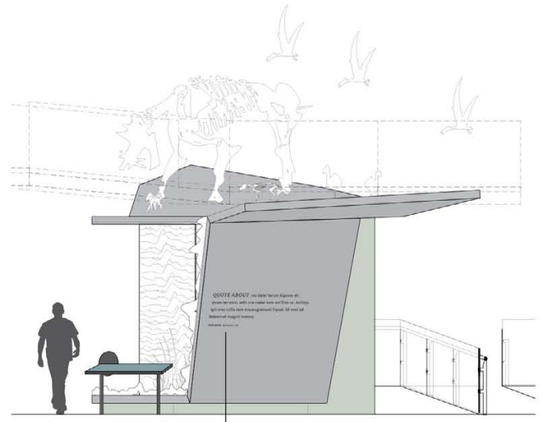
PW2.E03.fp01
DS-1

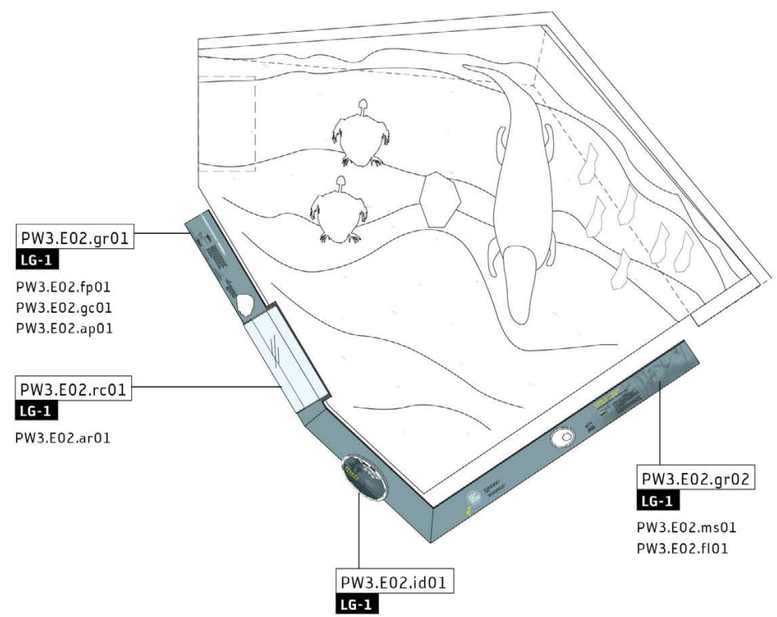


PW2.E03.gi02
IJ-1


PW2.E04.tt01
LG-1
MAMMOTH
BISON
PLEISTOCENE
dinner table
SABRE-TOOTH
What do I like to eat?
PW2.E04.gp06-10
LG-1
SABRE-TOOTH
BEAR
PW2.E04.gp11-15
LG-1
SABRE-TOOTH
PW2.E04.gp01-05
LG-1
UTAH'S FOSSIL RECORD
Cor sim exerili quamet sum il ipsum
PW2.E04.ap01
VY-1
PW2.E04.si01
VY-1
PW2.E04.qt01
VY-1
PW2.E03.ca01



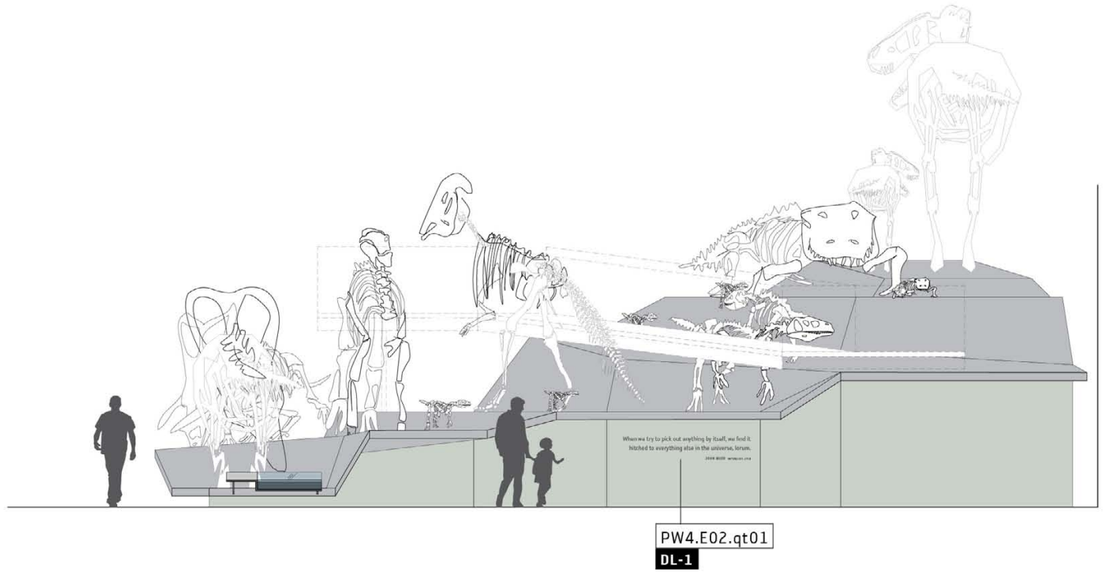


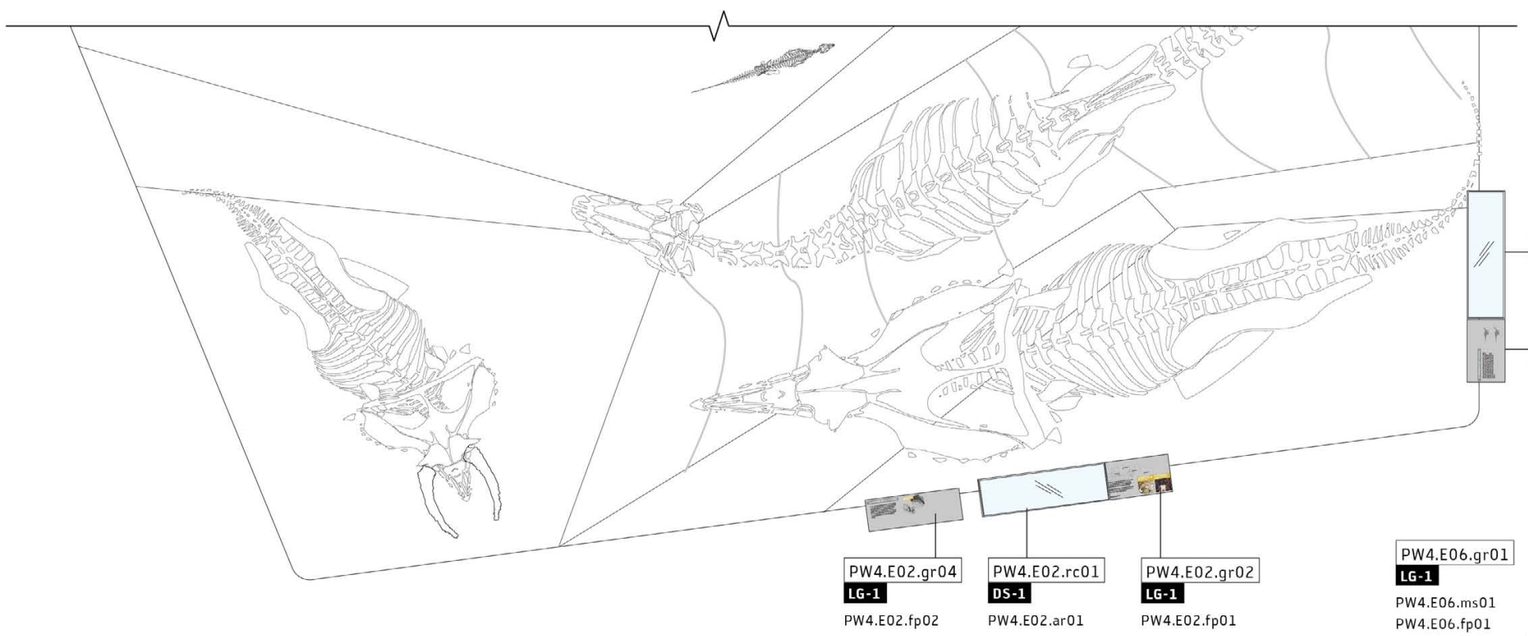


NOTE
Please see typical rail layouts on pages 34-35.

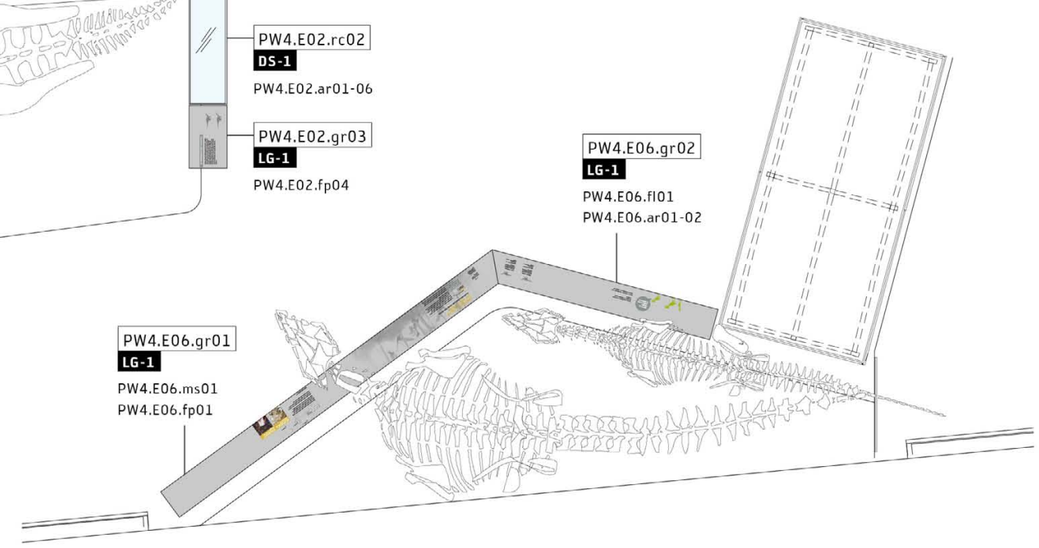
[PW] LATE CRETACEOUS PLATFORM

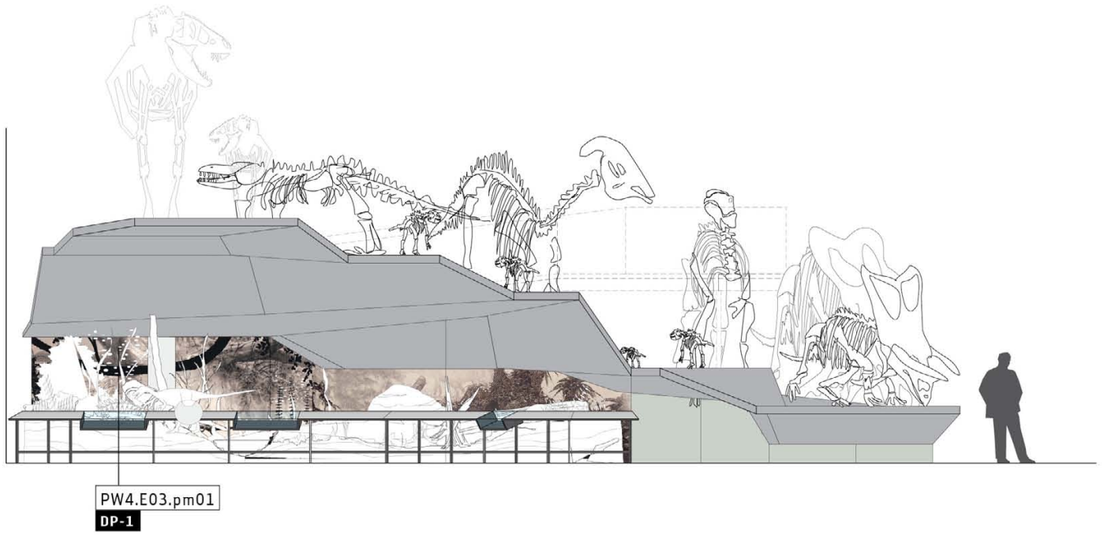
PAST WORLDS / LEVEL 2

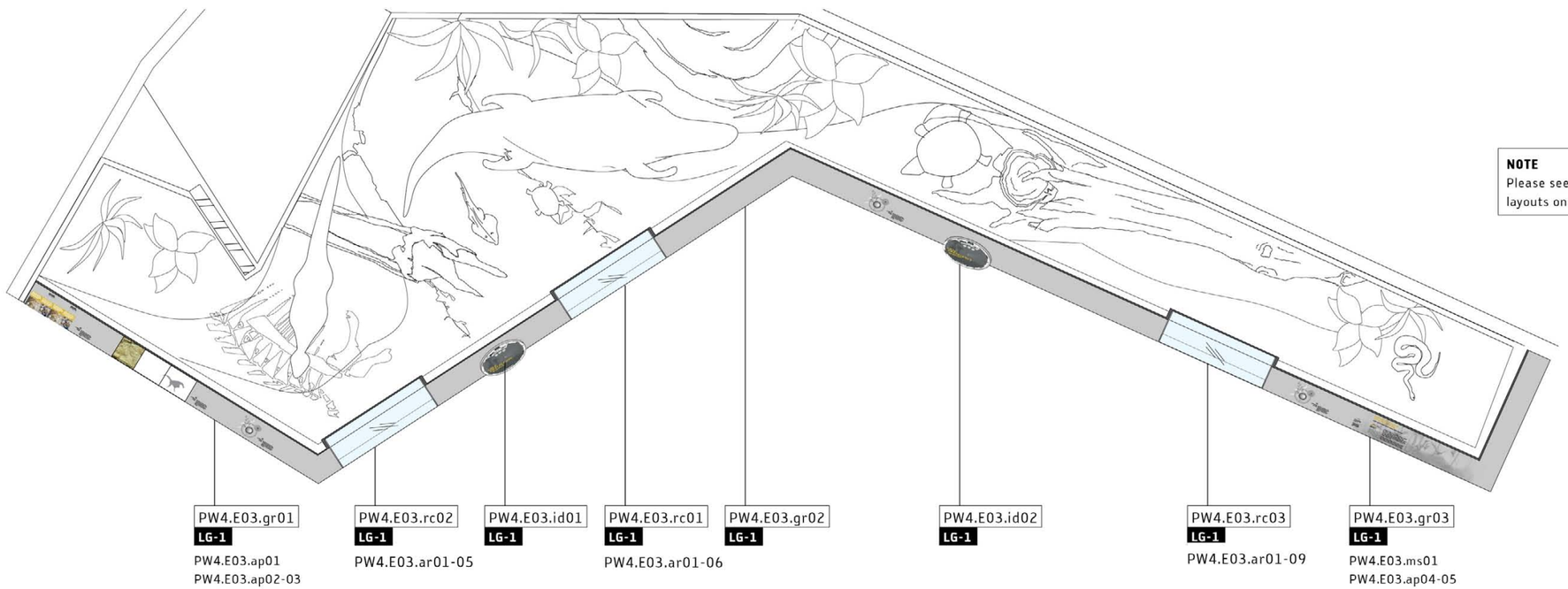




NOTE
Please see typical rail layouts on pages 34-35.



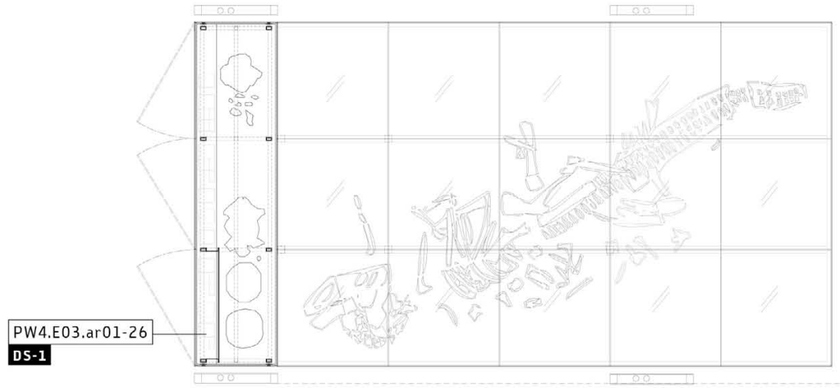


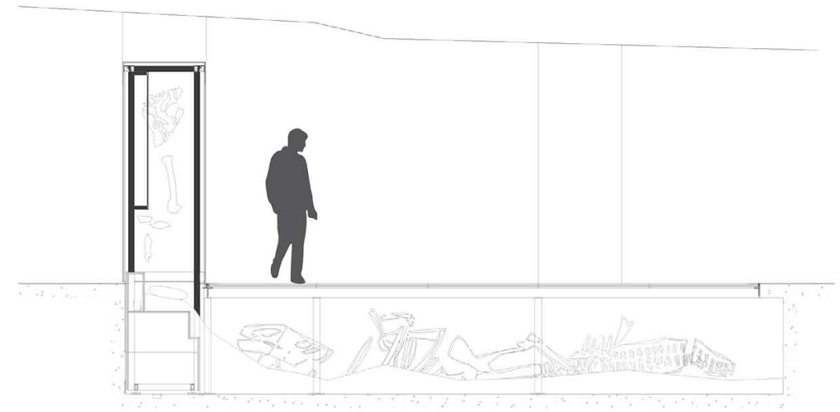


NOTE
Please see typical rail layouts on pages 34-35.

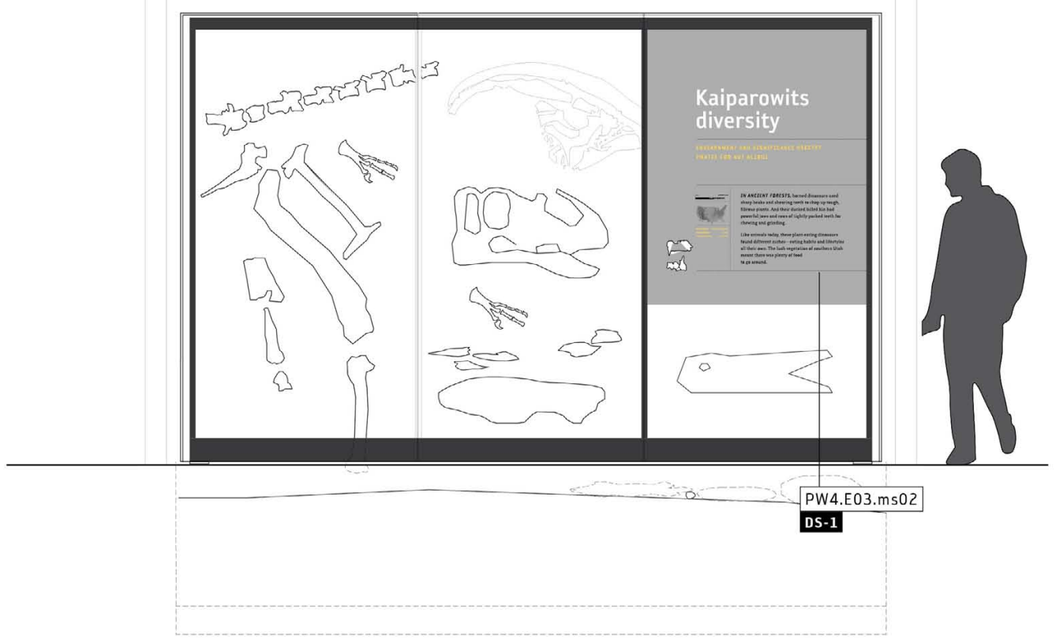
[PW] KAIPAROWITS DIVERSITY

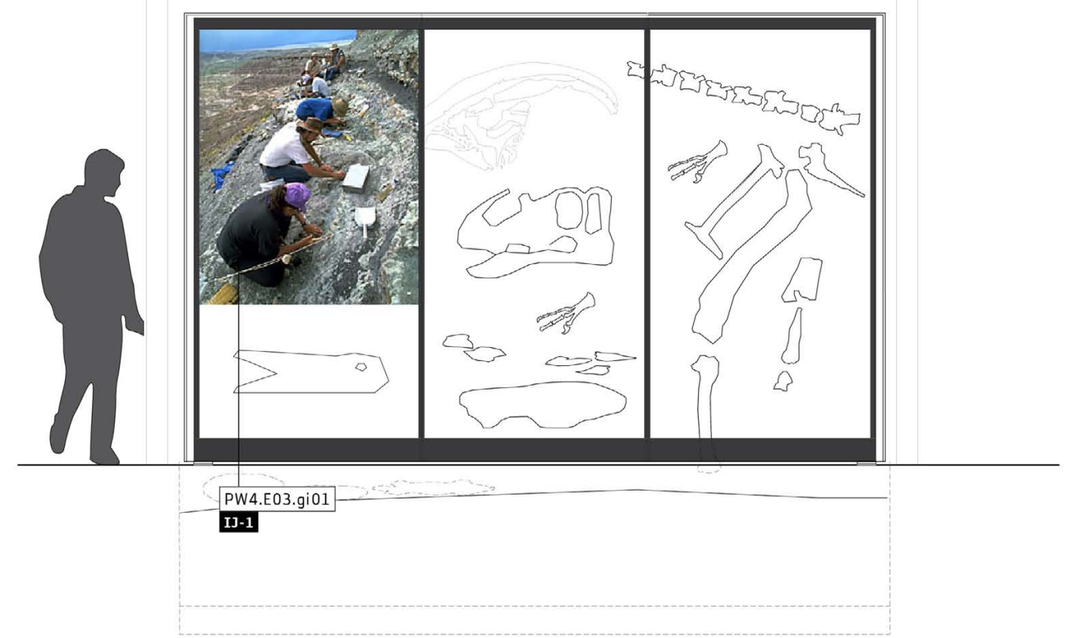
PAST WORLDS / LEVEL 2

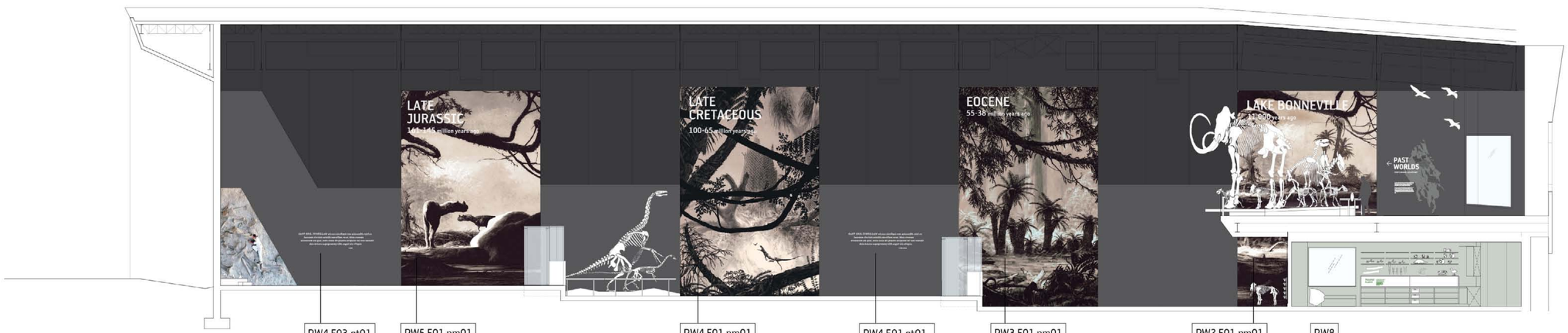


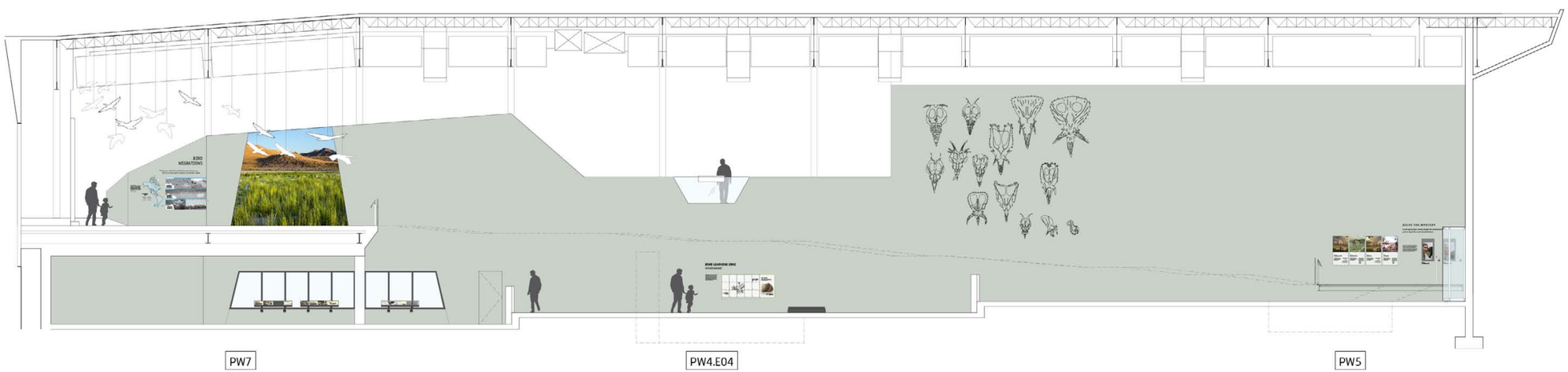


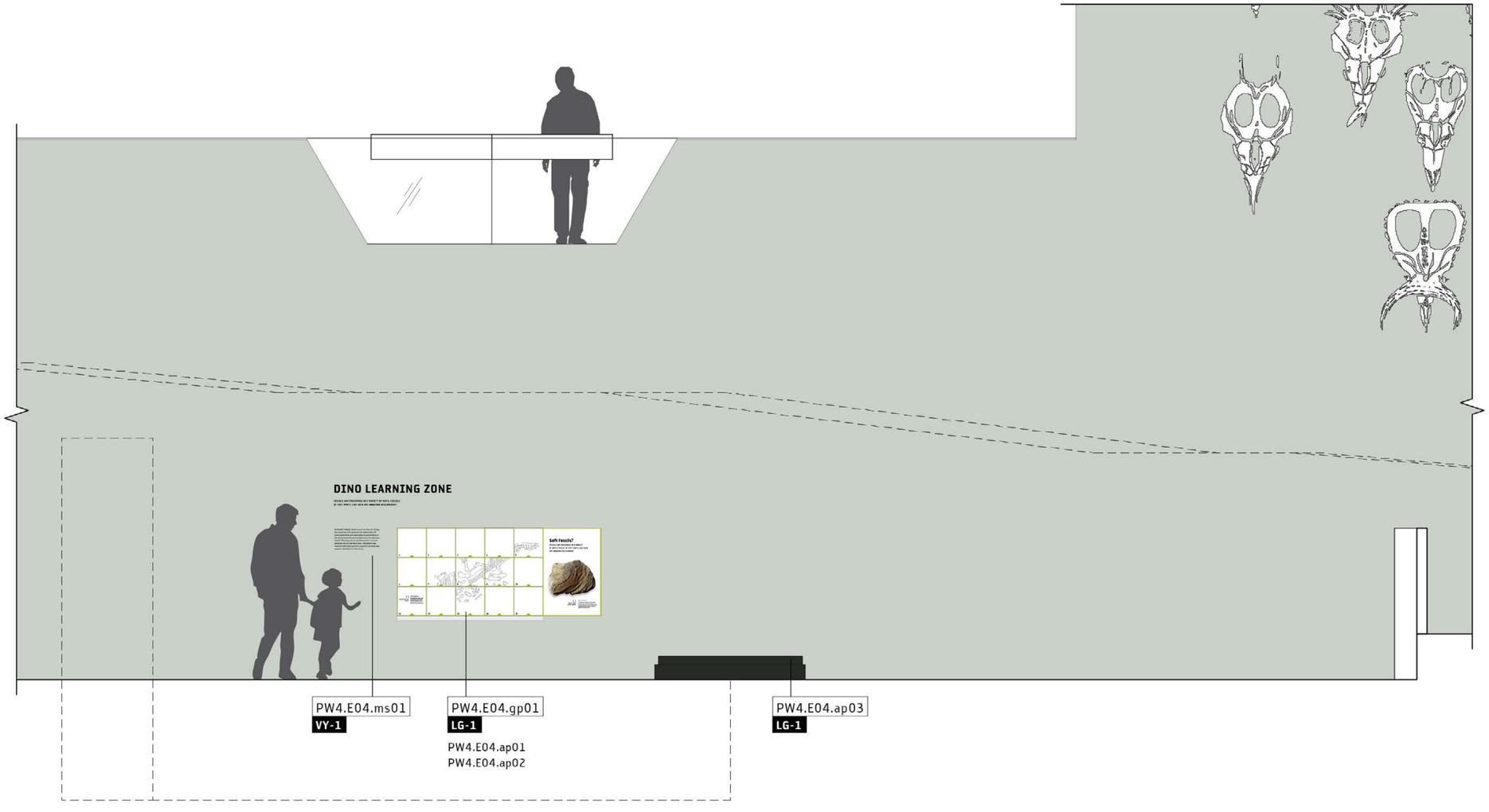
PW4.E03.ca05

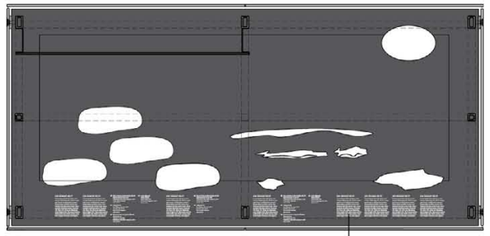





LATE JURASSIC
LATE CRETACEOUS
100-65 million years ago
EOCENE
55-38 million years ago
LAKE BONNEVILLE
PAST WORLDS
PW4.E03.qt01
VY-1
PW5.E01.pm01
DP-1
PW4.E01.pm01
DP-1
PW4.E01.qt01
VY-1
PW3.E01.pm01
DP-1
PW2.E01.pm01
DP-1
PW8

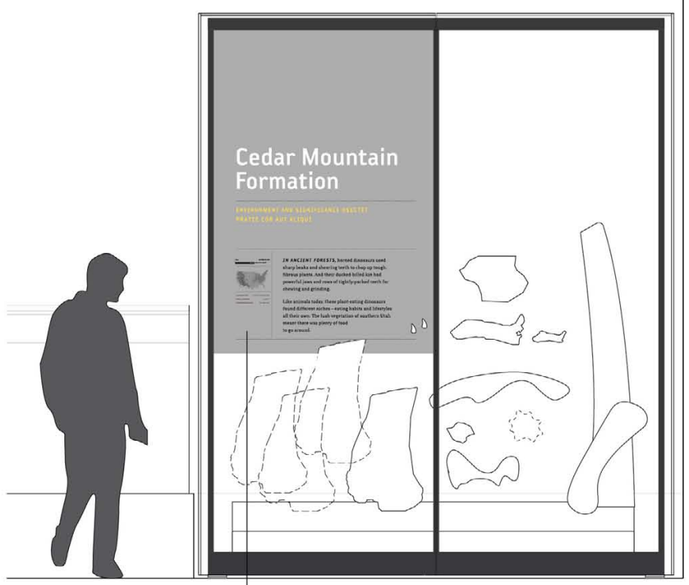

PW7
PW4.E04
PW5


DINO LEARNING ZONE
Soft Fossils?
PW4.E04.ms01
VY-1
PW4.E04.gp01
LG-1
PW4.E04.ap01
PW4.E04.ap02
PW4.E04.ap03
LG-1

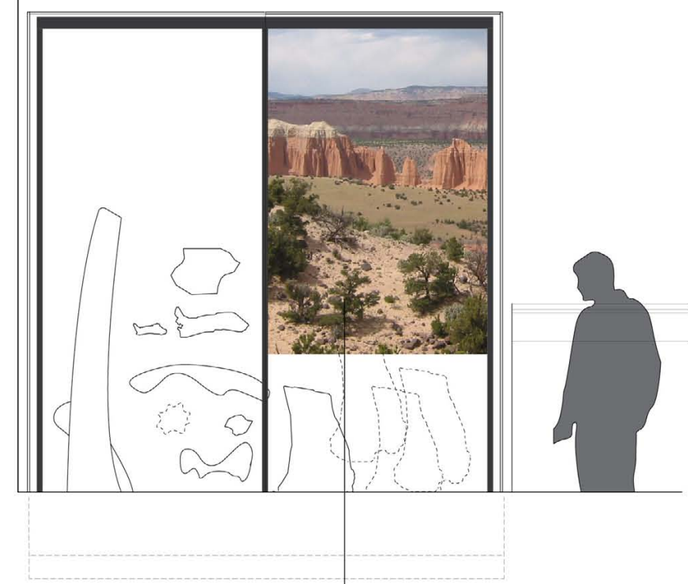


PW4.E06.ar01-11
DS-1

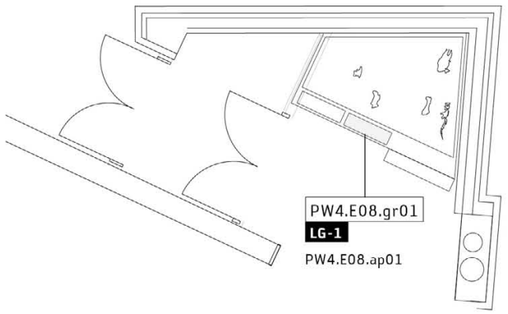
PW4.E06.ca04

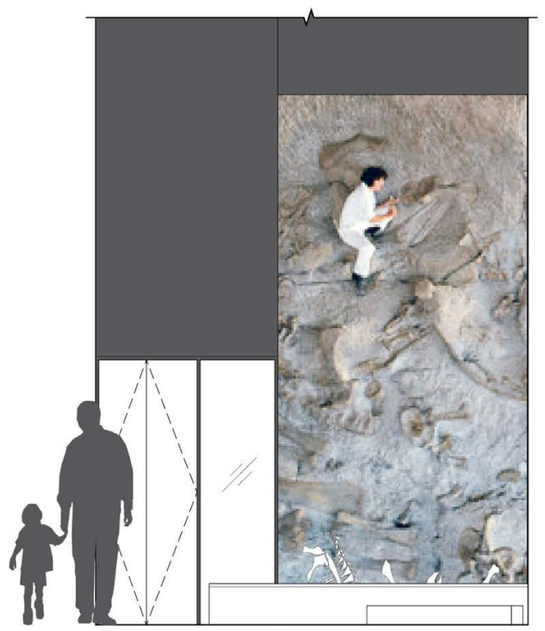


PW4.E06.ms02
DS-1

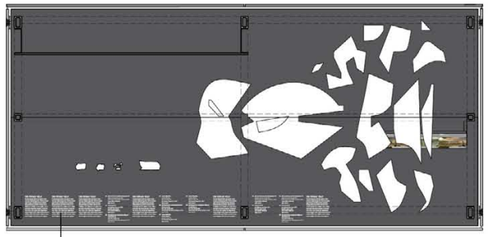


PW4.E06.gi01
IJ-1


PW4.E08.gr01
LG-1
PW4.E08.ap01

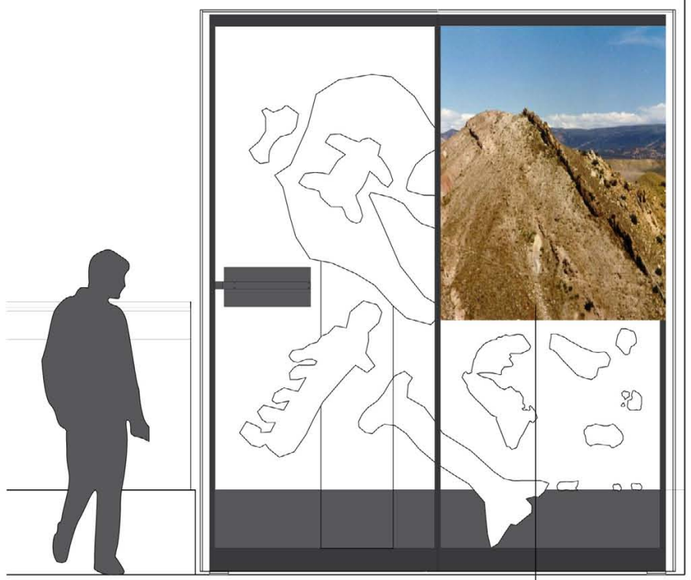


EAST ERIL IUSCILLAM ationse nisciliqui eum quissenibh euisl eu faccumm olortisis acinibh exercillam verat. Iduie consequ ationsenim am quat, secte conse dit praesto ercipisim vel iusn velendit duis dolenis sequipsummy nibh eugait wis elitquis.
–DALOR SIT AMUT
PW4.E08.pm01
DP-1
PW4.E03.qt01
VY-1



PW4.E09.ar01-16
DS-1

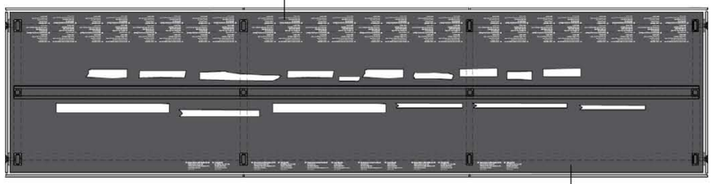
PW4.E09.ca03



PW4.E09.gi01
IJ-1

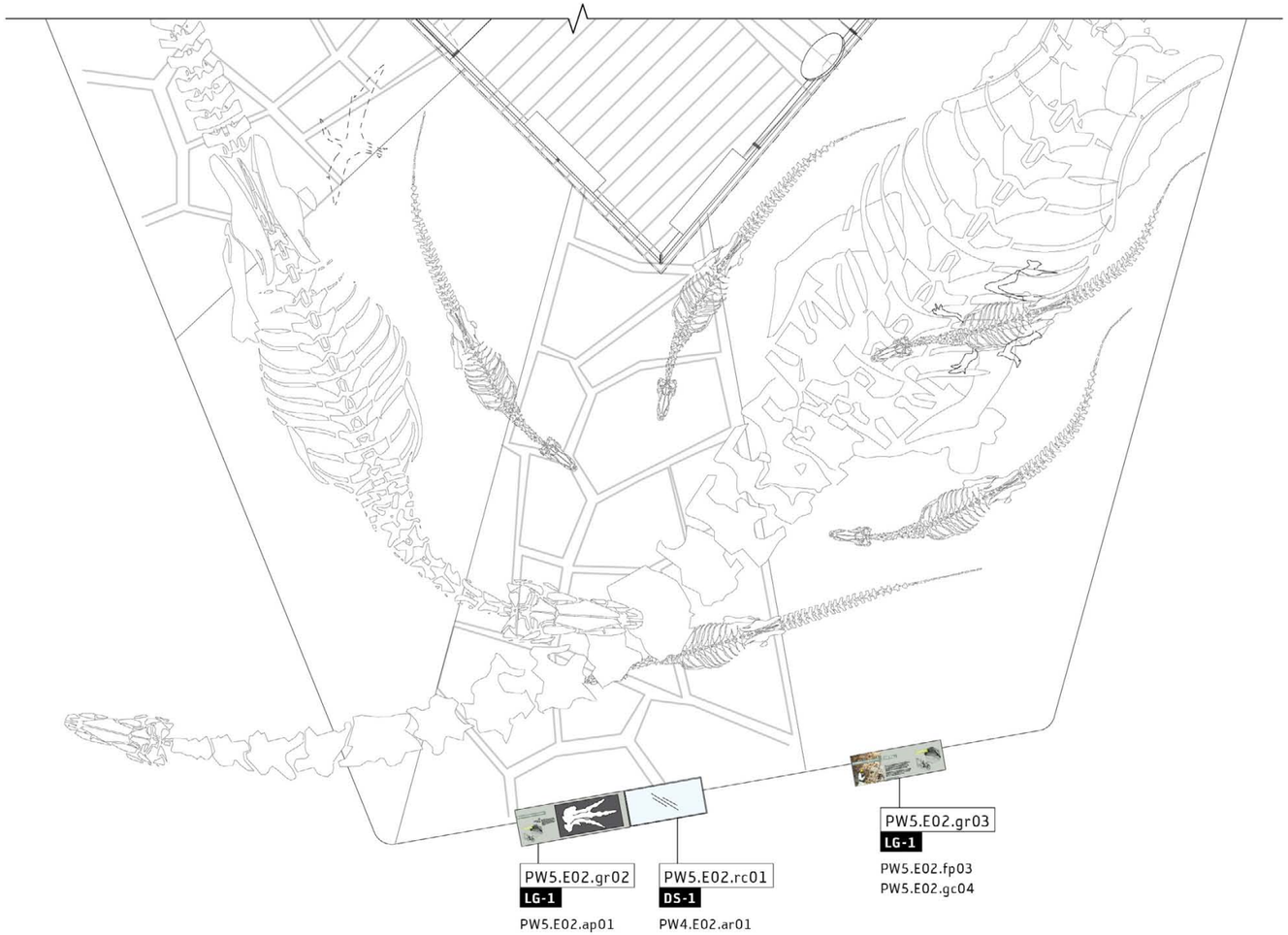
PW4.E09.ms01
DS-1

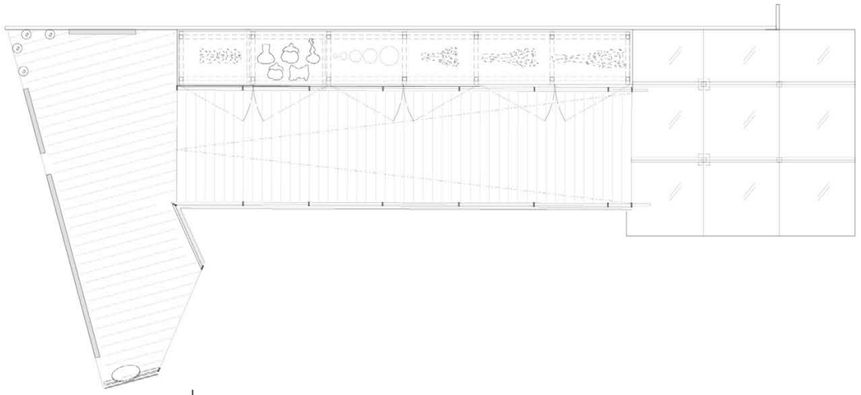
PW4.E09.gp01
DS-1

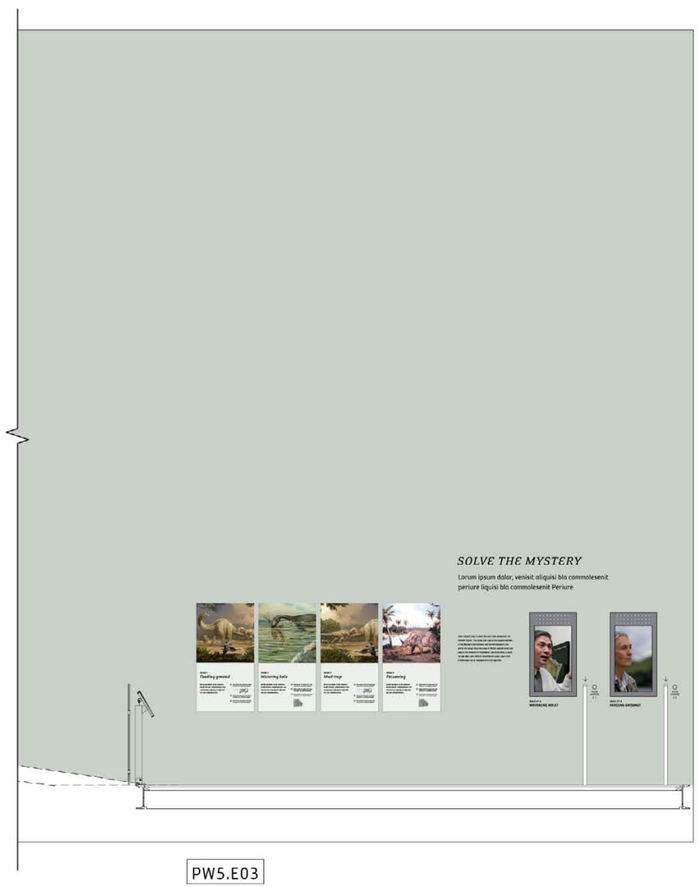

PW3.E03.ar01-33
DS-1
PW3.E03.ar01-12
DS-1

Green
River Diversity
ENVIRONMENT AND SIGNIFICANCE OSECTET
PRATIE COR AUT ALTQUI
IN ANCIENT FORESTS, horned dinosaurs used sharp beaks and shearing teeth to chop up tough, fibrous plants. And their duckbilled kin had powerful jaws and rows of tightly-packed teeth for chewing and grinding.
Like animals today, these plant-eating dinosaurs found different niches – eating habits and lifestyles all their own. The lush vegetation of southern Utah meant there was plenty of food to go around.
Timeline
Map / Diagram / Fact
PW4.E09.ms01
DS-1

PW3.E03.ca02
Green
River Diversity


PW5.E02.gr02
LG-1
PW5.E02.ap01
PW5.E02.rc01
DS-1
PW4.E02.ar01
PW5.E02.gr03
LG-1
PW5.E02.fp03
PW5.E02.gc04

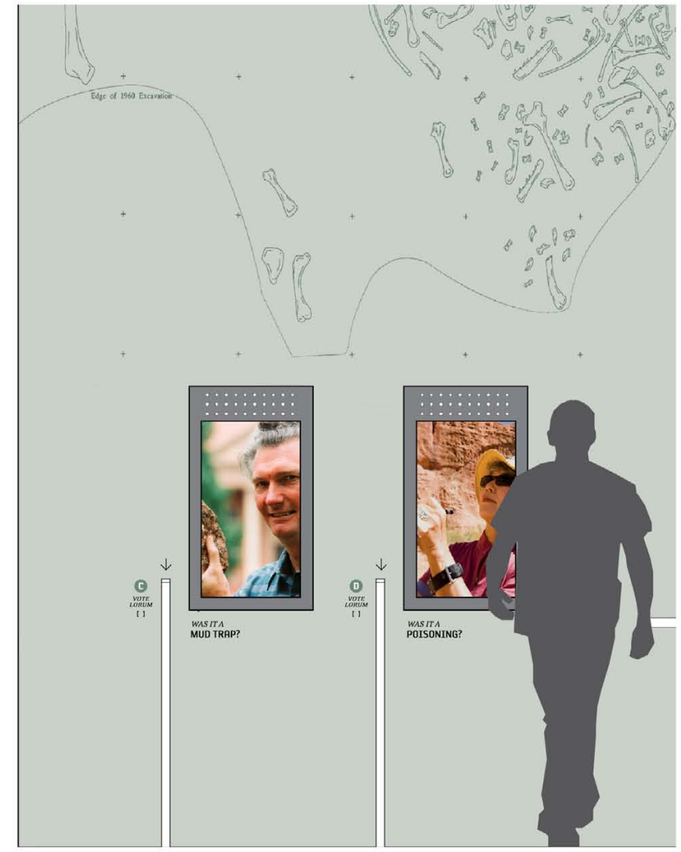


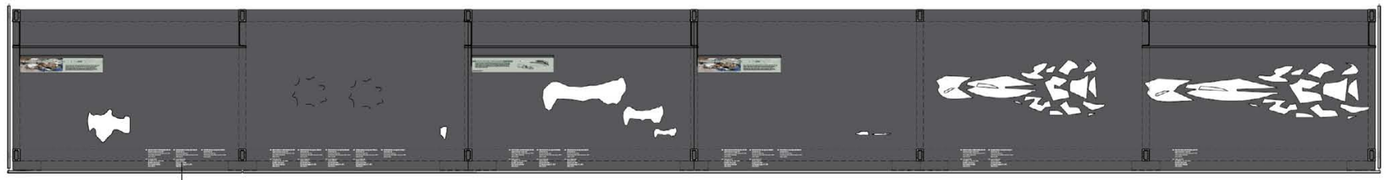


PW5.E03

PW5.E03.ca06

SOLVE THE MYSTERY
Lorum ipsum dalor, venisit aliquisi bla commolesenit periure liquisi bla commolesenit Periure
THEORY 1
Feeding ground
THEORY 2
Watering hole
THEORY 3
Mud trap
THEORY 4
Poisoning
THE GREAT SALT LAKE HOLDS THE MEMORY OF EVERY DROP. The Great Salt Lake is the largest salt lake in the Western Hemisphere, and the 4th largest in the world. It's larger than the state of Rhode Island! Great Salt Lake is the remnant of freshwater Lake Bonneville, a great ice age lake. uam, velenim ipsustionum quam, quam duis nisi.Ilummy nos er sequipsustis nisis digniam.
WAS IT A WATERING HOLE?
A
VOTE LORUM
[ ]
WAS IT A FEEDING GROUND?
B
VOTE LORUM
[ ]
PW5.E03.fp01
DS-1
PW5.E03.gi01-04
IJ-1
PW5.E03.ms01
VY-1
PW5.E03.ap01
VY-1

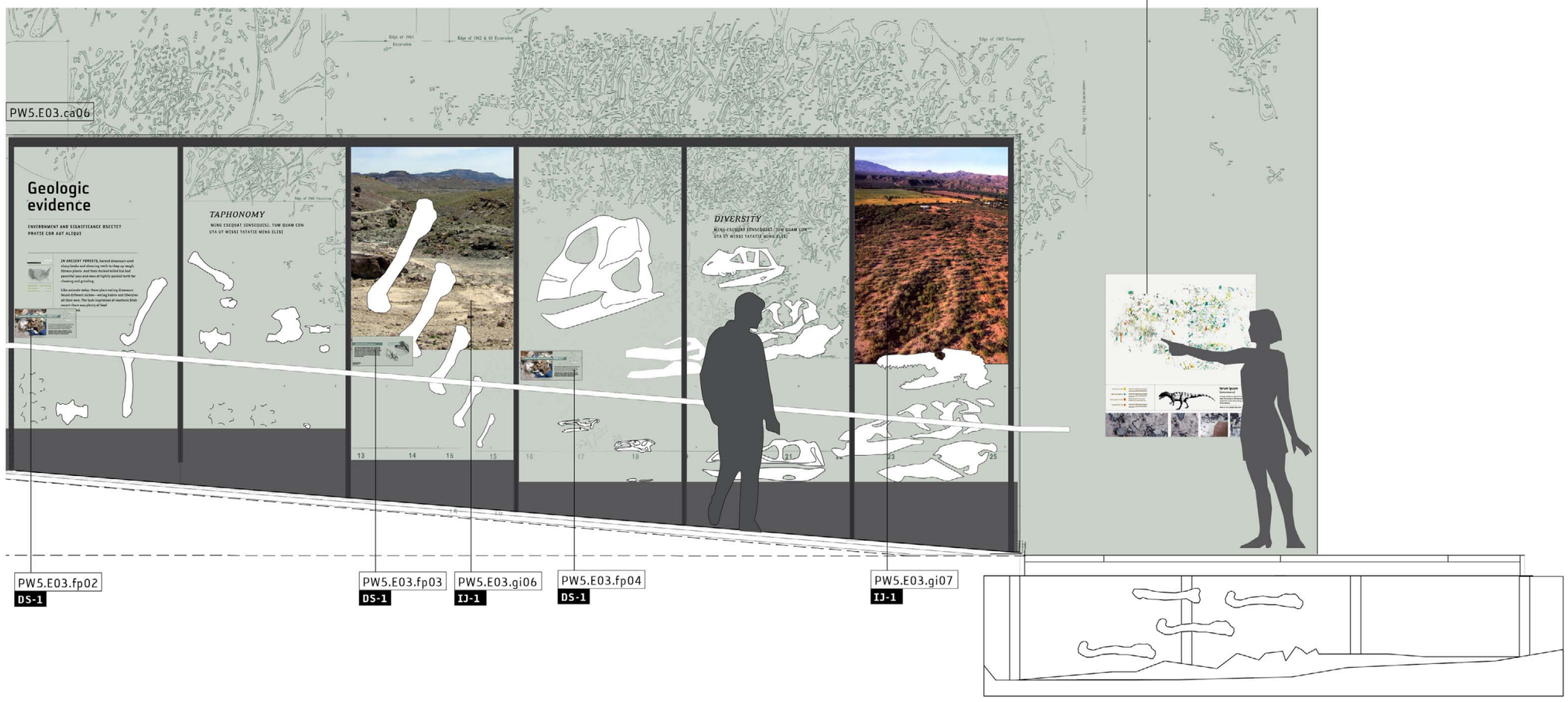

Edge of 1960 Excavation
C
VOTE LORUM
[ ]
WAS IT A MUD TRAP?
D
VOTE LORUM
[ ]
WAS IT A POISONING?



PW5.E03.ar01-27
DS-1

PW5.E03.gi05
DS-1

PW5.E03.ca06



PW5.E03.fp02
DS-1

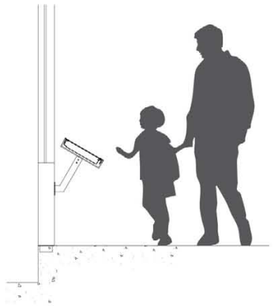
PW5.E03.fp03
DS-1

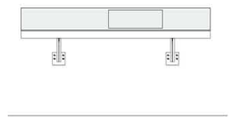
PW5.E03.gi06
IJ-1

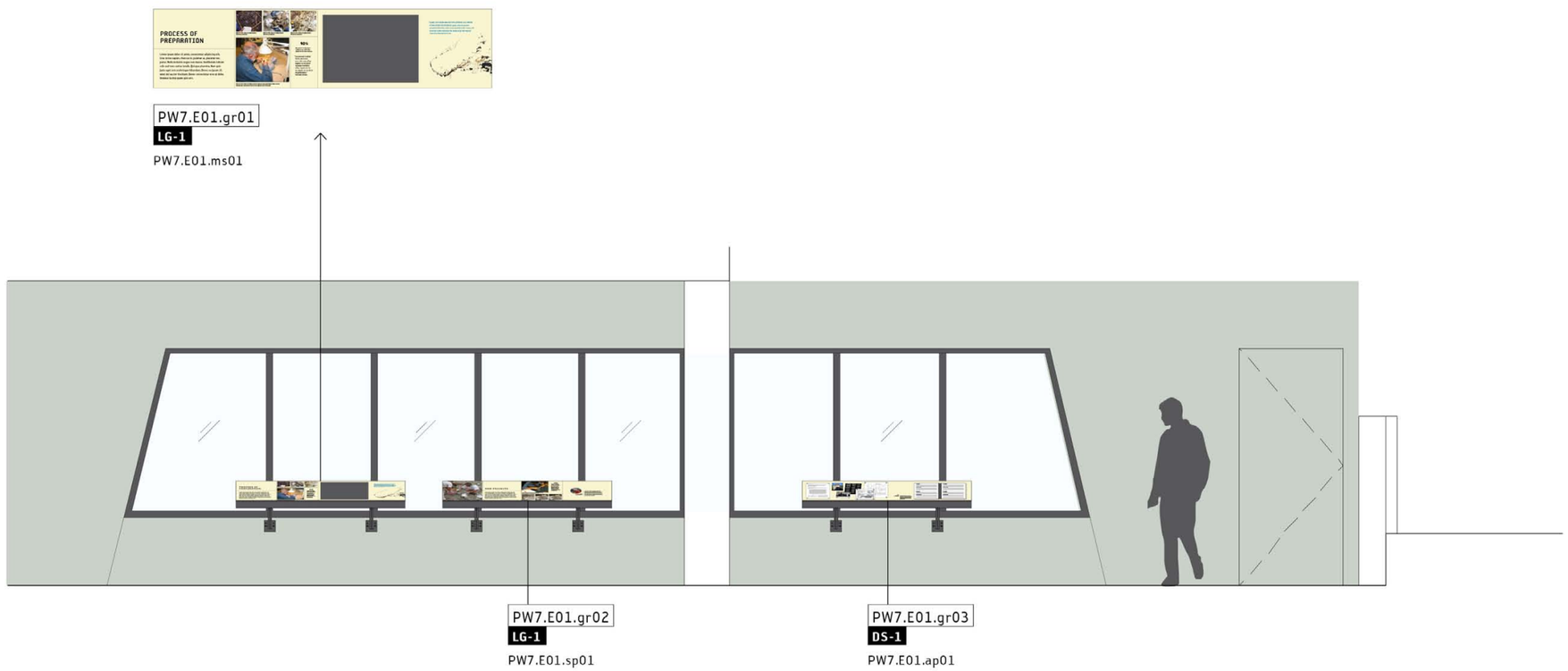
PW5.E03.fp04
DS-1

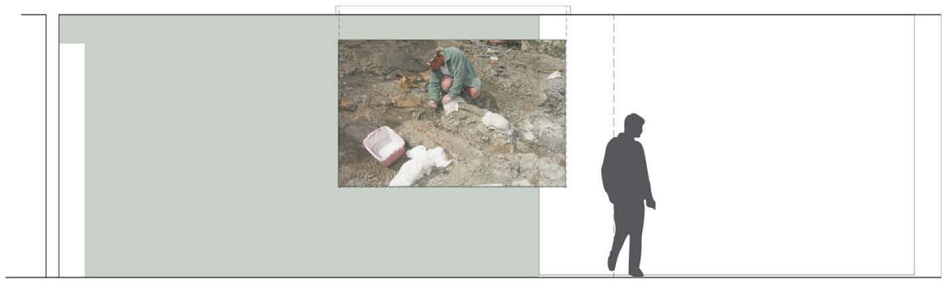
PW5.E03.gi07
IJ-1

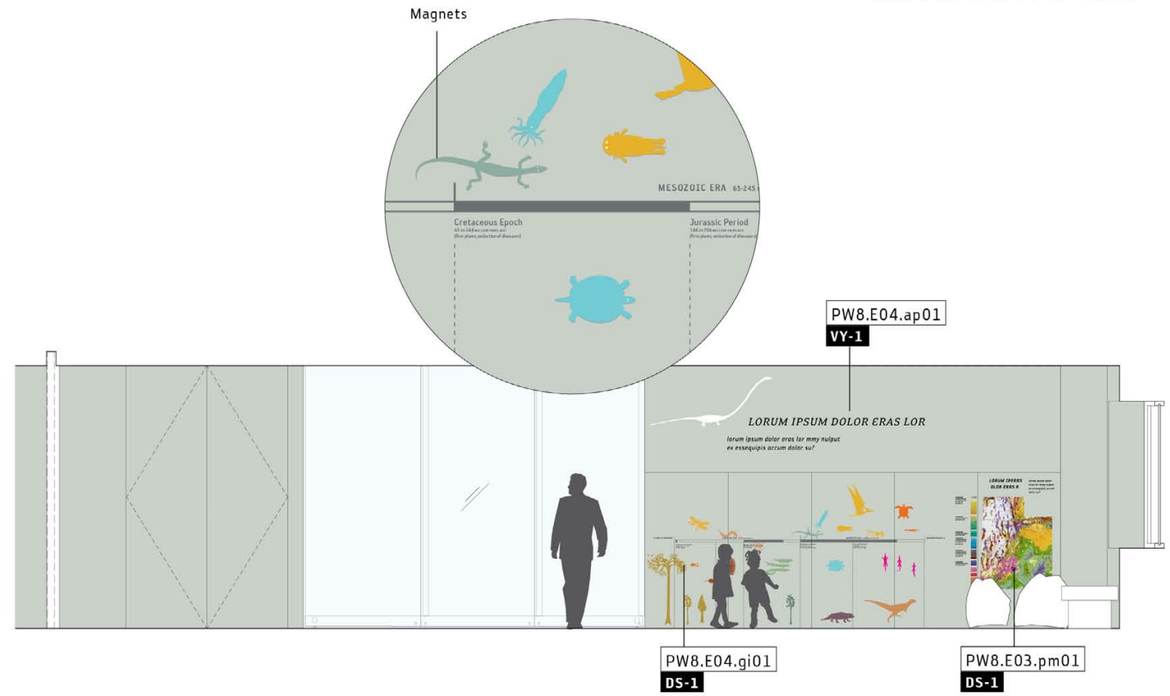
PAST WORLDS
UTAH'S INCREDIBLE FOSSIL RECORD
WE WILL VISIT FOUR SCENES IN THIS STORY, slicing through 150 million years of earth history, revealing four living communities—each one rich in interconnections.
Our first step backward into Utah's past worlds lands us on the shores of Ice-Age Lake Bonneville 11,000 years ago. Pleistocene glaciers frosted the mountains above, while in the valleys below, waters a thousand feet deep teemed.
REAL VS. CRUST
PW1.E02.fp01
DS-1
PW1.E01.ip01
DL-1
VY-1

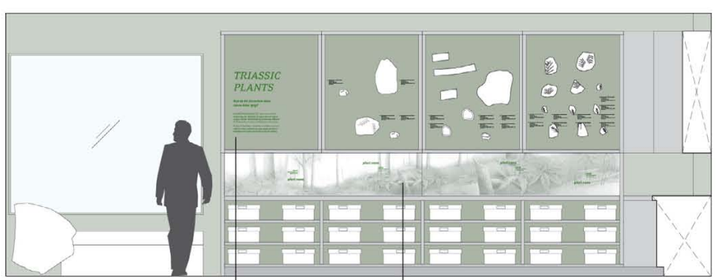


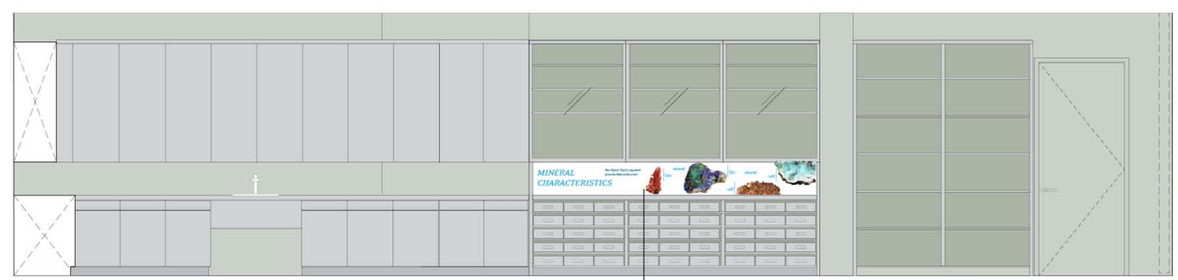



PROCESS OF PREPARATION
PW7.E01.gr01
LG-1
PW7.E01.ms01
PW7.E01.gr02
LG-1
PW7.E01.sp01
PW7.E01.gr03
DS-1
PW7.E01.ap01


PROJECTION SURFACE


Magnets
MESOZOIC ERA 65-245
Cretaceous Epoch
Jurassic Period
PW8.E04.ap01
VY-1
LORUM IPSUM DOLOR ERAS LOR
PW8.E04.gi01
DS-1
PW8.E03.pm01
DS-1


TRIASSIC PLANTS
PW8.E02.ms01
DS-1
PW8.E02.gp01
DS-1
PW8.E02.ar01-27

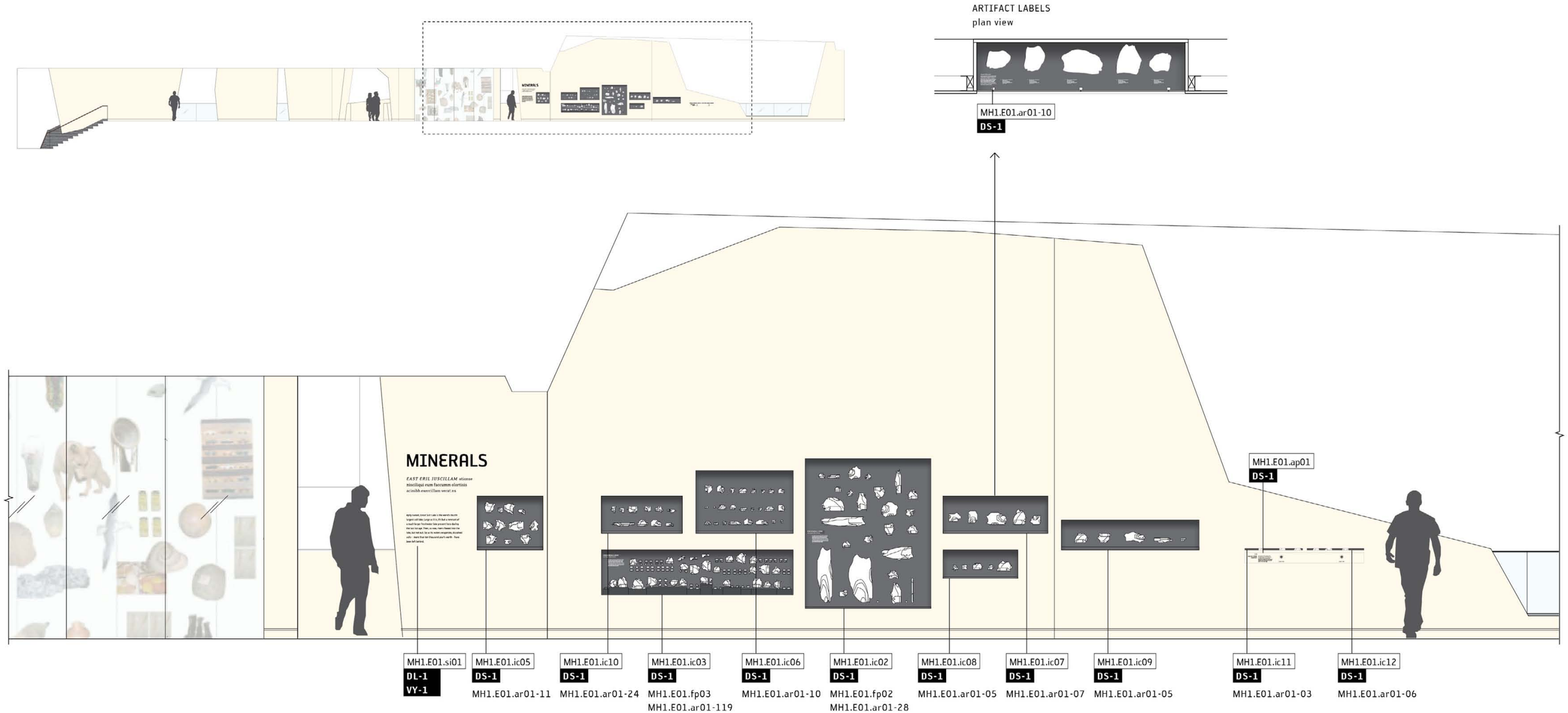

MINERAL CHARACTERISTICS
PW8.E01.gp01
DS-1

[MH] MINERAL HALL

	LEVEL 3
63	SOUTH ELEVATION: MINERALS
65	NORTH ELEVATION: COLLECTIONS

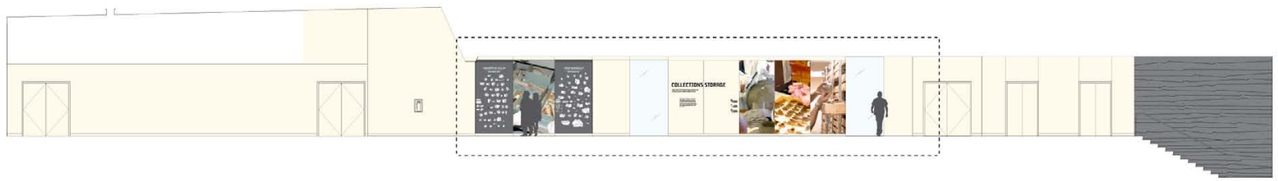
SOUTH ELEVATION: MINERALS [MH]

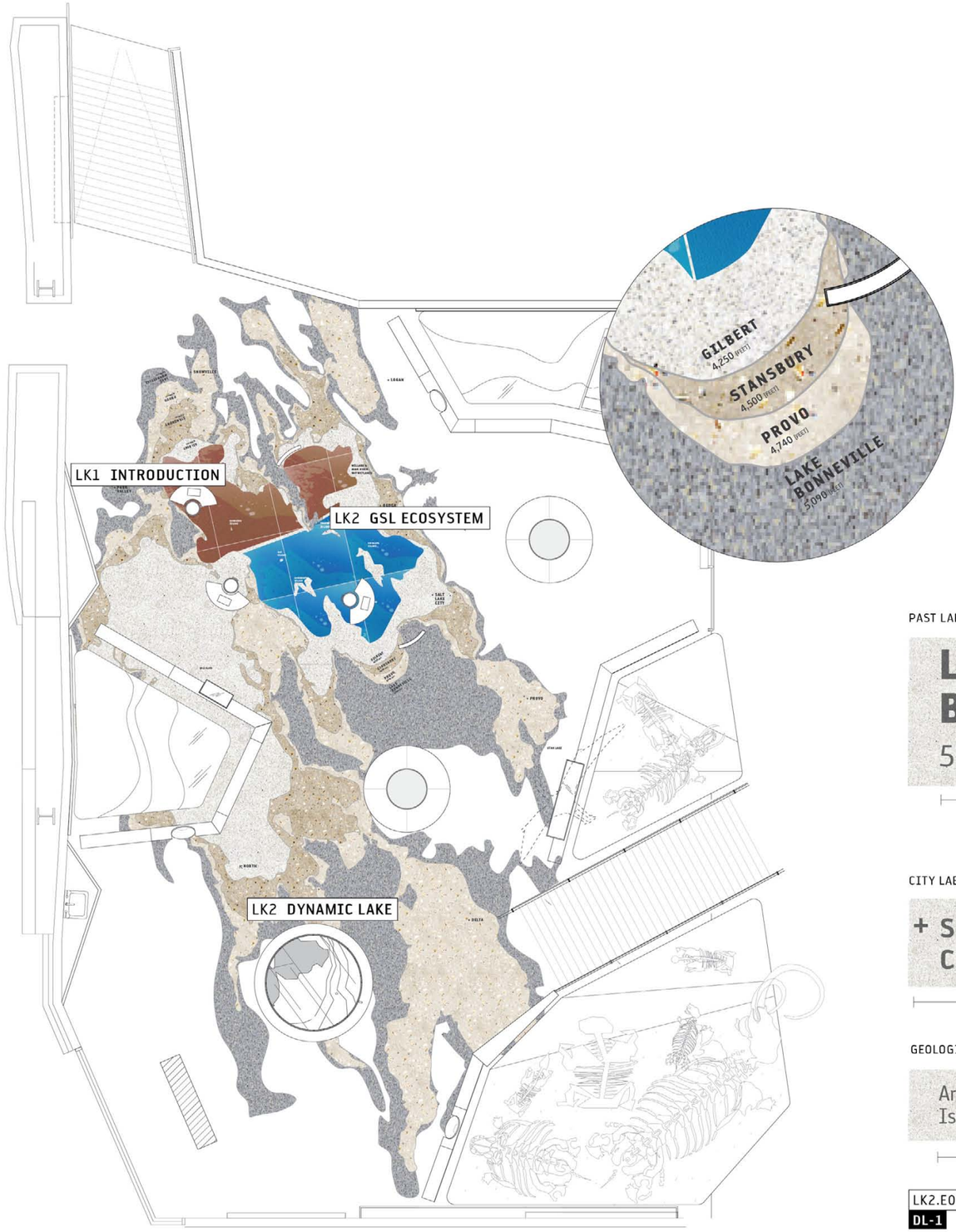
MINERAL HALL / LEVEL 3



NORTH ELEVATION: COLLECTIONS [MH]

MINERAL HALL / LEVEL 3





PAST LAKE LABELS

LAKE BONNEVILLE

5,090 [feet]

18"

CITY LABELS

+ SALT LAKE CITY

12"

GEOLOGICAL FEATURE LABELS

Antelope Island

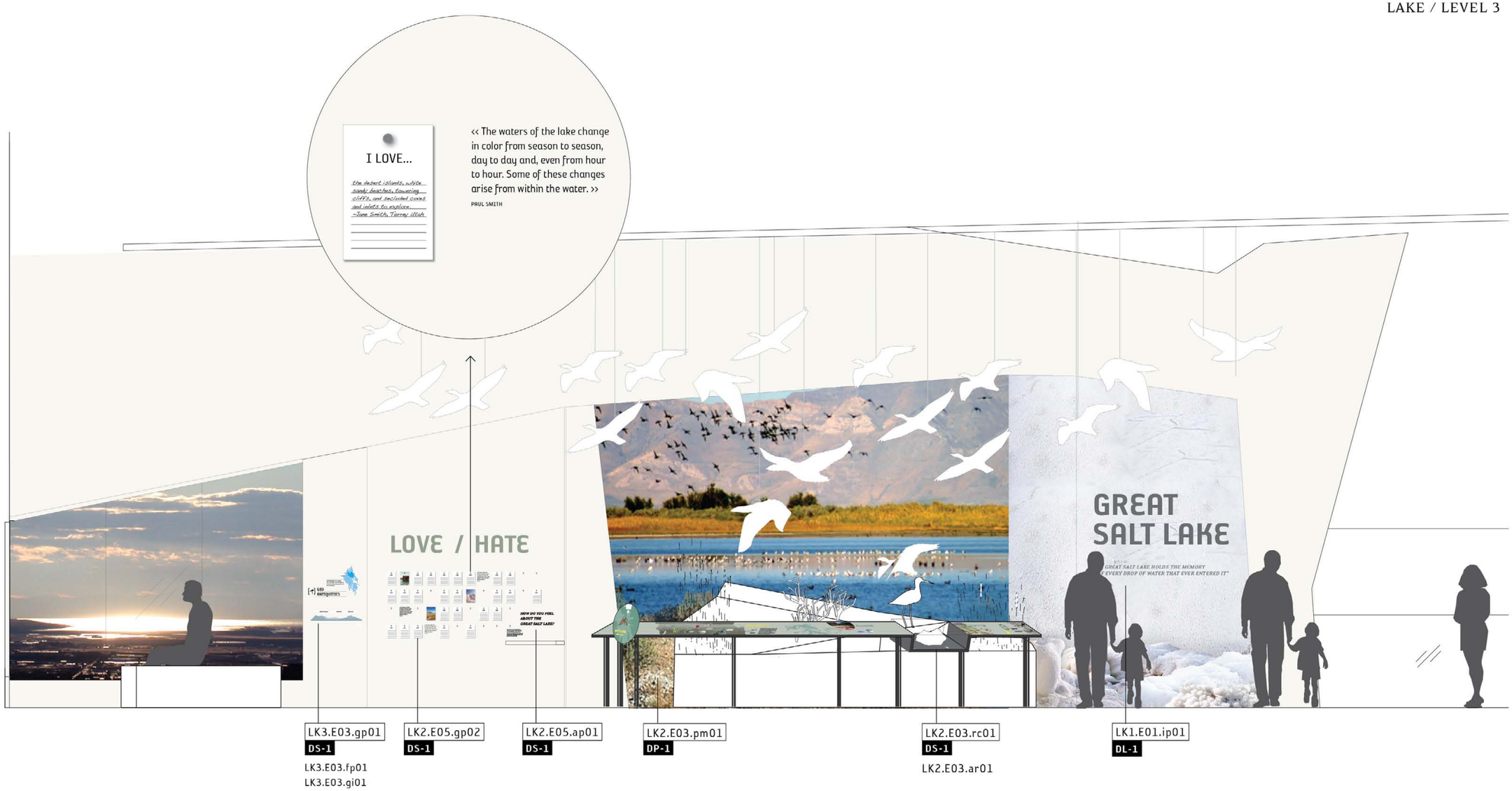
8"

LK2.E01.gc01-27

DL-1

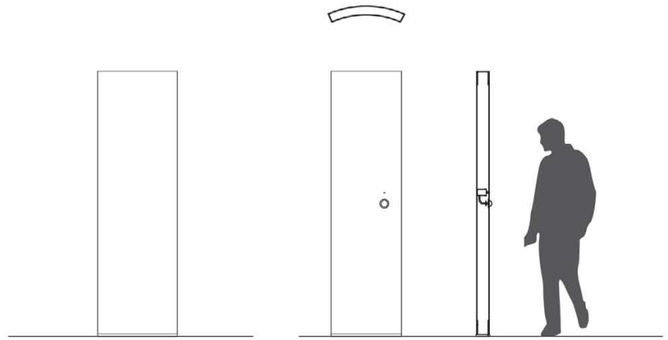
[LK] LAKE

	LEVEL 3
69	NORTH ELEVATION
70	ABOUT THE LAKE
71	BIOTA TUBES
72	SHORELINE RAILS
73	EAST ELEVATION
74	SAMPLE ID WHEEL
75	WETLANDS RAILS
76	PEOPLE AND THE LAKE
77	WATERSHED / WATERCYCLE
79	LAKE FORMATION RAIL


I LOVE...
the desert islands, white sandy beaches, towering cliffs, and secluded coves and inlets to explore.
–June Smith, Torrey, Utah
<< The waters of the lake change in color from season to season, day to day and, even from hour to hour. Some of these changes arise from within the water. >>
PAUL SMITH
LOVE / HATE
HOW DO YOU FEEL ABOUT THE GREAT SALT LAKE?
GREAT SALT LAKE
"GREAT SALT LAKE HOLDS THE MEMORY OF EVERY DROP OF WATER THAT EVER ENTERED IT"
LK3.E03.gp01
DS-1
LK3.E03.fp01
LK3.E03.gi01
LK2.E05.gp02
DS-1
LK2.E05.ap01
DS-1
LK2.E03.pm01
DP-1
LK2.E03.rc01
DS-1
LK2.E03.ar01
LK1.E01.ip01
DL-1

[LK] ABOUT THE LAKE

LAKE / LEVEL 3

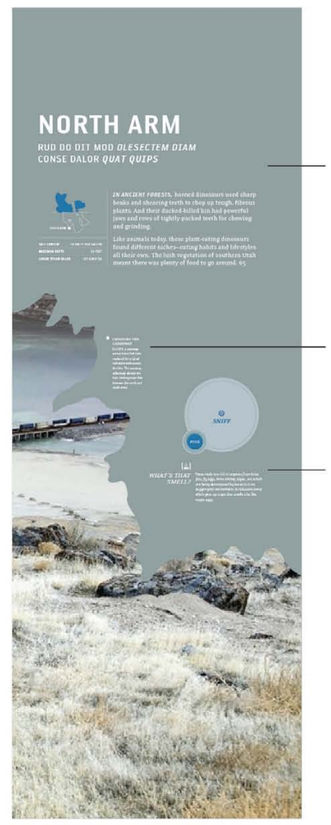


LK2.E01.si01

LK2.E01.ap01

LK2.E01.gp01

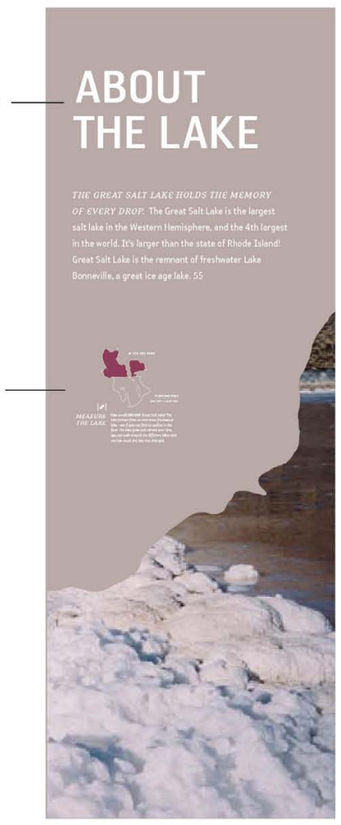
IJ-2



LK2.E01.ms01

LK2.E01.gc01

LK2.E01.ap02

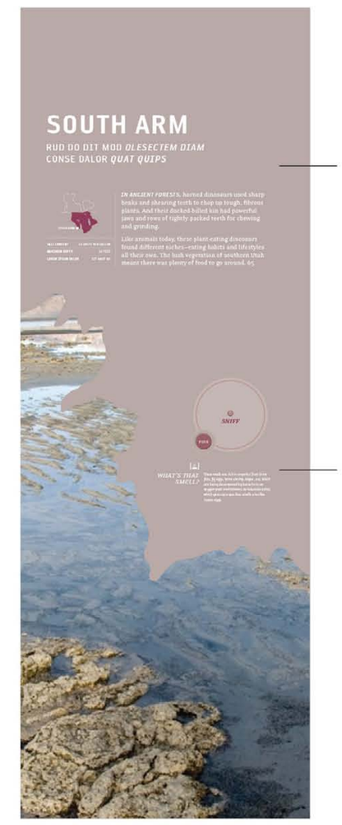


LK2.E01.si02

LK2.E01.ap03

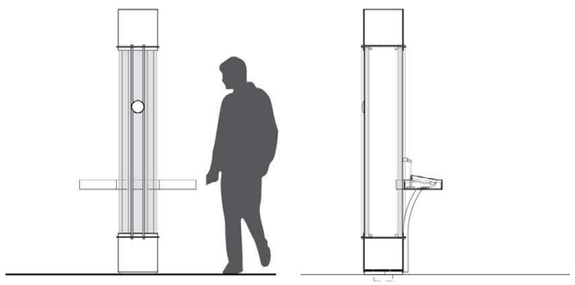
LK2.E01.gp02

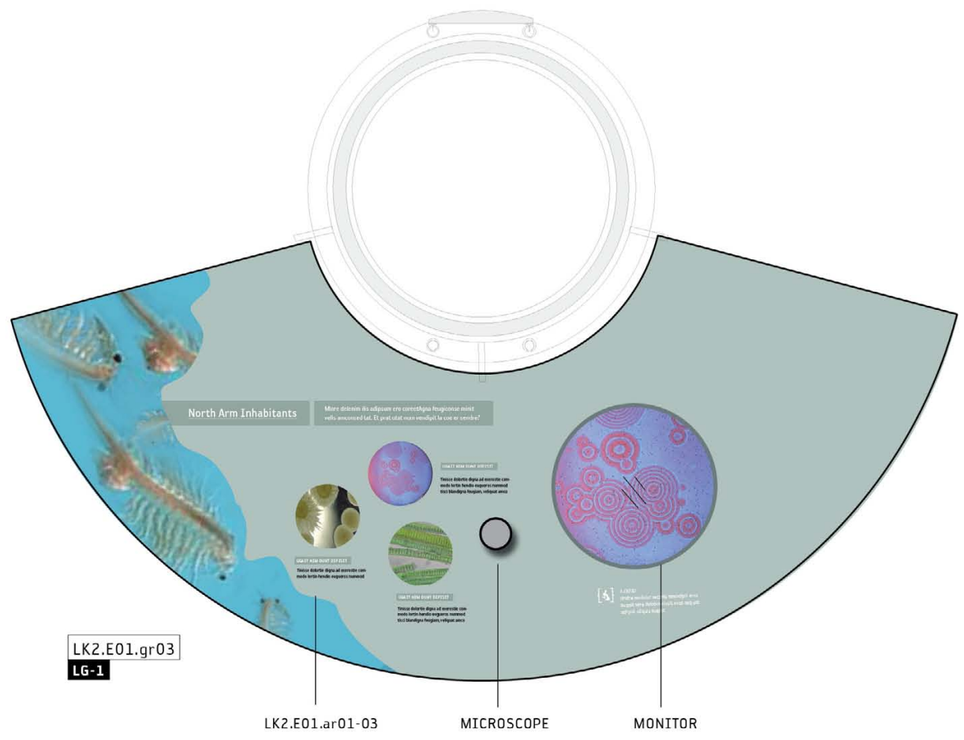
IJ-2



LK2.E01.ms02

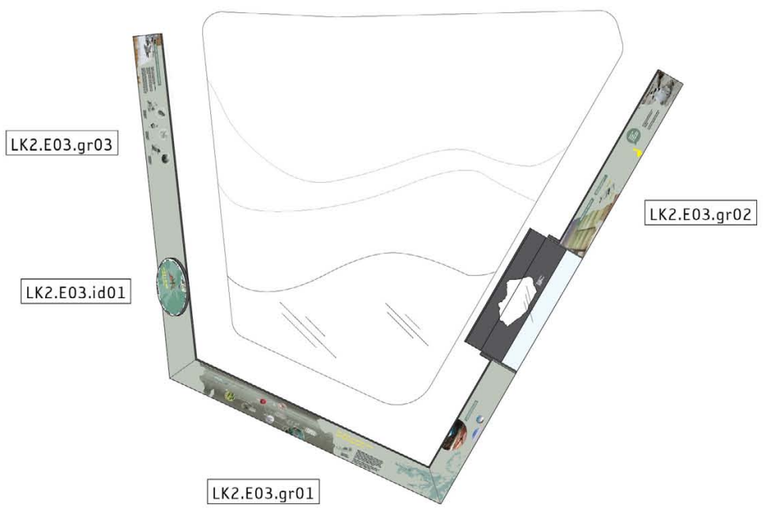
LK2.E01.ap04

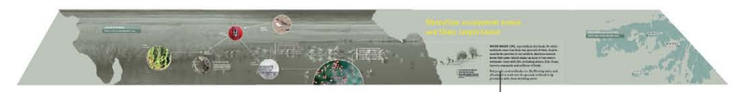



North Arm Inhabitants
LK2.E01.gr03
LG-1
LK2.E01.ar01-03
MICROSCOPE
MONITOR

[LK] SHORELINE RAILS

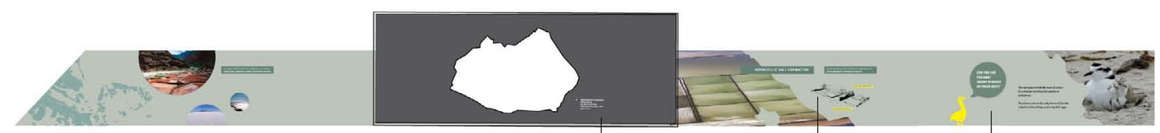
LAKE / LEVEL 3





LK2.E03.gr01
LG-1

LK2.E03.ms01



LK2.E03.gr02
LG-1

LK2.E03.rc01
DS-1

LK2.E03.ar01

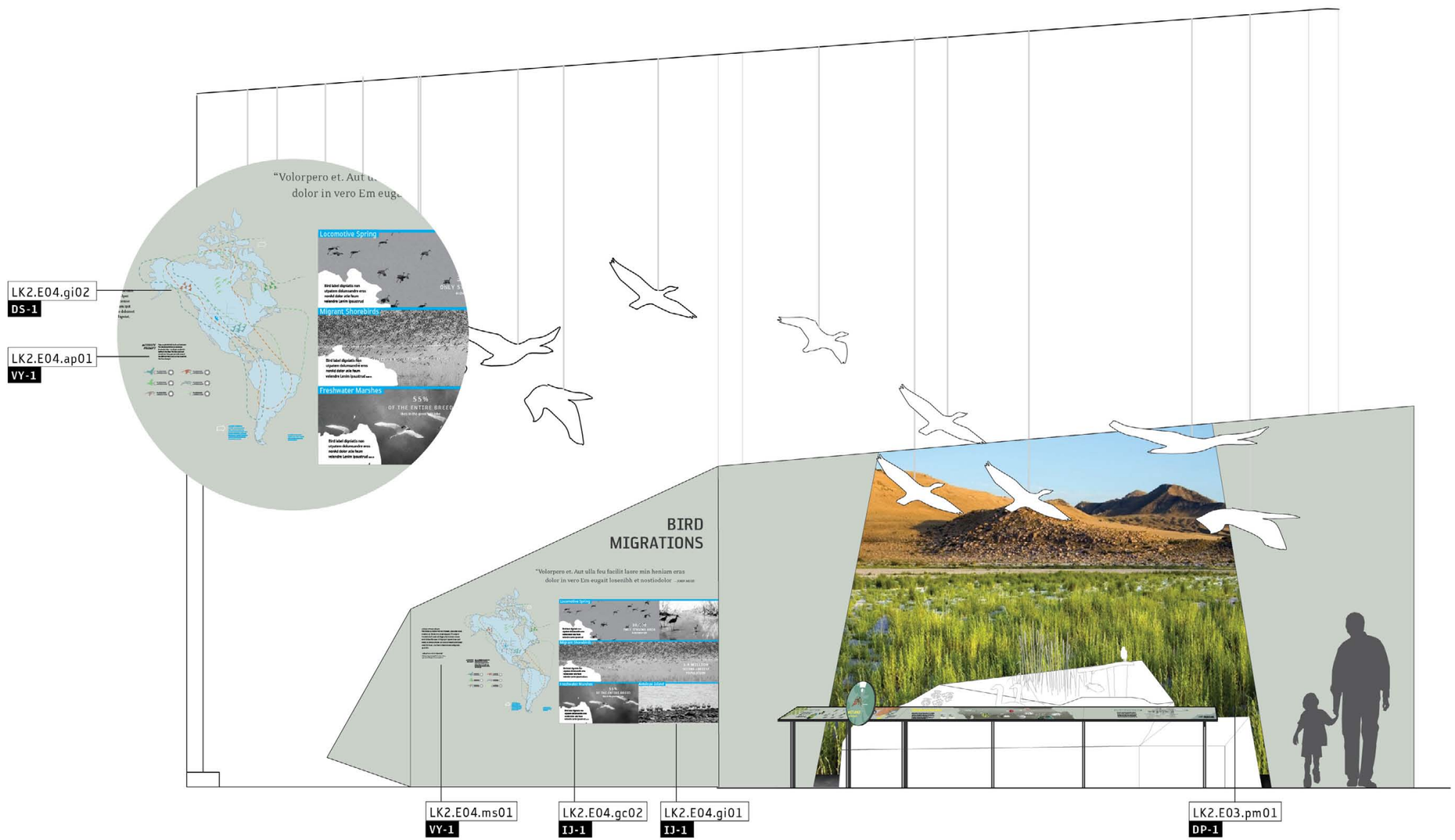
LK2.E03.gc02

LK2.E03.fl01

LK2.E03.gr03
LG-1

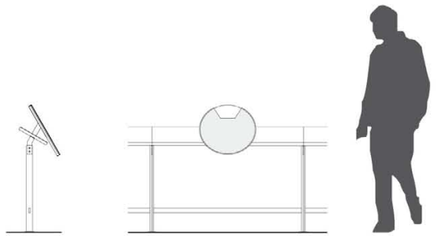
LK2.E03.fp01

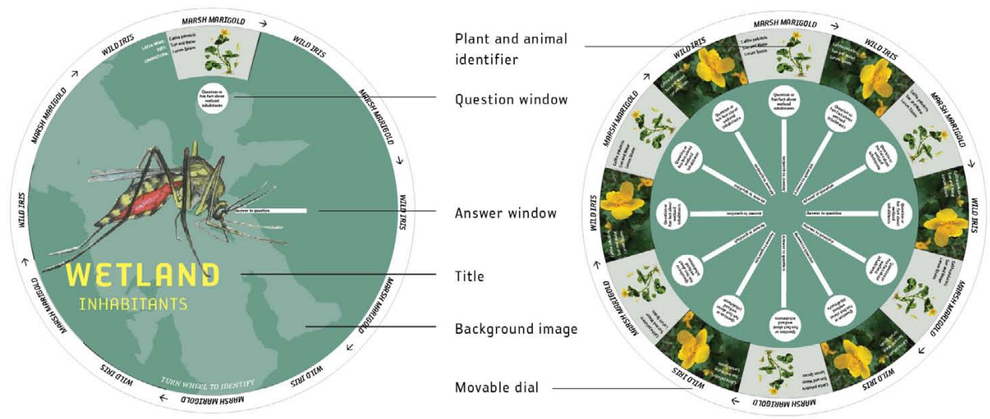
LK2.E03.id01
LG-1


LK2.E04.gi02
DS-1
LK2.E04.ap01
VY-1
Locomotive Spring
Migrant Shorebirds
Freshwater Marshes
BIRD MIGRATIONS
LK2.E04.ms01
VY-1
LK2.E04.gc02
IJ-1
LK2.E04.gi01
IJ-1
LK2.E03.pm01
DP-1

[LK] SAMPLE ID WHEEL

LAKE / LEVEL 3





ID WHEEL - FRONT

LG-1

ID WHEEL - GRAPHIC UNDERLAY

LG-1

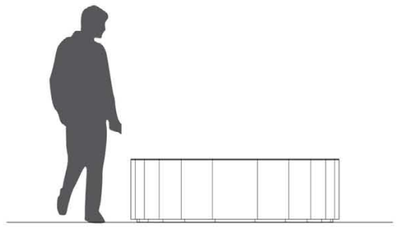
LK2.E02.gr01 LK2.E02.ms01
LG-1

LK2.E02.gr02 LK2.E02.fp01 LK2.E02.id01 LK2.E02.fl01
LG-1 LG-1

LK2.E02.gr03 LK2.E02.fp02 LK2.E02.ap01
LG-1

[LK] PEOPLE AND THE LAKE

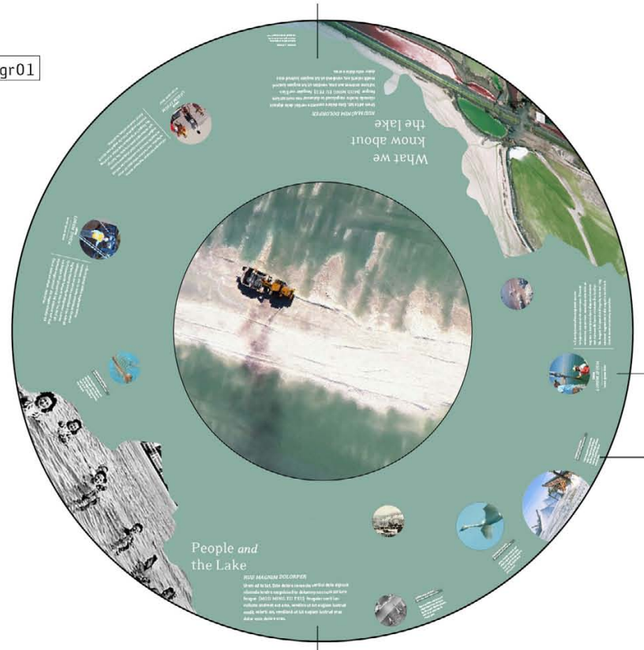
LAKE / LEVEL 3



LK2.E05.ms02

LK2.E05.gr01

LG-1



LK2.E05.sp01-03

LK2.E05.gc01

LK2.E05.ms01

PEOPLE AND THE LAKE STORYBOARD

birder

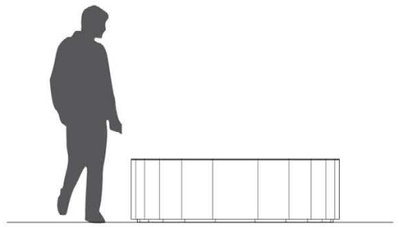
swimmer

geologist

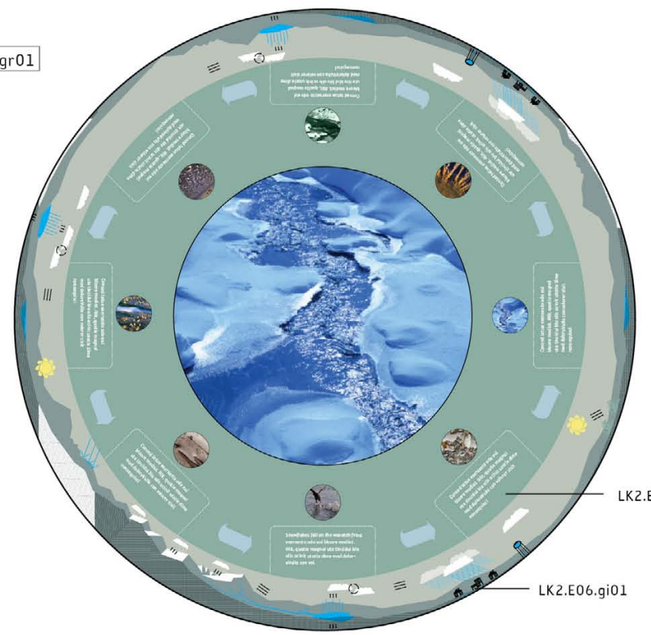
biologist

artist

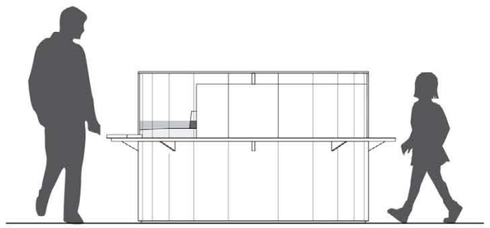
researcher

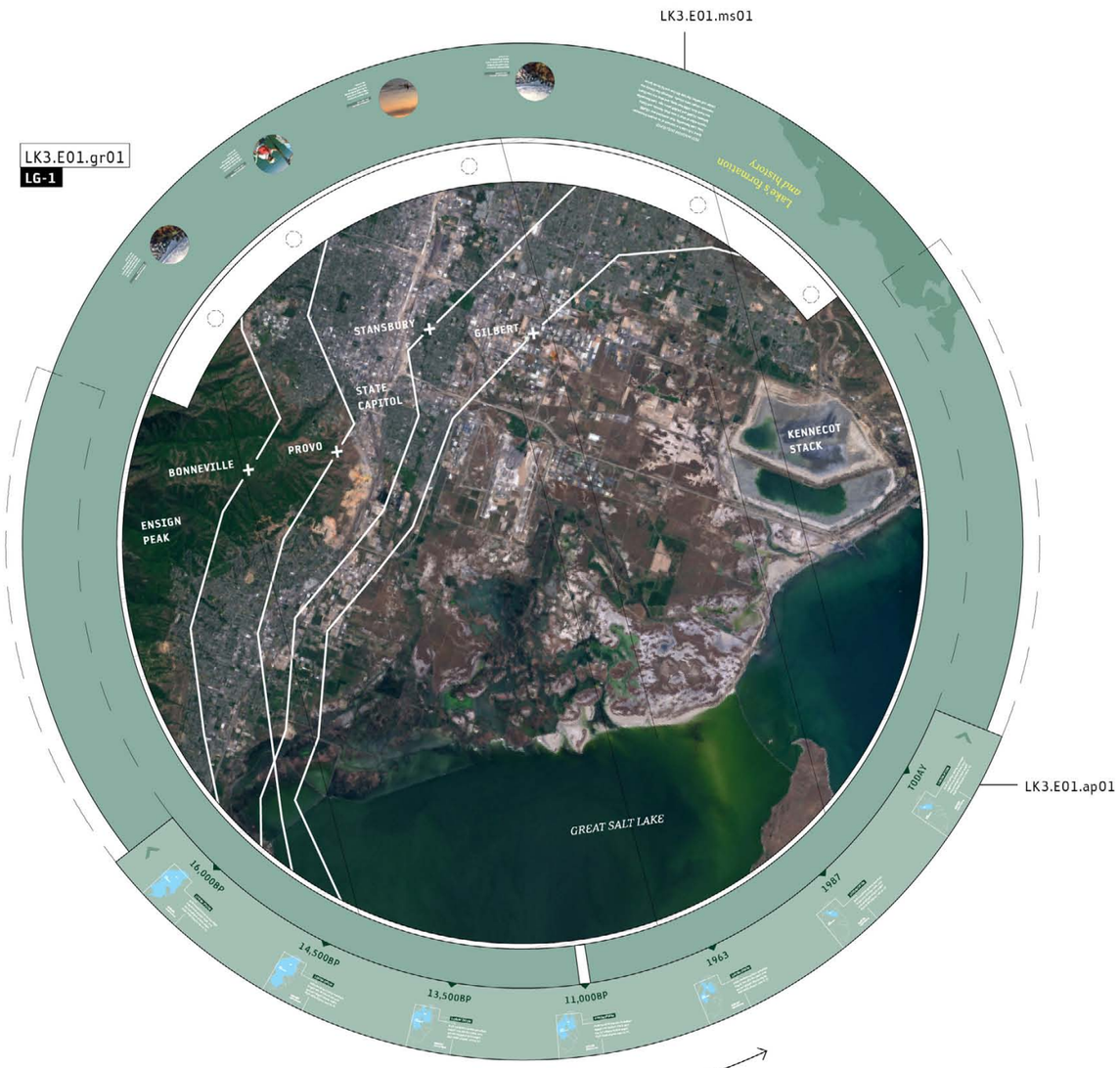


LK2.E06.gr01
LG-1

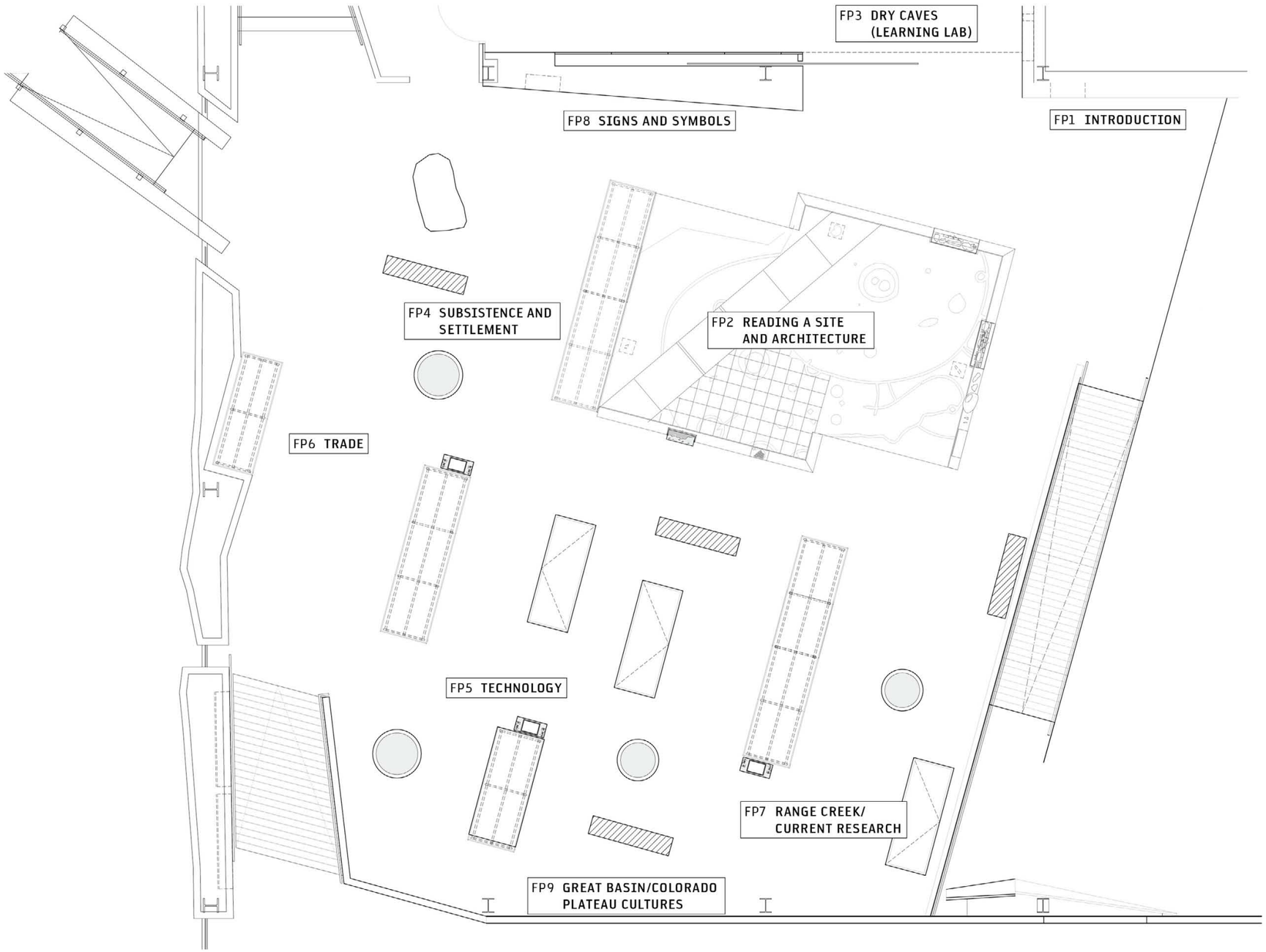


WATERSHED / WATERCYCLE STORYBOARD



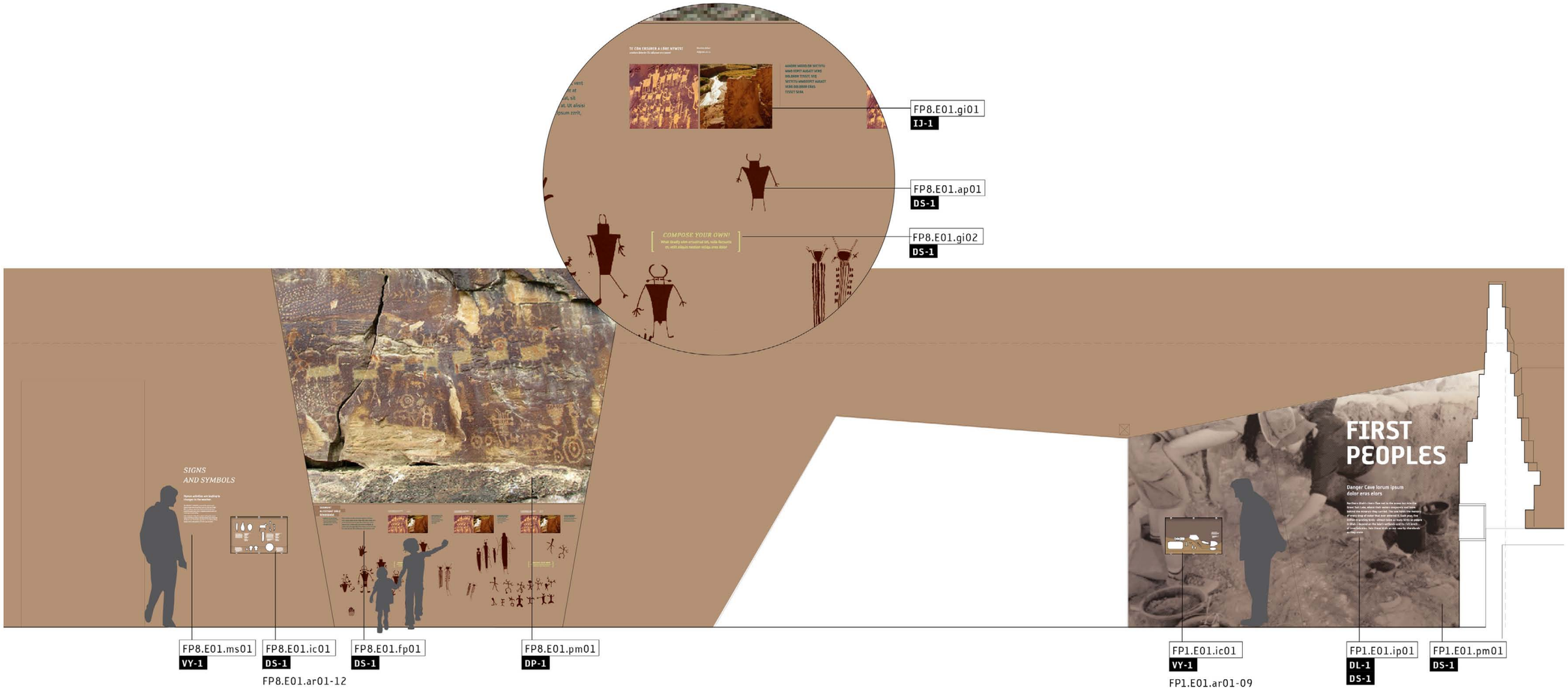


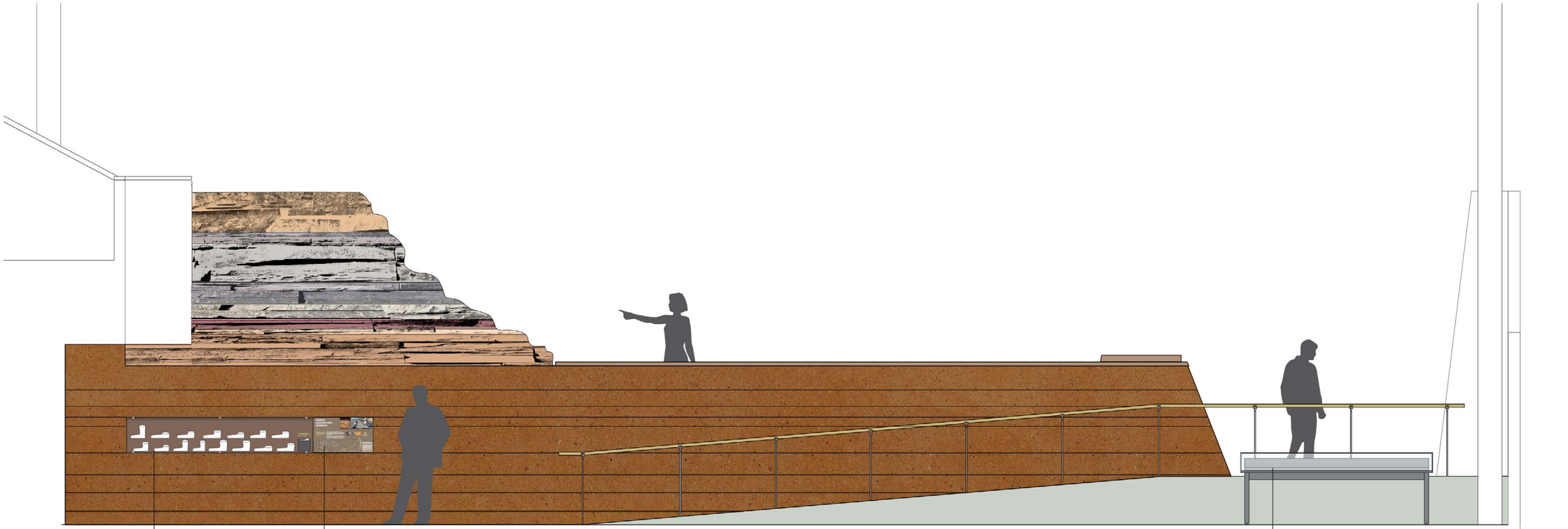
dial-a-lake using the rotating history ring

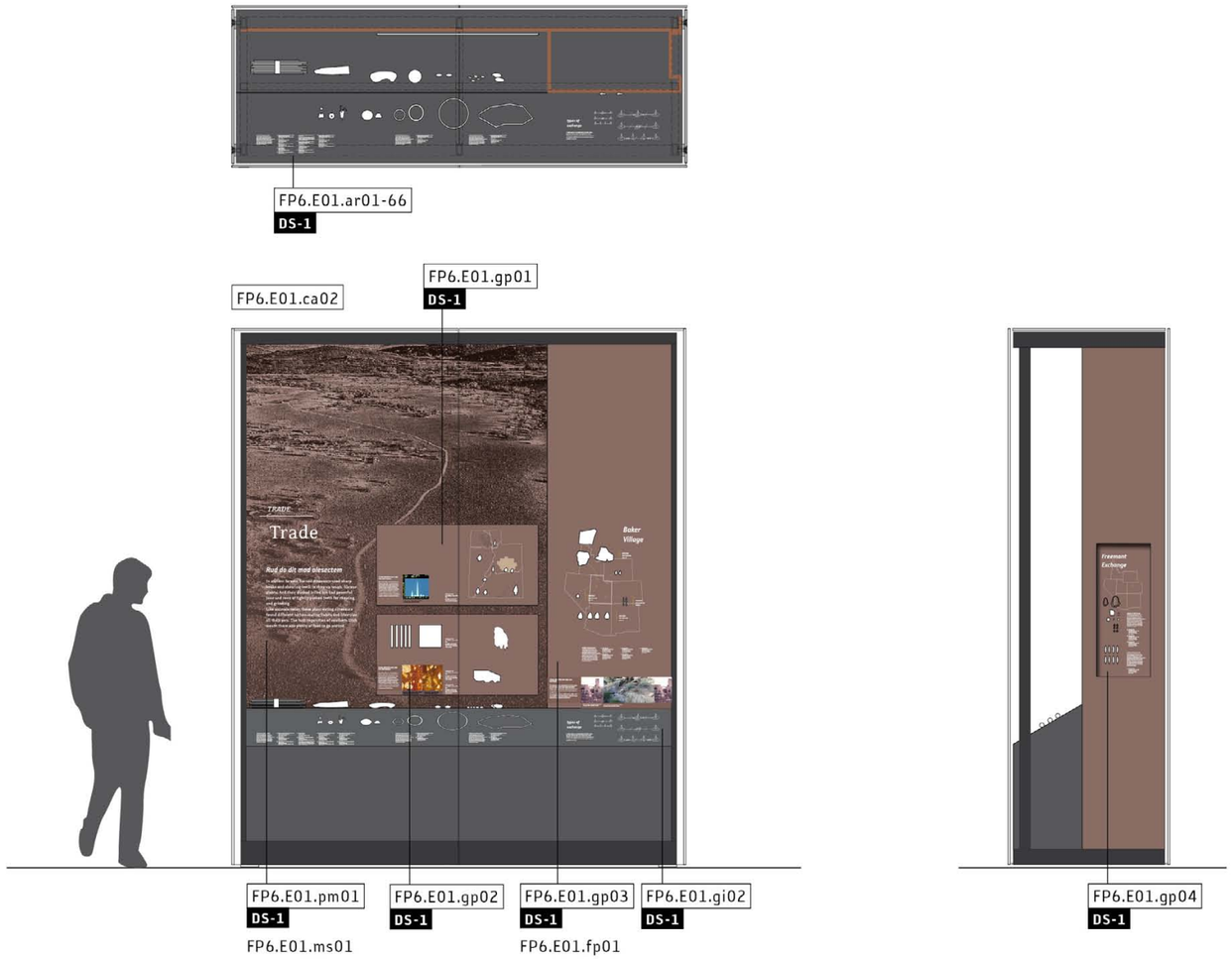


[FP] FIRST PEOPLES

	LEVEL 3
83	EAST ELEVATION
85	SOUTH ELEVATION
86	TRADE CASE
87	NORTH ELEVATION
88	MEDIAN VILLAGE
89	SUBSISTENCE CASE
91	BASKETS AND TEXTILES CASE
92	ORNAMENT / SHOES AND SANDALS TABLE CASES
93	WEAPONS AND STONE TOOLS CASE
94	TYPOLOGY CASE
95	CERAMICS CASE
96	CURRENT RESEARCH TABLE CASE
97	WEST ELEVATION
99	INTERACTIVE TABLES
101	DRY CAVE ELEVATIONS


FP8.E01.gi01
IJ-1
FP8.E01.ap01
DS-1
FP8.E01.gi02
DS-1
COMPOSE YOUR OWN!
SIGNS AND SYMBOLS
FIRST PEOPLES
Danger Cave lorum ipsum dolor eras elors
FP8.E01.ms01
VY-1
FP8.E01.ic01
DS-1
FP8.E01.ar01-12
FP8.E01.fp01
DS-1
FP8.E01.pm01
DP-1
FP1.E01.ic01
VY-1
FP1.E01.ar01-09
FP1.E01.ip01
DL-1
DS-1
FP1.E01.pm01
DS-1

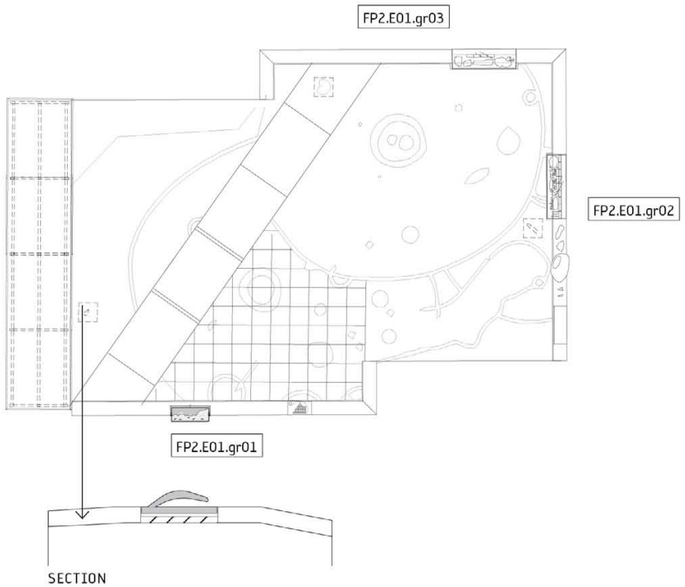

FP3.E04.ic01
DS-1
FP3.E04.ar01-18
FP3.E04.gp01
LG-1
FP3.E04.ms01
FP3.E04.fp01
FP3.E04.gc01
FP7.E01.ca08


FP6.E01.ar01-66
DS-1
FP6.E01.ca02
FP6.E01.gp01
DS-1
Trade
Baker Village
Freemont Exchange
FP6.E01.pm01
DS-1
FP6.E01.ms01
FP6.E01.gp02
DS-1
FP6.E01.gp03
DS-1
FP6.E01.fp01
FP6.E01.gi02
DS-1
FP6.E01.gp04
DS-1

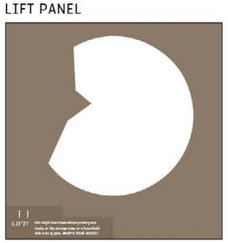
THERE ARE SONGS STILL BEING SUNG
and stories that long to be told in the places where people lived thousands of years ago, places that braid the Colorado left. Handprints on redrock walls.
– TERRY TEMPEST WILLIAMS
FIRST PEOPLES
Trade
LK2.E05.gp01
LG-1
LK2.E05.ic01
DS-1
LK2.E05.ar01-33
LK2.E05.ic02
DS-1
LK2.E05.ar01-14
LK2.E05.qt01
VY-1
FP1.E02.pm01
DP-1
FP1.E02.ip01
DL-1
VY-1
FP6.E01.ca02

[FP] MEDIAN VILLAGE

FIRST PEOPLES / LEVEL 3

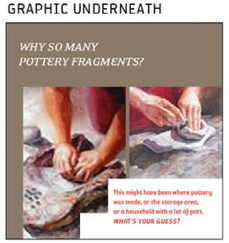


LIFT PANEL

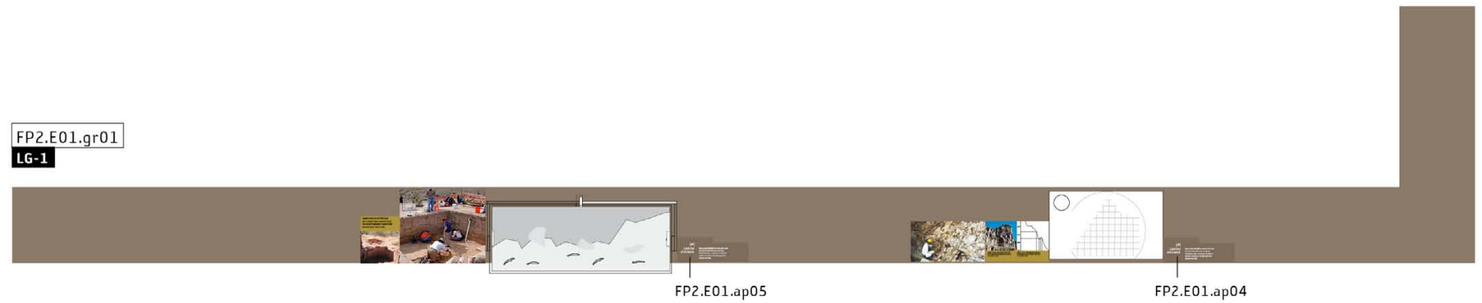


FP2.E01.ap01
AP-1

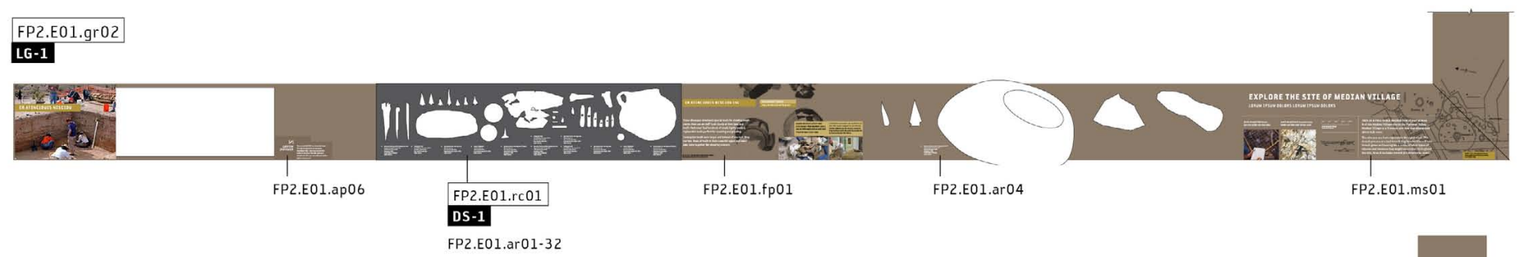
GRAPHIC UNDERNEATH



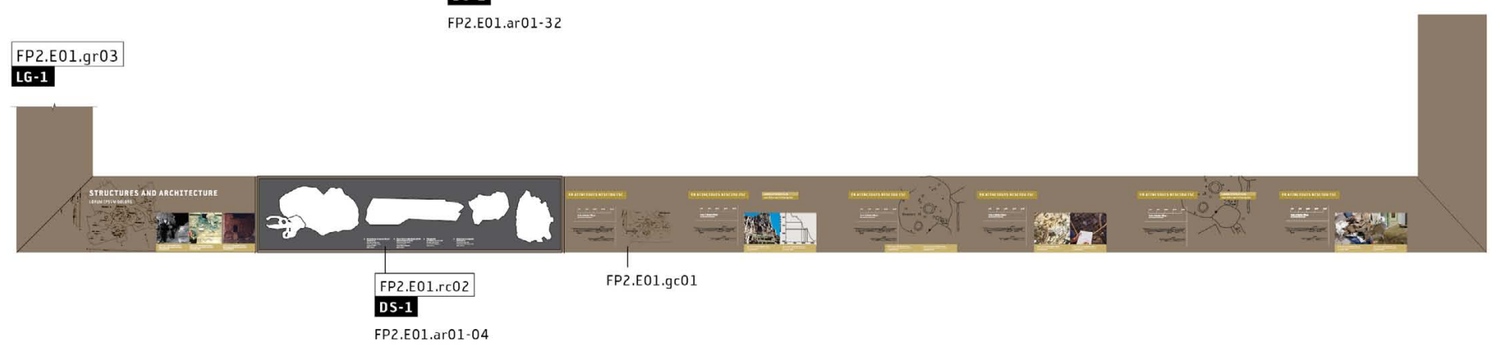
FP2.E01.gr01
LG-1

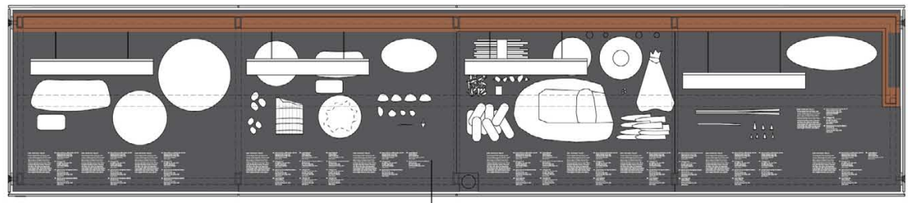


FP2.E01.gr02
LG-1

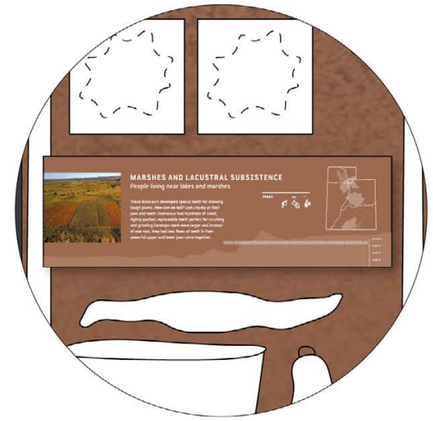


FP2.E01.gr03
LG-1





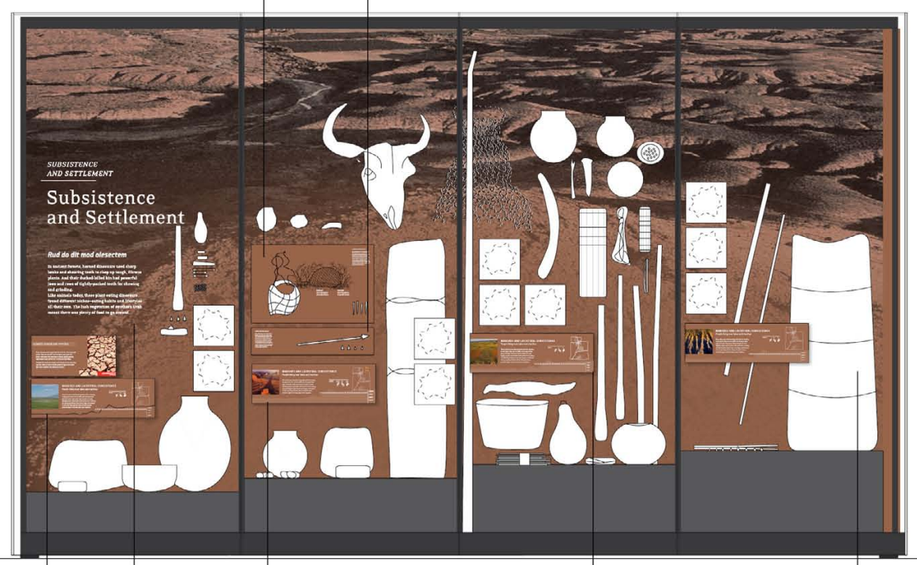
FP4.E01.ar01-107
DS-1



FP4.E01.ca07

FP4.E01.gp01
DS-1

FP4.E01.gp02
DS-1



FP4.E01.fp02
FP4.E01.fp01
DS-1

FP4.E01.pm01
DS-1
FP4.E01.ms01

FP4.E01.fp03
DS-1

FP4.E01.fp04
DS-1

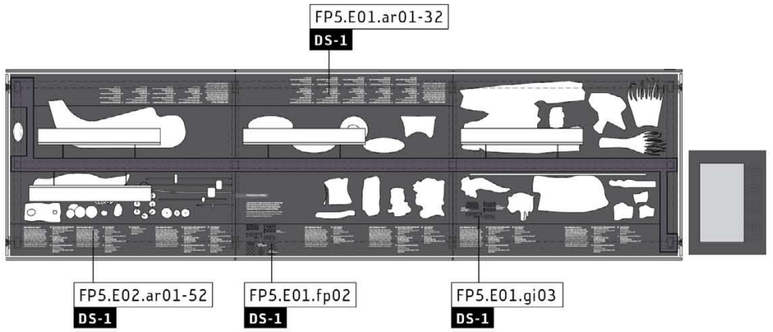
FP4.E01.fp05
DS-1

FP4.E01.gp04
DS-1

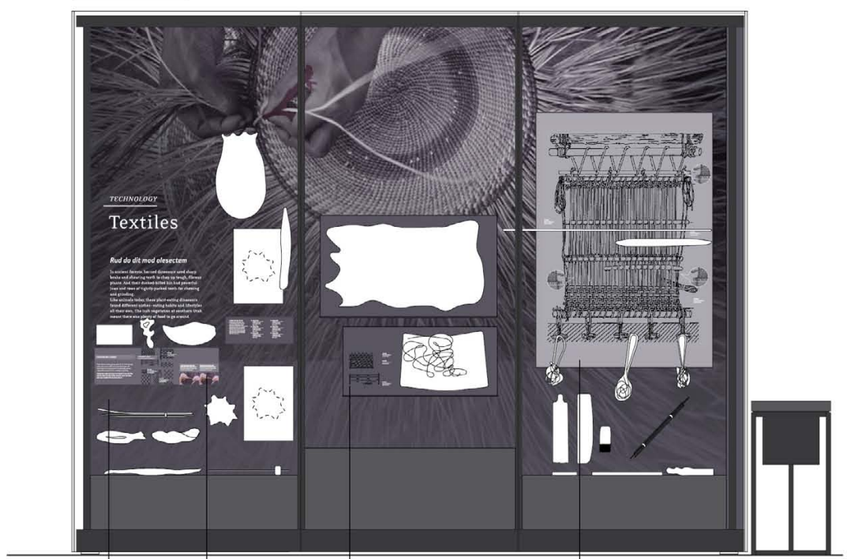
FP4.E01.gp03
DS-1
FP4.E01.sp03

FP2.E01.st01
VY-1

FP2.E01.pm01
DP-1



FP5.E02.ca01



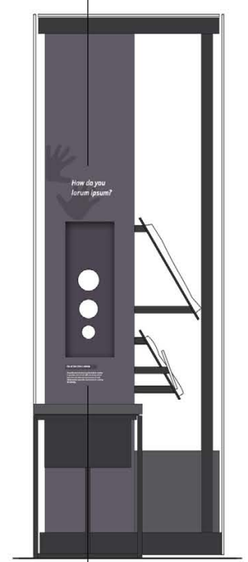
FP5.E02.pm01
DS-1
FP5.E02.ms01

FP5.E02.fp01
DS-1

FP5.E02.gp01
DS-1

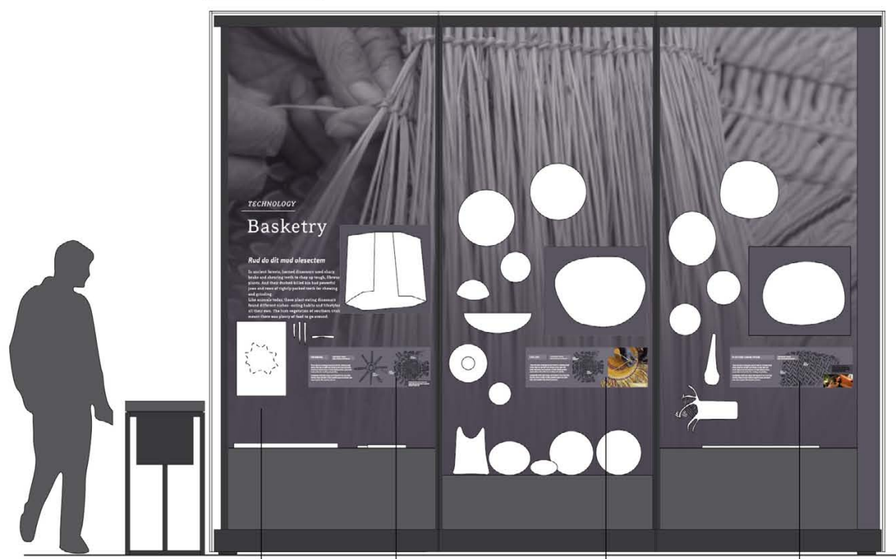
FP5.E02.gp02
DS-1

FP5.E02.gp04
DS-1



FP5.E02.gp03
DS-1
FP5.E02.at01

FP5.E01.ca01



FP5.E01.pm01
DS-1
FP5.E01.ms01

FP5.E01.fp01
DS-1

FP5.E01.fp02
DS-1

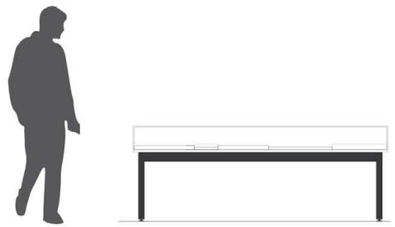
FP5.E01.fp03
DS-1

FP5.E01.gp02
DS-1

FP5.E01.gp01
DS-1
FP5.E01.sp01

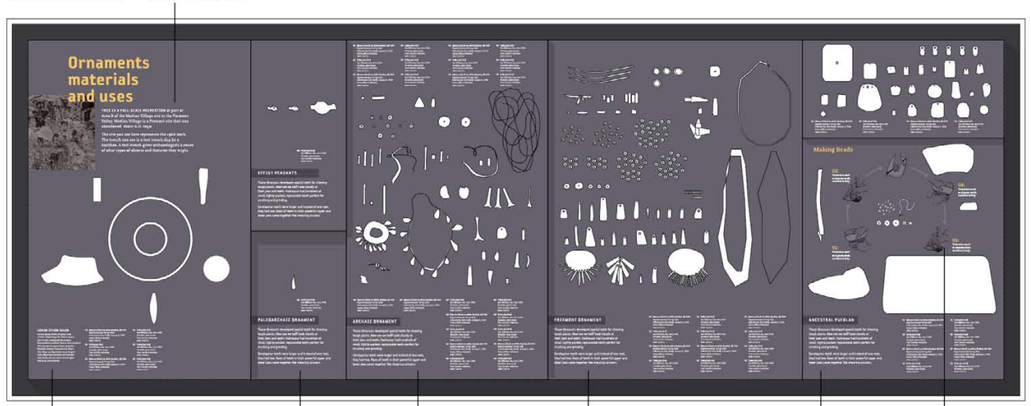
[FP] ORNAMENT / SHOES AND SANDALS TABLE CASES

FIRST PEOPLES / LEVEL 3



FP5.E03.ca04

FP5.E03.ms01



FP5.E03.ar01-168

DS-1

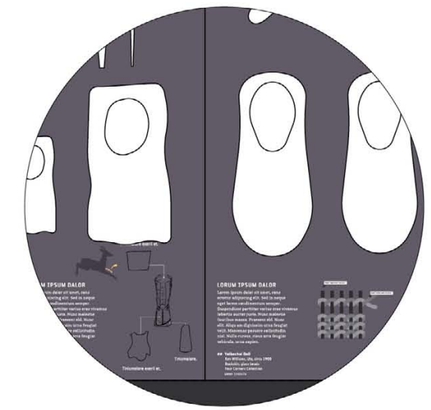
FP5.E03.fp01

FP5.E03.fp02

FP5.E03.fp03

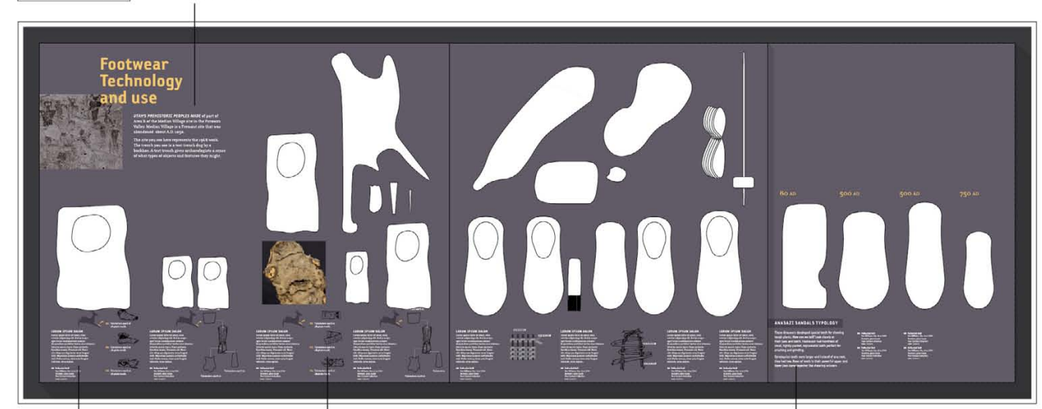
FP5.E03.fp04

FP5.E03.gi01



FP5.E04.ca05

FP5.E04.ms01



FP5.E04.ar01-27

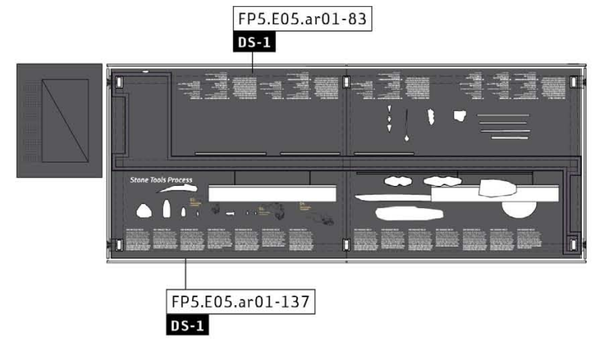
DS-1

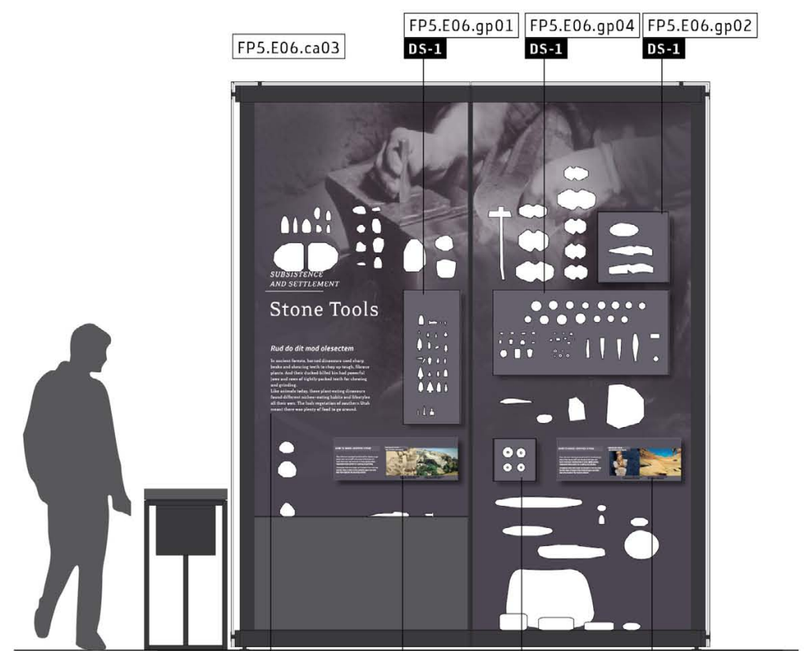
FP5.E04.gi01-04

FP5.E04.fp01

FP5.E05.ms01

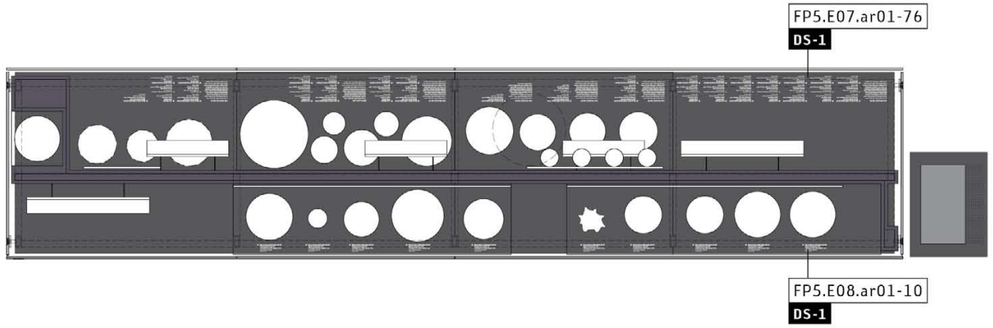
FP5.E05t.at





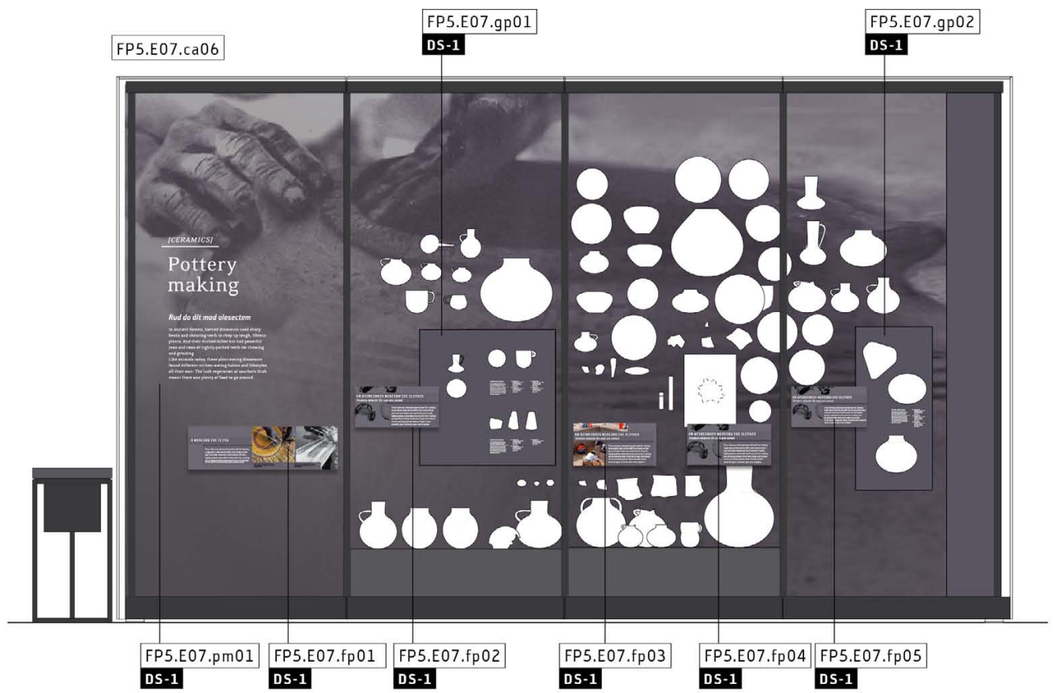
FP5.E06.ms01

FP5.E06.sp01


FP5.E07.ar01-76
DS-1
FP5.E08.ar01-10
DS-1

FP5.E08.ca06
[CERAMICS]
Principles of typology
QUOTE OR
QUESTION LORUM RET ALIS
MIN CILLUM UTE MITE.
FP5.E08.sp01
DS-1
FP5.E08.pm01
DS-1
FP5.E08.ms01
FP5.E08.fp01-10
DS-1
FP5.E08.gi01

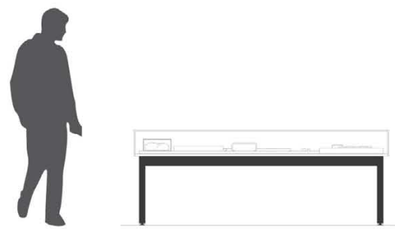
FP5.E08.gp02
DS-1
FP5.E08.gp01
DS-1
FP5.E08.at01

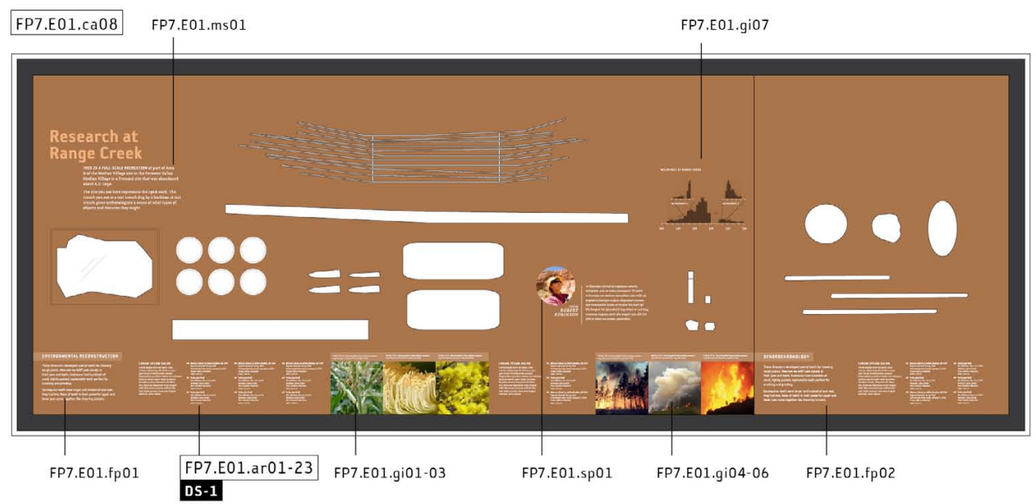

FP5.E07.ca06
FP5.E07.gp01
DS-1
FP5.E07.gp02
DS-1
[CERAMICS]
Pottery making
Rud do dit mod olesectem
FP5.E07.pm01
DS-1
FP5.E07.fp01
DS-1
FP5.E07.fp02
DS-1
FP5.E07.fp03
DS-1
FP5.E07.fp04
DS-1
FP5.E07.fp05
DS-1
FP5.E07.ms01

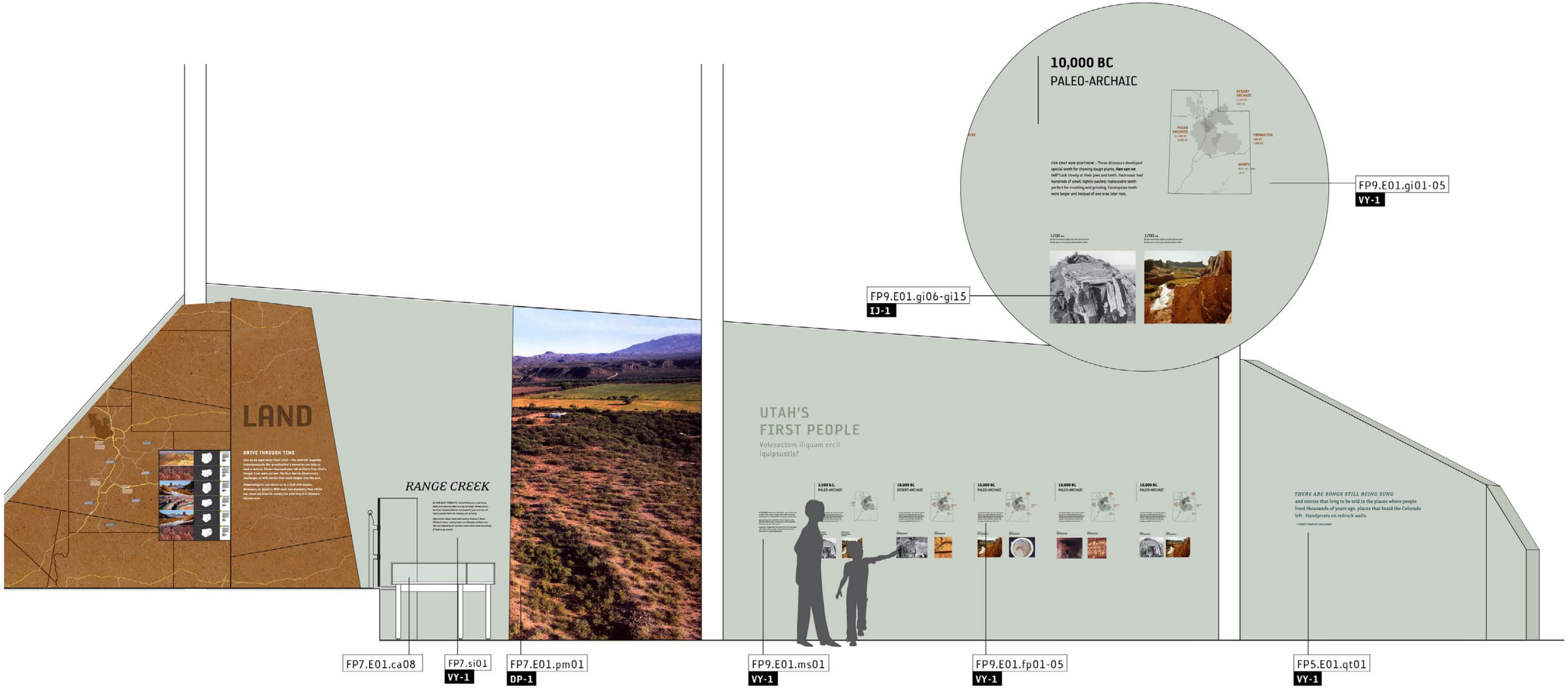
FP5.E07.gp04
DS-1
[ARCHEOLOGIST PERSPECTIVE]
FP5.E07.gp03
DS-1
FP5.E07.sp01

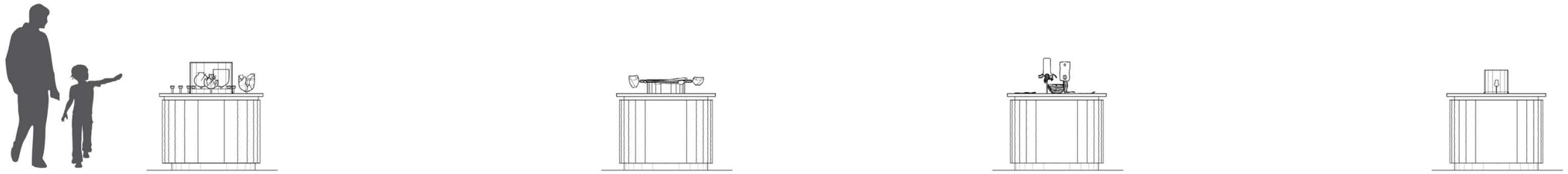
[FP] CURRENT RESEARCH TABLE CASE

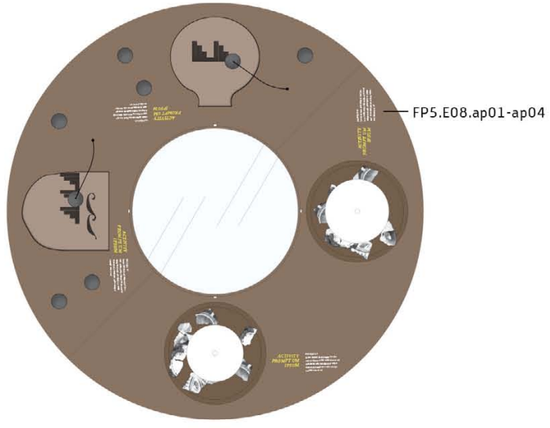
FIRST PEOPLES / LEVEL 3



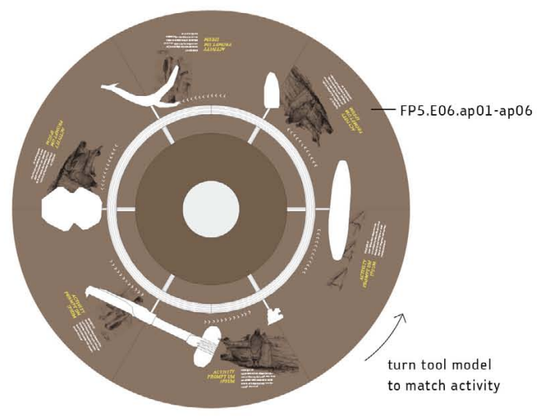



10,000 BC
PALEO-ARCHAIC
FP9.E01.gi01-05
VY-1
FP9.E01.gi06-gi15
IJ-1
LAND
DRIVE THROUGH TIME
RANGE CREEK
UTAH'S
FIRST PEOPLE
Velesectem iliquam ercil
iquipsustis?
THERE ARE SONGS STILL BEING SUNG
and stories that long to be told in the places where people lived thousands of years ago, places that braid the Colorado left. Handprints on redrock walls.
FP7.E01.ca08
FP7.si01
VY-1
FP7.E01.pm01
DP-1
FP9.E01.ms01
VY-1
FP9.E01.fp01-05
VY-1
FP5.E01.qt01
VY-1

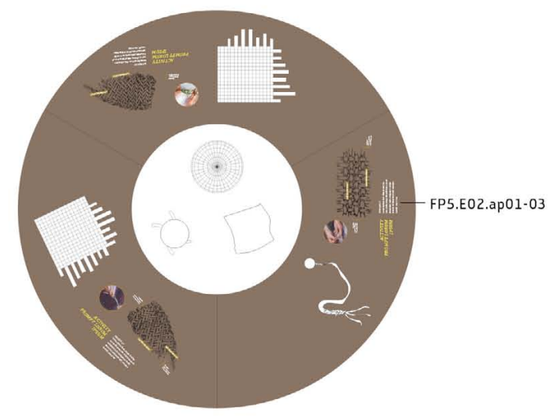




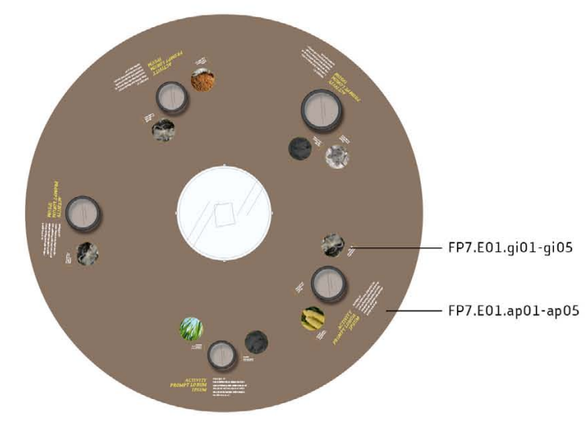
FP5.E08.tt01
LG-1



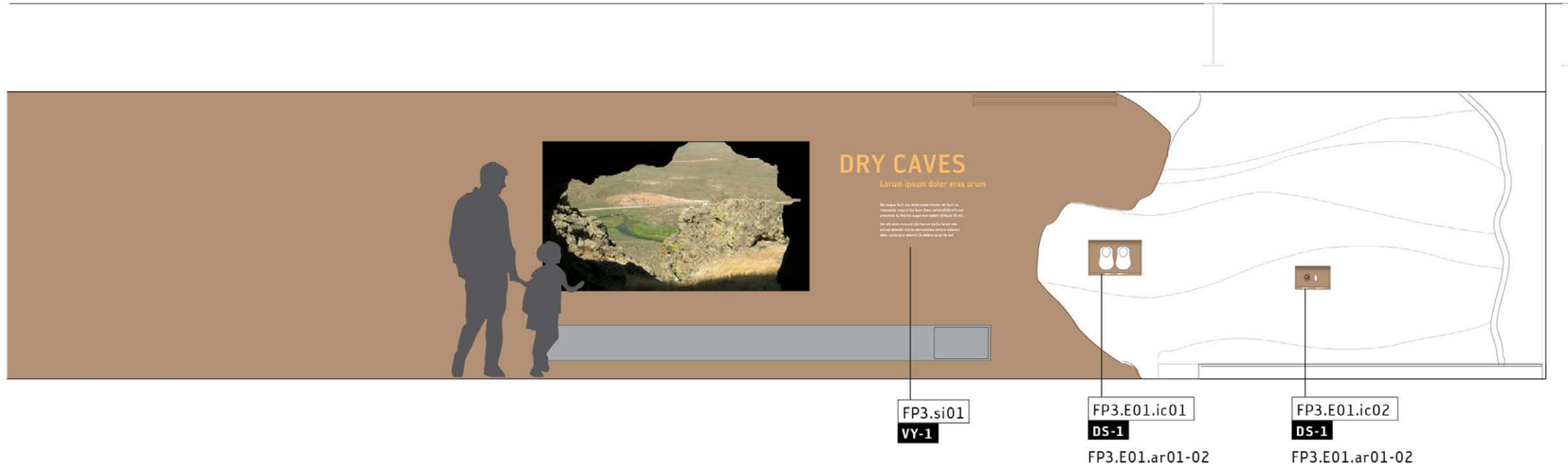
FP5.E06.tt01
LG-1

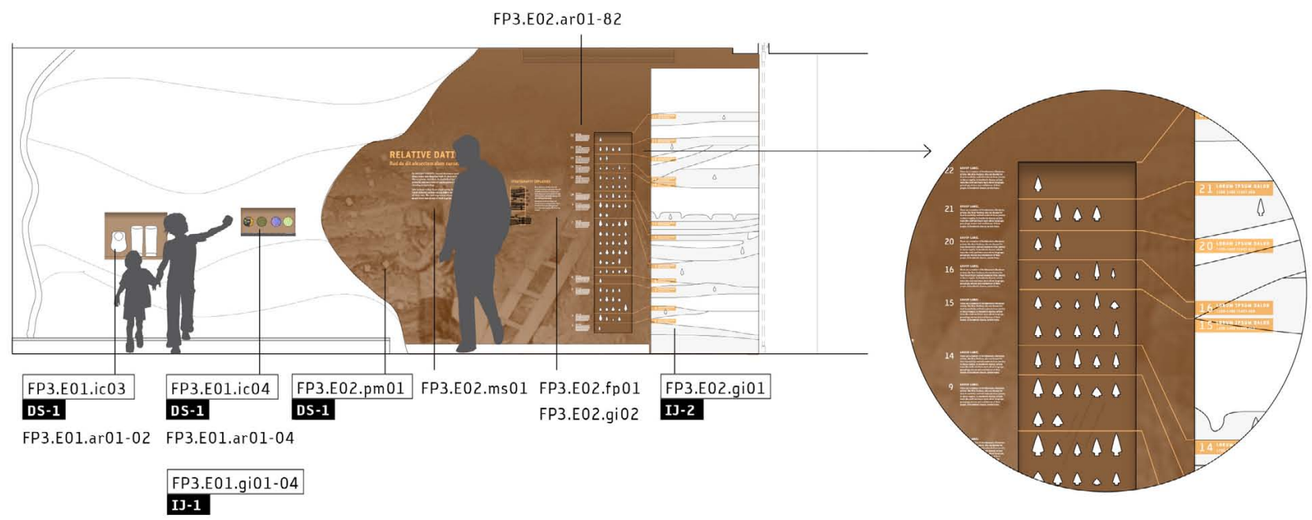


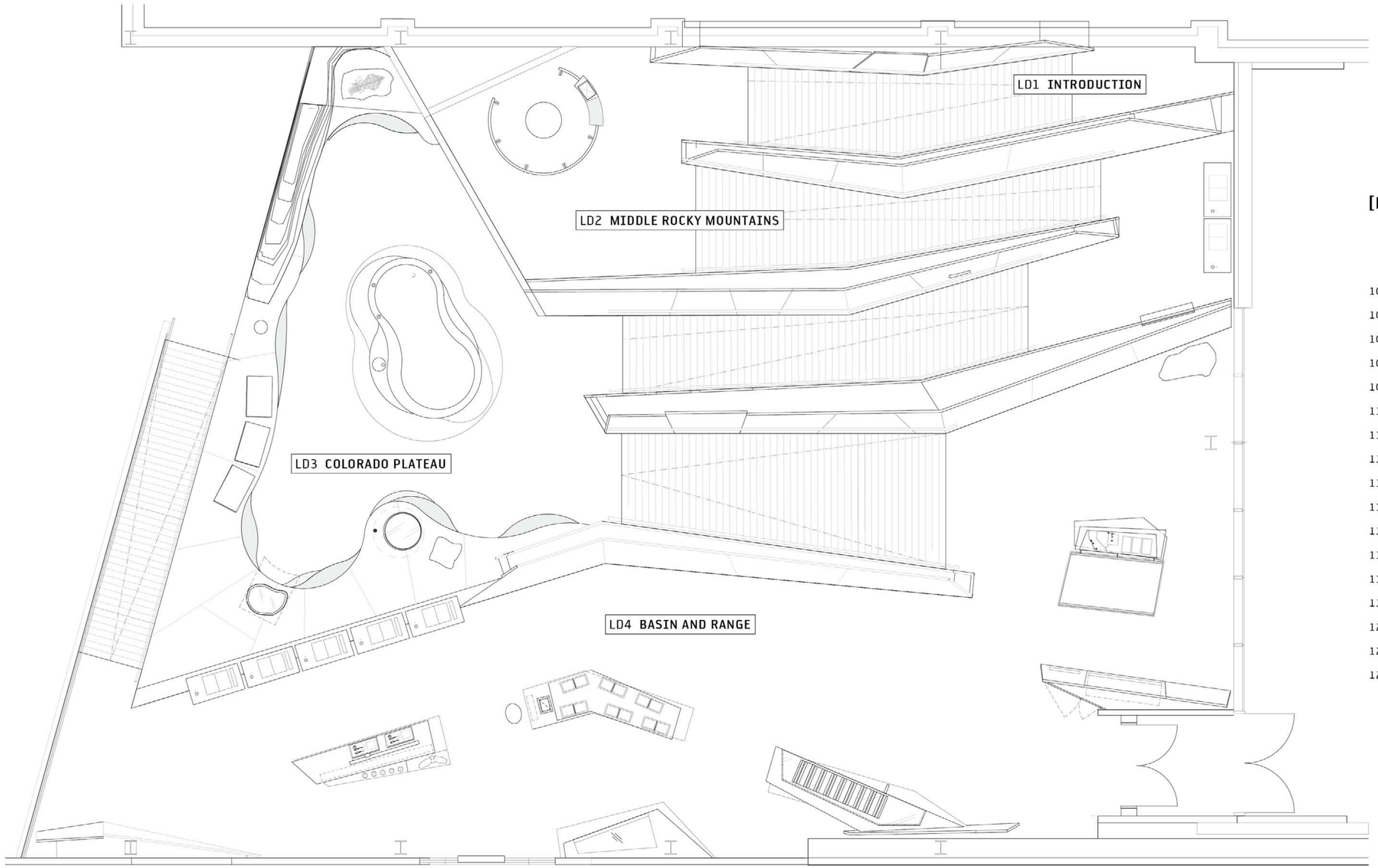
FP5.E02.tt01
LG-1



FP7.E01.tt01
LG-1

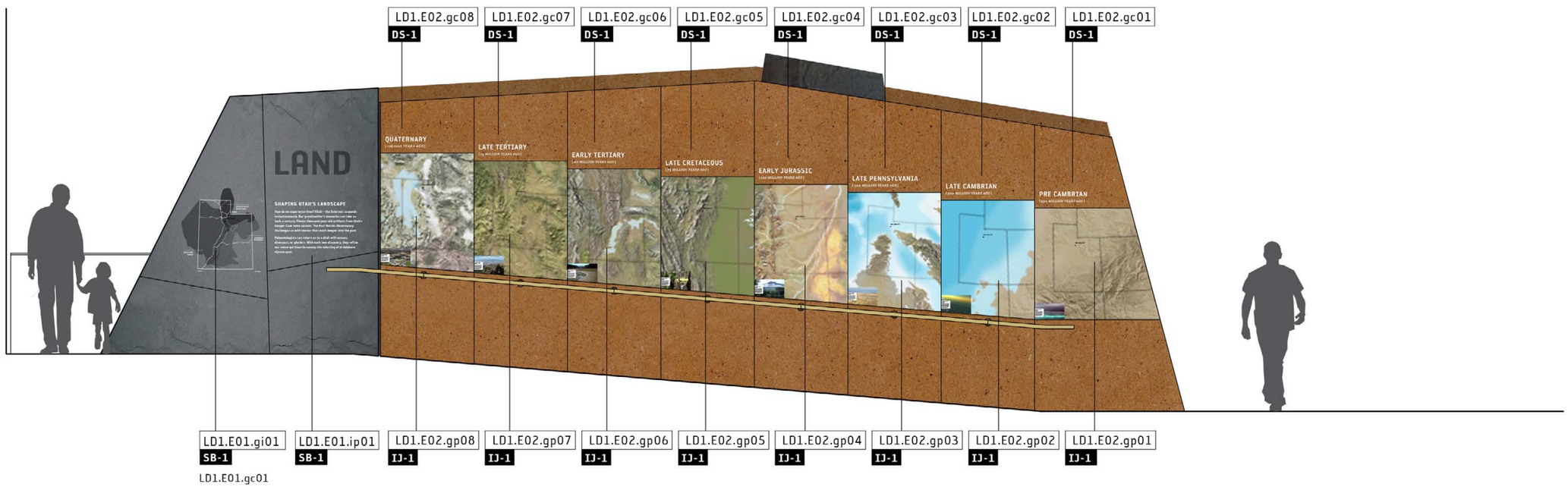

DRY CAVES
Lorum ipsum dolor eras orum
FP3.si01
VY-1
FP3.E01.ic01
DS-1
FP3.E01.ar01-02
FP3.E01.ic02
DS-1
FP3.E01.ar01-02


FP3.E02.ar01-82
RELATIVE DATI
FP3.E01.ic03
DS-1
FP3.E01.ar01-02
FP3.E01.ic04
DS-1
FP3.E01.ar01-04
FP3.E01.gi01-04
IJ-1
FP3.E02.pm01
DS-1
FP3.E02.ms01
FP3.E02.fp01
FP3.E02.gi02
FP3.E02.gi01
IJ-2



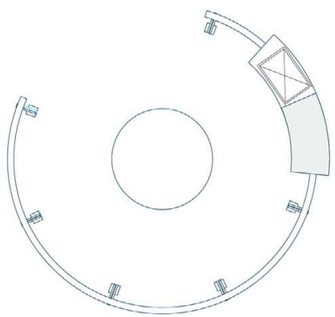
[LD] LAND

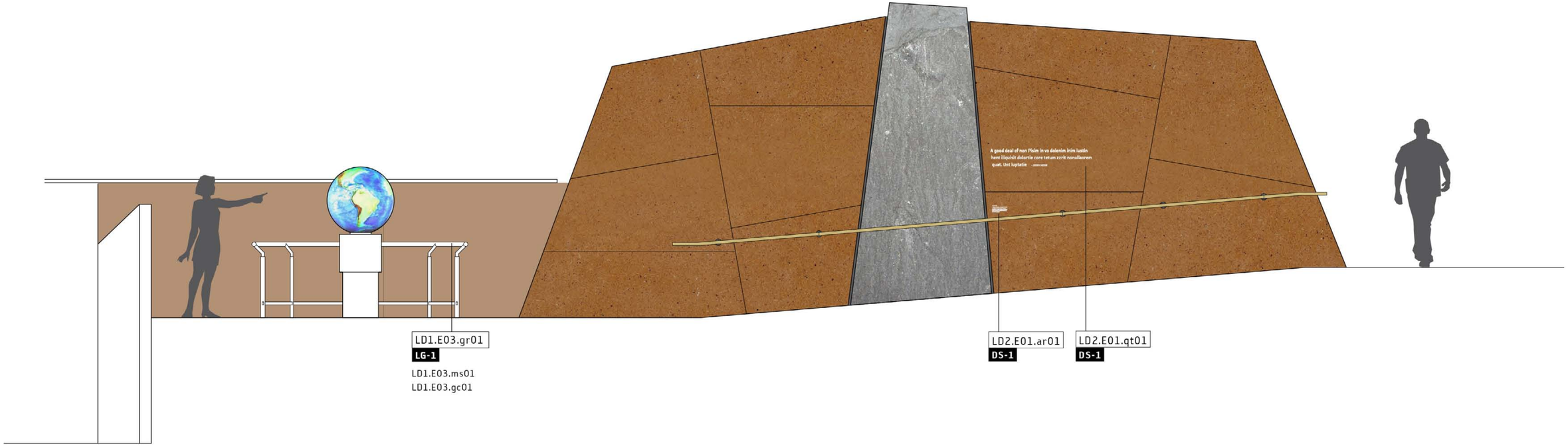
	LEVEL 3
105	MIDDLE ROCKY MOUNTAINS: WEST ELEVATION
106	MIDDLE ROCKY MOUNTAINS: EAST ELEVATION
107	MIDDLE ROCKY MOUNTAINS: EAST ELEVATION
108	MIDDLE ROCKY MOUNTAINS: WEST ELEVATION
109	MIDDLE ROCKY MOUNTAINS: EAST ELEVATION
110	COLORADO PLATEAU: EROSION TABLE
111	COLORADO PLATEAU: INDEX FOSSILS
113	COLORADO PLATEAU: NORTH ELEVATION
114	BASIN AND RANGE: EAST ELEVATION
115	BASIN AND RANGE: ROCK CYCLE
116	BASIN AND RANGE: WEST ELEVATION
117	BASIN AND RANGE: WASATCH FAULT/FRONT
118	BASIN AND RANGE: HUMAN INTERACTIONS
119	BASIN AND RANGE: FORMATION
120	BASIN AND RANGE: HOUSE RANGE
121	BASIN AND RANGE: HOMESTEAD CAVE
123	INTRO FROM FIRST PEOPLES

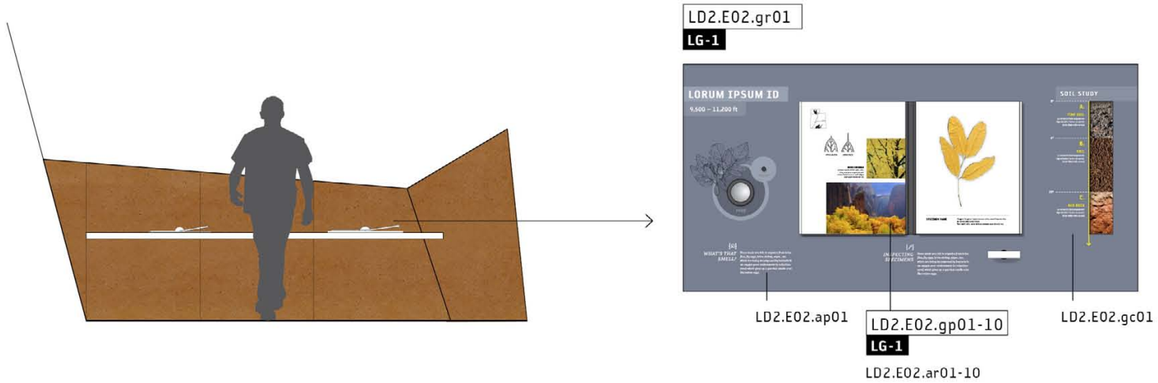

LD1.E02.gc08
DS-1
LD1.E02.gc07
DS-1
LD1.E02.gc06
DS-1
LD1.E02.gc05
DS-1
LD1.E02.gc04
DS-1
LD1.E02.gc03
DS-1
LD1.E02.gc02
DS-1
LD1.E02.gc01
DS-1
LAND
SHAPING UTAH'S LANDSCAPE
QUATERNARY
LATE TERTIARY
EARLY TERTIARY
LATE CRETACEOUS
EARLY JURASSIC
LATE PENNSYLVANIA
LATE CAMBRIAN
PRE CAMBRIAN
LD1.E01.gi01
SB-1
LD1.E01.ip01
SB-1
LD1.E02.gp08
IJ-1
LD1.E02.gp07
IJ-1
LD1.E02.gp06
IJ-1
LD1.E02.gp05
IJ-1
LD1.E02.gp04
IJ-1
LD1.E02.gp03
IJ-1
LD1.E02.gp02
IJ-1
LD1.E02.gp01
IJ-1
LD1.E01.gc01

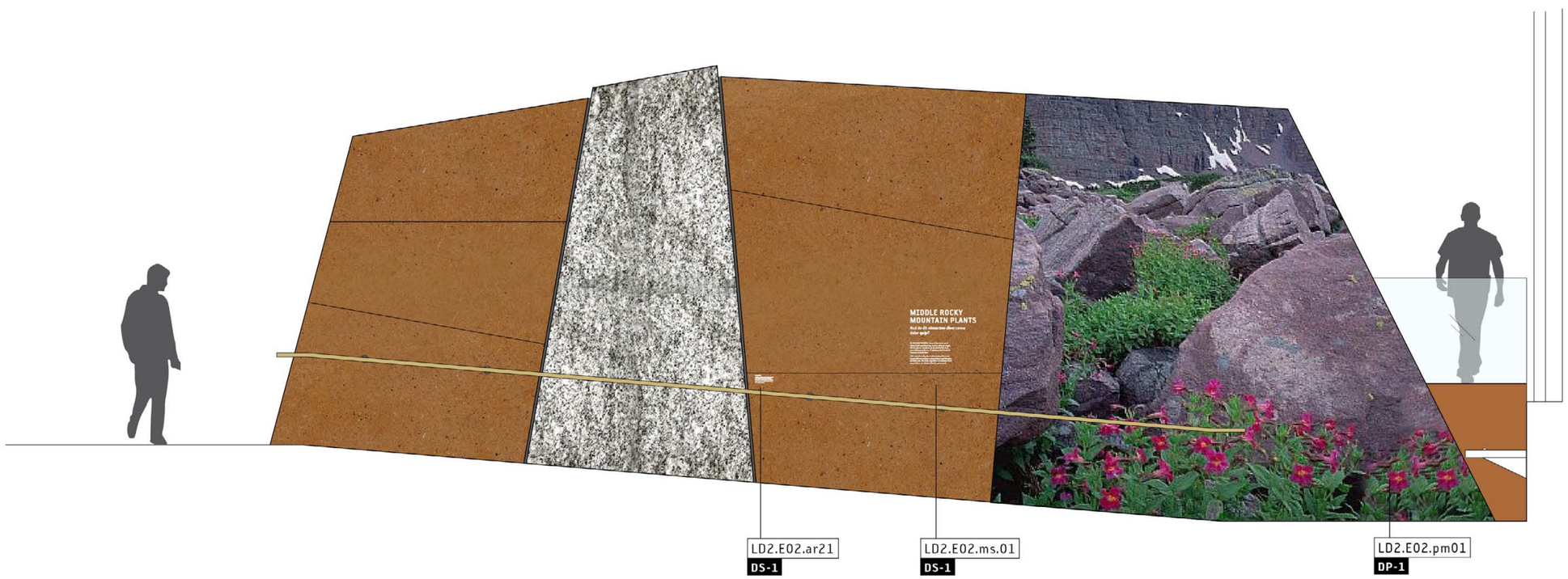
[LD] MIDDLE ROCKY MOUNTAINS: EAST ELEVATION

LAND / LEVEL 3



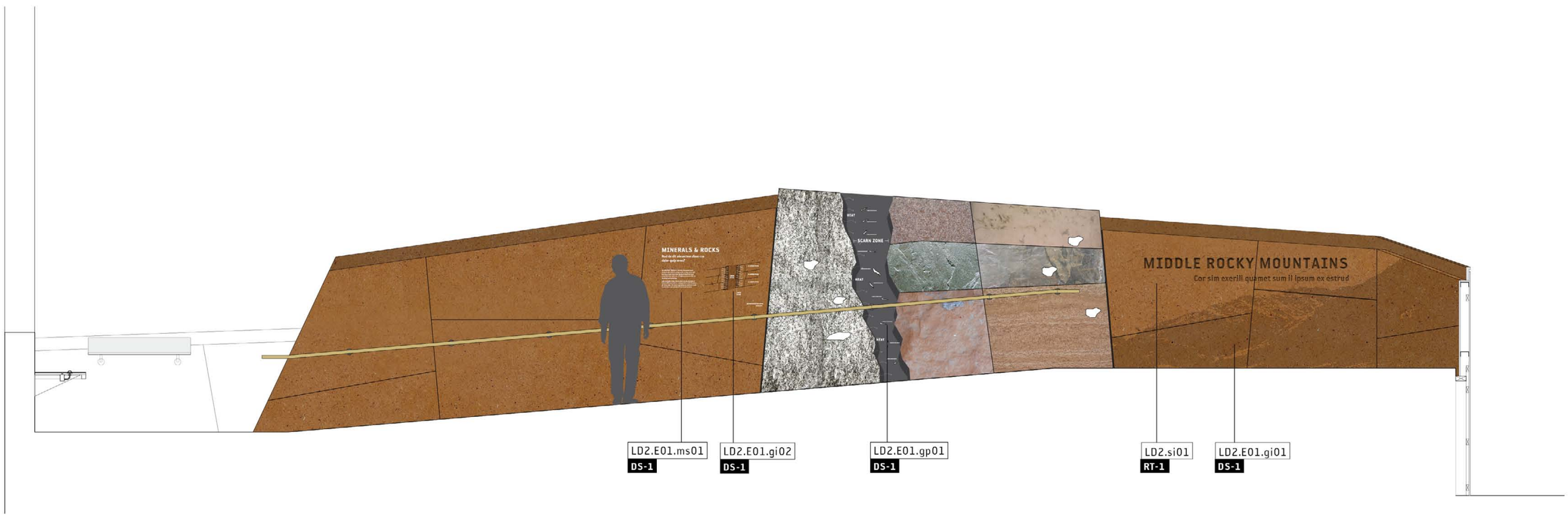


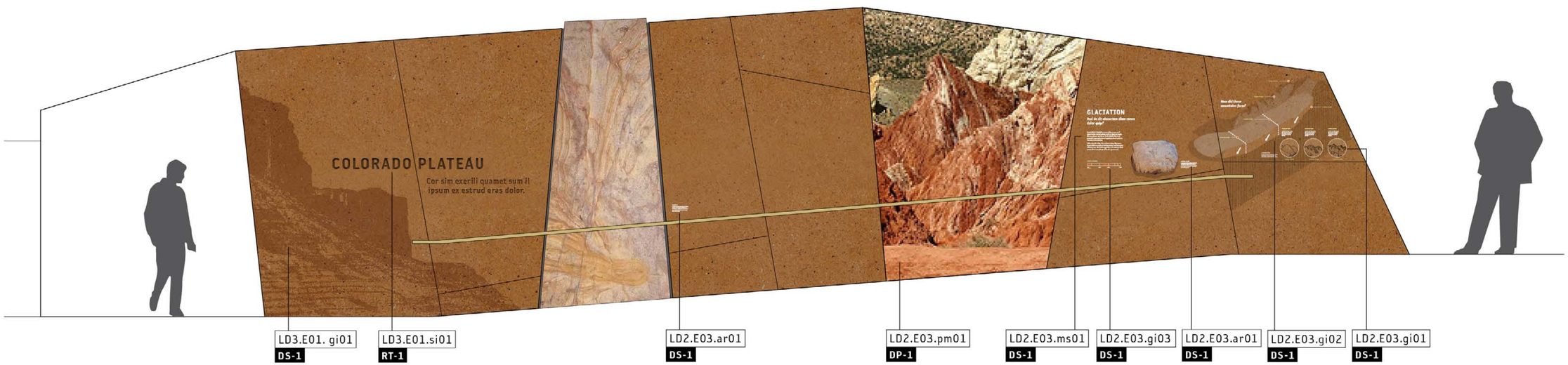

LD2.E02.gr01
LG-1
LORUM IPSUM ID
SOIL STUDY
LD2.E02.ap01
LD2.E02.gp01-10
LG-1
LD2.E02.gc01
LD2.E02.ar01-10


MIDDLE ROCKY
MOUNTAIN PLANTS
LD2.E02.ar21
DS-1
LD2.E02.ms.01
DS-1
LD2.E02.pm01
DP-1

[LD] MIDDLE ROCKY MOUNTAINS: WEST ELEVATION

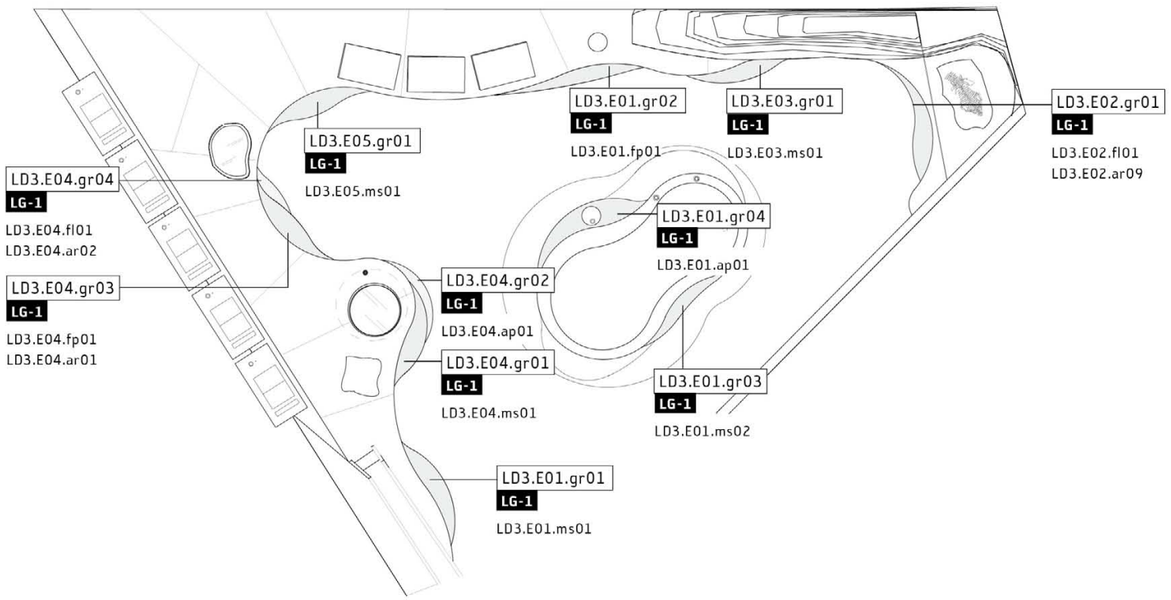
LAND / LEVEL 3

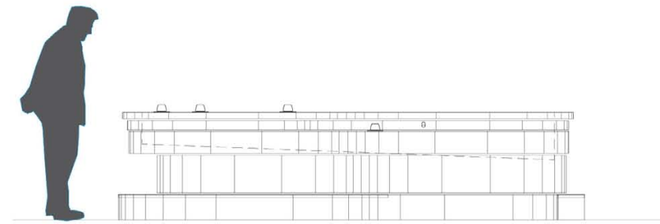



COLORADO PLATEAU
Cor sim exerili quamet sum il ipsum ex estrud eras dolor.
GLACIATION
LD3.E01. gi01
DS-1
LD3.E01.si01
RT-1
LD2.E03.ar01
DS-1
LD2.E03.pm01
DP-1
LD2.E03.ms01
DS-1
LD2.E03.gi03
DS-1
LD2.E03.ar01
DS-1
LD2.E03.gi02
DS-1
LD2.E03.gi01
DS-1

[LD] COLORADO PLATEAU: EROSION TABLE

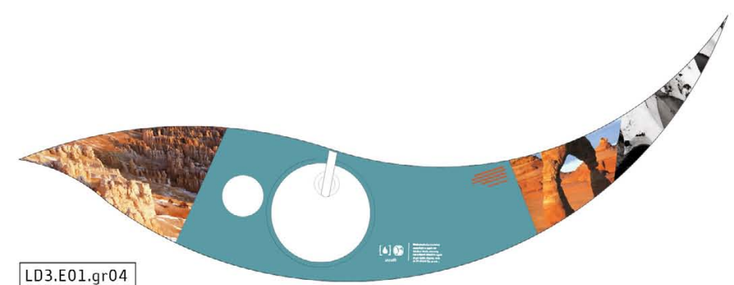
LAND / LEVEL 3



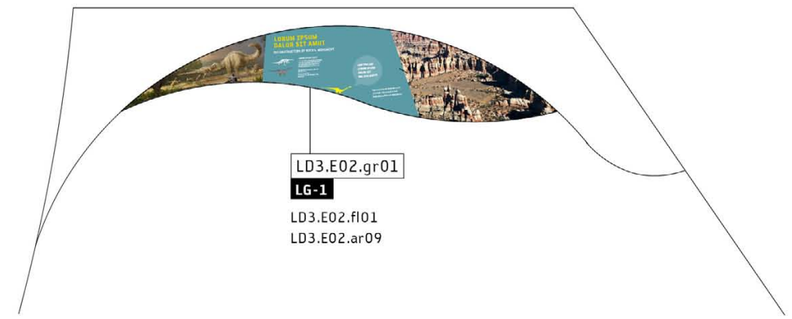


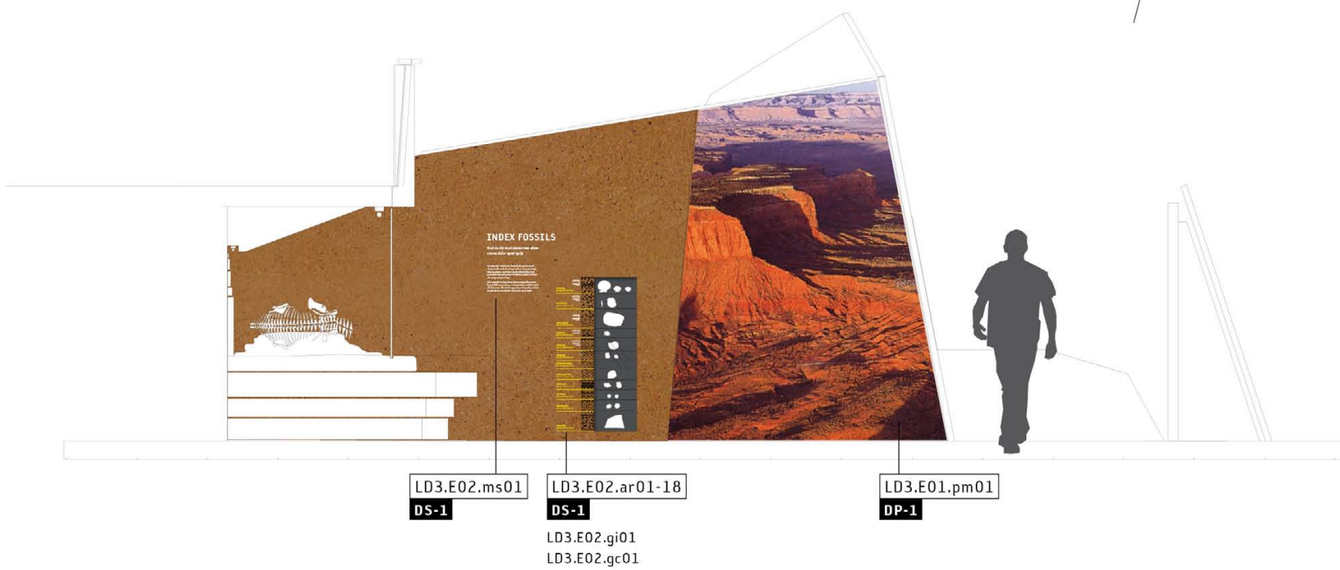
LD3.E01.gr03
LG-1
LD3.E01.ms02

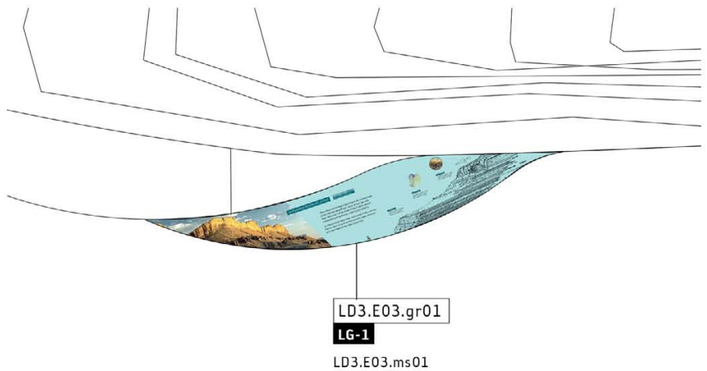
COLORADO PLATEAU SAMPLE RAIL

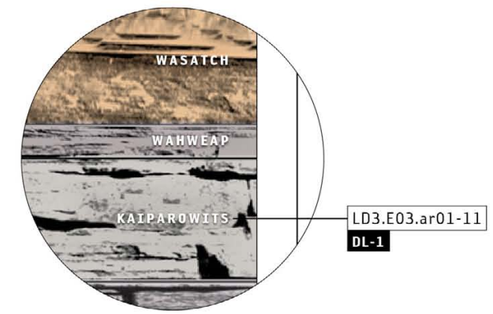


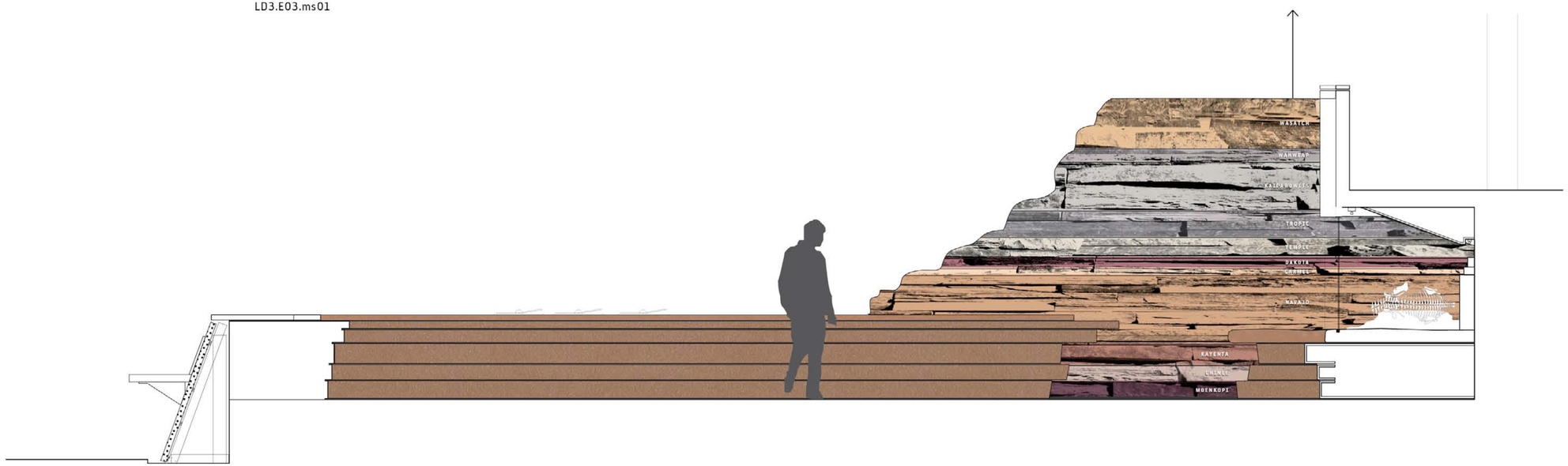
LD3.E01.gr04
LG-1
LD3.E01.ap01
LD3.E01.gi02
LD3.E01.gc01


LD3.E02.gr01
LG-1
LD3.E02.fl01
LD3.E02.ar09


INDEX FOSSILS
LD3.E02.ms01
DS-1
LD3.E02.ar01-18
DS-1
LD3.E02.gi01
LD3.E02.gc01
LD3.E01.pm01
DP-1

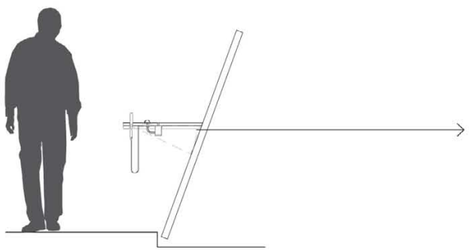

LD3.E03.gr01
LG-1
LD3.E03.ms01


WASATCH
WAHWEAP
KAIPAROWITS
LD3.E03.ar01-11
DL-1


WASATCH
WAHWEAP
KAIPAROWITS
TROPIC
TEMPLE
DAKOTA
CEDAR
NAVAJO
KAYENTA
CHINLE
MOENKOPI

[LD] BASIN AND RANGE: EAST ELEVATION

LAND / LEVEL 3



LD4.E09.gr01
LG-1

LD4.E09.ap01

LD4.E09.gp01-10
LG-1

LD4.E09.ar01-10

LD4.E09.gc01

LD4.E09.ms01
DS-1

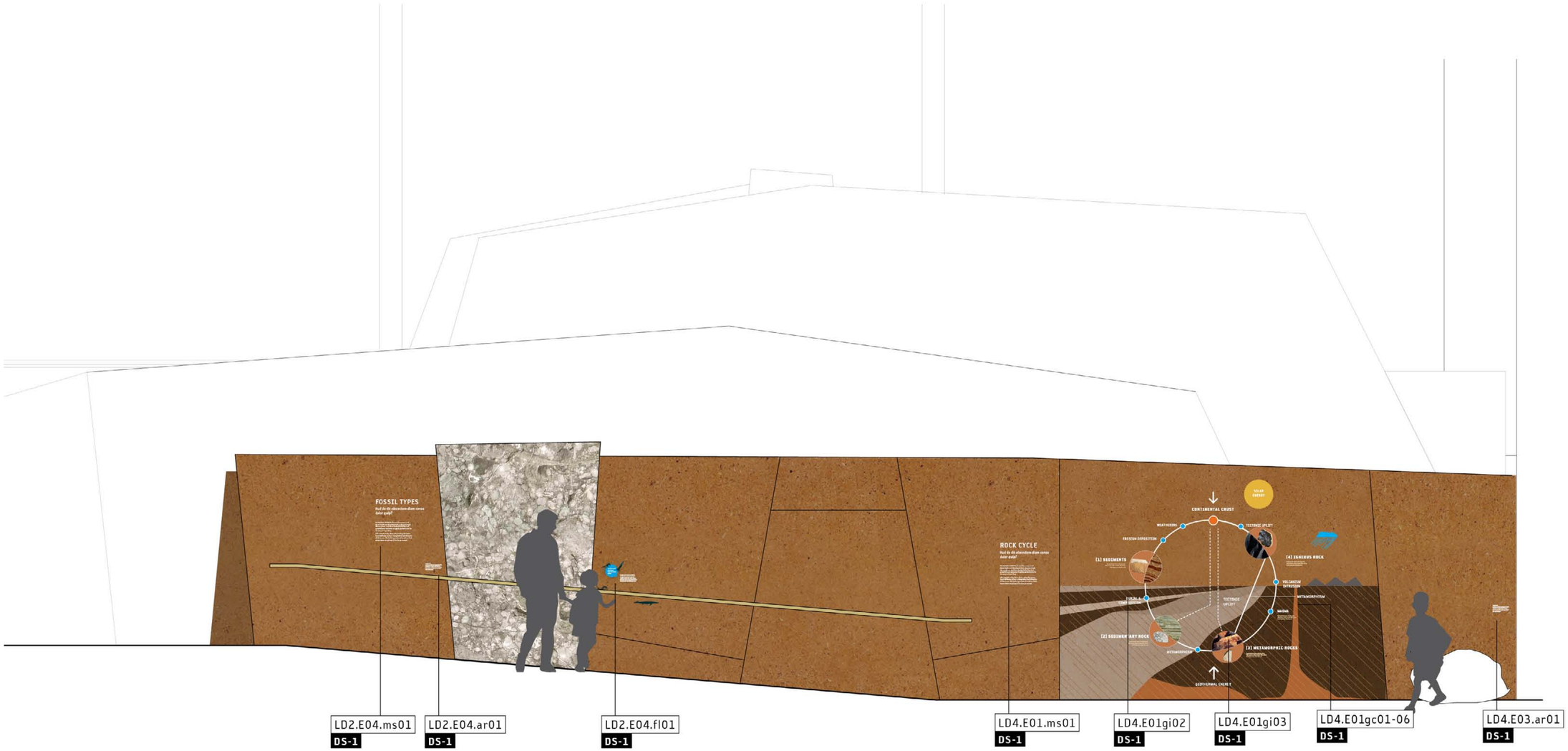
LD4.E09.gr01-05
LG-1

LD4.E09.gi01
DS-1

LD4.E08.ms01
DS-1

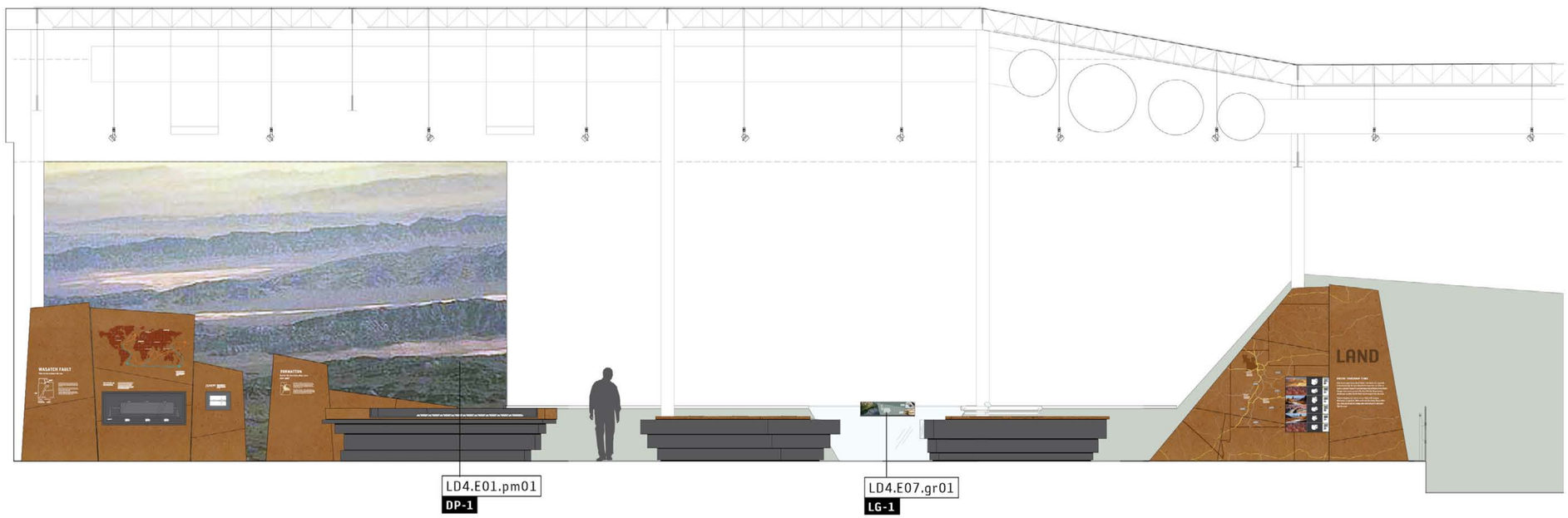
LD4.si01
RT-1

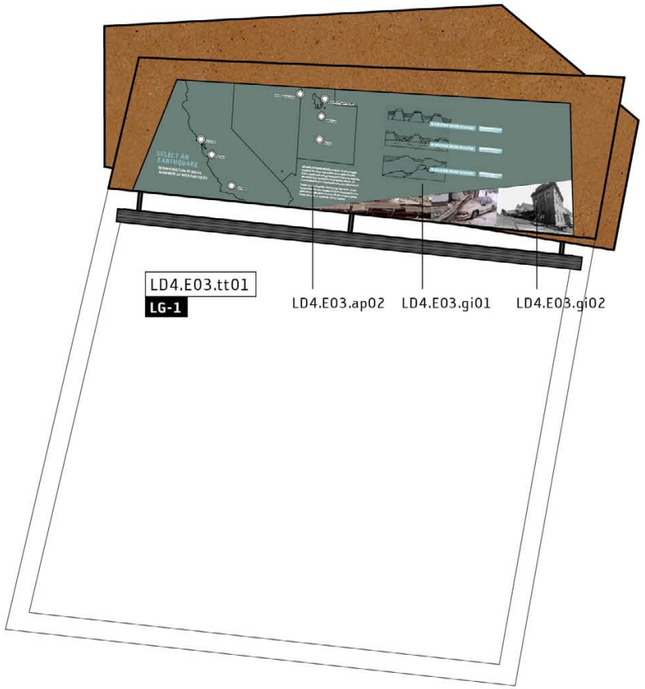
LD4.E01.gi01
DS-1


FOSSIL TYPES
ROCK CYCLE
CONTINENTAL CRUST
WEATHERING
TECTONIC UPLIFT
EROSION DEPOSITION
[1] SEDIMENTS
[4] IGNEOUS ROCK
VOLCANISM INTRUSION
METAMORPHISM
MAGMA
TECTONIC UPLIFT
[2] SEDIMENTARY ROCK
METAMORPHISM
[3] METAMORPHIC ROCKS
GEOTHERMAL ENERGY
LD2.E04.ms01
DS-1
LD2.E04.ar01
DS-1
LD2.E04.fl01
DS-1
LD4.E01.ms01
DS-1
LD4.E01gi02
DS-1
LD4.E01gi03
DS-1
LD4.E01gc01-06
DS-1
LD4.E03.ar01
DS-1

[LD] BASIN AND RANGE: WEST ELEVATION

LAND / LEVEL 3

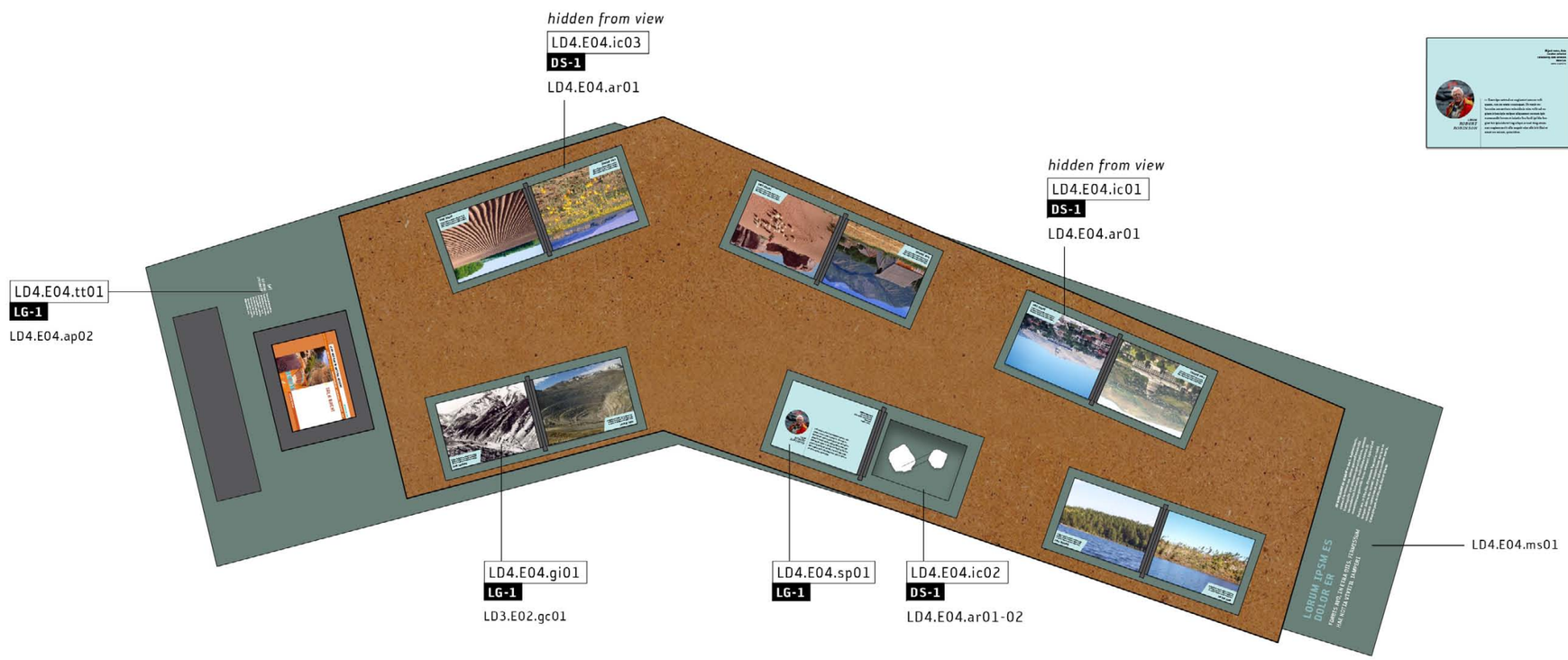


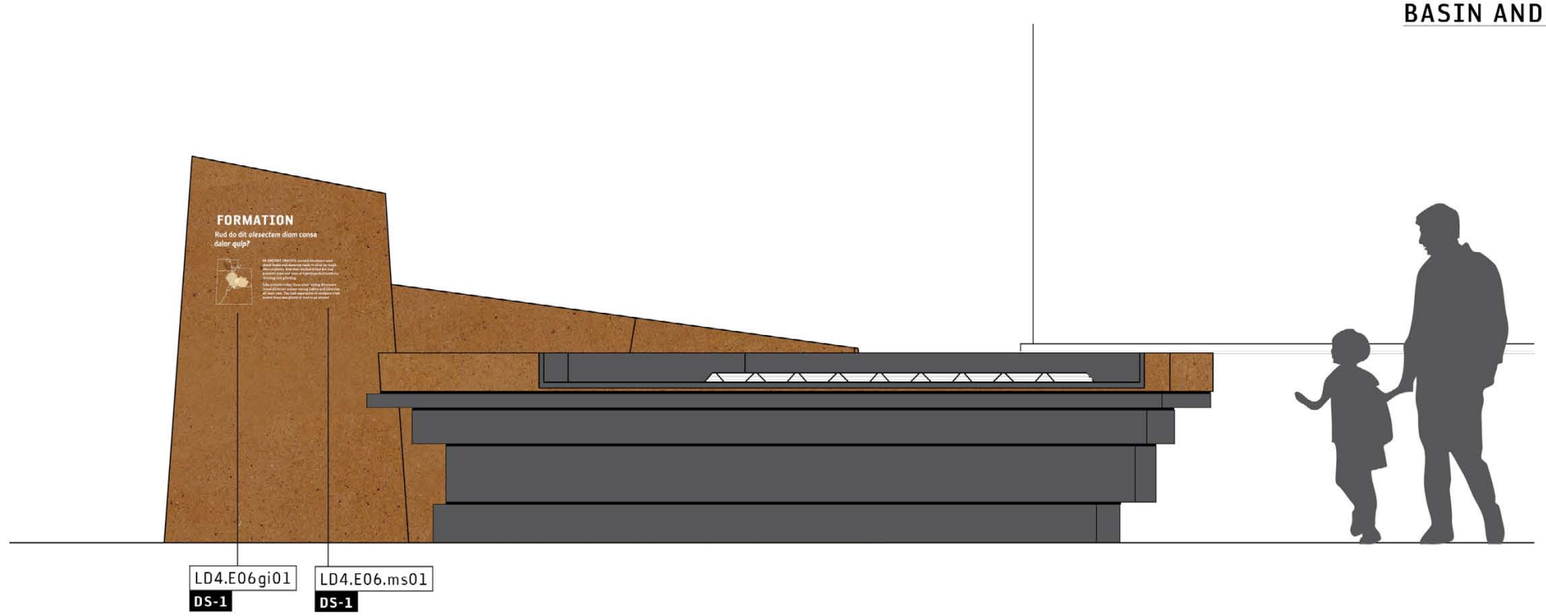


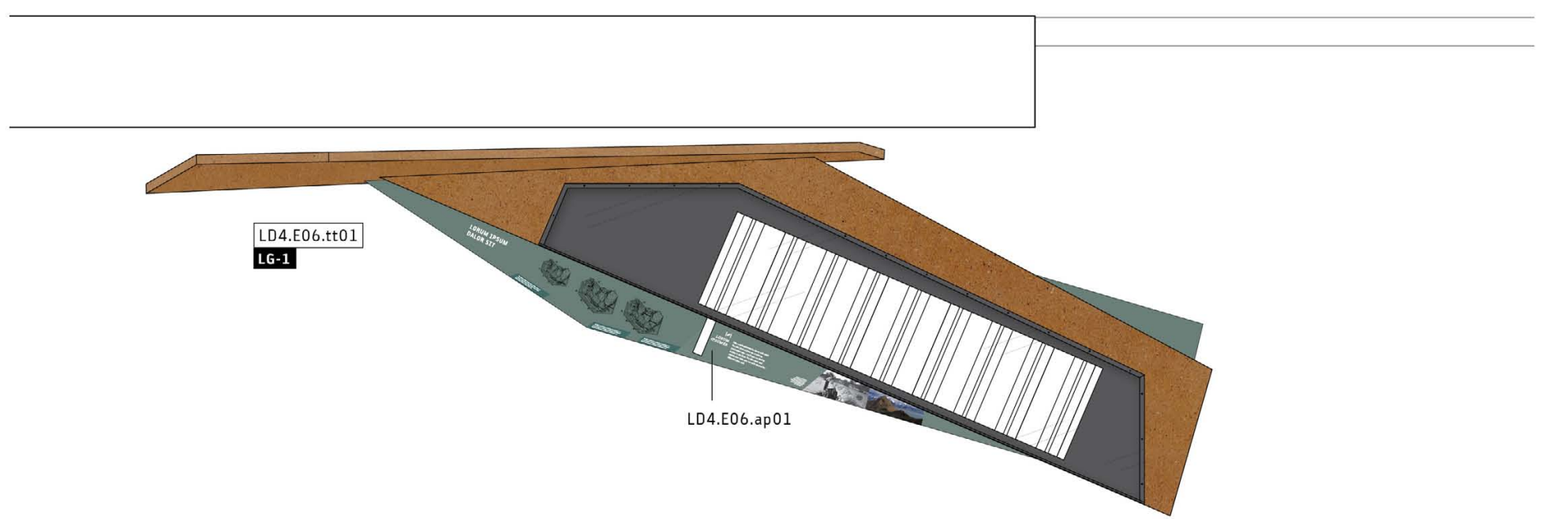
on floor
LD4.E03.ap02
VY-2

[LD] BASIN AND RANGE: HUMAN INTERACTIONS

LAND / LEVEL 3

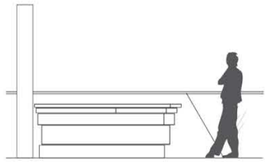


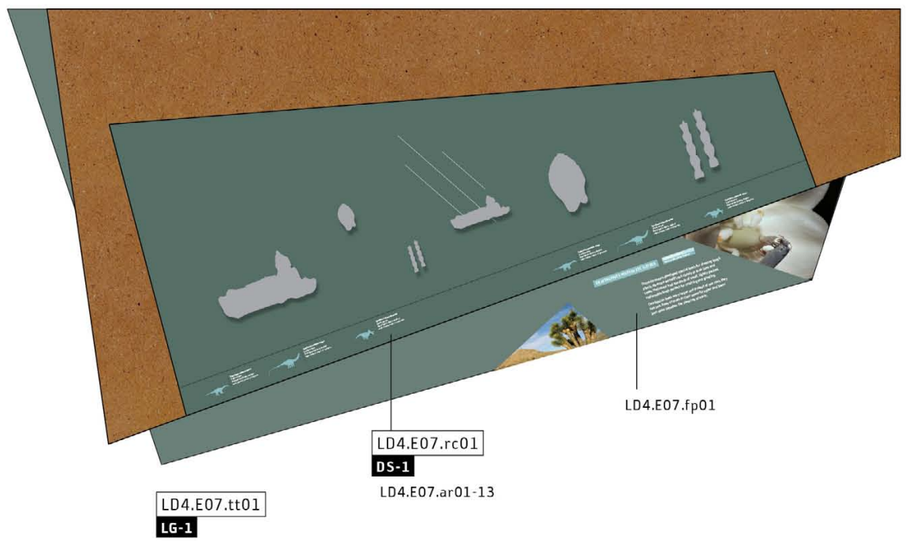

FORMATION
Rud do dit alisectem diam conse dolor quip?
LD4.E06gi01
DS-1
LD4.E06.ms01
DS-1

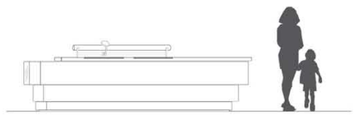

LD4.E06.tt01
LG-1
LD4.E06.ap01

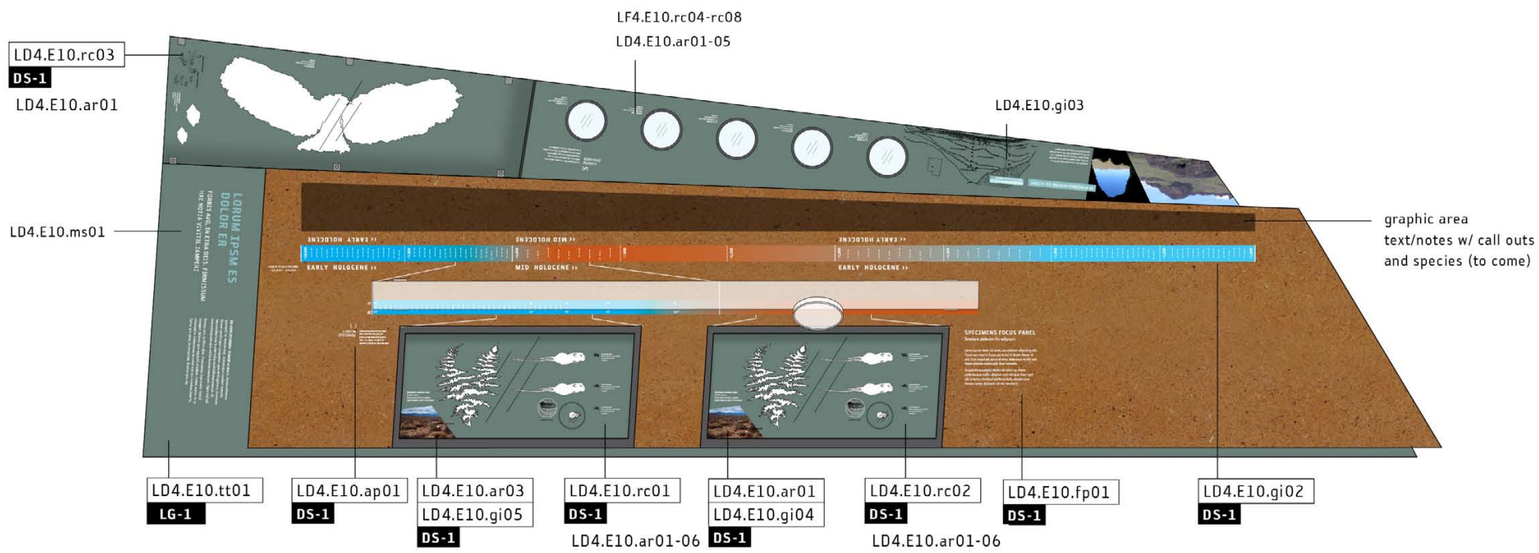
[LD] BASIN AND RANGE: HOUSE RANGE

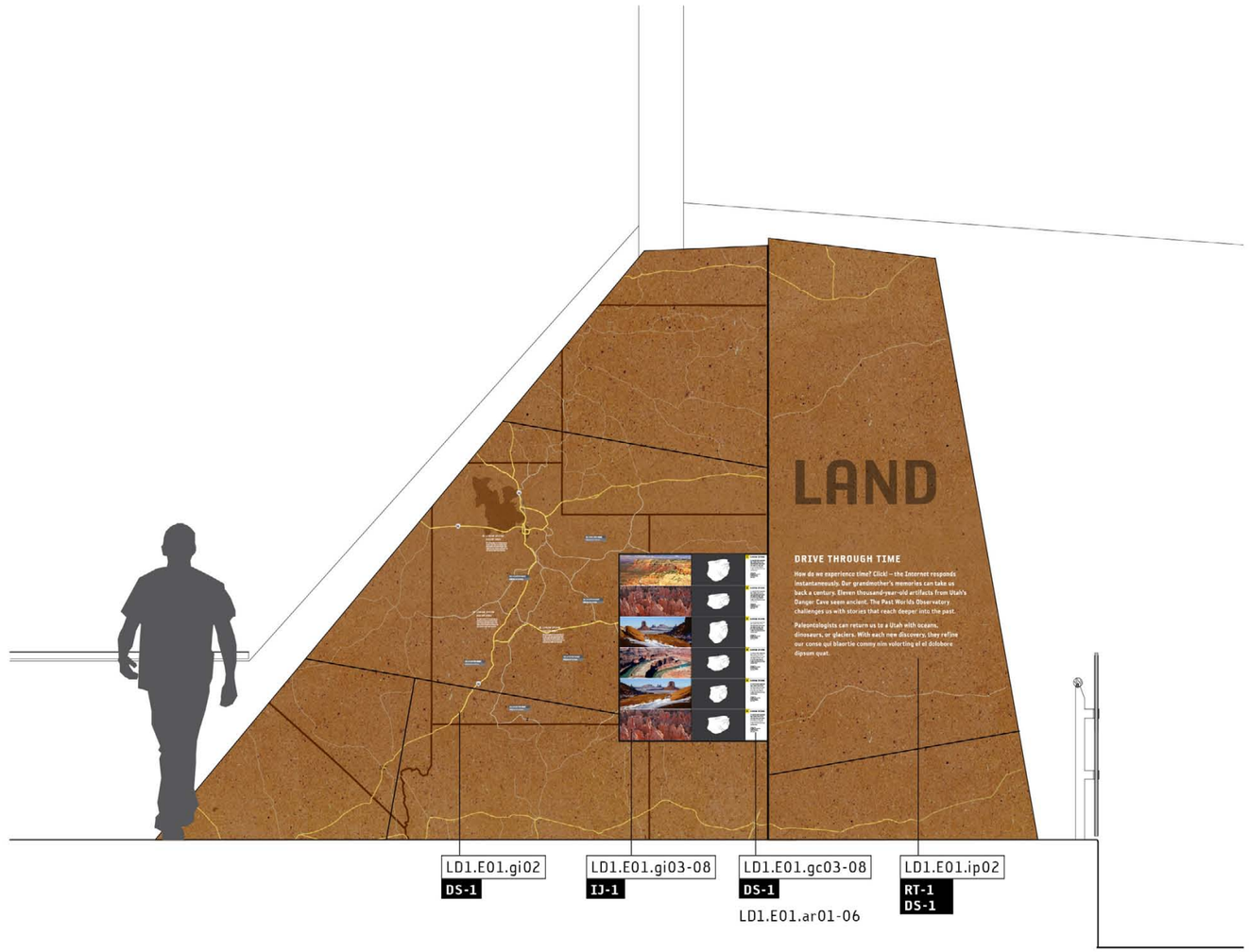
LAND / LEVEL 3

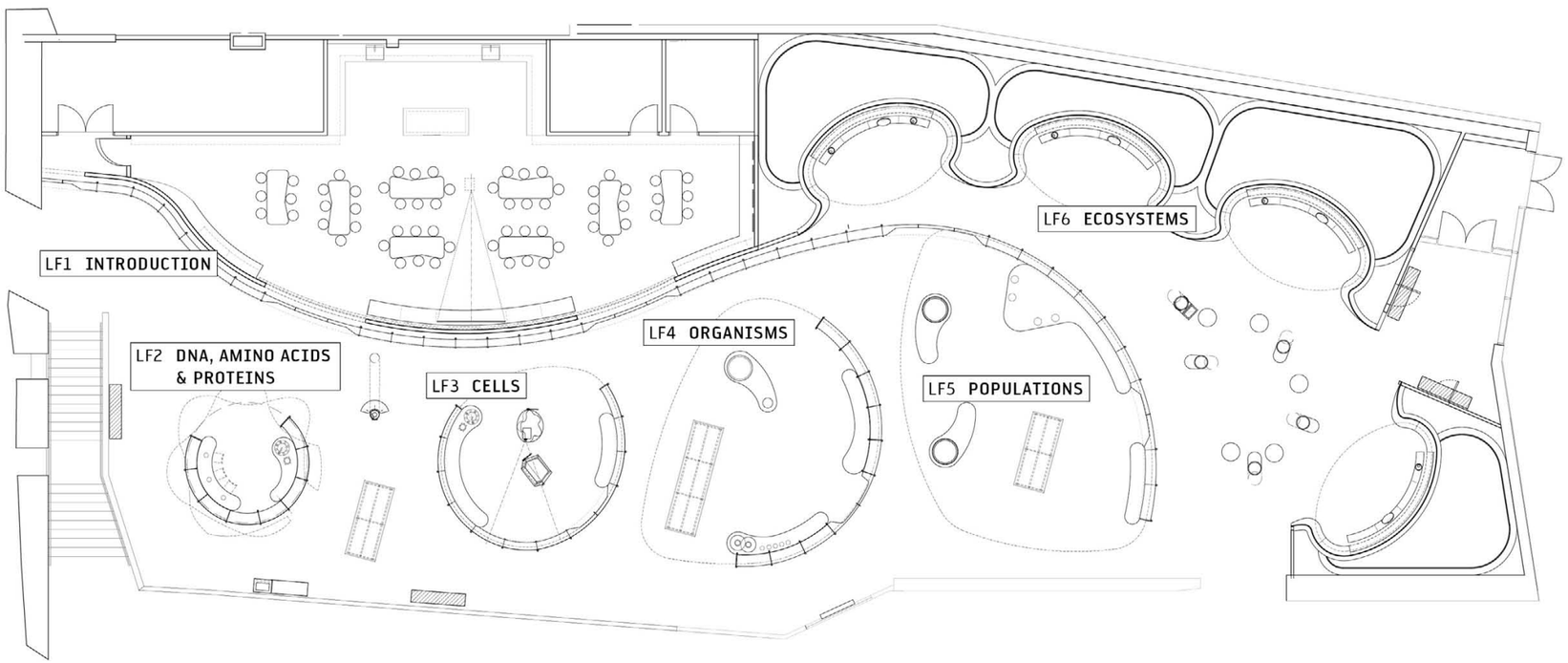







LD4.E10.rc03
DS-1
LD4.E10.ar01
LF4.E10.rc04-rc08
LD4.E10.ar01-05
LD4.E10.gi03
LD4.E10.ms01
graphic area
text/notes w/ call outs
and species (to come)
LD4.E10.tt01
LG-1
LD4.E10.ap01
DS-1
LD4.E10.ar03
LD4.E10.gi05
DS-1
LD4.E10.rc01
DS-1
LD4.E10.ar01-06
LD4.E10.ar01
LD4.E10.gi04
DS-1
LD4.E10.rc02
DS-1
LD4.E10.ar01-06
LD4.E10.fp01
DS-1
LD4.E10.gi02
DS-1

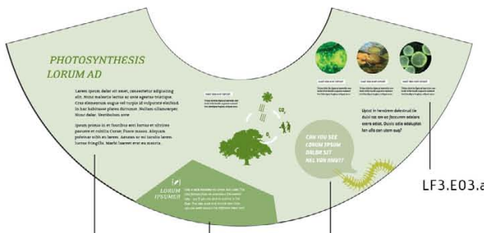

LAND
DRIVE THROUGH TIME
How do we experience time? Click! – the Internet responds instantaneously. Our grandmother's memories can take us back a century. Eleven thousand-year-old artifacts from Utah's Danger Cave seem ancient. The Peat Wei-Ha Observatory challenges us with stories that reach deeper into the past.
Paleontologists can return us to a Utah with oceans, dinosaurs, or glaciers. With each new discovery, they refine our conse qui blaortie commy nim volorting el el dolobore dipsum quat.
LD1.E01.gi02
DS-1
LD1.E01.gi03-08
IJ-1
LD1.E01.gc03-08
DS-1
LD1.E01.ar01-06
LD1.E01.ip02
RT-1
DS-1



[LF] LIFE

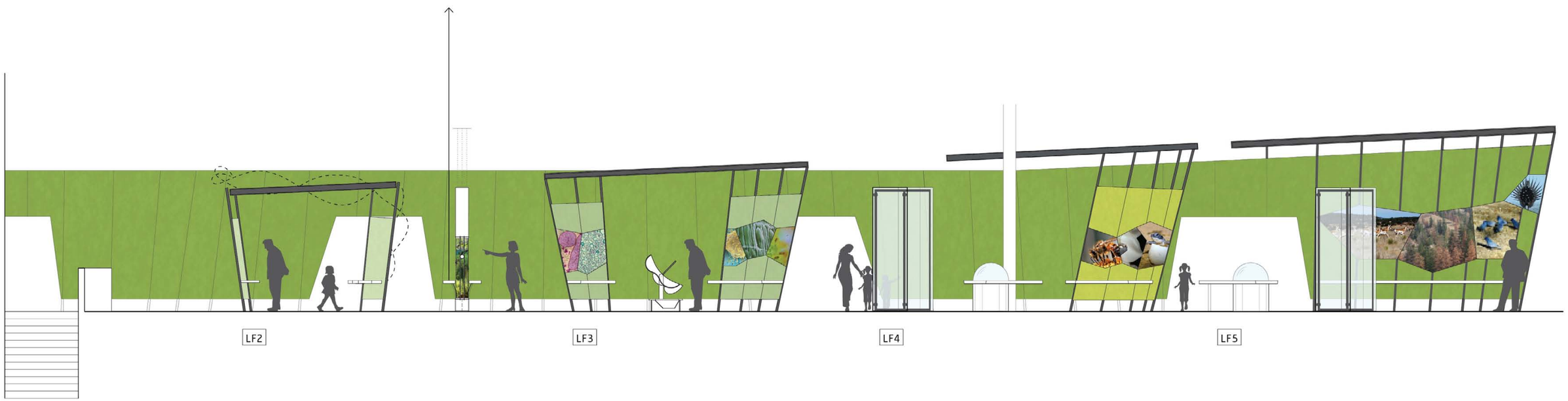
	LEVEL 4
127	EAST SECTION
129	LIFE INTRO
130	DNA, AMINO ACIDS & PROTEINS: RAILS
131	DNA, AMINO ACIDS & PROTEINS: ELEVATIONS
133	KERATIN CASE
134	CELLS: RAILS
135	CELLS: ELEVATIONS
136	ORGANISMS: RAILS
137	ORGANISMS: ELEVATIONS
139	ORGANISMS: CASE
140	POPULATIONS: RAILS
141	POPULATIONS: ELEVATIONS
142	POPULATIONS: INTERACTIVE
143	POPULATIONS: CASE
145	TREE OF LIFE
146	WEST ELEVATION
147	HOMINID EVOLUTION
149	ECOSYSTEMS: ELEVATIONS
151	HUMAN INTERACTIONS
153	NATURALISTS LAB

LF3.E03.gr01
LG-1

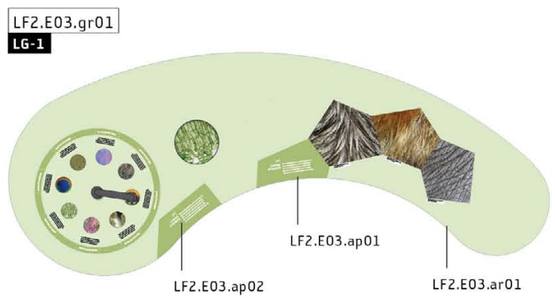


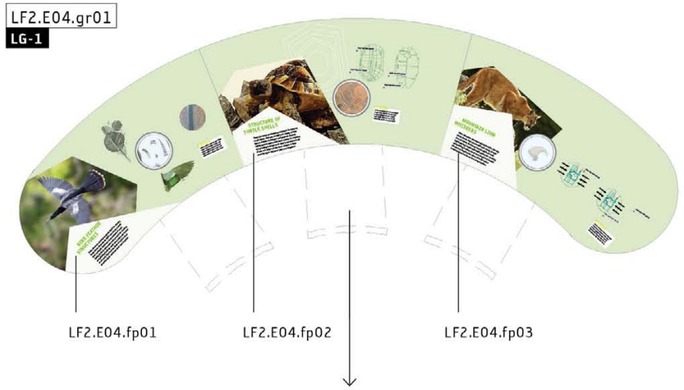
LF3.E03.ar01-03

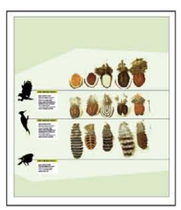
LF3.E03.ms01 LF3.E03.ap01 LF3.E03.fl01



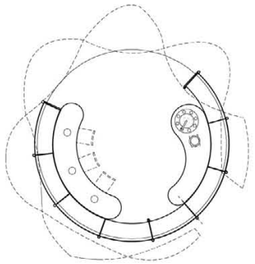
LIFE
Lorem ipsum dolor sit amet consectetur adipiscing
Lorem ipsum dolor sit amet, consectetur adipiscing elit. Praesent mattis, felis sit amet mattis posuere, erat arcu lacinia ante, a facilisis ante risus ac mauris. Vivamus ultricies enim placerat urna. Aliquam vulputate placerat metus. Ut facilisis. Suspendisse nibh. Sed nunc risus, dictum at, gravida nec, faucibus at, ligula. Donec iaculis convallis sapien. Donec dictum libero quis turpis. Pellentesque tempus iaculis sapien. Suspendisse dictum malesuada neque. Nunc vitae erat.
DNA
GENETIC INSTRUCTIONS
CELLS
50 AND 100 TRILLION CELLS IN OUR BODY
ORGANISMS
LORUM IPSUM DOLOR ERAS LORUM
POPULATIONS
LORUM IPSUM DOLOR ERAS LORUM
ECOSYSTEMS
LORUM IPSUM DOLOR ERAS LORUM
LF1.E01.ip01
DL-1
VY-1
DL-1
LF1.E01.gi01-09
projection

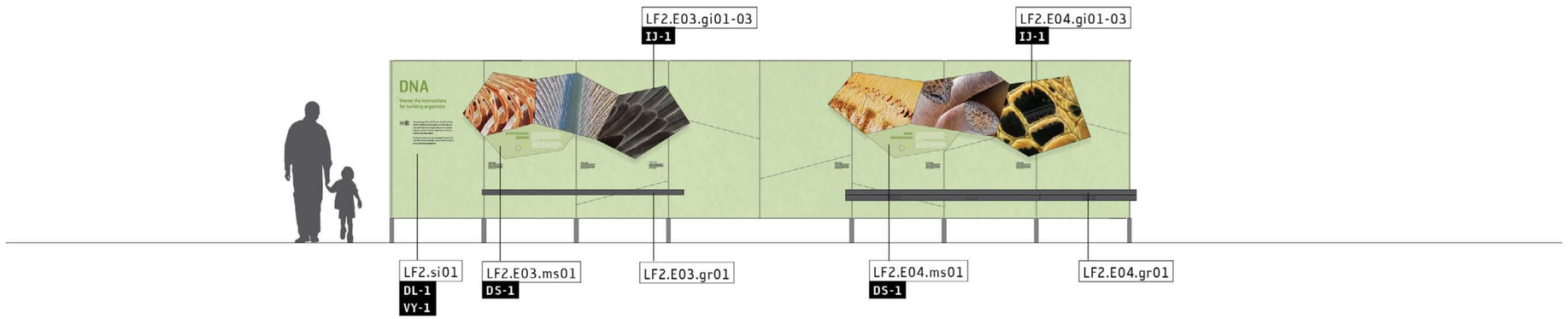


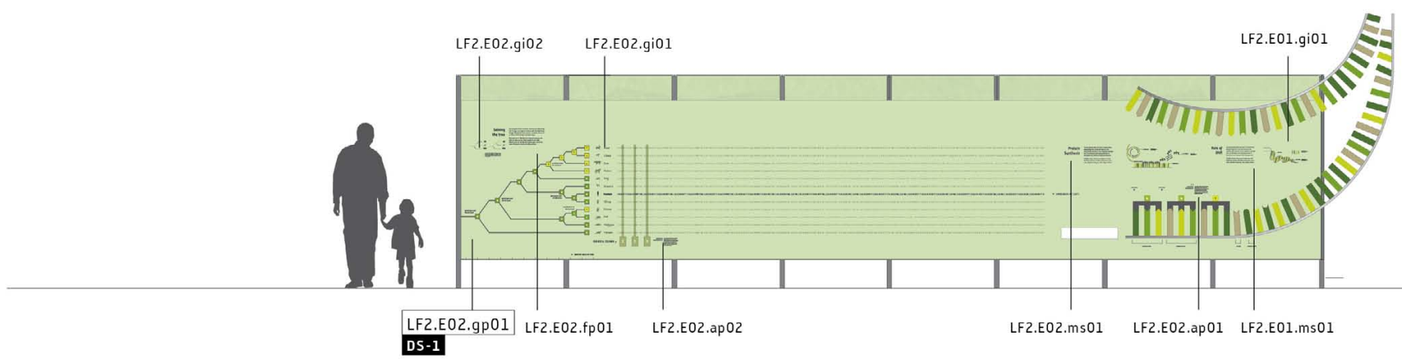


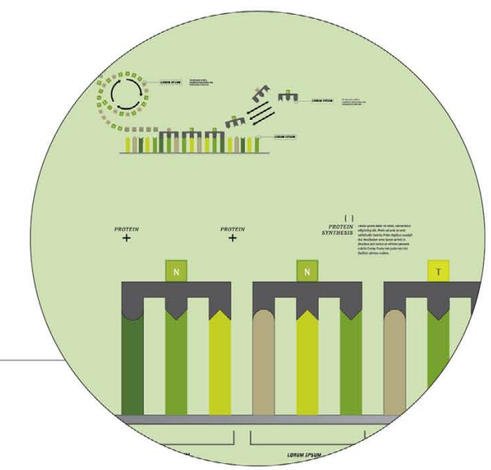


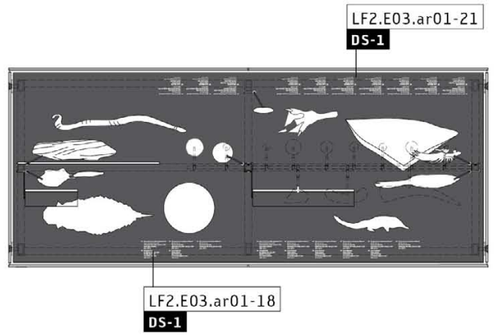
LF2.E04.gp01-03
LF2.E04.ar01
DS-1

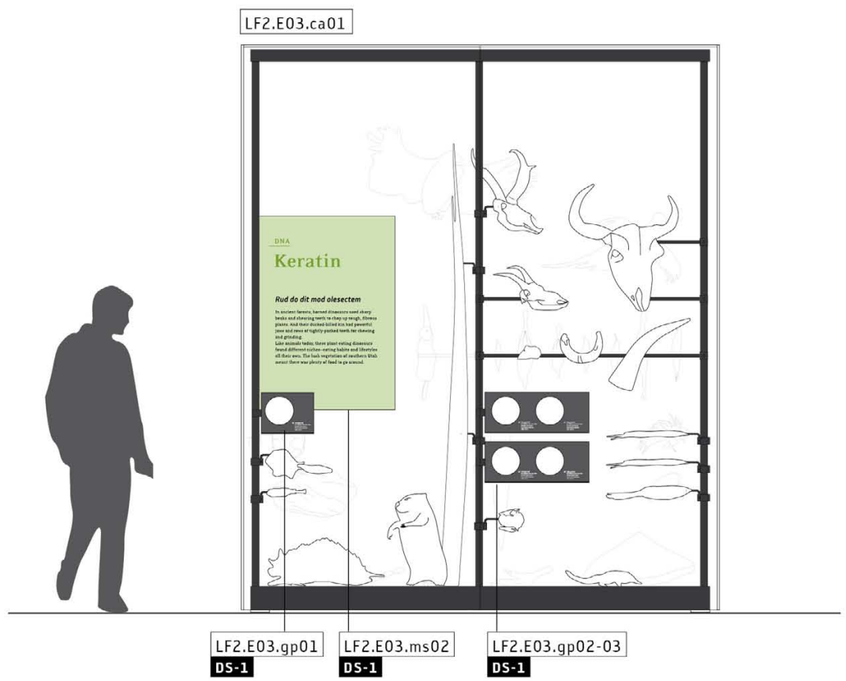


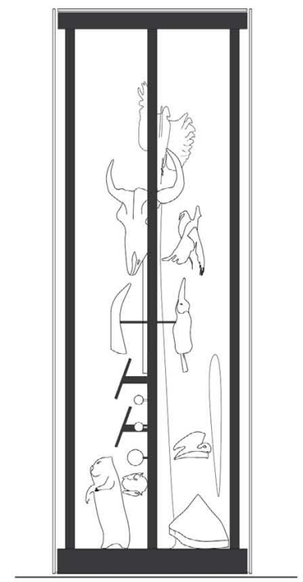

LF2.E03.gi01-03
IJ-1
LF2.E04.gi01-03
IJ-1
DNA
LF2.si01
DL-1
VY-1
LF2.E03.ms01
DS-1
LF2.E03.gr01
LF2.E04.ms01
DS-1
LF2.E04.gr01


LF2.E02.gi02
LF2.E02.gi01
LF2.E01.gi01
LF2.E02.gp01
DS-1
LF2.E02.fp01
LF2.E02.ap02
LF2.E02.ms01
LF2.E02.ap01
LF2.E01.ms01

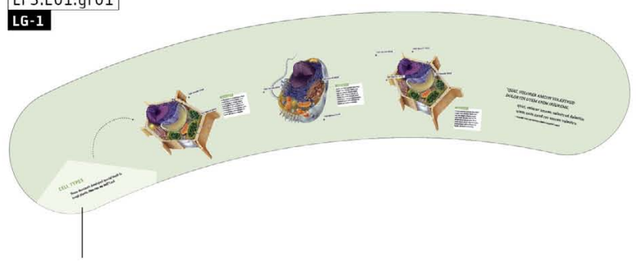

PROTEIN
+
PROTEIN
+
PROTEIN SYNTHESIS
N
N
T


LF2.E03.ar01-21
DS-1
LF2.E03.ar01-18
DS-1


LF2.E03.ca01
DNA
Keratin
Rud do dit mod oiesectem
LF2.E03.gp01
DS-1
LF2.E03.ms02
DS-1
LF2.E03.gp02-03
DS-1

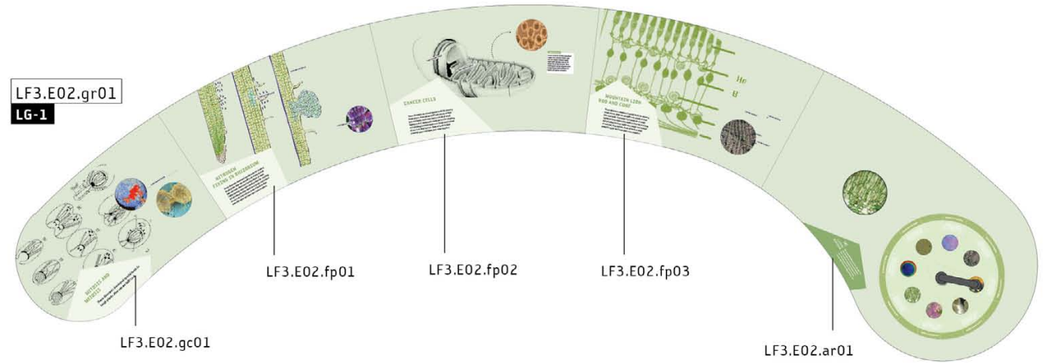


LF3.E01.gr01
LG-1



LF3.E02.gc01-03

LF3.E02.gr01
LG-1



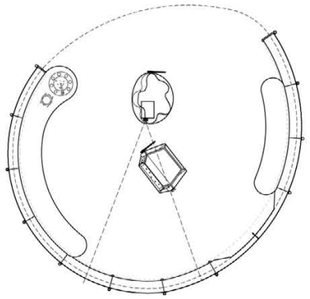
LF3.E02.gc01

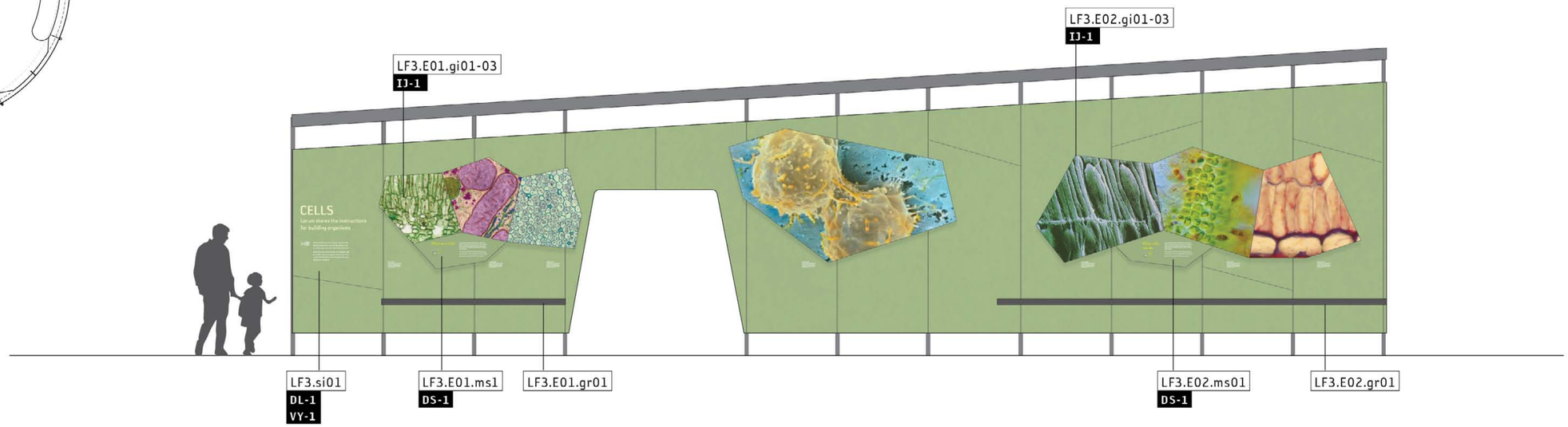
LF3.E02.fp01

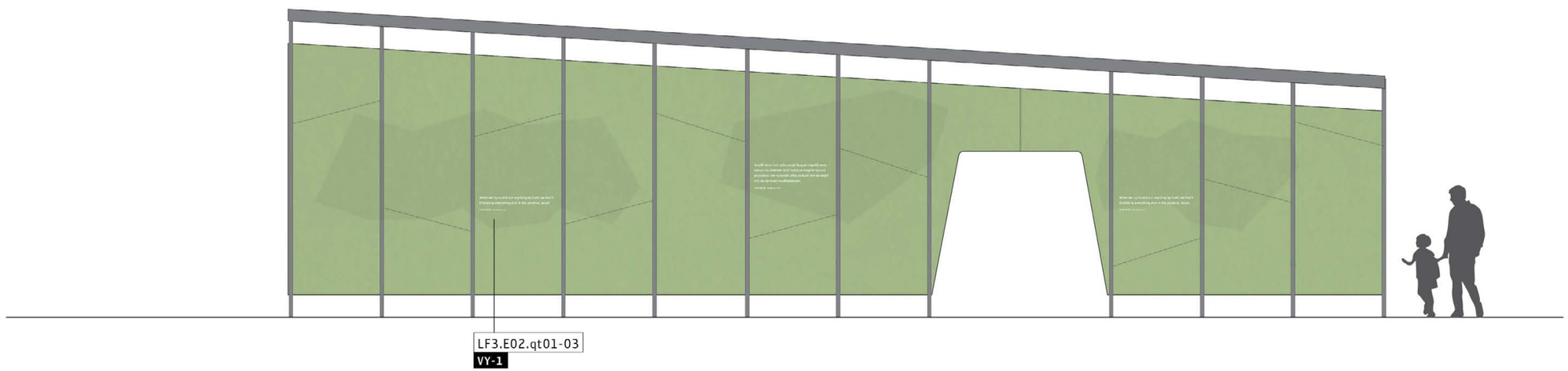
LF3.E02.fp02

LF3.E02.fp03

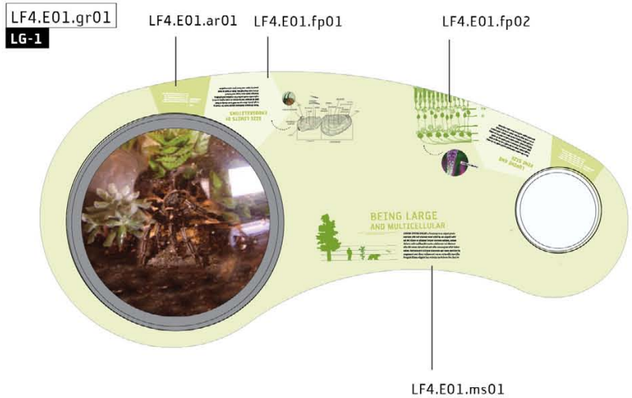
LF3.E02.ar01




LF3.E01.gi01-03
IJ-1
LF3.E02.gi01-03
IJ-1
CELLS
LF3.si01
DL-1
VY-1
LF3.E01.ms1
DS-1
LF3.E01.gr01
LF3.E02.ms01
DS-1
LF3.E02.gr01


LF3.E02.qt01-03
VY-1

LF4.E01.gr01
LG-1



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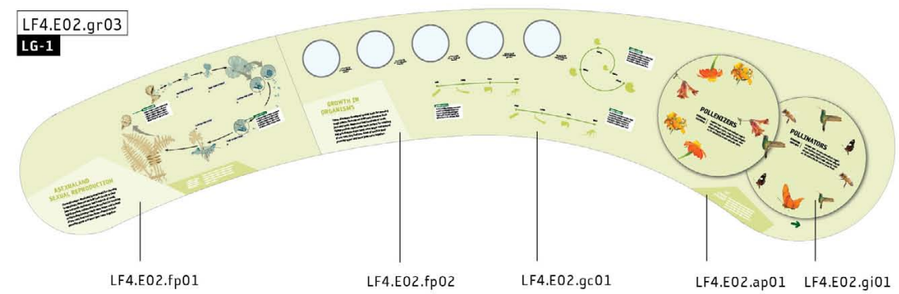
LG-1



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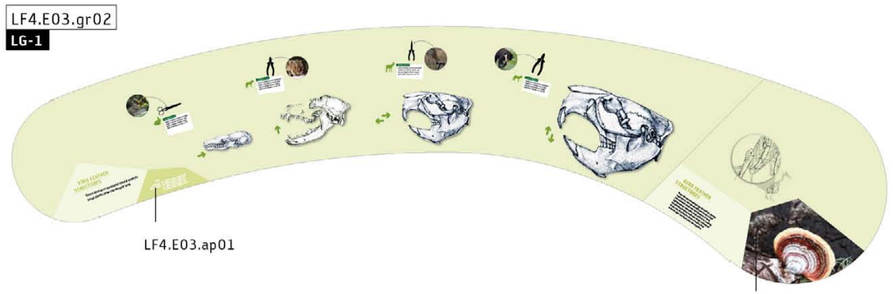
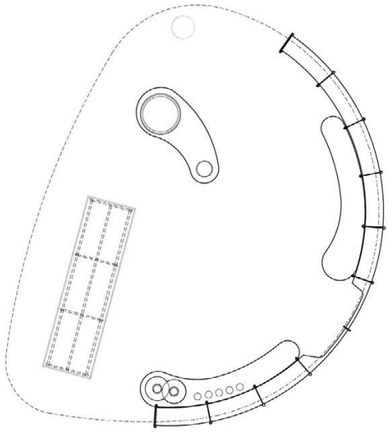
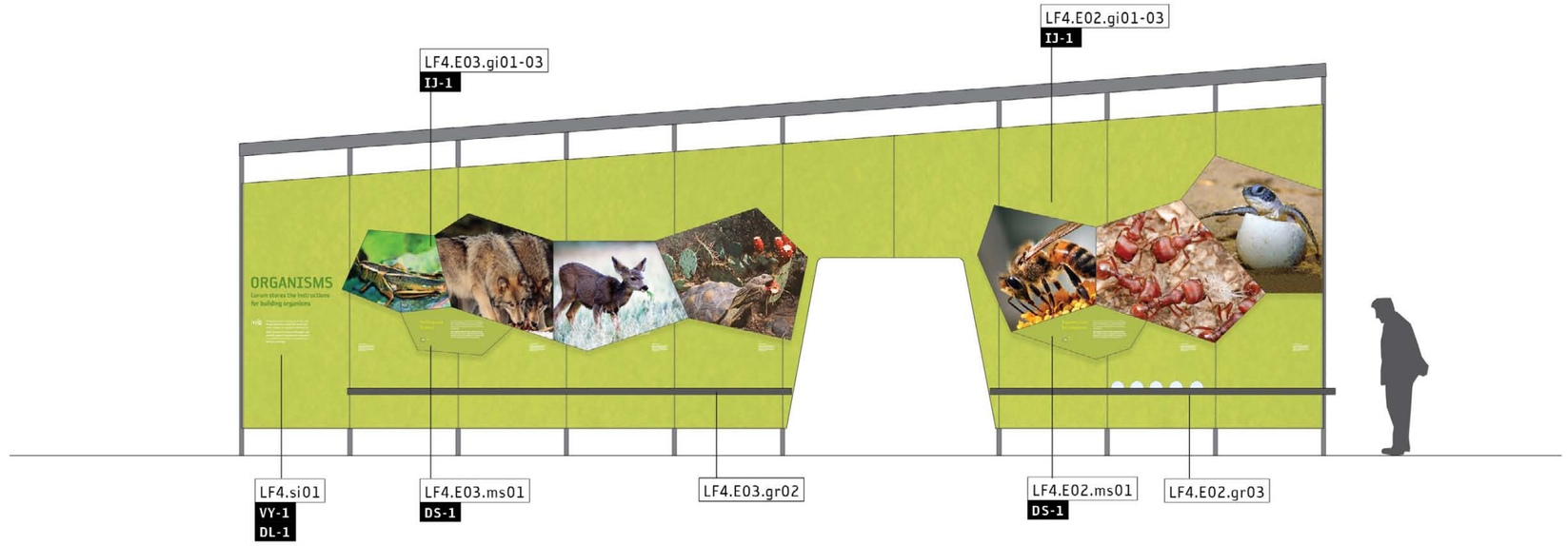
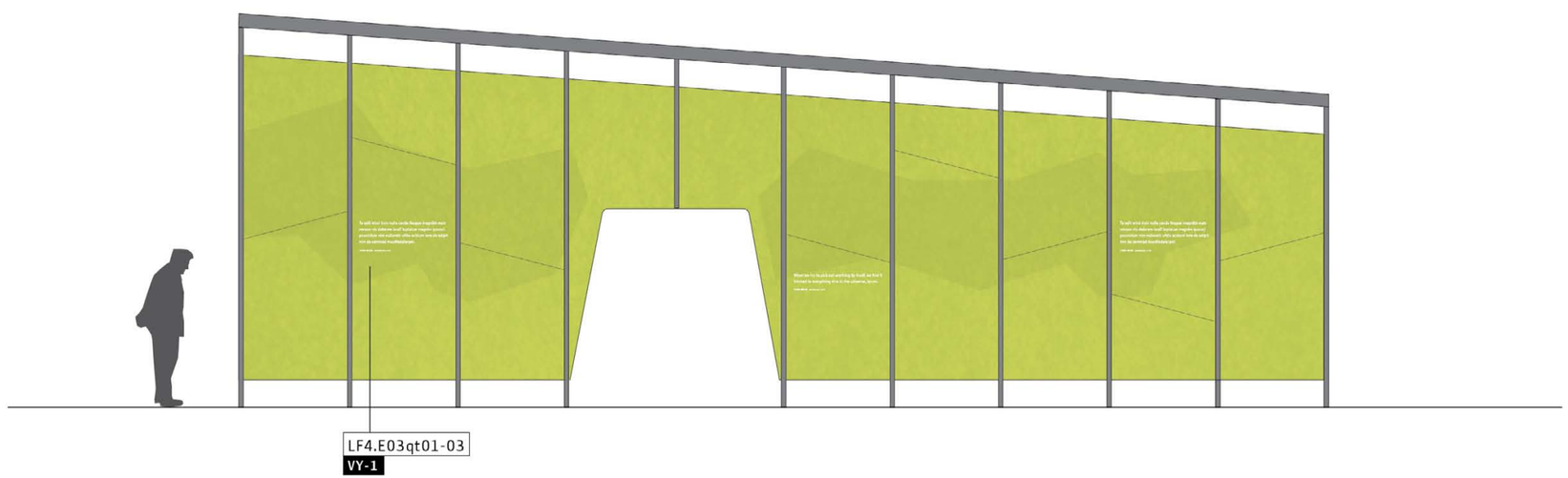
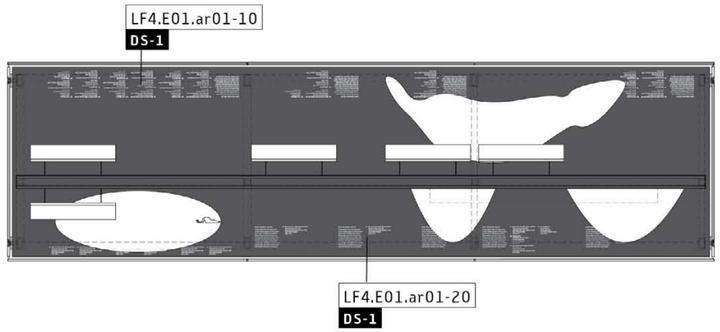
LG-1






LF4.E03.gi01-03
IJ-1
LF4.E02.gi01-03
IJ-1
ORGANISMS
LF4.si01
VY-1
DL-1
LF4.E03.ms01
DS-1
LF4.E03.gr02
LF4.E02.ms01
DS-1
LF4.E02.gr03


LF4.E03qt01-03
VY-1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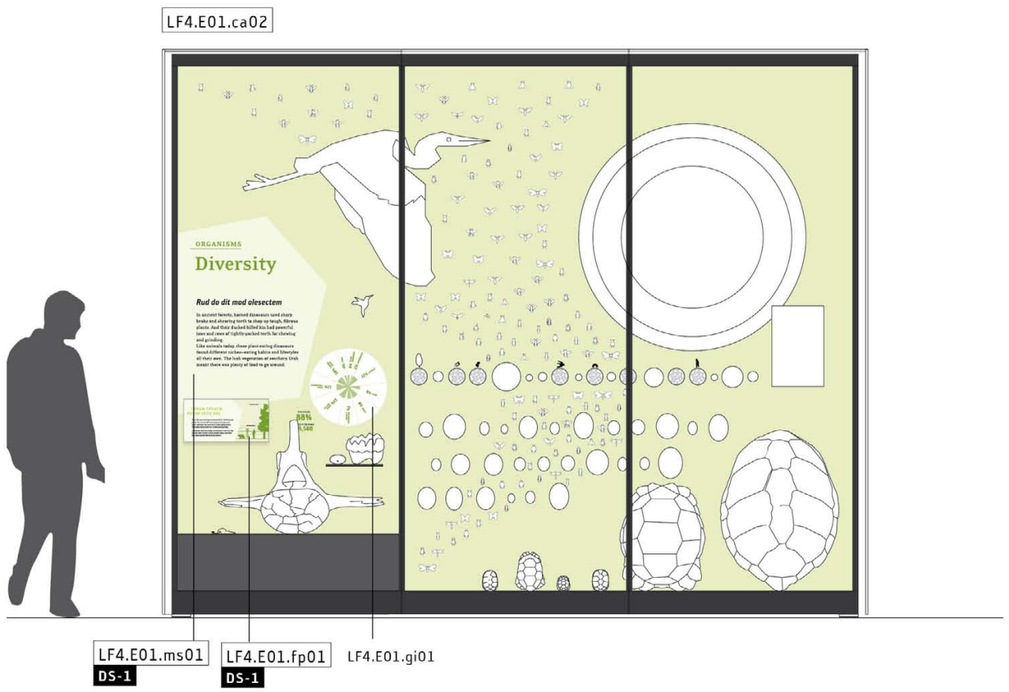
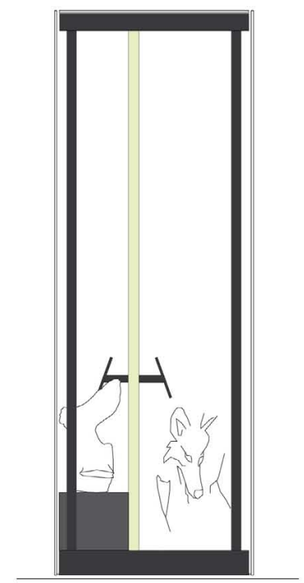
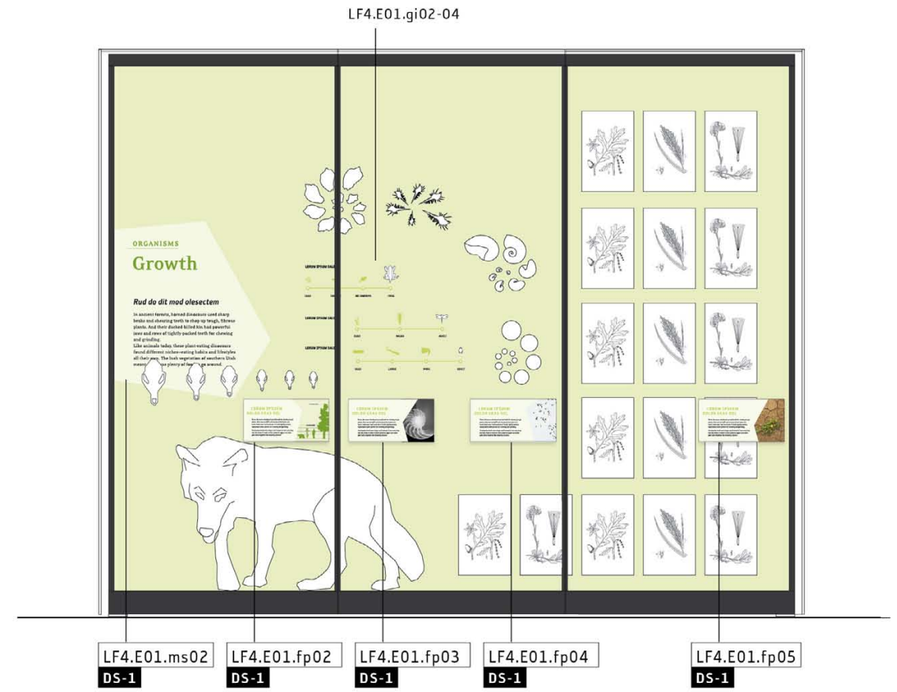
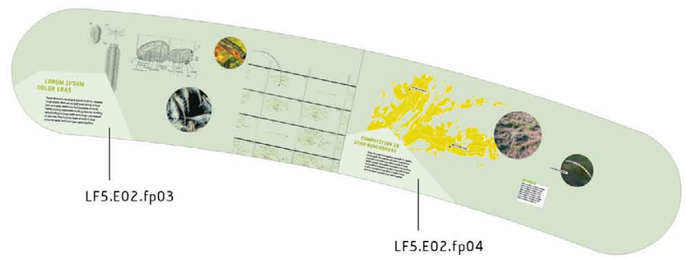
DS-1
LF4.E01.ar01-20
DS-1


LF4.E01.ca02
ORGANISMS
Diversity
Rud do dit mod olesectem
LF4.E01.ms01
DS-1
LF4.E01.fp01
DS-1
LF4.E01.gi01

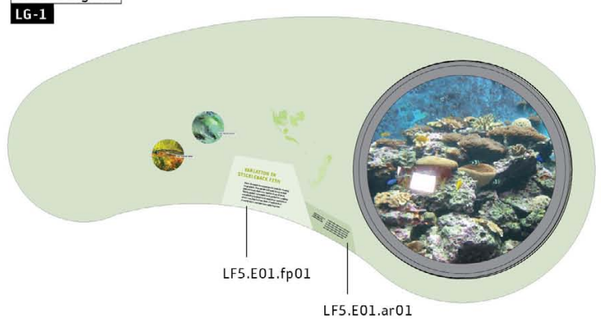



LF4.E01.gi02-04
ORGANISMS
Growth
Rud do dit mod olesectem
LF4.E01.ms02
DS-1
LF4.E01.fp02
DS-1
LF4.E01.fp03
DS-1
LF4.E01.fp04
DS-1
LF4.E01.fp05
DS-1

LF5.E02.gr02
LG-1



LF5.E01.gr01
LG-1



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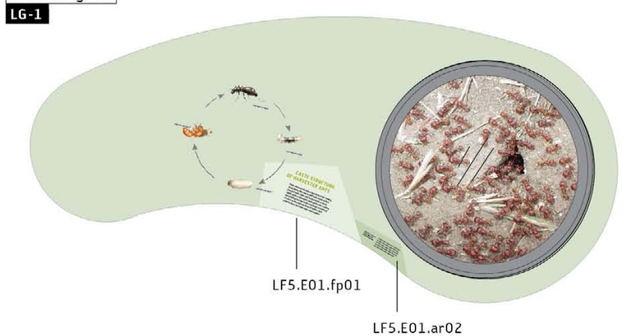
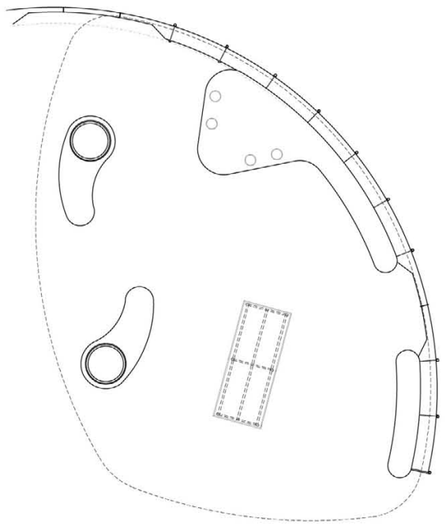
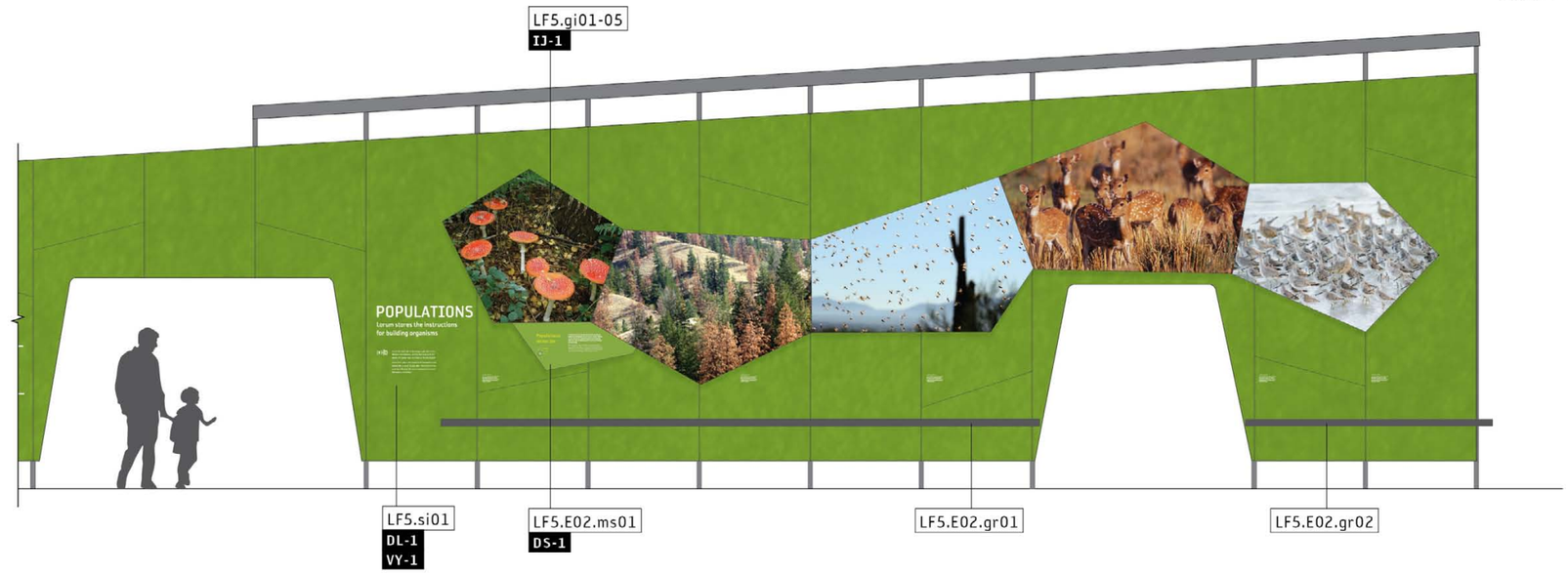
LG-1



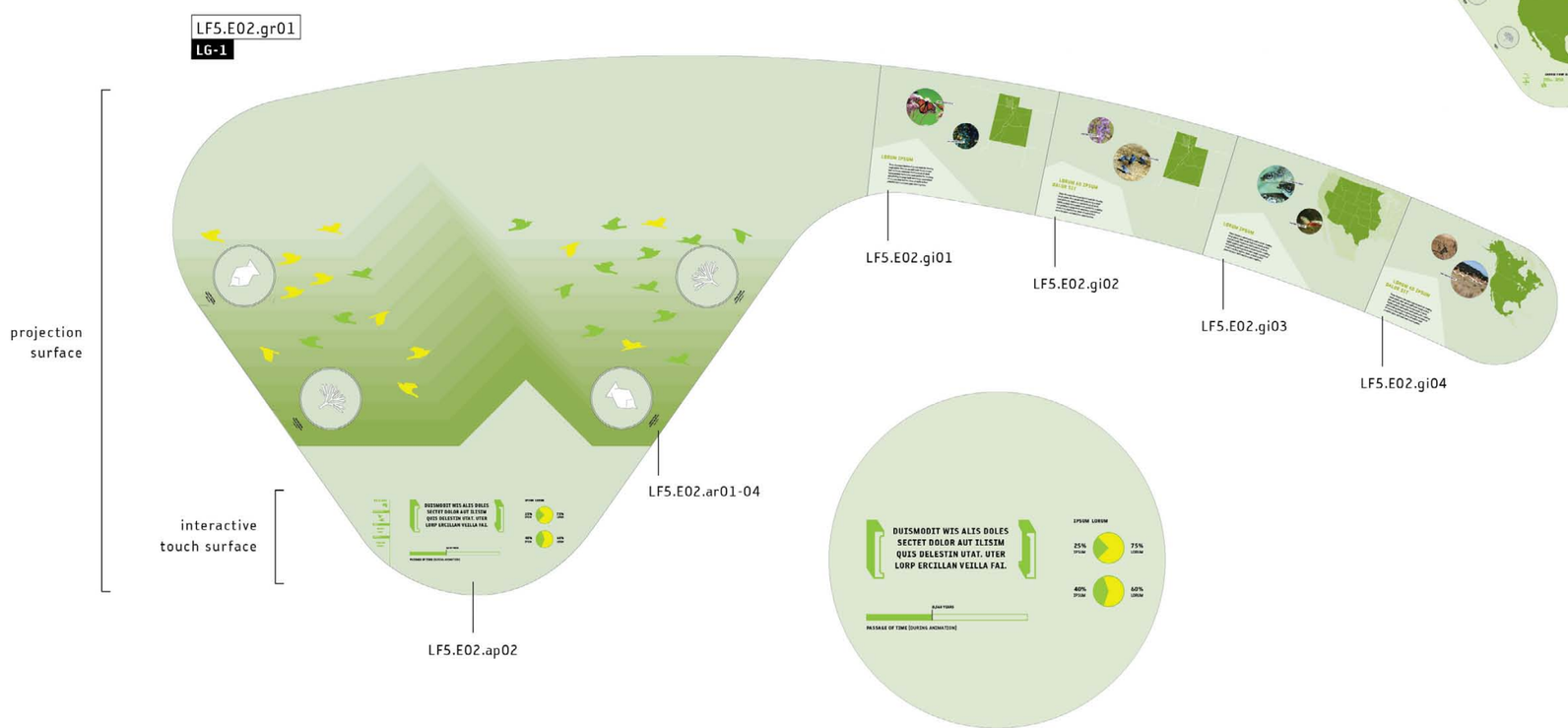


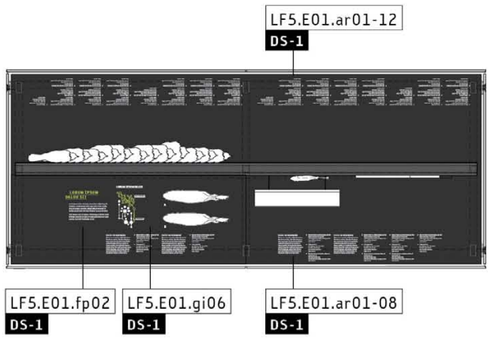

LF5.gi01-05
IJ-1
POPULATIONS
Lorem stores the instructions
for building organisms
LF5.si01
DL-1
VY-1
LF5.E02.ms01
DS-1
LF5.E02.gr01
LF5.E02.gr02

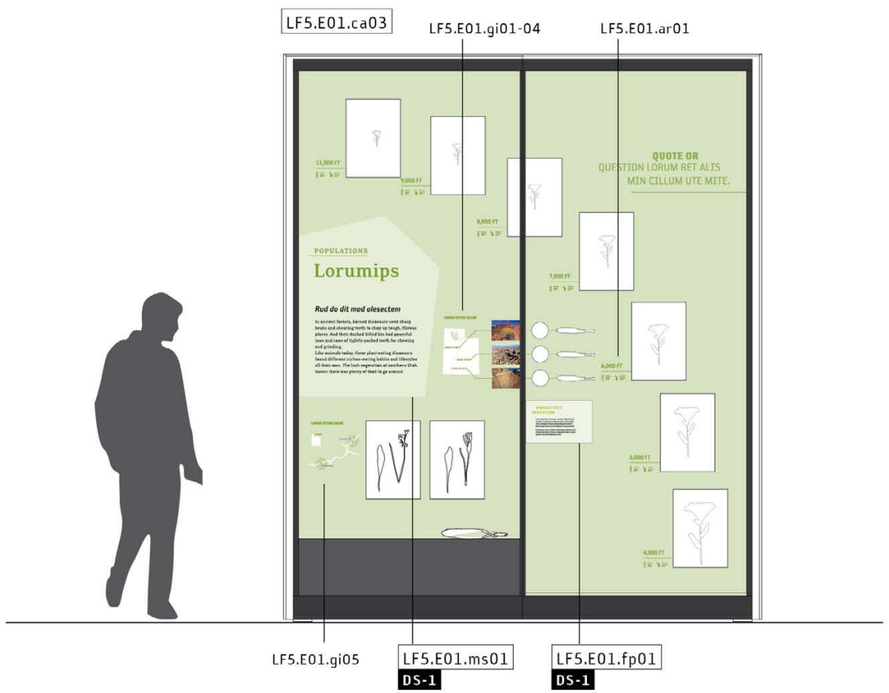
LIFE
Lorem ipsum dolor sit amet
consectetur adipiscing
LF1.E01.ip02
DL-1
VY-1
LF1.E01.gi10
DS-1
LF5.E02.qt01-03
VY-1

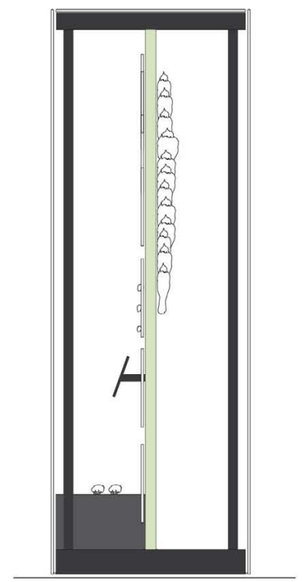
[LF] POPULATIONS: INTERACTIVE

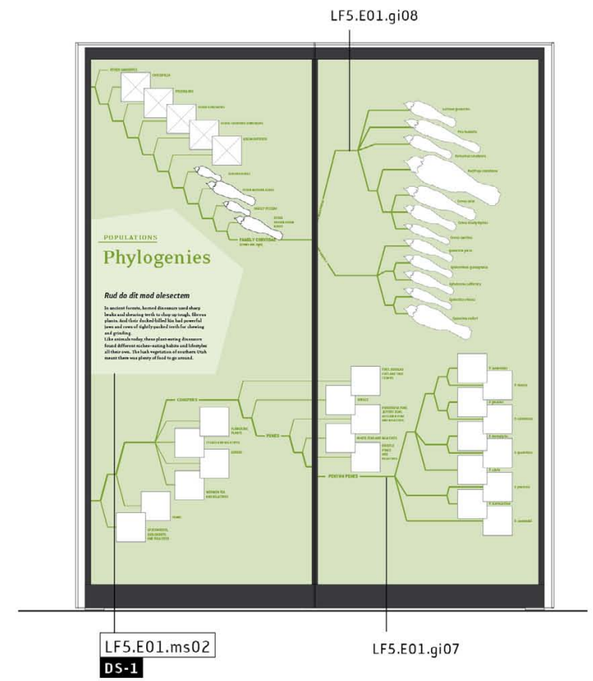
LIFE / LEVEL 4

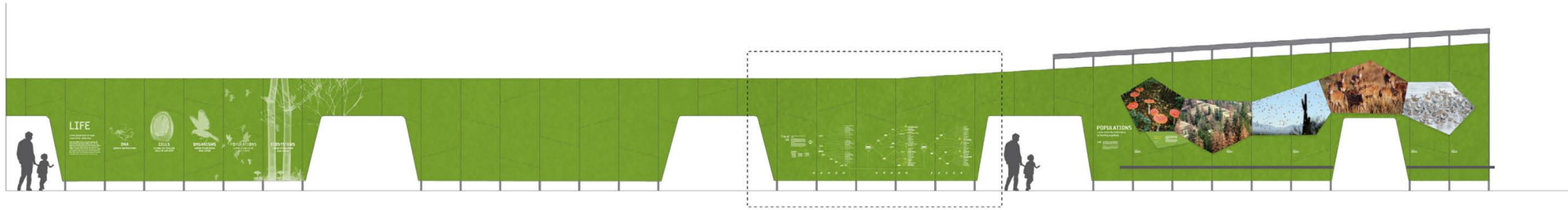


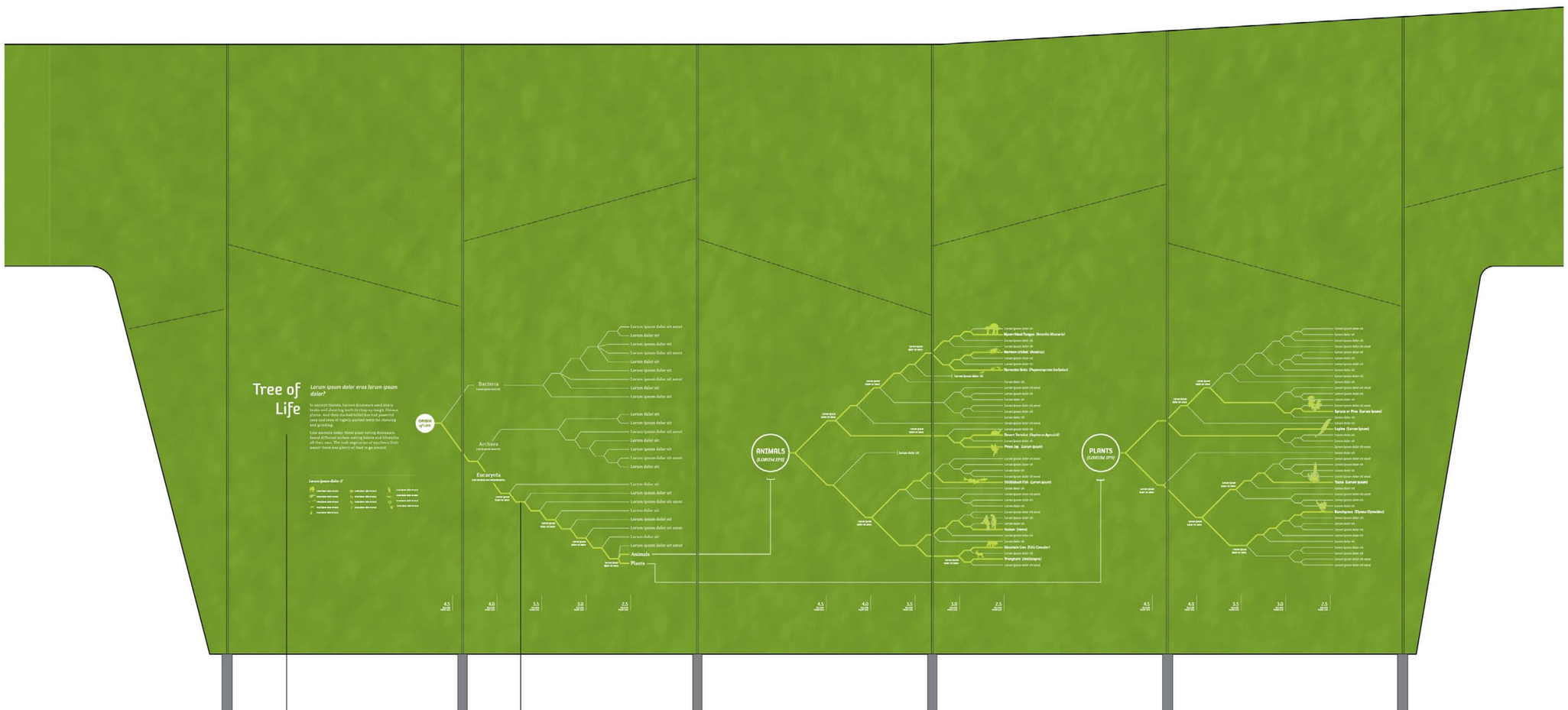

LF5.E01.ar01-12
DS-1
LF5.E01.fp02
DS-1
LF5.E01.gi06
DS-1
LF5.E01.ar01-08
DS-1


LF5.E01.ca03
LF5.E01.gi01-04
LF5.E01.ar01
QUOTE OR
QUESTION LORUM RET ALIS
MIN CILLUM UTE MITE.
POPULATIONS
Lorumips
Rud do dit mod olesectem
LF5.E01.gi05
LF5.E01.ms01
DS-1
LF5.E01.fp01
DS-1




LF5.E01.gi08
POPULATIONS
Phylogenies
Rud do dit mod olesectem
LF5.E01.ms02
DS-1
LF5.E01.gi07



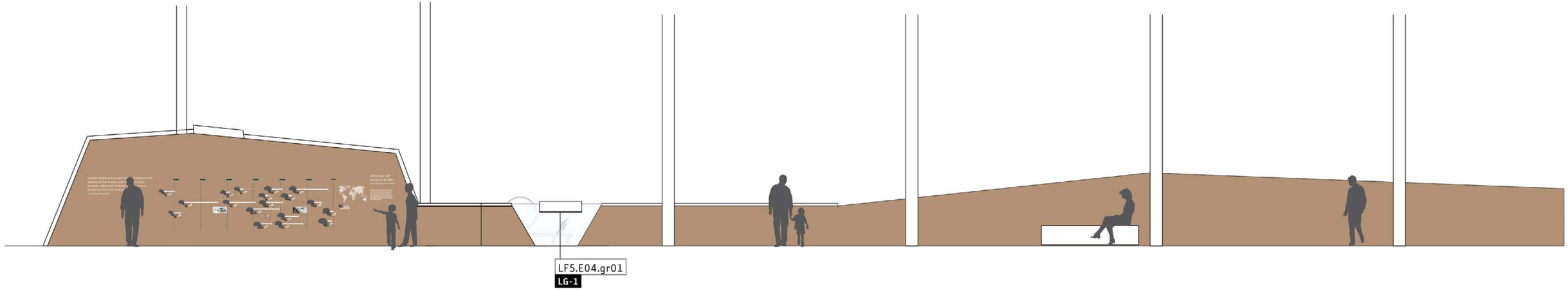


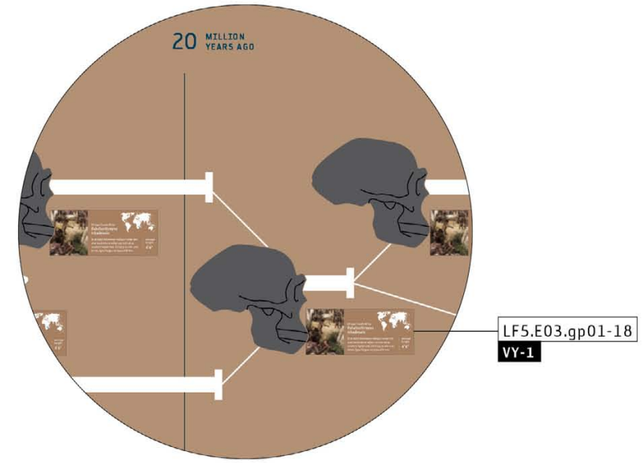
LF7.E01.ms01
DS-1

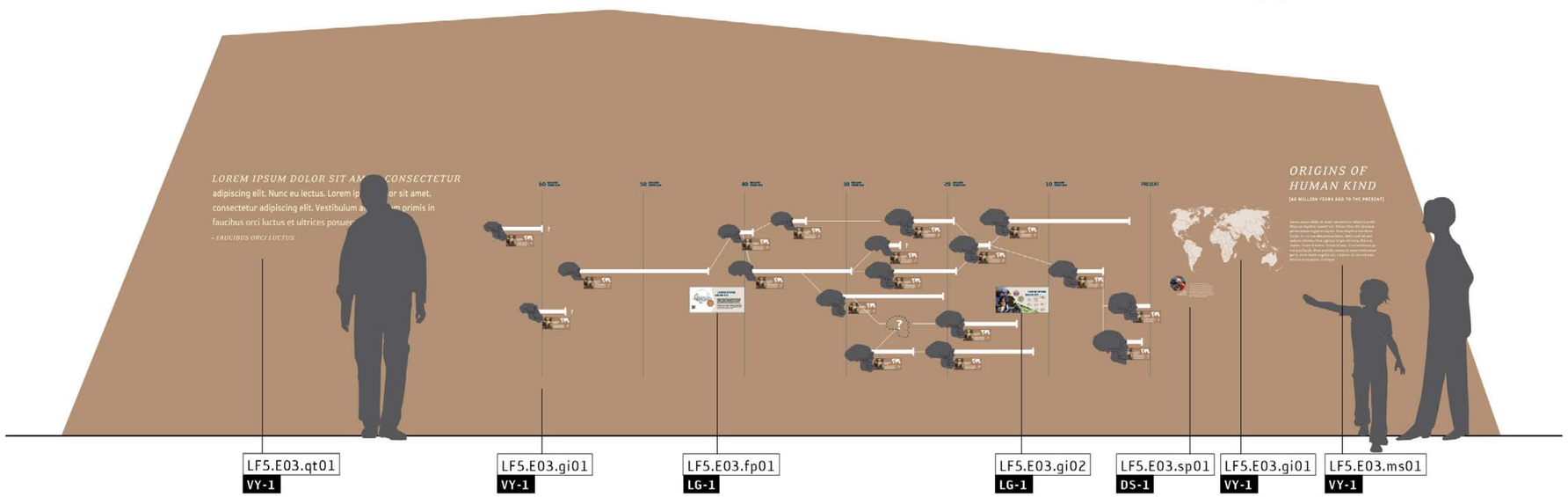
LF7.E01.gi01
DS-1

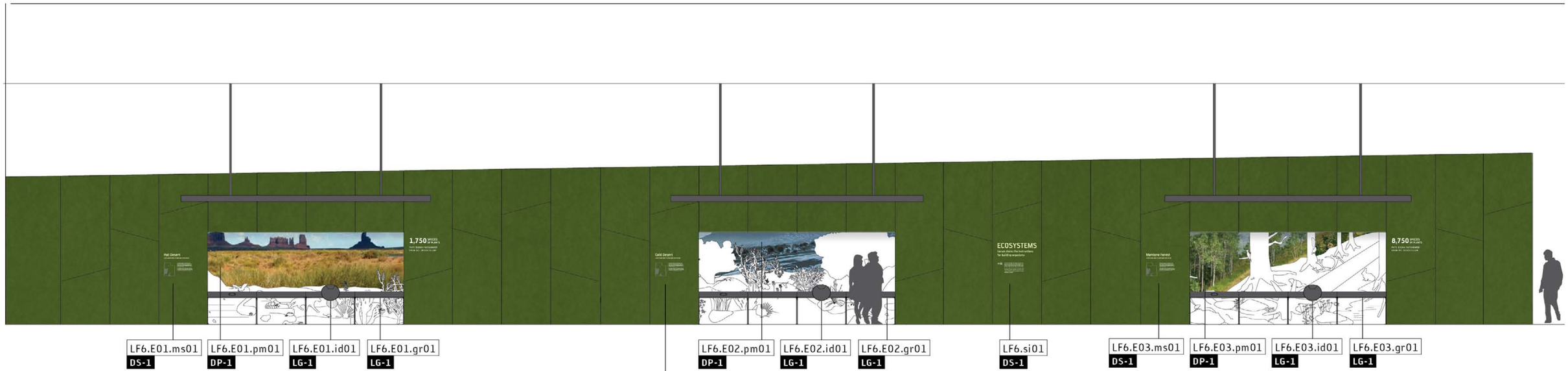
[LF] WEST ELEVATION

LIFE / LEVEL 4

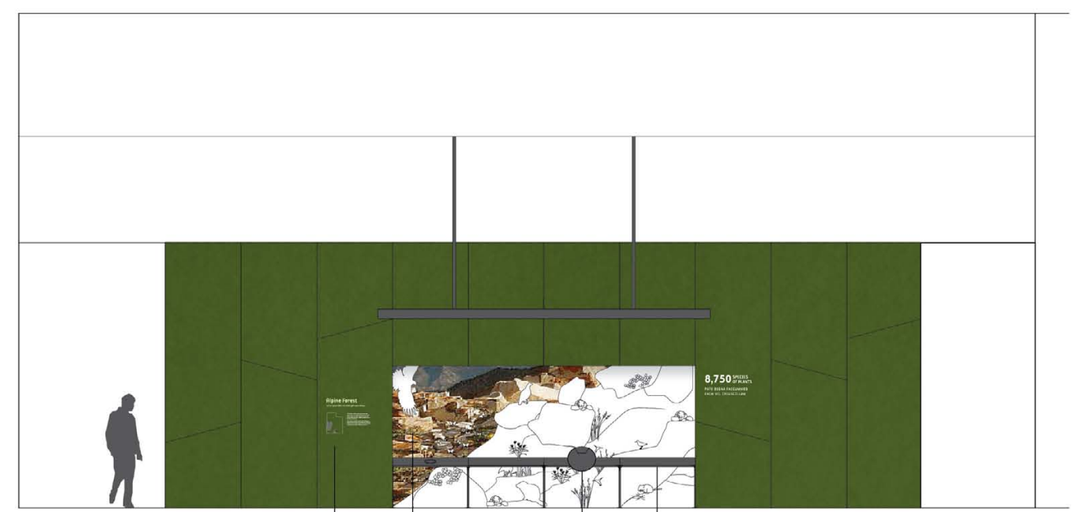


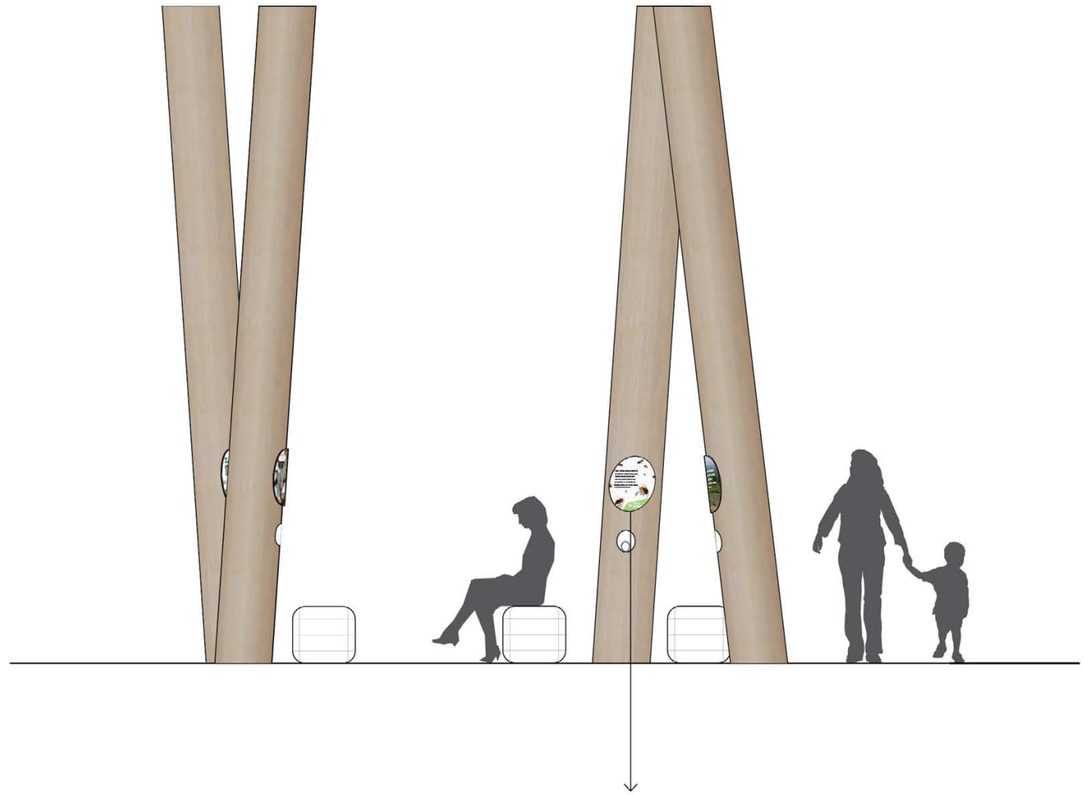

20 MILLION YEARS AGO
LF5.E03.gp01-18
VY-1


LOREM IPSUM DOLOR SIT AM CONSECTETUR
adipiscing elit. Nunc eu lectus. Lorem ip or sit amet,
consectetur adipiscing elit. Vestibulum a m primis in
faucibus orci luctus et ultrices posuer
– FAUCIBUS ORCI LUCTUS
60
50
40
30
20
10
PRESENT
ORIGINS OF HUMAN KIND
[60 MILLION YEARS AGO TO THE PRESENT]
LF5.E03.qt01
VY-1
LF5.E03.gi01
VY-1
LF5.E03.fp01
LG-1
LF5.E03.gi02
LG-1
LF5.E03.sp01
DS-1
LF5.E03.gi01
VY-1
LF5.E03.ms01
VY-1



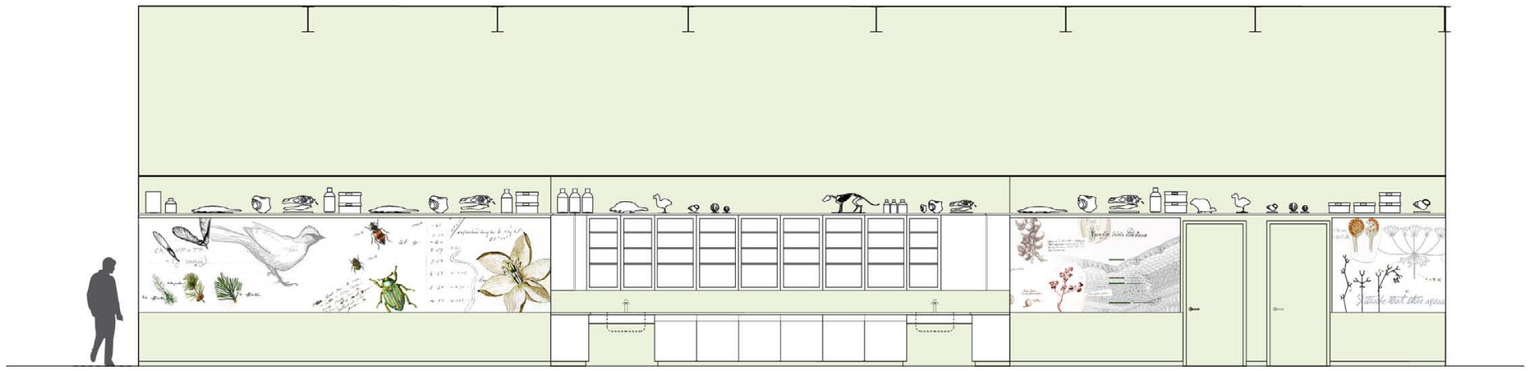
LF6.E02.ms01 DS-1





LF6.E05.ms01
LG-1

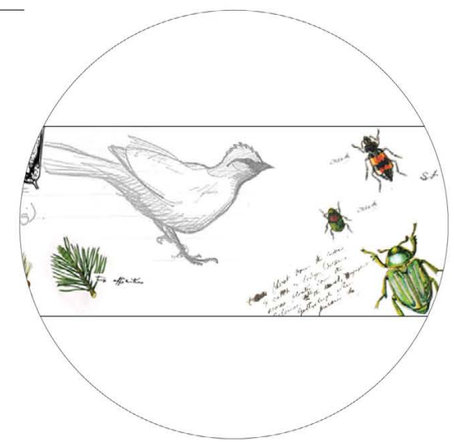
LF6.E05.sp01-04
LG-1

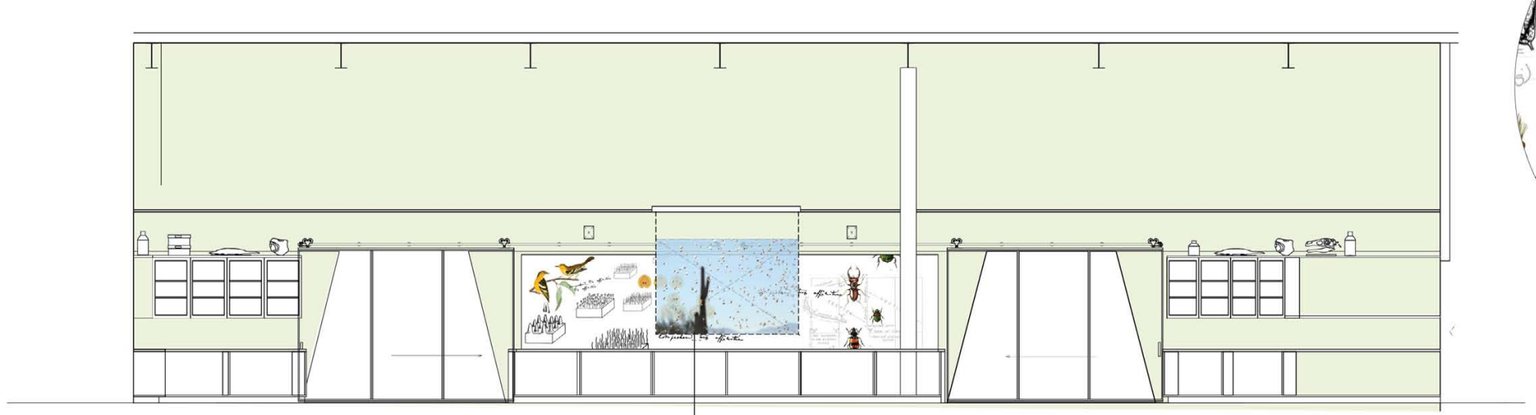


LF7.E01.pm01
DP-1

LF7.E01.pm02
DP-1

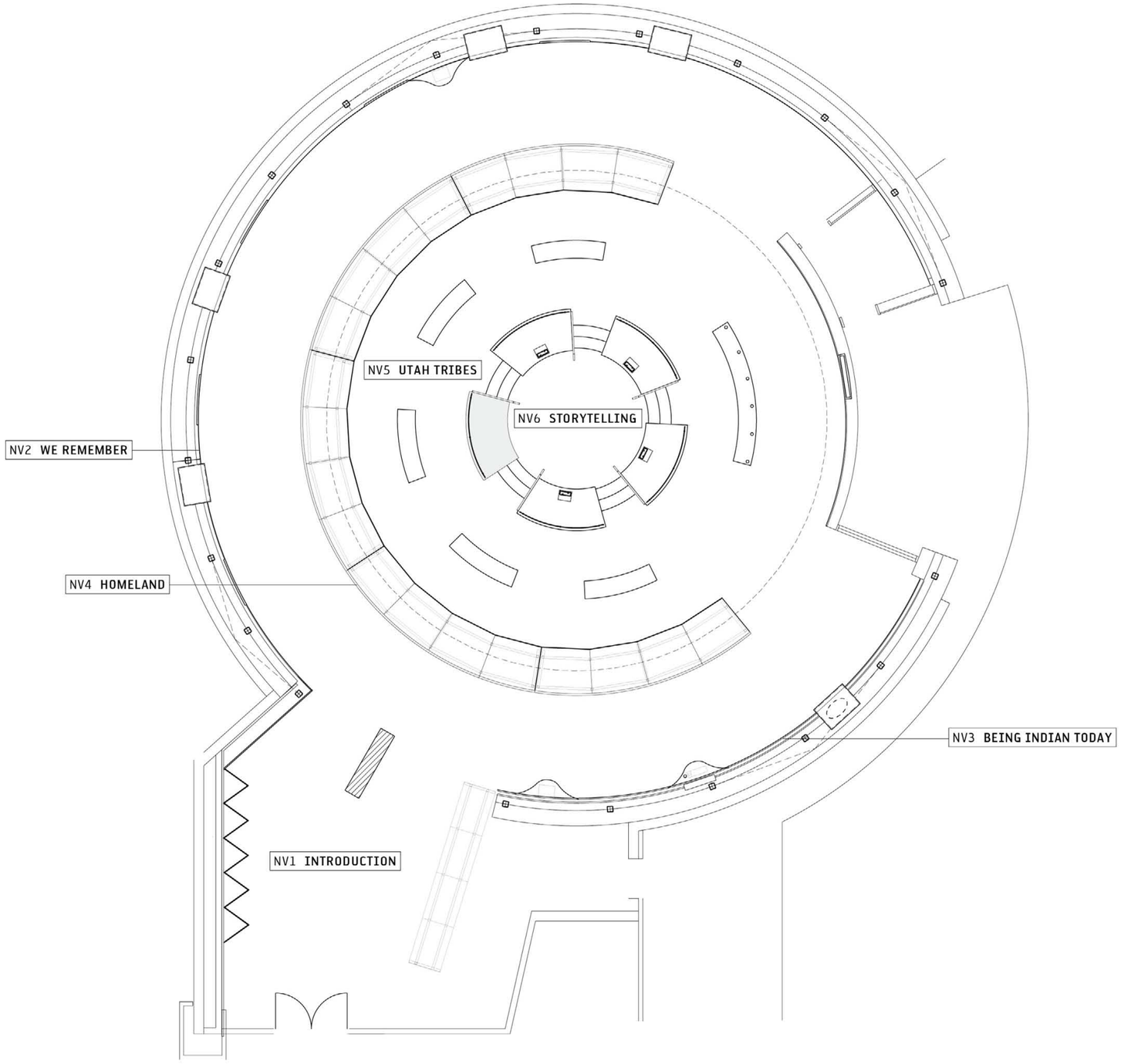
LF7.E01.pm03
DP-1





LF7.E01.pm04
DP-1

projection surface

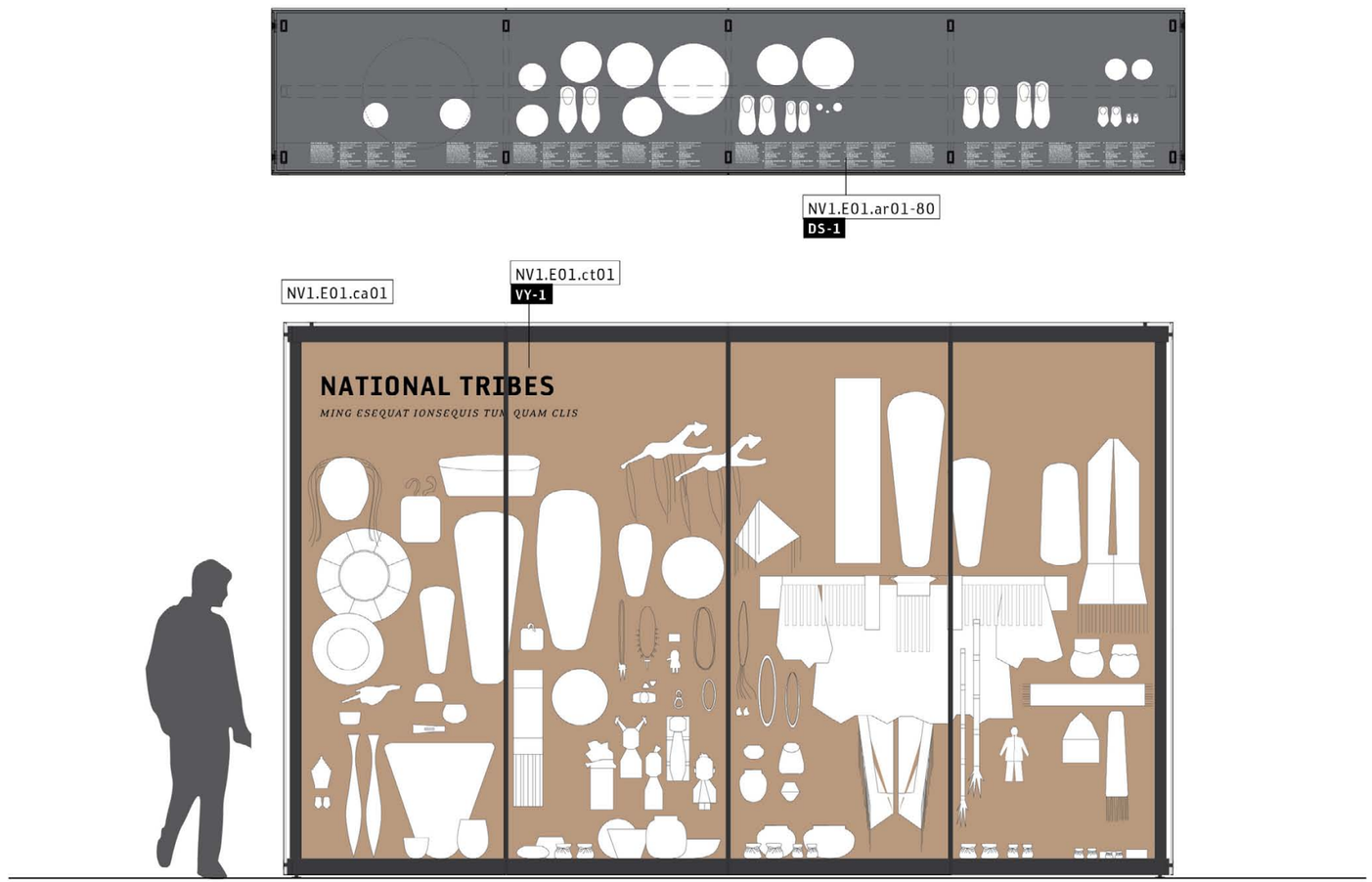


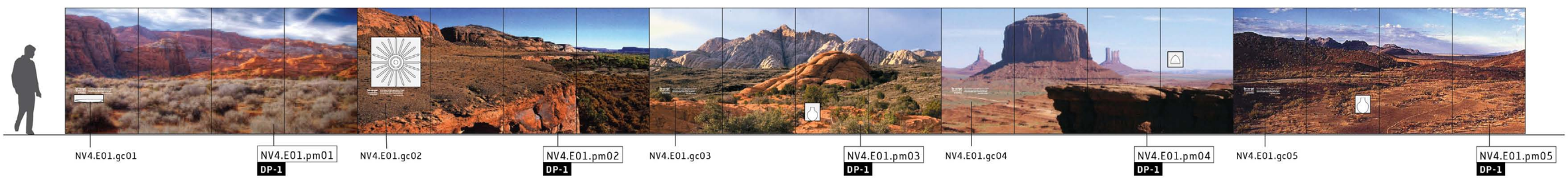
[NV] NATIVE VOICES

	LEVEL 5
157	NORTH ELEVATION: INTRO AREA
158	NATIONAL TRIBES CASE
159	HOMELAND PHOTOMURAL ELEVATION
160	WE REMEMBER ELEVATION
162	BEING INDIAN TODAY ELEVATION
163	UTAH'S TRIBES SECTION INTRO
164	STORYTELLING CIRCLE
165	STORYTELLER PHOTOMURALS
167	INTERACTIVE TABLE
168	CASES
169	UTE CASE
170	SHOSHONE CASE
171	GOSHUTE CASE
172	PAIUTE CASE
173	NAVAJO CASE

ENTERING NATIVE VOICES:
Adults and elders signify
story and tradition

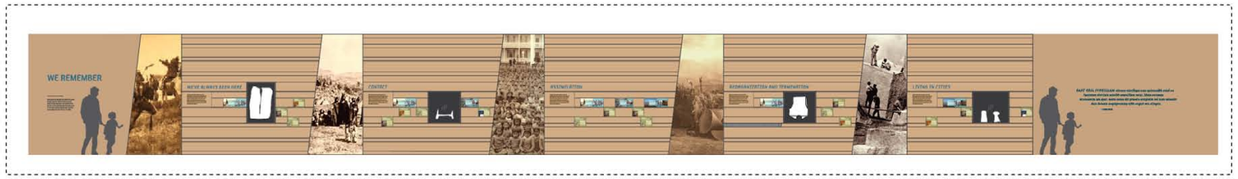
AS VISITORS EXIT:
Children's photographs signify
the future


NV1.E01.ar01-80
DS-1
NV1.E01.ca01
NV1.E01.ct01
VY-1
NATIONAL TRIBES
MING ESEQUAT IONSEQUIS TUM QUAM CLIS

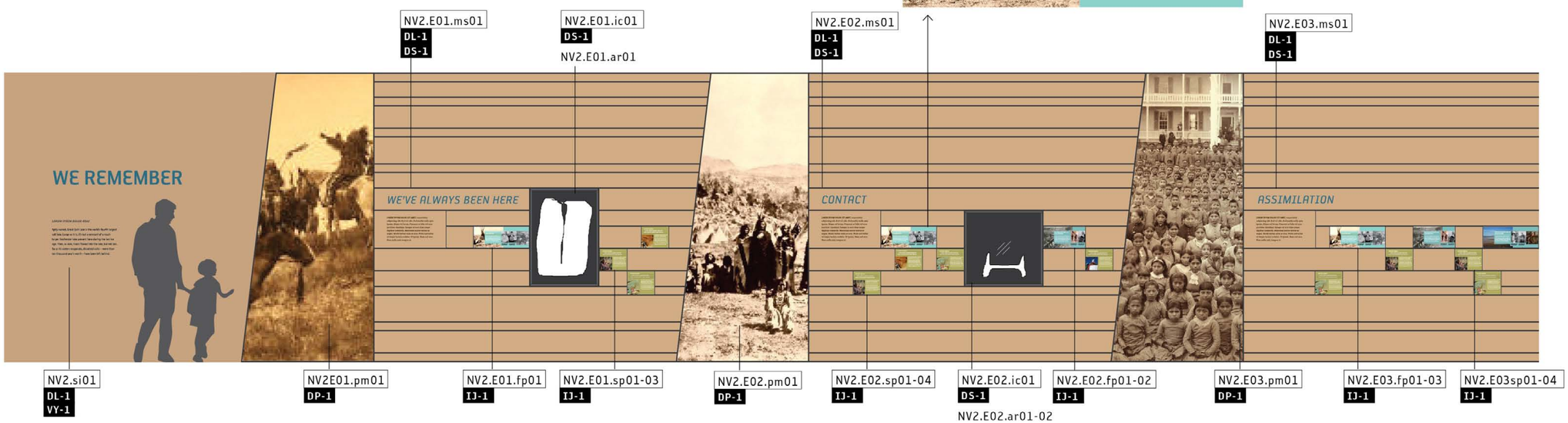

NV4.E01.gc01
NV4.E01.pm01
DP-1
NV4.E01.gc02
NV4.E01.pm02
DP-1
NV4.E01.gc03
NV4.E01.pm03
DP-1
NV4.E01.gc04
NV4.E01.pm04
DP-1
NV4.E01.gc05
NV4.E01.pm05
DP-1

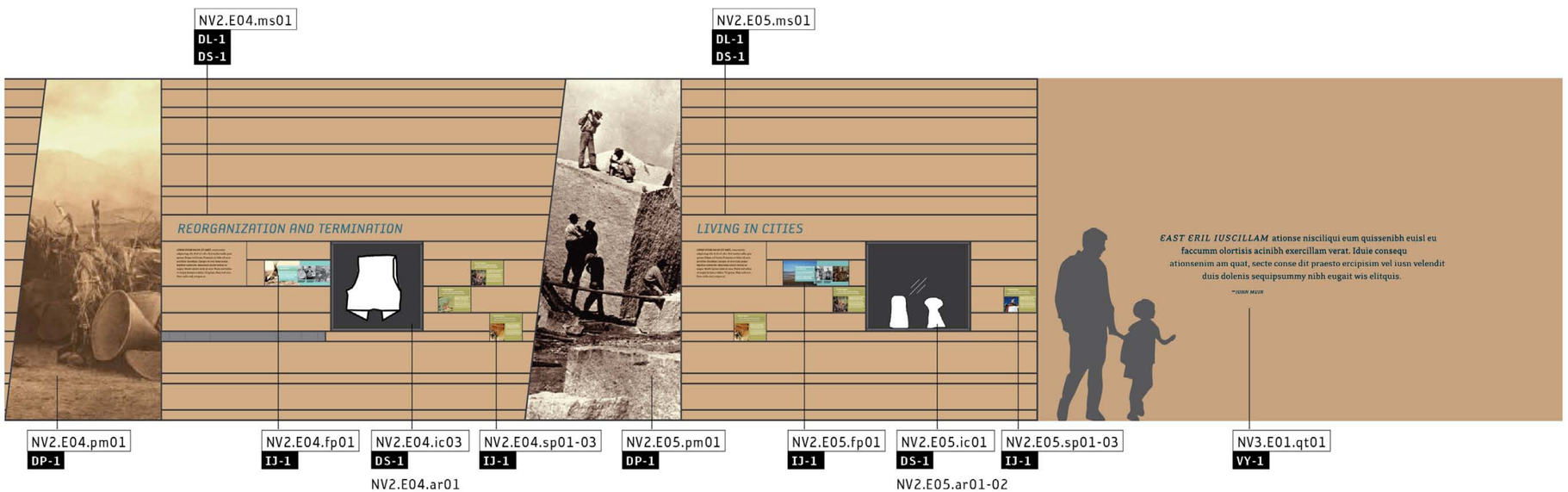
[NV] WE REMEMBER ELEVATION

NATIVE VOICES / LEVEL 5



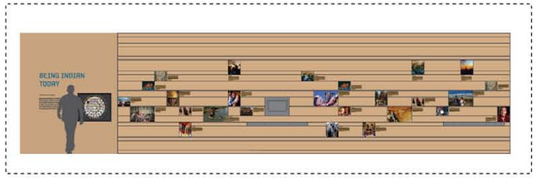
SAMPLE FOCUS PANEL

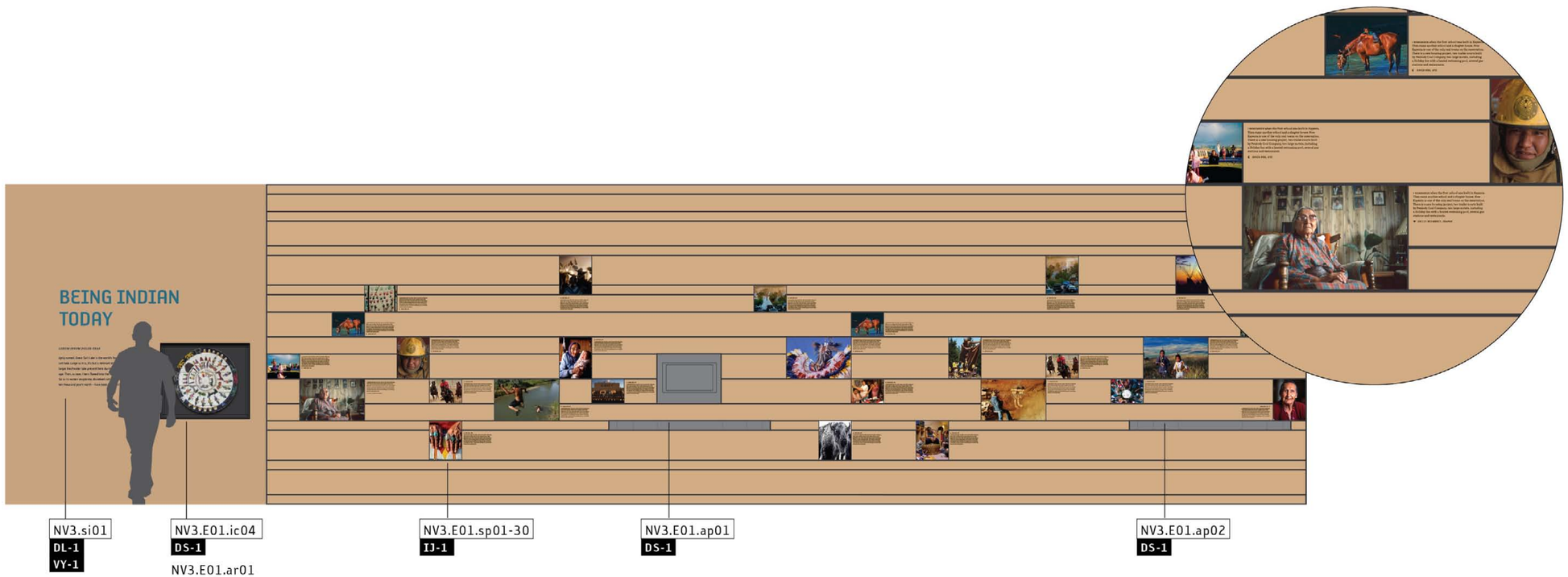


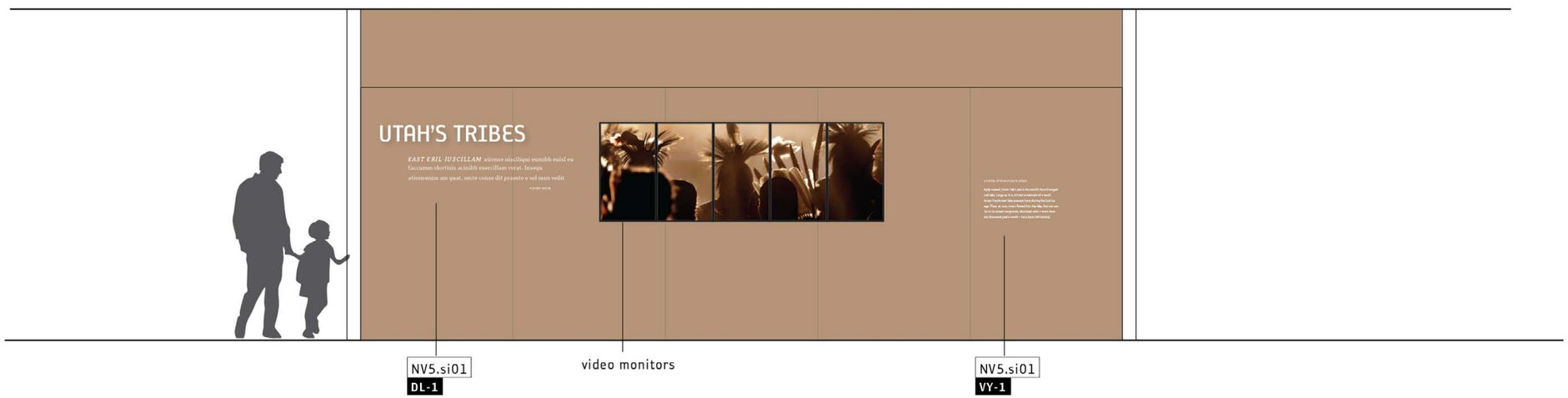

NV2.E04.ms01
DL-1
DS-1
NV2.E05.ms01
DL-1
DS-1
REORGANIZATION AND TERMINATION
LIVING IN CITIES
EAST ERIL IUSCILLAM ationse nisciliqui eum quissenibh euisl eu faccumm olortisis acinibh exercillam verat. Iduie consequ ationsenim am quat, secte conse dit praesto ercipisim vel iusn velendit duis dolenis sequipsummy nibh eugait wis elitquis.
—JOHN MUIR
NV2.E04.pm01
DP-1
NV2.E04.fp01
IJ-1
NV2.E04.ic03
DS-1
NV2.E04.ar01
NV2.E04.sp01-03
IJ-1
NV2.E05.pm01
DP-1
NV2.E05.fp01
IJ-1
NV2.E05.ic01
DS-1
NV2.E05.ar01-02
NV2.E05.sp01-03
IJ-1
NV3.E01.qt01
VY-1

[NV] BEING INDIAN TODAY ELEVATION

NATIVE VOICES / LEVEL 5

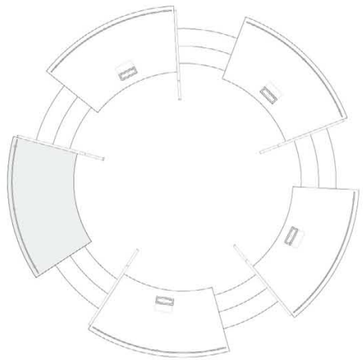


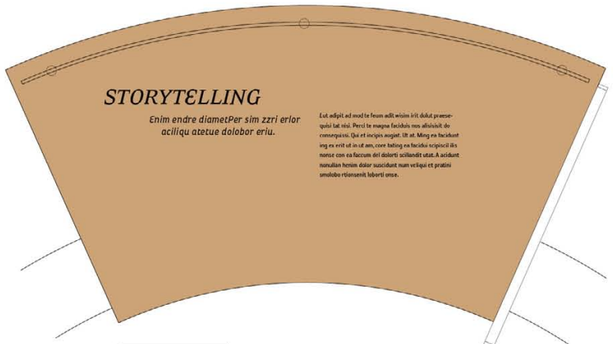



UTAH'S TRIBES
NV5.si01
DL-1
video monitors
NV5.si01
VY-1

[NV] STORYTELLING CIRCLE

NATIVE VOICES / LEVEL 5

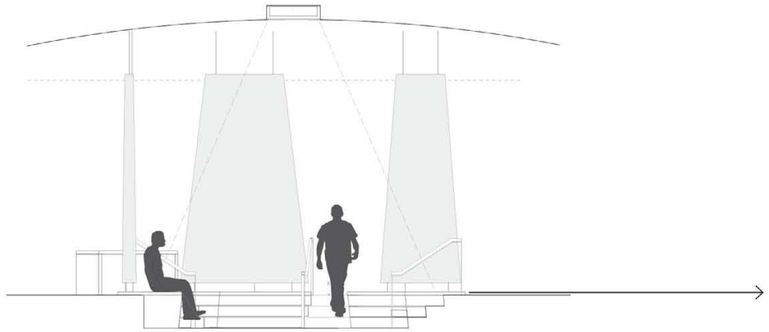




NV6.E01.tt01

RT-1

NV6.E01.ms01

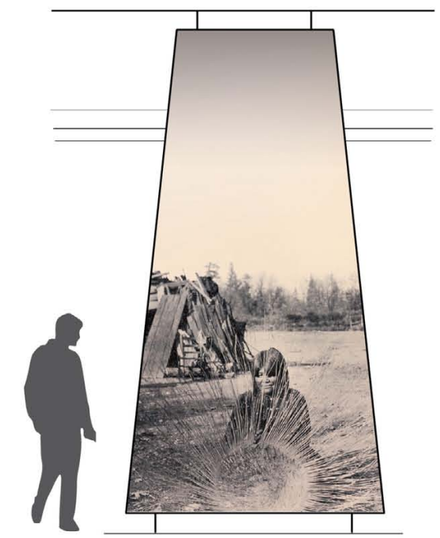


NV6.E01.gp01
DP-1

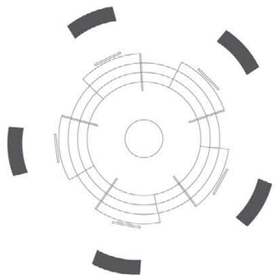
NV6.E01.gp02
DP-1

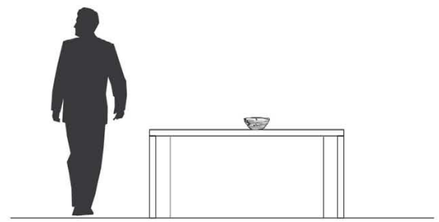
NV6.E01.gp03
DP-1

NV6.E01.gp04
DP-1



NV6.E01.gp05
DP-1



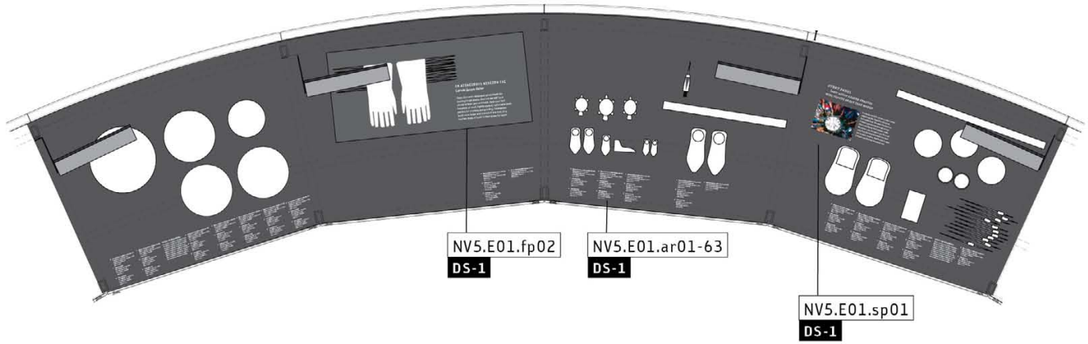


elevation

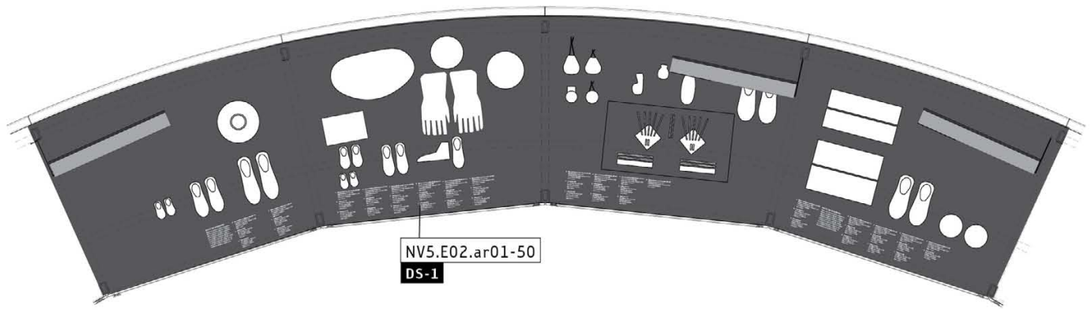
TYPICAL INTERACTIVE TABLE

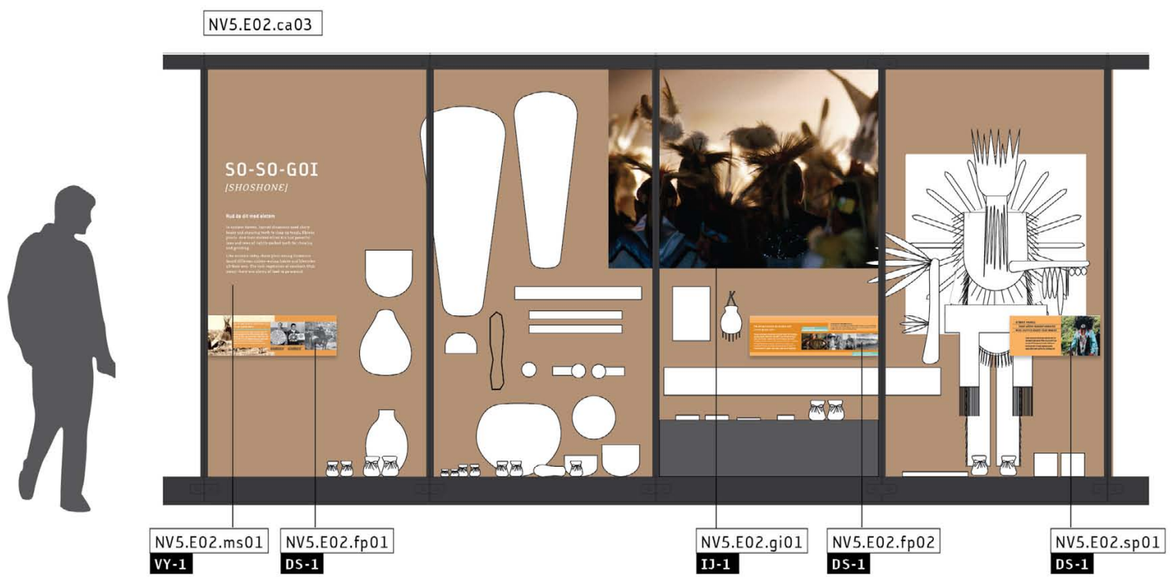
LG-1

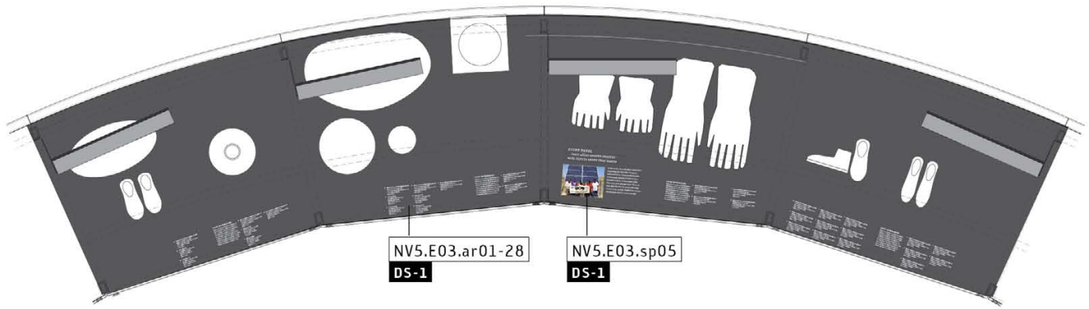
DINE
NUWUVI
NEWE
SO-SO-GOI
UTE
NAVAJO
PAIUTE
GOSHUTE
SHOSHONE
UTE



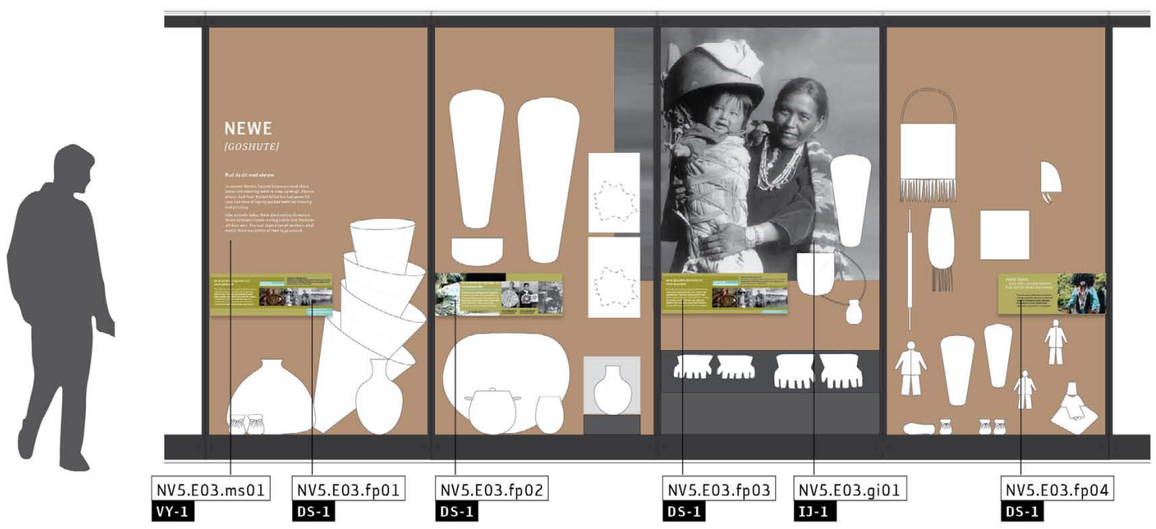
Ute NV5.E01.ca02

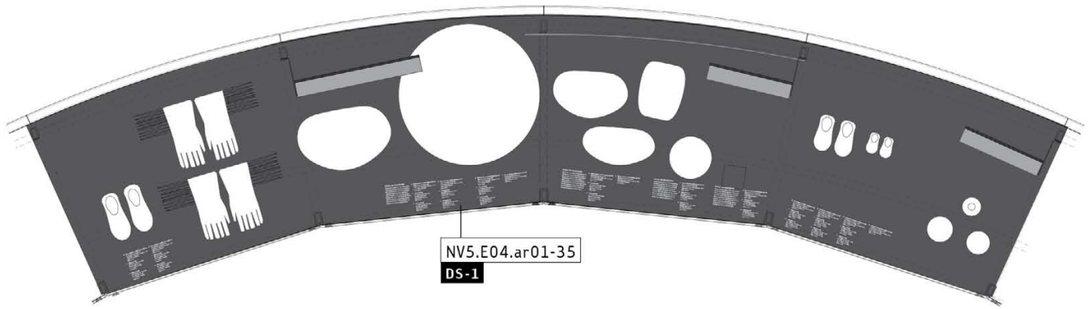

NV5.E02.ar01-50
DS-1


NV5.E02.ca03
SO-SO-GOI
[SHOSHONE]
NV5.E02.ms01
VY-1
NV5.E02.fp01
DS-1
NV5.E02.gi01
IJ-1
NV5.E02.fp02
DS-1
NV5.E02.sp01
DS-1

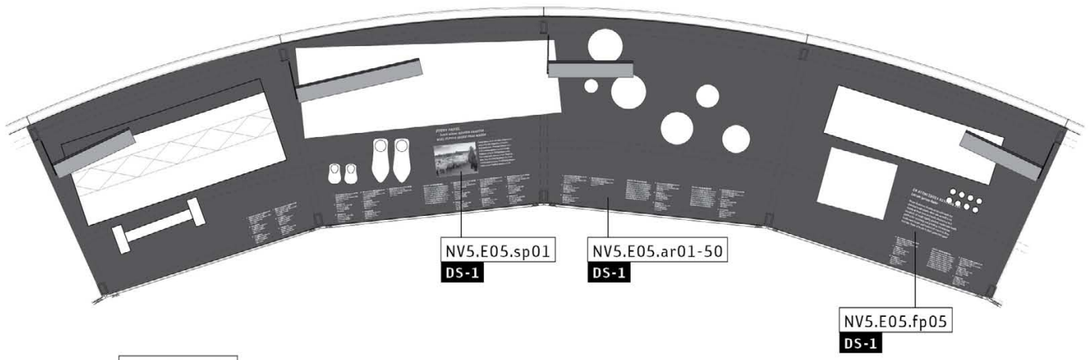

NV5.E03.ar01-28
DS-1
NV5.E03.sp05
DS-1

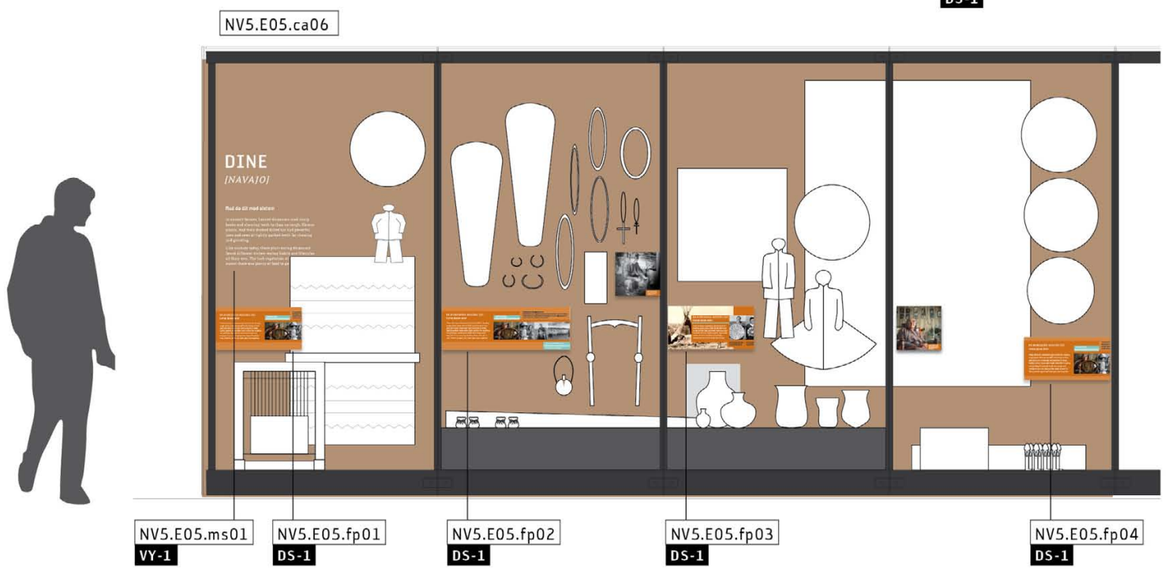
NV5.E03.ca04

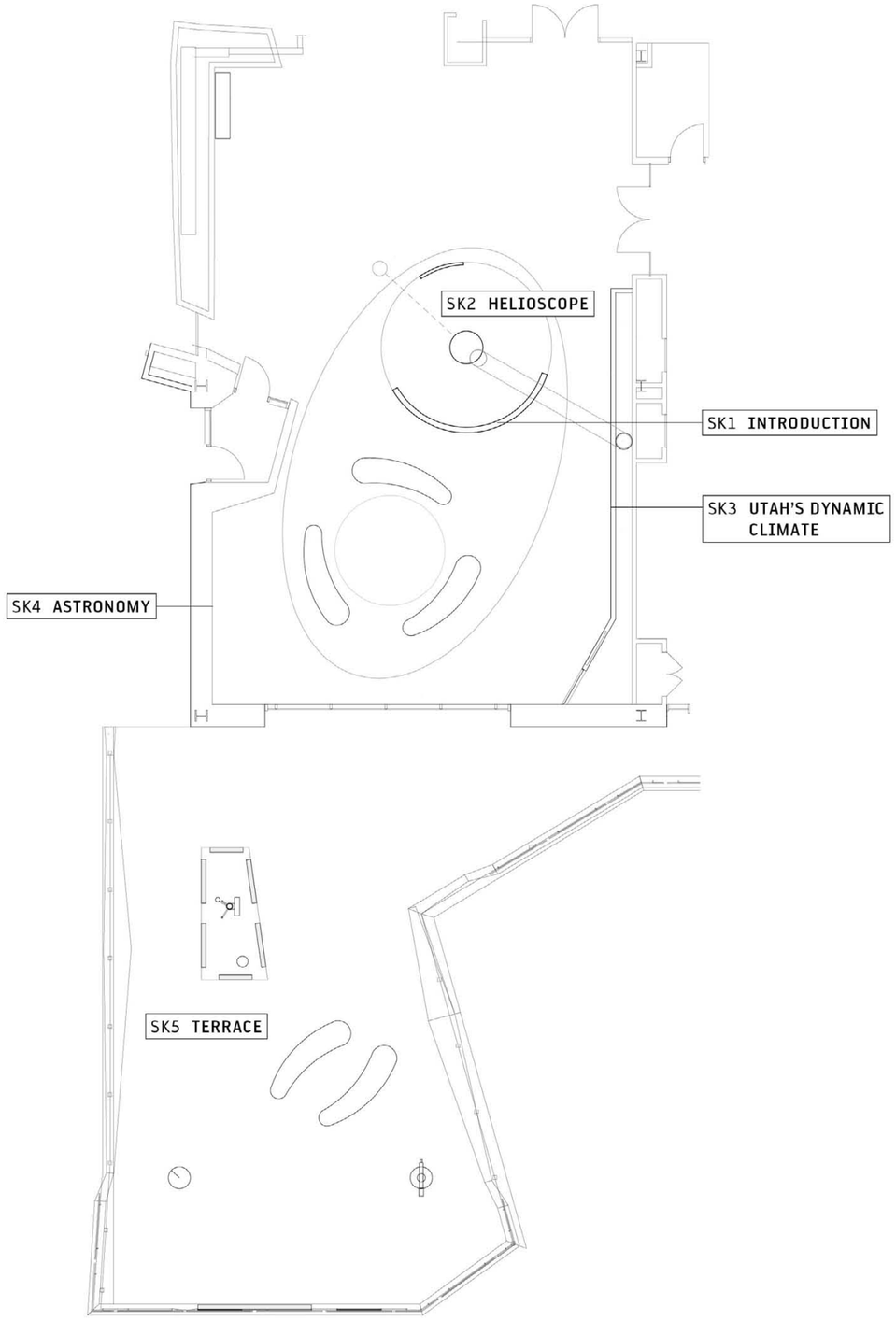

NEWE
[GOSHUTE]
NV5.E03.ms01
VY-1
NV5.E03.fp01
DS-1
NV5.E03.fp02
DS-1
NV5.E03.fp03
DS-1
NV5.E03.gi01
IJ-1
NV5.E03.fp04
DS-1


NV5.E04.ar01-35
DS-1

NV5.E04.ca05
NUWUVI
[PAIUTE]
NV5.E04.ms01
VY-1
NV5.E04.fp01
DS-1
NV5.E04.gi01
IJ-1
NV5.E04.fl01
DS-1
NV5.E04.fp02
DS-1

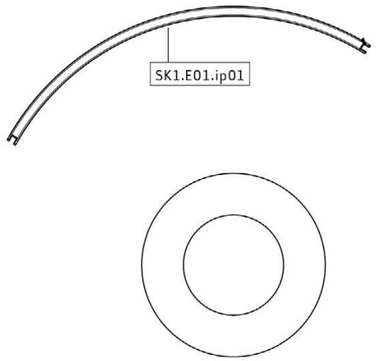

NV5.E05.sp01
DS-1
NV5.E05.ar01-50
DS-1
NV5.E05.fp05
DS-1

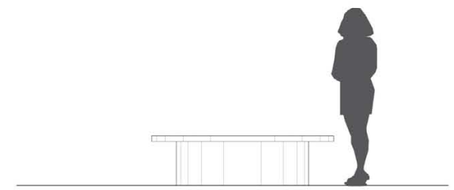

NV5.E05.ca06
DINE
(NAVAJO)
NV5.E05.ms01
VY-1
NV5.E05.fp01
DS-1
NV5.E05.fp02
DS-1
NV5.E05.fp03
DS-1
NV5.E05.fp04
DS-1

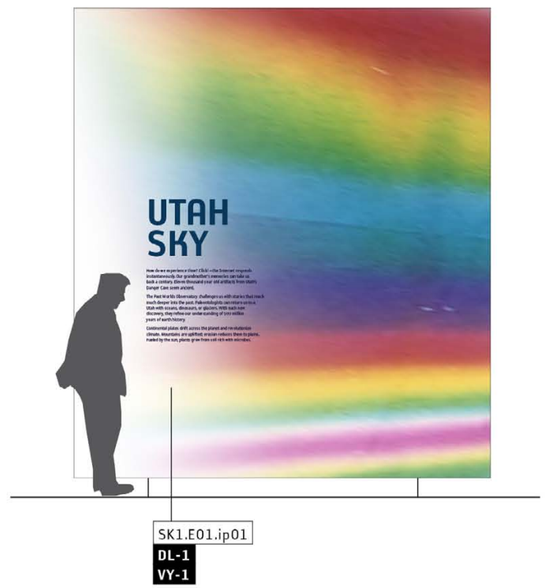


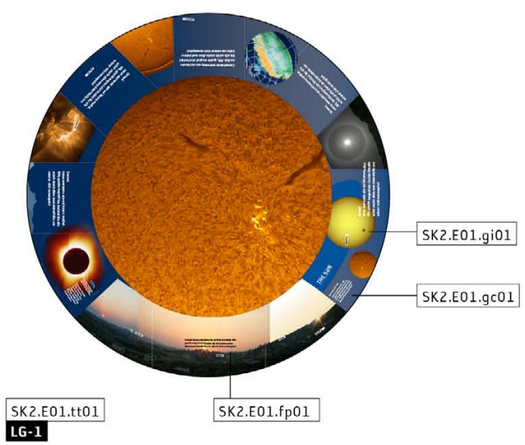
[SK] SKY

	LEVEL 5
177	INTRO PANEL / HELIOSCOPE
178	UTAH'S DYNAMIC CLIMATE
179	WEATHER STATION
181	ASTRONOMY
182	SKY TERRACE


SK1.E01.ip01

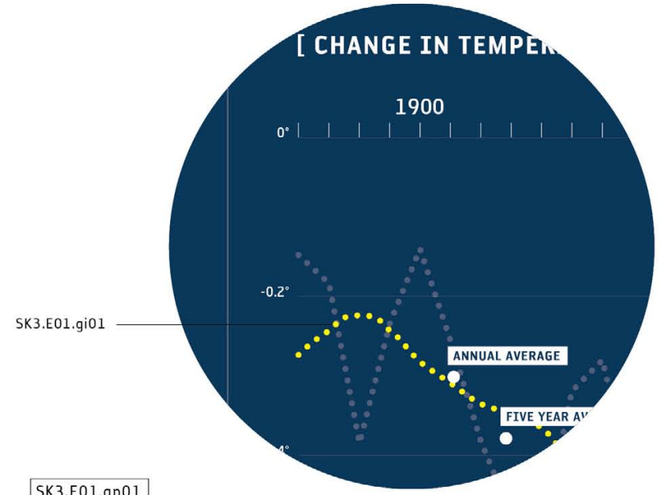



UTAH
SKY
SK1.E01.ip01
DL-1
VY-1


SK2.E01.gi01
SK2.E01.gc01
SK2.E01.tt01
LG-1
SK2.E01.fp01

[SK] UTAH'S DYNAMIC CLIMATE

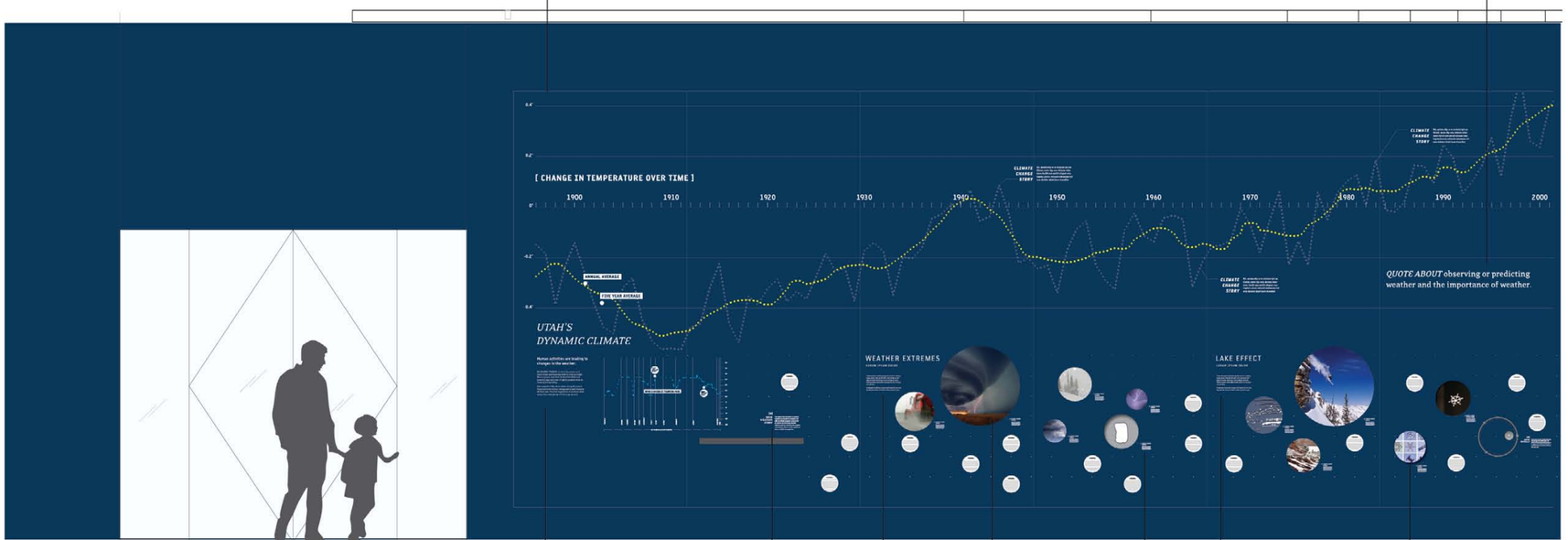
SKY / LEVEL 5

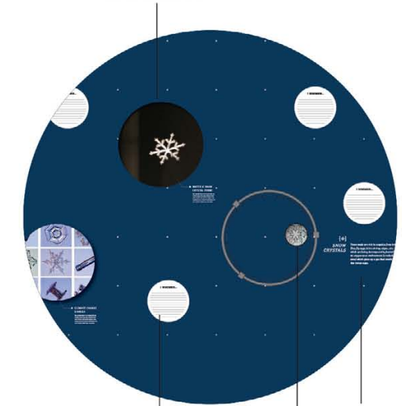


SK3.E01.gi01

SK3.E01.gp01
DS-1

SK3.E01.qt01





snowflake av

SK3.E01.ap02

SK3.E01.gp03
DS-1

Plastinated snow crystals and magnifier

SK3.E01.ms01

SK3.E01.ap01

SK3.E01.fp01

SK3.E01.gi02-06
IJ-1

SK3.E01.ic01
DS-1

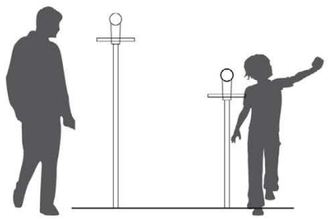
SK3.E01.ar01

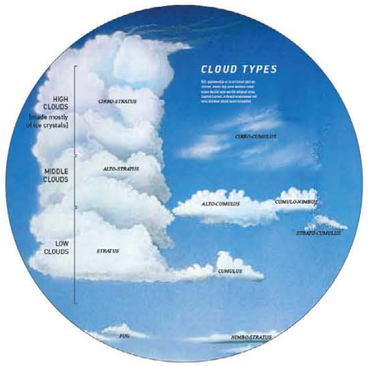
SK3.E01.fp02

SK3.E01.gi07-09
IJ-1

PREDICTING WEATHER
SK3.E01.gp02
DS-1
SK3.E01.fp03
SK3.E01.fl01
DS-1

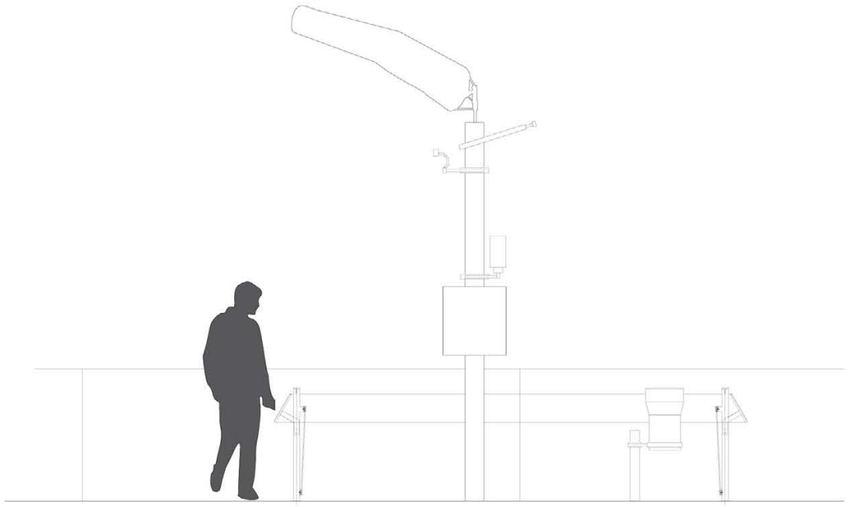
SK4.E01.pm01
DP-1
SK4.E01.gi04
IJ-1
SK4.E01.gc04
SK4.E01.gi03
IJ-1
SK4.E01.gc03
ASTRONOMY
QUOTE ABOUT wisit amet aliquam zzrit, velit nia tvolor sum zzrillan ut aciliquipit irilla core eugue iusciliquat. Ut verHent ad dolestrud magnit lummy
SK4.E01.ms01
SK4.E01.ic02
LG-1
SK4.E01.ar01-02
SK4.E01.sp01
DS-1
SK4.E01.gi02
IJ-1
SK4.E01.gc02
SK4.E01.gi01
IJ-1
SK4.E01.gc01
SK4.E01.sp02
DS-1
SK4.E01.ic01
LG-1
SK4.E01.ar01-03
SK4.E01.qt01
VY-1

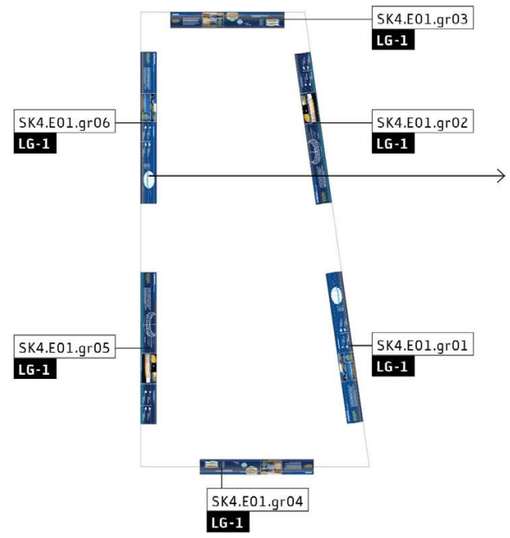




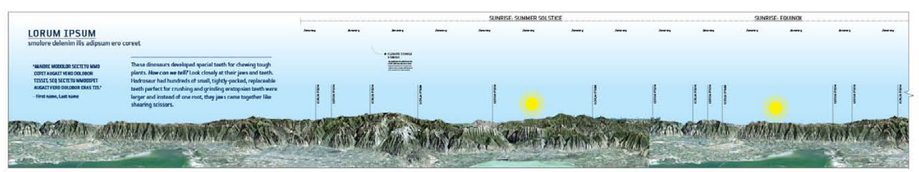
SK5.E02.gp01
LG-1

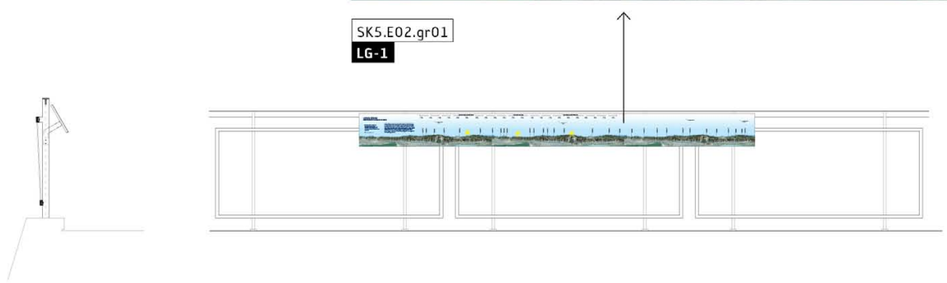
SK5.E02.sp01
AS-1




SK4.E01.gr03
LG-1
SK4.E01.gr06
LG-1
SK4.E01.gr02
LG-1
SK4.E01.gr05
LG-1
SK4.E01.gr01
LG-1
SK4.E01.gr04
LG-1

INVERSION
smolore delenim ilis adipsum ero coreet
90%
QUOTE ABOUT observing or predicting weather; about importance of weather to people


LORUM IPSUM
smolore delenim ilis adipsum ero coreet
SUNRISE: SUMMER SOLSTICE
SUNRISE: EQUINOX


SK5.E02.gr01
LG-1

PANEL SCHEDULES

	LEVEL 3
187	CANYON
189	UTAH FUTURES
191	OUR BACKYARD
193	PAST WORLDS
201	MINERAL HALL
203	LAKE
205	FIRST PEOPLES
213	LAND
219	LIFE
227	NATIVE VOICES
233	SKY

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
CN2.E02.qt01-qt08	quotes	Canyon Collections Wall	Quotes are inscribed on various facets of the North Canyon Collections Wall	(8) 72" x 48"		DL	
CN3.E01.si01	section intro	Collections Storage Window	Section intro describes collections storage; role of research and collections in the museum and in science	48" x 24" 36" x 28"		DL title VY body text	
CN3.E01.pm01-03	photomural	Collections Storage Window	Collections	(3) 54" x 120"	on GWB	DP	
CN3.E01.sp01-03	story panel	Collections Storage Window	Story panel	18" x 30"	1/8" paint finish substrate	DS	
CN2.E01.ar01	artifact label	Canyon Collections Wall	Label describes Utah Sky and artifacts	24" x 24"	3/4" paint finish substrate	DS	
CN2.E01.ar02	artifact label	Canyon Collections Wall	Label describes Native Voices	24" x 24"	3/4" paint finish substrate	DS	
CN2.E01.ar03	artifact label	Canyon Collections Wall	Label describes Life	24" x 24"	3/4" paint finish substrate	DS	
CN2.E01.ar04	artifact label	Canyon Collections Wall	Label describes Past Worlds	24" x 24"	3/4" paint finish substrate	DS	
CN2.E01.ar05	artifact label	Canyon Collections Wall	Label describes First Peoples	24" x 24"	3/4" paint finish substrate	DS	
CN2.E01.ar06	artifact label	Canyon Collections Wall	Label describes the Great Salt Lake	24" x 24"	3/4" paint finish substrate	DS	
CN2.E01.ar07	artifact label	Canyon Collections Wall	Label describes Land	24" x 24"	3/4" paint finish substrate	DS	
CN2.E01.ar08	artifact label	Canyon Collections Wall	Label describes UF	24" x 24"	3/4" paint finish substrate	DS	
CN1.E01.gr01	graphic rail	Topo Model	Land Ownership	42" x 10"		LG	
CN1.E01.gr02	graphic rail	Topo Model	Demographics	42" x 10"		LG	
CN1.E01.gr03	graphic rail	Topo Model	Attractions	42" x 10"		LG	
CN2.E01.fp01	focus panel	Canyon Collections Wall	Overall organization of the museum	24" x 24"		VY	
TM.E01.gp01-40	graphic panel	Trail marker	Trail markers: Partners and programs	(40) 3" diam.	1/8" recycled substrate with eased edge	DS	see 3D drawings for details
TM.E02.gp01-40	graphic panel	Trail marker	Trail markers: UMNH greatest hits	(40) 3" diam.	1/8" recycled substrate with eased edge	DS	see 3D drawings for details
TM.E03.gp01-40	graphic panel	Trail marker	Trail markers: Sustainability	(40) 3" diam.	1/8" recycled substrate with eased edge	DS	see 3D drawings for details

[CN]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
TM.E04.gp01-40	graphic panel	Trail marker	Trail markers: Dig deeper/ Choose your own adventure	(40) 3" diam.	1/8" recycled substrate with eased edge	DS	see 3D drawings for details
TM.E05.gp01-40	graphic panel	Trail marker	Trail markers: Teaching UMNH	(40) 3" diam.	1/8" recycled substrate with eased edge	DS	see 3D drawings for details
TM.E06.gp01-40	graphic panel	Trail marker	Trail markers: The art of fact (formerly Utah voices)	(40) 3" diam.	1/8" recycled substrate with eased edge	DS	see 3D drawings for details
NH.ip01	graphic panel	Natural History Now	Natural History Now intro panels	(3) 60" x 18"		DL	see 3D drawings for details
NH.gp01	graphic panel	Natural History Now	Natural History Now intro panel graphic	(3) 21" x 18"		IJ-2	see 3D drawings for details
NH.gp02	graphic panel	Natural History Now	Natural History Now small graphic unit	(1) 24" x 18"		IJ-2	see 3D drawings for details
NH.gp03	graphic panel	Natural History Now	Natural History Now large graphic unit	(1) 48" x 18"		IJ-2	see 3D drawings for details
NH.gp04	graphic panel	Natural History Now	Natural History Now touch object graphic	(1) 24" x 18"		IJ-2	see 3D drawings for details

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
UF1.E01.ip01	introduction panel	Introduction	We can forge a sustainable present and future.	60" x 24" 36" x 30"		DL title VY body text	
UF2.E01.ar01-12	artifact label	The Carbon Story UF2.E01.ca01	artifact labels	96" x 7" live area:	1/8" paint finish substrate on case	DS	see 3D drawings
UF2.E01.fp01	focus panel	The Carbon Story UF2.E01.ca01	How plants capture carbon	36" x 10"	3/4" paint finish substrate	DS	
UF2.E03.fp02	focus panel	The Carbon Story UF2.E01.ca01	Clothing and the carbon cycle	36" x 10"	3/4" paint finish substrate	DS	
UF2.E05.fp03	focus panel	The Carbon Story UF2.E01.ca01	Carbonates	36" x 10"	3/4" paint finish substrate	DS	
UF2.E06.fp04	focus panel	The Carbon Story UF2.E01.ca01	Analysis of carbon can help scientists identify dinosaur diets.	36" x 10"	3/4" paint finish substrate	DS	
UF3.E01.ms01	mindset	Sustainability	Definition of sustainability and explanation of the three pillars	18" x 26"	3/4" paint finish substrate	DS	
UF3.E01.gp01-09	graphic panels	Sustainability	Sustainability topics	(9) 18" x 26"		IJ	
UF3.E01.gr01	graphic rail	Central area	sustainabilty av/ talkback/ activity prompts	204" x 10"		LG	
UF2.E01.ms01	mindset	The Carbon Story UF2.E01.ca01	Mindset panel explains the carbon cycle.	26" x 26"		VY	
UF3.E01.ap03	activity prompts	Central area	Sustainabilty av prompt, talkback prompts	12" x 12"		VY	
UF3.E01.ms01	mindset	Sustainability	Titles for the 3 sustainability sections	53" x 10"		VY	
UF4.E01.qt01	Quote	Passage to PW	About the future	72" x 36"		VY	
UF4.E01.qt02	Quote	Passage to PW	About the past informing the future	48" x 24"		VY	
UF4.E01.qt03	Quote	Passage to PW	About extinctions past and present	48" x 24"		VY	
UF2.E01.gp01	graphic panel	The Carbon Story UF2.E01.ca01	Carbon cycle diagram	48" x 48"	on rear case glass	VY (3 colors)	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
OB1.E01.ip01	intro panel	Intro	Introduces observatory title	72" x 8"		DL title	
OB1.E04..pm01	photomural	Garden Center	Backdrop to tool area showing insect interactions	72" x 96"		DP	
OB2.E01.pm01	photomural	Tree Area	photomural- (on west wall)	26" x 120"		DP	
OB3.E01.pm01	photomural	South Wall	Photomural over the underground crawl	240" x 120"		DP	
OB3.E01.pm02	photomural	Underground Crawl	Photomural in the underground crawl	540" x 52"		DP	
OB4.E01.pm01	photomural	Pond Shoreline	Scenic pond shoreline mural	384" x 120"		DP	
OB3.E01.ar01-ar03	artifact labels	Underground Crawl	Snake, collared lizard and ant colony	(3) 5" x 5"	(no paperstone)	DS	
OB1.E03.gp01	graphic panel	Garden	Magnetic metal panel for flexible graphics	100" x 22"	on magnetic surface	DS	
OB1.E01.ap01	activity prompt	Front Porch	Take a basket	12" diameter	(no paperstone)	LG	
OB1.E01.gp01	graphic panel	Front Porch	identifies swallows nest	18" diameter	(no paperstone)	LG	
OB1.E02.gp01	graphic panel	Kitchen Area	A spider and its webbed creations	10" diameter	(no paperstone)	LG	
OB1.E04.ar01-ar12	graphic panel	Kitchen Area	Id's for specimens	3" diameter	(no paperstone)	LG	
OB2.E01.gc01-gc05	graphic captions	Tree Area	Textured bark panels associated with five different trees	(5) 10" x 10"	(no paperstone)	LG	
OB2.E01.gp01-gp05	graphic panels	Tree Area	Five animals featured in the ambient audio who make their home in or near the tree	10" diameter	(no paperstone)	LG	
OB4.E01.ap01-02	activity prompt	Pond Shoreline	Encourages kids to look closely	(2) 9" diameter	(no paperstone)	LG	
OB4.E01.gi01-06	graphic panel	Pond Shoreline	Three critters that live in the water	(6) 6" diameter	(no paperstone)	LG	
OB4.E01.gi07-gi08	graphic panel	Pond Shoreline	Tracks in the bottom of the pond show what creatures have been passing through	(2) 9" diameter	(no paperstone)	LG	
OB4.E01.gp02-gp04	graphic panel	Pond Shoreline	Woodhouse toad, boreal chorus frog and tiger salamanders habitats	(3) 12" diameter	(no paperstone)	LG	
OB1.E02.qt01	quote	Kitchen Area	Hidden discoveries that kids might find indoors	48" x 12"		VY	
OB1.E04.qt01	quote	Garden Center	Mystery waiting outdoors	48" x 12"		VY	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
PW2.si01	section intro	Lake Bonneville	Orients visitors to the Lake Bonneville ecosystem	36" x 12" 36" x 10"	brake formed steel 77" x 10" x 42"	AS-1 WJ-1	
PW3.si01	section intro	Eocene Lakeshore	Orients visitors to the Eocene exhibits.	36" x 12" 36" x 10"	brake formed steel 77" x 10" x 42"	AS-1 WJ-1	
PW4.si01	section intro	Late Cretaceous	Orients visitors to the Cretaceous exhibits	36" x 12" 36" x 10"	brake formed steel 77" x 10" x 42"	AS-1 WJ-1	
PW5.si01	section intro	Late Jurassic	Orients visitors to the Late Jurassic exhibits	36" x 12" 36" x 10"	brake formed steel 77" x 10" x 42"	AS-1 WJ-1	
PW3.E02.qt01	quote/question	Eocene Lakeshore	Eocene Lakeshore	72" x 12"		DL	
PW1.E01.ip01	intro panel	Gallery Intro in LK	Intro from Lake Bonneville	60" x 24" 36" x 30"		DL title VY body text VY body text	
PW1.E02.ip01	intro panel	Gallery Intro at Learning Lab	Utah has an incredible fossil record	60" x 24" 36" x 30"		DL title VY body text VY body text	
PW2.E01.pm01	photomural	Lake Bonneville Fauna	Lake Bonneville approximately 12,000 ya	240" x 216" 84" x 120"	on GWB	DP	
PW3.E01.pm01	photomural	Eocene Lakeshore	Artists mural of Eocene	240" x 378"	on GWB	DP	
PW4.E01.pm01	photomural	Late Cretaceous	Artist's mural showing conifers, araucaria, shrubs	240" x 378"	on GWB	DP	
PW5.E01.pm01	photomural	Late Jurassic	Artist's mural showing Late Jurassic scene	240" x 378"	on GWB	DP	
PW4.E03.pm01	photomural	Late Cretaceous Tableau	Artist's mural Late Cretaceous scene	372" x 156"	on substrate	DP	
PW4.E08.pm01	photomural	Dino Dig	Dino Dig	168" x 168"	on substrate	DP	
PW5.E03.pm01	photomural	CLQ PW5.E03.ca06	Quarry map photomural, distribution and taphonomy	288" x 288"		DP	
PW1.E02.fp01	focus panel	Gallery Intro at Learning Lab	Real vs. cast material	32" x 10"	1/8" paint finish substrate	DS	
PW2.E02.ar01-04	artifact labels	Bison Attack PW2.E02.rc01	Smilodon, Canis dirus skulls	40" x 2" live area: (4) 5" x 2"	1/8" paint finish substrate	DS	
PW3.E02.ar01-16	artifact labels	Eocene Lakeshore Drawers	In pull-out drawers. Hydrocarbon, vertebrate poop, undichnus, fish, ostracod, sediment, crocodile, leaf, bird or bat, turtle layers	(8) 30" x 2" live area" (16) 5" x 2"	1/8" paint finish substrate	DS	
PW4.E02.ar01	artifact labels	Late Cretaceous PW4.E02.rc01	Hadrosaur/ceratopsian material	40" x 2" live area: 5" x 2"	1/8" paint finish substrate	DS	

[PW]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
PW4.E02.ar01-06	artifact labels	Late Cretaceous PW4.E02.rc02	Hypsilophodontid material	40" x 2" live area: (6) 5" x 2"	1/8" paint finish substrate	DS	
PW4.E03.ar	artifact labels	Late Cretaceous PW4.E03.rc01	Eggshell, theropod teeth, hypsilophodontid femur	40" x 2" live area: ( ) 5" x 2"	1/8" paint finish substrate	DS	
PW4.E03.ar01-05	artifact labels	Late Cretaceous PW4.E03.rc02	Ant nest, plant material, mammal material, lizards and snakes	40" x 2" live area: (5) 5" x 2"	1/8" paint finish substrate	DS	
PW4.E03.ar01-09	artifact labels	Late Cretaceous PW4.E03.rc03	Turtles, fish	40" x 2" live area: (9) 5" x 2"	1/8" paint finish substrate	DS	
PW5.E02.ar01	artifact labels	Allosaurus Foot PW5.E02.rc01	Allosaurus Foot	40" x 1.5" live area: 5" x 2"	1/8" paint finish substrate	DS	
PW8.E04.pm01	photomural	Rock Cycle	Rock Cycle	52" x 52"	1/8" paint finish substrate	DS	
PW3.E03.ar01-12	artifact labels	Green River PW3.E03.ca02 side a	Green River fish and rays	144" x 7" live area: (12) 6" x 3"	1/8" paint finish substrate on case deck	DS	see 3D drawings
PW3.E03.ar01-33	artifact labels	Green River PW3.E03.ca02 side b	Green River plants, insects	144" x 7" live area: (33) 6" x 3"	1/8" paint finish substrate on case deck	DS	see 3D drawings
PW4.E03.ar01-26	artifact labels	Kaiparowits diversity PW4.E03.ca05	Kaiparowits material	144" x 7" live area: (26) 6" x 3"	1/8" paint finish substrate on case deck	DS	see 3D drawings
PW4.E06.ar01-11	artifact labels	Cedar Mt. Formation PW4.E06.ca04	Sauropod, Iguanodontian, ankylosaurid, theropod, Crocodile, Cynodont material	96" x 7" live area: (11) 6" x 3"	1/8" paint finish substrate on case deck	DS	see 3D drawings
PW4.E09.ar01-16	artifact labels	N. Horn Formation PW4.E09.ca03	T. rex material	96" x 7" live area: (16) 6" x 3"	1/8" paint finish substrate on case deck	DS	see 3D drawings
PW5.E03.ar01-27	artifact labels	CLQ PW5.E03.ca06	CLDQ material	288" x 7" live area: (27) 6" x 3"	1/8" paint finish substrate on case deck	DS	see 3D drawings
PW2.E03.ar01-19	artifact labels	Pleistocene Mammals PW2.E03.ca01	Mammoth, mastodon, Musk ox, Ovis canadensis, Camelops, Bison, Canis dirus, arctodus material	144" x 7" live area: (19) 6" x 3"	1/8" paint finish substrate on lift and case deck	DS	see 3D drawings
PW2.E02.fp01	focus panel	Pleistocene Mammals PW2.E03.ca01	predator techniques	24" x 10"	3/4" paint finish substrate	DS	
PW2.E03.fp02	focus panel	Pleistocene Mammals PW2.E03.ca01	Asexual selection in mammoths, mastodons, bison	24"x 10"	3/4" paint finish substrate	DS	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
PW2.E03.ms01	mindset	Pleistocene Mammals PW2.E03.ca01	Pleistocene mammals	(2) 40" x 48"	3/4" paint finish substrate	DS	
PW4.E03.ms01	mindset	Kaiparowits diversity PW4.E03.ca05	Kaiparowits diversity	40" x 48"	3/4" paint finish substrate	DS	
PW4.E06.ms02	mindset	Cedar Mt. Formation PW4.E06.ca04	Importance of Cedar Mountain Formation	40" x 48"	3/4" paint finish substrate	DS	
PW4.E09.gi01	graphic image	N. Horn Formation PW4.E09.ca03	Dinosaur extinctions, and the K/T boundary at North Horn	18" x 10"	3/4" paint finish substrate	DS	
PW4.E09.ms01	mindset	N. Horn Formation PW4.E09.ca03	Environment and significance of the North Horn Formation	40" x 48"	3/4" paint finish substrate	DS	
PW5.E03.fp02	focus panel	CLQ PW5.E03.ca06	Taphonomy and describes the taphonomic features found at CLDQ	30" x 10"	3/4" paint finish substrate	DS	
PW5.E03.fp03	focus panel	CLQ PW5.E03.ca06	Allosaur growth and age distribution	30" x 10"	3/4" paint finish substrate	DS	
PW5.E03.fp04	focus panel	CLQ PW5.E03.ca06	Diversity of CLDQ dinosaurs	30" x 10"	3/4" paint finish substrate	DS	
PW5.E03.gi05	graphic image	CLQ PW5.E03.ca06	Quarry map with highlighted areas	36" x 42"	3/4" paint finish substrate	DS	
PW5.E03.fp01	focus panel	Solve the Mystery of the Quarry	Introduces scenarios (w/ illustrations)	(4) 24" x 24"	3/4"paint finish substrate	DS	
PW3.E03.ms01	mindset	Green River Case	Green River diversity	30" x 42"	on case partition	DS	
PW8.E04.gi01	graphic image	Rock Cycle	Permanent timeline and magnetic plants and animals	(25) 8" x 8"	on magnet	DS	
PW7.E01.gr03	graphic rail	Paleo-Prep Lab	Activity prompt for interactive talk back board	60" x 10"	on magnetic surface	DS	
PW8.E02.ms01	mindset	Earth Lab: Triassic plants	Mindset triassic plants	30" x 40"		DS	
PW5.E03.gi01-04	graphic image	Solve the Mystery of the Quarry	Scenario reconstructions w/ focus panels	(4) 24" x 24"	1/8" set flush w/ DS panel (PW5.E03.fp01)	IJ	
PW2.E03.gi01	graphic image	Pleistocene Mammals Case	Dig site background image	48" x 72"	on approved conservation substrate	IJ	
PW2.E03gi02	graphic image	Pleistocene Mammals Case	Photomural from Lab side	94" x 72"	on approved conservation substrate	IJ	
PW4.E03.gi01	graphic image	Kaiparowits diversity PW4.E03.ca05	Dig site background image	48" x 72"	on approved conservation substrate	IJ	

[PW]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
PW4.E06.gi01	graphic image	Cedar Mt. Formation PW4.E06.ca04	Quarry image	48" x 72"	on approved conservation substrate	IJ	
PW4.E09.gp01	graphic image	N. Horn Formation PW4.E09.ca03	Dig site background image	48" x 72"	on approved conservation substrate	IJ	
PW5.E03.gi06	graphic image	CLQ PW5.E03.ca06	Site photo	48" x 72"	on approved conservation substrate	IJ	
PW5.E03.gi07	graphic image	CLQ PW5.E03.ca06	Site photo	48" x 72"	on approved conservation substrate	IJ	
PW3.E02.ap01	activity prompt	Eocene Lakeshore Drawers	Above pull-out drawers	5" diam.	(no paperstone)	LG	
PW3.E02.gc01-08	graphic caption	Eocene Lakeshore Drawers	Labels for pull-out drawers	(8) 30" x 2.5"	1/16" mounted to millwork	LG	
PW2.E04.gp06-10	graphic panel	Ice Age Dinner Table	(5) Place cards	(5) 2.75" diam.	1/4" graphic mounted to tt	LG	
PW8.E01.gp01	graphic panel	Earth Lab: Minerals	Mineral characteristics/ graphic captions	120" x 14"	mounted to GWB (no paperstone)	LG	
PW8.E02.gp01	graphic panel	Earth Lab: Triassic plants	Triassic forests. Artifact labels describe ferns and gymnosperms	120" x 14"	mounted to GWB (no paperstone)	LG	
PW4.E08.gr01	graphic rail	Dino Dig	Dino dig/ activity prompt	60" x 10"	on MDF	LG	
PW2.E01.gr01	graphic rail	Lake Bonneville Fauna	Lake Bonneville mindset / graphic captions	116" x 10"		LG	
PW2.E01.id01	id label	Lake Bonneville Fauna	Lake Bonneville id- side a	19" diam.		LG	
PW2.E01.id01	id label	Lake Bonneville Fauna	Lake Bonneville id- side b	18" diam.	1/16" mounted to 1/8" steel	LG	
PW2.E02.gr01	graphic rail	Bison Attack	Bison Attack mindset	78" x 10"		LG	
PW2.E02.gr02	graphic rail	Bison Attack	Predator technique focus/ family label	120" x 10"		LG	
PW2.E04.gp01- 5	graphic panel	Ice Age Dinner Table	(5) Meals	(5) 17" diam.		LG	
PW2.E04.tt01	graphic panel	Ice Age Dinner Table	Pleistocene dinner table	48" diam.		LG	
PW2.E05.gr01	graphic rail	Bird Evolution	Bird evolution/ mindset/ artifact label	48" x 10"		LG	
PW3.E01.gr01	graphic rail	Eocene Lakeshore	Eocene ecosystem/ mindset	32" x 10"		LG	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
PW3.E01.gr02	graphic rail	Eocene Lakeshore	Mammals filling roles/ focus	32" x 10"		LG	
PW3.E01.id01	id label	Eocene Lakeshore	Who's who illustration- side a	18" diam.		LG	
PW3.E01.id01	id label	Eocene Lakeshore	Who's who illustration- side b	19" diam.	1/16" mounted to 1/8" steel	LG	
PW3.E02.gr01	graphic rail	Eocene Lakeshore	Stratigraphy basics and hydrocarbons/ focus/ activity prompt	130" x 10"		LG	
PW3.E02.gr02	graphic rail	Eocene Lakeshore	Underwater ecosystem of Green River/ mindset/ family label	94" x 10"		LG	
PW3.E02.id01	id label	Eocene Lakeshore	Eocene tableau- side a	18" diam.		LG	
PW3.E02.id01	id label	Eocene Lakeshore	Eocene tableau- side b	19" diam.	1/16" mounted to 1/8" steel	LG	
PW4.E01.fl01	family label	Late Cretaceous	Juvenile T. rex	18" x 10"		LG	
PW4.E01.gr01	graphic rail	Late Cretaceous	Carnivorous dinosaurs/ mindset	32" x 10"		LG	
PW4.E01.gr02	graphic rail	Late Cretaceous	Carnivore niches/ focus panel	18" x 10"		LG	
PW4.E01.id01	id label	Late Cretaceous	Who's who illustration label - side a	18" diam.		LG	
PW4.E01.id01	id label	Late Cretaceous	Who's who illustration label - side b	19" diam.	1/16" mounted to 1/8" steel	LG	
PW4.E02.gr01	graphic rail	Late Cretaceous Plant Eaters	Herbivores found in the Kp/ mindset	32" x 10"		LG	
PW4.E02.gr02	graphic rail	Late Cretaceous	Hadrosaur and ceratopsian teeth and diet, signaling structures and sexual selection/ focus panels	18" x 10"		LG	
PW4.E02.gr03	graphic rail	Late Cretaceous	Hypsilophodontid and pachycephalosaur finds	18" x 10"		LG	
PW4.E02.gr04	graphic rail	Late Cretaceous	Sexual Selection	32" x 10"		LG	
PW4.E02.id01	id label	Late Cretaceous	Who's who illustration label- side a	18" diam.		LG	
PW4.E02.id01	id label	Late Cretaceous	Who's who illustration label- side b	19" diam.	1/16" mounted to 1/8" steel	LG	
PW4.E03.gr01	graphic rail	Late Cretaceous Tableau	Drawing interactive with activity prompts	124" x 10"		LG	
PW4.E03.gr02	graphic rail	Late Cretaceous Tableau	Color no content	204" x 10"		LG	
PW4.E03.gr03	graphic rail	Late Cretaceous	Ecosystem/ mindset	22" x 10"		LG	

[PW]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
PW4.E03.id01	id label	Late Cretaceous Tableau	Ecosystem players, where they get their food- side a	18" diam.		LG	
PW4.E03.id01	id label	Late Cretaceous Tableau	Ecosystem players, where they get their food- side b	19" diam.	1/16" mounted to 1/8" steel	LG	
PW4.E04.gp01	graphic panel	Gryposaurus Activities	Quarry map photomural, distribution and taphonomy. Includes activity prompts	84" x 36"		LG	
PW4.E05.gr01	graphic rail	Ceratopsian Evolution	Ceratopsian anatomy and Cretaceous biogeography/ mindset/ graphic image/ caption	32" x 10"		LG	
PW4.E05.gr02	graphic rail	Ceratopsian	Chasmosaurs and Centrosaurs/ focus panels/ artifact labels/ story panels	32" x 10"		LG	
PW4.E06.gr01	graphic rail	Therizinosaurs/ Early Cretaceous	Meat-eating dinosaurs evolve into herbivores, transitional features/ mindset/ focus panel	130" x 10"		LG	
PW4.E06.gr02	graphic rail	Therizinosaurs/ Early Cretaceous	Humans as omnivores vs. Falcarius and Nothronychus/ family label/ artifact labels	6" x 10"		LG	
PW4.E07.gi01	graphic rail	New Finds	Paleontologist story, new dinosaur species/ story/ focus/ mindset/ artifact label	182" x 10"		LG	
PW5.E01.gr01	graphic rail	Predators or Scavengers	Environment of the Cleveland-Lloyd Quarry / diversity of meat-eaters/ mindset/ focus	18" x 10"		LG	
PW5.E01.id01	id label	Predators or Scavengers	Who's who illustration/label- side a	18" diam.		LG	
PW5.E01.id01	id label	Predators or Scavengers	Who's who illustration/label- side b	19" diam.	1/16" mounted to 1/8" steel	LG	
PW5.E02.gr01	graphic rail	Allosaurus and Barosaurus	Pack hunting and bullying / allosaurs at Cleveland-Lloyd/ focus panels	32" x 10"		LG	
PW5.E02.gr02	graphic rail	Allosaurus Foot	Allosaurus foot activity prompt	18" x 10"		LG	
PW5.E02.gr03	graphic rail	Barosaurus Biology	Barosaurus and sauropod biology / Cleveland-Lloyd herbivores/ focus panel	32" x 10"		LG	
PW5.E02.id01	id label	Allosaurus and Barosaurus	Who's who illustration/label- side a	18" diam.		LG	
PW5.E02.id01	id label	Allosaurus and Barosaurus	Who's who illustration/label- side b	19" diam.	1/16" mounted to 1/8" steel	LG	
PW7.E01.gr01	graphic rail	Paleo-Prep Lab	Process of preparation mindset/ Running time and title of Paleo Prep AV	60" x 10"		LG	
PW7.E01.gr02	graphic rail	Paleo-Prep Lab	Temporary text and story/ update on current work in the lab	60" x 10"		LG	
PW4.E02.qt01	quote/question	Late Cretaceous	At base of Cretaceous platform	72" x 18"		SB	
PW2.E04.ap01	activity prompt	Herbivore/ Carnivore	Baby Mammoth	18" x 6"		VY	
PW2.E04.qt01	quote/question	Herbivore/ Carnivore	On back wall	60" x 16"		VY	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
PW2.E04.si01	section intro	Herbivore/ Carnivore	Title and subhead on wall	72" x 12"		VY	
PW4.E01.qt01	quote/question	Late Cretaceous	On west wall	72" x 18"		VY	
PW4.E04.ms01	mindset	Gryposaurus Activities	Finding and excavating of the specimen	24" x 24"		VY	
PW5.E01.qt01	quote/question	Late Jurassic	On west wall	72" x 18"		VY	
PW5.E03.ap01	activity prompt	Solve the Mystery of the Quarry	Penny drop	(4) 12" x 4"		VY	
PW5.E03.ms01	mindset	Solve the Mystery of the Quarry	Outlines the mystery and introduces scenarios	(2) 30" x 30"		VY	
PW5.E03.qt01	quote/question	Solve the Mystery of the Quarry	Cleveland-Lloyd or fossil mysteries	72" x 18"		VY	
PW8.E04.ap01	activity prompt	Rock Cycle	Rock Cycle	84" x 10"		VY	
PW1.E01gi01	graphic image	Gallery Intro in LK	Map of GSL and Lake Bonneville shorelines	114" x 149"		VY (3 colors)	
PW2.E04.gp11-15	graphic panel	Ice Age Dinner Table	Images attached to seating	(5) 15.5 " x 12.5" (oval)	1/8" graphic mounted to seating		

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
MH1.E01.si01	section intro	Mineral Collection	Minerals	48" x 24" 36"x 28"		DL title VY text	
MH1.E01.pm01	photomural	Mineral Collection	Collections	54" x 120"	on GWB	DP	
MH1.E01.ap01	activity prompt	Mineral Collection	Labels for fluorescents (number tbd)	56" x 5"	1/8" paint finish substrate	DS	
MH1.E01.ar01-03	artifact labels	Mineral Collection MH1.E01.ic11	Fluorescents; with 1" viewing slit and light, long wave UV	25" x 2" live area: (3) 5" x 2"	1/8" paint finish substrate	DS	
MH1.E01.ar01-05	artifact labels	Mineral Collection MH1.E01.ic08	Pseudomorph minerals	36" x 2" live area: (5) 5" x 2"	1/8" paint finish substrate	DS	
MH1.E01.ar01-05	artifact labels	Mineral Collection MH1.E01.ic09	Botryoidal, mammilary, stalactitic, dendritic minerals	66" x 2" live area: (5) 5" x 2"	1/8" paint finish substrate	DS	
MH1.E01.ar01-06	artifact labels	Mineral Collection MH1.E01.ic12	Fluorescents; w. 1" viewing slit and light, short wave UV	25" x 5" live area: (6) 5" x 2"	1/8" paint finish substrate	DS	
MH1.E01.ar01-07	artifact labels	Mineral Collection MH1.E01.ic07	Phantoms/inclusions/zoning minerals	50" x 2" live area: (7) 5" x 2"	1/8" paint finish substrate	DS	
MH1.E01.ar01-10	artifact labels	Mineral Collection MH1.E01.ic06	Twinning/ reticulation/rosettes minerals	47" x 5" live area: (10) 5" x 2"	1/8" paint finish substrate	DS	
MH1.E01.ar01-11	artifact labels	Mineral Collection MH1.E01.ic05	Filamentary/acicular/radiating minerals	32" x 5" live area: (11) 5" x 2"	1/8" paint finish substrate	DS	
MH1.E01.ar01-24	artifact labels	Mineral Collection MH1.E01.ic10	Minerals of different shapes and habits	39" x 5" live area: (24) 5" x 2"	1/8" paint finish substrate	DS	
MH1.E01.ar01-28	artifact labels	Mineral Collection MH1.E01.ic02	Crystals large and small	60" x 5" live area: (28) 5" x 2"	1/8" paint finish substrate	DS	
MH1.E01.ar01-43	artifact labels	Mineral Collection MH1.E01.ic01	Inset case holds Utah minerals	50" x 7" live area: (43) 5" x 2"	1/8" paint finish substrate	DS	
MH1.E01.ar01-51	artifact labels	Mineral Collection MH1.E01.ic04	Inset case holds minerals of different colors	50" x 7" live area:	1/8" paint finish substrate	DS	
MH1.E01.ar01-119	artifact labels	Mineral Collection MH1.E01.ic03	Gemstones	92" x 5" live area: (119) 5" x 2"	1/8" paint finish substrate on lifts	DS	see 3D drawings
MH1.E01.ct01	case title	Mineral Collection	Case title	36" x 5"		VY	

[MH]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
MH1.E01.ct02	case title	Mineral Collection	Case title	36" x 5"		VY	
MH1.E01.fp01	focus panel	Mineral Collection MH1.E01.ic01	Utah minerals	18" x 18"		VY	
MH1.E01.fp02	focus panel	Mineral Collection MH1.E01.ic02	Crystals large and small	18" x 18"		VY	
MH1.E01.fp03	focus panel	Mineral Collection MH1.E01.ic03	Gemstones	18" x 18"		VY	
MH1.E01.fp04	focus panel	Mineral Collection MH1.E01.ic04	Mineral color	18" x 18"		VY	
MH1.E01.fp05	focus panel	Mineral Collection MH1.E01.ic04	Variety in mineral shape	18" x 18"		VY	
MH1.E01.gi01	graphic image	Mineral Collection	Map of Utah noting origin of mineral samples	24" x 24"		VY	
MH1.E01.qt01	quote	Collections Storage Window	Quote about collections located near the window to the collections area	48" x 36"		VY	
MH1.E01.sp01	story panel	Mineral Collection	Story from mineralogist	18" x 18"		VY	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
LK2.E01.gc01-27	graphic captions	Lake Floor	27 place locations- dimensional letters inset into floor	(27) 3" x 10"	set into terrazzo	DL	
LK1.E01.ip01	intro panel	Gallery Intro	Quote/question/fact	70" x 48"		DL	
LK2.E02.pm01	photomural	Lake Habitat- Wetlands	Bear River Refuge or Shoreline Preserve	168" x 150"	on GWB	DP	
LK2.E03.pm01	photomural	Lake Habitat- Shoreline	View from within the lake looking out	168" x 150"	on GWB	DP	
LK2.E04.gi02	graphic image	Migration	Migration map	36" x 50"	1/2" paint finish substrate	DS	
LK2.E03.ar01	artifact label	Lake Habitat- Shoreline LK2.E03.rc01	artifact label explains the salt industry	40" x 1.5" live area: 5" x 2"	1/8" paint finish substrate	DS	
LK2.E05.ar01-12	artifact label	People and The Lake LK2.E05.ic02	People in the lake artifacts	86" x 2" live area: (12) 5" x 2"	1/8" paint finish substrate	DS	
LK2.E05.ar01-33	artifact label	People and The Lake LK2.E05.ic01	People in the lake artifacts	62" x 2" live area: (33) 5" x 2"	1/8" paint finish substrate	DS	
LK2.E05.ap01	activity prompt	Talk Back	What do you love/hate about the lake?	90" x 128" live area: 24" x 12" 62" x 9"	3/4" paint finish substrate	DS	
LK3.E03.gp01	graphic panel	GSL Viewshed	Geoantiquities	115" x 31" live area: 24" x 24"	3/4" paint finish substrate	DS	
LK2.E05.gp02	graphic panel	Talk Back	Talk back prompt, text only	(40) 4" x 6"	on whiteboard	DS	
LK2.E05.gp02	graphic panel	Talk Back	Color lake images on talk back prompt	(15) 4" x 6"	on whiteboard	DS	
LK2.E04.gi01	graphic image	Migration	Groups of birds / migratory birds, their homes and migration destinations	66" x 60"	3/4" paint finish substrate	IJ	
LK2.E01.gp01	graphic panel	North Arm of the Lake	The North Arm/ mindset/ activity prompt	30" x 84"		IJ-2	
LK2.E01.gp02	graphic panel	South Arm of the Lake	The South Arm/ mindset/ activity prompt	30" x 84"		IJ-2	
LK2.E01.si01	section intro	North Arm of the Lake	How the lake is Great (size), Salt (chemistry) and a terminal lake	30" x 84"		IJ-2	
LK2.E01.si02	section intro	South Arm of the Lake	How the lake is Great (size), Salt (chemistry) and a terminal lake	30" x 84"		IJ-2	
LK2.E01.gr03	graphic rail	North Arm Winogradsky Column	North arm Winogradsky column and microscope with slide tray	36" x 12" curved panel		LG	

[LK]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
LK2.E01.gr04	graphic rail	South Arm Tube	South arm tube and microscope with slide tray	36" x 12" curved panel		LG	
LK2.E02.gr01	graphic rail	Lake Habitat- Wetlands	Wetland and its role in the watershed, and in migrations	96" x 10"		LG	
LK2.E02.gr02	graphic rail	Lake Habitat- Wetlands	Soil cross-section and describes filtration process / instructions for filtration interactive	72" x 10"		LG	
LK2.E02.gr03	graphic rail	Wetland Adaptation	Animal and plant adaptations to life in wetlands / family label about insect adaptations	53" x 10"		LG	
LK2.E02.id01	id label	Lake Habitat- Wetlands	Plants and animals and their connections- side a	18" diam.		LG	
LK2.E02.id01	id label	Lake Habitat- Wetlands	Plants and animals and their connections- side b	19" diam.	1/16" mounted to 1/8" steel	LG	
LK2.E03.gr01	graphic rail	Lake Habitat- Shoreline	Shoreline ecosystem zones and their importance	150" x 10"		LG	
LK2.E03.gr02	graphic rail	Lake Habitat- Shoreline	Bonneville salt flats and their formation/ family label	150" x 10"		LG	
LK2.E03.gr03	graphic rail	Lake Habitat- Shoreline	Animal and plant adaptations to life along the shoreline	106" x 10"		LG	
LK2.E03.id01	id label	Lake Habitat- Shoreline	Plants and animals and their connections- side a	18" diam.		LG	
LK2.E03.id01	id label	Lake Habitat- Shoreline	Plants and animals and their connections- side b	19" diam.	1/16" mounted to 1/8" steel	LG	
LK2.E05.gp01	graphic panel	People and The Lake	People in the lake artifacts	30" x 18"		LG	
LK2.E05.gr01	graphic rail	People and The Lake	Human interactions	66" diam. 17" wide rail		LG	
LK2.E06.gr01	graphic rail	Watershed/ Watercycle	Graphic images, captions, maps, and illustrations explain the water cycle	66" diam. 17" wide rail		LG	
LK3.E01.gr01	graphic rail	Lake Formation	Lake's formation and history/ mindset/ activity prompt	84"x 6" diam. 8" wide rail		LG	
LK3.E02.gr01	graphic rail	Sedimentary Core	Sedimentary core activities/ activity prompt	36" x 12" curved panel		LG	
LK2.E04.ms01	mindset	Migration	Migrations and lake's importance in the Pacific and Central flyways	24" x 24" 60" x 12" (title)		VY	
LK2.E05.qt01	quote	People and The Lake	People and The Lake	72" x 36"		VY	
LK2.E04.ap01	activity prompt	Migration	Prompt for map interactive. Touch a bird icon to see its migration route	12" x 12"		VY (6 colors)	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
FP4.E01.gp02	graphic panel	Subsistence FP4.E01.ca07	group label and artifacts	28" x 6" live area: 5" x 7.5"	1/2" paint finish substrate	DS	
FP5.E02.gp01	graphic panel	Textiles	Turkey and rabbit robe technique illustration	9" x 9"	1/2" paint finish substrate	DS	
FP5.E02.gp02	graphic panel	Textiles	Weaving on a loom; accompanies artifact display	48" x 60"	1/2" paint finish substrate	DS	
FP5.E05.gp01	graphic panel	Weapons	Photo of oldest spear find	14" x 40" live area: 14" x 14"	1/2" paint finish substrate	DS	
FP5.E05.gp02	graphic panel	Weapons	Atlatl diagrams or illustrations, rendering of atlatl being used	14" x 40" live area: 14" x 14"	1/2" paint finish substrate	DS	
FP5.E05.gp03	graphic panel	Weapons	Bow illustration showing parts; arrow illustration	14" x 40" live area: 14" x 14"	1/2" paint finish substrate	DS	
FP5.E06.gp01	graphic panel	Weapons: Stone Tools FP5.E06.ca03	Artifact labels and artifacts	12" x 28" live area: 5" x 5"	1/2" paint finish substrate	DS	
FP5.E06.gp02	graphic panel	Weapons: Stone Tools FP5.E06.ca03	Artifact labels and artifacts	14" x 14" live area: 5" x 5"	1/2" paint finish substrate	DS	
FP5.E06.gp03	graphic panel	Weapons: Stone Tools FP5.E06.ca03	Artifact labels and artifacts	8" x 8" live area: 5" x 5"	1/2" paint finish substrate	DS	
FP5.E06.gp04	graphic panel	Weapons: Stone Tools FP5.E06.ca03	Artifact labels and artifacts	36" x 18" live area: 5" x 5"	1/2" paint finish substrate	DS	
FP5.E07.gp01	graphic panel	Ceramics FP5.E07.ca06	artifact labels and artifacts	30" x 30" live area: 15" x 5"	1/2" paint finish substrate	DS	
FP5.E07.gp02	graphic panel	Ceramics FP5.E07.ca06	artifact labels and artifacts	16" x 34" live area: 15" x 5"	1/2" paint finish substrate	DS	
FP5.E08.fp01	focus panel	Ceramics: Typology FP5.E08.ca06	BIII	11" x 17"	1/2" paint finish substrate	DS	
FP5.E08.fp02	focus panel	Ceramics: Typology FP5.E08.ca06	PI	11" x 17"	1/2" paint finish substrate	DS	
FP5.E08.fp03	focus panel	Ceramics: Typology FP5.E08.ca06	PII	11" x 17"	1/2" paint finish substrate	DS	
FP5.E08.fp04	focus panel	Ceramics: Typology FP5.E08.ca06	PIII	11" x 17"	1/2" paint finish substrate	DS	

[FP]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
FP5.E08.fp05	focus panel	Ceramics: Typology FP5.E08.ca06	PIV	11" x 17"	1/2" paint finish substrate	DS	
FP5.E08.fp06	focus panel	Ceramics: Typology FP5.E08.ca06	San Bernardo Polychrome	11" x 17"	1/2" paint finish substrate	DS	
FP5.E08.fp07	focus panel	Ceramics: Typology FP5.E08.ca06	Pollaca Polychrome - Early	11" x 17"	1/2" paint finish substrate	DS	
FP5.E08.fp08	focus panel	Ceramics: Typology FP5.E08.ca06	Pollaca Polychrome - Late	11" x 17"	1/2" paint finish substrate	DS	
FP5.E08.fp09	focus panel	Ceramics: Typology FP5.E08.ca06	Early Sityatki Revival	11" x 17"	1/2" paint finish substrate	DS	
FP5.E08.fp10	focus panel	Ceramics: Typology FP5.E08.ca06	Hano Polychrome	11" x 17"	1/2" paint finish substrate	DS	
FP6.E01.gp01	graphic panel	Trade FP6.E01.ca02	Point scatters, regression analysis	36" x 18" live area: 14" X 8"	1/2" paint finish substrate	DS	
FP6.E01.gp02	graphic panel	Trade FP6.E01.ca02	Microscopic image of thin section	36" x 18" live area: 21" x 18"	1/2" paint finish substrate	DS	
FP2.E01.ar01-04	artifact labels	Median Village FP2.E01.ic02	Median Village. Structure and Architecture	40" x 2" live area: (4) 5" x 2"	1/8" paint finish substrate	DS	
FP2.E01.ar01-32	artifact labels	Median Village FP2.E01.rc01	Median Village	40" x 2" live area: (32) 5" x 2"	1/8" paint finish substrate	DS	
FP3.E01.ar01-02	artifact labels	Dry Caves Learning Lab FP3.E01.ic01	In inset cases in scenic reconstruction	18" x 2" live area: (2) 5" x 2"	1/8" paint finish substrate	DS	
FP3.E01.ar01-02	artifact labels	Dry Caves Learning Lab FP3.E01.ic02	In inset cases in scenic reconstruction	12" x 2" live area: (2) 5" x 2"	1/8" paint finish substrate	DS	
FP3.E01.ar01-02	artifact labels	Dry Caves Learning Lab FP3.E01.ic03	In inset cases in scenic reconstruction	20" x 2" live area: (2) 5" x 2"	1/8" paint finish substrate	DS	
FP3.E01.ar01-04	artifact labels	Dry Caves Learning Lab FP3.E01.ic04	In inset cases in scenic reconstruction	14" x 2" live area: (4) 5" x 2"	1/8" paint finish substrate	DS	
FP3.E04.ar01-18	artifact label	Absolute Dating FP3.E04.ic01	Moccasin display	94" x 2" live area: (18) 5" x 2"	1/8" paint finish substrate	DS	
FP5.E02.fp02	focus panel	Textiles FP5.E02.ca01	Looped, netted, braided objects	36" x 10"	1/8" paint finish substrate on lift	DS	
FP5.E02.gi03	graphic image	Textiles FP5.E02.ca01	Illustrations of weaving	8" x 6"	1/8" paint finish substrate on lift	DS	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
FP6.E01.gi02	graphic image	Trade FP6.E01.ca02	Diagrams of different kinds of trade	22" x 10"	1/8" paint finish substrate on lift	DS	
FP4.E01.fp01	focus panel	Subsistence FP4.E01.ca07	Mojave subsistence and settlement	26" x 10"	3/4" paint finish substrate	DS	
FP4.E01.fp02	focus panel	Subsistence FP4.E01.ca07	Climate change and coping behavior	18" x 10"	3/4" paint finish substrate	DS	
FP4.E01.fp03	focus panel	Subsistence FP4.E01.ca07	marshland/lacustral subsistence and settlement	26" x 10"	3/4" paint finish substrate	DS	
FP4.E01.fp04	focus panel	Subsistence FP4.E01.ca07	foothills/plateau subsistence and settlement	26" x 10"	3/4" paint finish substrate	DS	
FP4.E01.fp05	focus panel	Subsistence FP4.E01.ca07	montane subsistence and settlement	26" x 10"	3/4" paint finish substrate	DS	
FP5.E01.fp01	focus panel	Basketry FP5.E01.ca01	Twining	26" x 10"	3/4" paint finish substrate	DS	
FP5.E01.fp02	focus panel	Basketry FP5.E01.ca01	Coiling	26" x 10"	3/4" paint finish substrate	DS	
FP5.E01.fp03	focus panel	Basketry FP5.E01.ca01	Plaiting	26" x 10"	3/4" paint finish substrate	DS	
FP5.E02.fp01	focus panel	Textiles FP5.E02.ca01	Preparation of fibers	36" x 10"	3/4" paint finish substrate	DS	
FP5.E06.fp01	focus panel	Weapons: Stone Tools FP5.E06.ca03	Chipped stone tools, manufacture and use	26" x 10"	3/4" paint finish substrate	DS	
FP5.E06.fp02	focus panel	Weapons: Stone Tools FP5.E06.ca03	Ground stone tools source materials, manufacture, use	26" x 10"	3/4" paint finish substrate	DS	
FP5.E07.fp01	focus panel	Ceramics FP5.E07.ca06	How to prepare the materials	32" x 10"	3/4" paint finish substrate	DS	
FP5.E07.fp02	focus panel	Ceramics FP5.E07.ca06	How vessels are formed	32" x 10"	3/4" paint finish substrate	DS	
FP5.E07.fp03	focus panel	Ceramics FP5.E07.ca06	How vessels are finished	32" x 10"	3/4" paint finish substrate	DS	
FP5.E07.fp04	focus panel	Ceramics FP5.E07.ca06	How vessels are decorated	32" x 10"	3/4" paint finish substrate	DS	
FP5.E07.fp05	focus panel	Ceramics FP5.E07.ca06	Firing and Repair	32" x 10"	3/4" paint finish substrate	DS	
FP5.E08.sp01	story panel	Ceramics FP5.E07.ca06	story panel	18" x 10"	3/4" paint finish substrate	DS	
FP6.E01.ar01-66	artifact label	Trade FP6.E01.ca02	Trade labels	96" x 7" live area: (66) 6" x 3"	1/8" paint finish substrate on case decks	DS	see 3D drawings
FP5.E05.ar01-83	artifact labels	Weapons FP5.E05.ca03	Weapons material	96" x 7" live area: (83) 6" x 3"	1/8" paint finish substrate on lift and case deck	DS	see 3D drawings

[FP]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
FP5.E06.ar01-137	artifact labels	Weapons: Stone Tools FP5.E06.ca03	Stone tool material	96" x 7" live area: (137) 6" x 3"	1/8" paint finish substrate on lift and case deck	DS	see 3D drawings
FP4.E01.ar01-107	artifact labels	Subsistence FP4.E01.ca07	Subsistence artifact labels	192" x 7" live area: (107) 6" x 3"	1/8" paint finish substrate on lifts	DS	see 3D drawings
FP5.E01.ar01-32	artifact labels	Basketry FP5.E01.ca01	Materials, basketry, tools	144" x 7" live area: (32) 6" x 3"	1/8" paint finish substrate on lifts	DS	see 3D drawings
FP5.E01.ar01-52	artifact labels	Textiles FP5.E02.ca01	Materials, basketry, tools	144" x 7" live area:	1/8" paint finish substrate on lifts	DS	see 3D drawings
FP5.E03.ar01-168	artifact labels	Ornament FP5.E03.ca04	Ornament Mindset and labels. Includes FP5.E03.ms01, FP5.E03.fp01-04, FP5.E03.gi01	96" x 36" live area:	1/8" paint finish substrate on lifts	DS	see 3D drawings
FP5.E04.ar01-27	artifact labels	Footwear FP5.E04.ca05	How moccasins were made and used. Includes FP5.E04.ms01 and FP5.E04.gi01-04, FP5.E04.fp01	96" x 36" live area: 96" x 10"	1/8" paint finish substrate on lifts	DS	see 3D drawings
FP5.E07.ar01-76	artifact labels	Ceramics FP5.E07.ca06	Ceramic artifacts	48" x 7" live area: ( ) 6" x 3"	1/8" paint finish substrate on lifts	DS	see 3D drawings
FP7.E01.ar01-23	artifact labels	Range Creek FP7.E01.ca08	Range Creek artifacts. Includes FP7.E01.ms01, FP7.E01.fp01-02 and FP7.E01.sp01, FP7.E01.gi01-07	96" x 36" live area: 96" x 18"	1/8" paint finish substrate on lifts	DS	see 3D drawings
FP5.E08.ar01-10	artifact labels	Ceramics: Typology FP5.E08.ca06	Ceramic artifacts	144" x 7" live area: (76) 6" x 3"	1/8" paint finish substrate on lifts and case deck	DS	see 3D drawings
FP8.E01.gi02	graphic image	Signs and Symbols	Rock art symbols	(24) 6" x 6"	on magnetic surface	DS	
FP8.E01.ap01	activity prompt	Signs and Symbols	Rock art activity	12" x 8"	on magnetic surface	DS	
FP4.E01.gp03 FP4.E01.sp01	graphic panel	Subsistence FP4.E01.ca07	Hunting strategies in the Great Basin	112" x 20" live area: 15" x 20"	on partition	DS	
FP4.E01.gp04	graphic panel	Subsistence FP4.E01.ca07	artifact label and artifact	12" x 30" live area: 5" x 5"	on partition	DS	
FP4.E01.pm01	photomural	Subsistence FP4.E01.ca07	Subsistence. Includes FP4.E01.ms01	192" x 120"	on partition	DS	
FP5.E01.gp01 FP5.E01.sp01	graphic panel	Basketry FP5.E01.ca01	Story panel describes small seed processing	112" x 20" live area: 15" x 20"	on partition	DS	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
FP5.E01.gp02	graphic panel	Basketry FP5.E01.ca01	artifact label and artifact	12" x 30" live area: 5" x 5"	on partition	DS	
FP5.E01.pm01	photomural	Basketry FP5.E01.ca01	Hands making a basket. Includes FP5.E01.ms01	144"x 120"	on partition	DS	
FP5.E02.gp03 FP5.E02.at01	graphic panel	Textiles	Question/grabber	112" x 20" live area: 15" x 20"	on partition	DS	
FP5.E02.gp04	graphic panel	Textiles	artifact labels and artifacts	12" x 30" live area: 5" x 5"	on partition	DS	
FP5.E02.pm01	photomural	Textiles	Hands making textiles. Includes FP5.E02.ms01	144" x 120"	on partition	DS	
FP5.E05.gp04 FP5.E05.fp03	focus panel	Weapons FP5.E05.ca03	Projectile point sequence timeline	14" x 112" live area: 4" x 90"	on partition	DS	
FP5.E05.gp05 FP5.E05.av01	graphic panel	Weapons	Question/grabber	112" x 20" live area: 15" x 20"	on partition	DS	
FP5.E05.gp06	graphic panel	Weapons	artifact labels and artifacts	12" x 30" live area: 5" x 5"	on partition	DS	
FP5.E05.pm01	photomural	Weapons	Weapons. Includes FP5.E05.ms01	96" x 120"	on partition	DS	
FP5.E06.gp05 FP5.E06.sp01	graphic panel	Weapons: Stone Tools FP5.E06.ca03	Story panel: interpretation: warfare in the Southwest	112" x 20" live area: 15" x 20"	on partition	DS	
FP5.E06.gp06	graphic panel	Weapons: Stone Tools FP5.E06.ca03	Artifact labels and artifacts	12" x 30" live area:	on partition	DS	
FP5.E06.pm01	photomural	Weapons: Stone Tools FP5.E06.ca03	Stone tools. Includes FP5.E06.ms01	96" x 120"	on partition	DS	
FP5.E07.gp03 FP5.E07.sp01	graphic panel	Ceramics FP5.E07.ca06	Story from Steve Simms on ceramics and residential mobility	112" x 20" live area:	on partition	DS	
FP5.E07.gp04	graphic panel	Ceramics FP5.E07.ca06	artifact labels and artifacts	12" x 30" live area:	on partition	DS	
FP5.E07.pm01	photomural	Ceramics FP5.E07.ca06	Ceramics. Includes FP5.E07.ms01	192" x 120"	on partition	DS	
FP5.E08.gp01 FP5.E08.at01	graphic panel	Ceramics FP5.E07.ca06	Question/grabber	112" x 20" live area:	on partition	DS	
FP5.E08.gp02	graphic panel	Ceramics FP5.E07.ca06	artifact labels and artifacts	12" x 30" live area:	on partition	DS	
FP5.E08.pm01	photomural	Ceramics: Typology FP5.E08.ca06	Ceramics. Includes FP5.E08.ms01	192" x 120"	on partition	DS	

[FP]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
FP6.E01.gp03 FP6.E01.fp01	graphic panel	Trade FP6.E01.ca02	Baker Village and central place exchange	28" x 82" live area: 28" x 32"	on partition	DS	
FP6.E01.gp04	graphic panel	Trade FP6.E01.ca02	Freemont exchange	12" x 30" live area: 12" x 15"	on partition	DS	
FP6.E01.pm01	photomural	Trade FP6.E01.ca02	Trade. Includes FP6.E01.ms01	96" x 120"	on partition	DS	
FP8.E01.fp01	focus panel	Signs and Symbols	What we can and can't know about rock art	30" x 15"	on substrate	DS	
FP8.E01.st01	story panel	Signs and Symbols	Sally Cole discusses rock art	10" x 10"	on substrate	DS	
FP1.E01.pm01	photomural	Process	Archaeologists at work in Danger cave	172" x 125"		DS	
FP3.E01.pm01	photomural	Dry Caves Learning Lab	Sudden Shelter. Includes mindset, graphic image, focus panel and labels. Includes FP3.E02.ar01-ar22, FP3.E02.fp01, FP3.E02.gi01, FP3.E02.gi02	100" x 98"		DS	
FP9.E01.gi06-gi15	graphic images	Colorado Plateau Cultures	images depicting eras and artifacts	(10) 8" x 10"	1/2" paint finish substrate	IJ	
FP3.E01.gi01-04	graphic image	Dry Caves Learning Lab	Blow-ups of contents of petrie dishes in Hogup cave	(4) 4" x 4"		IJ	
FP8.E01.gi01	graphic image	Signs and Symbols	Rock art locations	(6) 8" x 8"		IJ	
FP2.E01.ap01	activity prompt	Within Median Village	Lift panel with pottery shards	12" x 12"	(no paperstone)	LG	
FP2.E01.ap02	activity prompt	Within Median Village	Lift panel with points	12" x 12"	(no paperstone)	LG	
FP2.E01.ap03	activity prompt	Within Median Village	Lift panel with corn cobs	12" x 12"	(no paperstone)	LG	
FP2.E01.gr01	graphic rail	Median Village Exhibits	Median Village	193" x 120"		LG	
FP2.E01.gr02	graphic rail	Median Village Exhibits	Median Village	201" x 120"		LG	
FP2.E01.gr03	graphic rail	Median Village Exhibits	Median Village	201" x 120"		LG	
FP3.E04.gp01	graphic panel	Absolute Dating	Moccasin display	30" x 15"		LG	
FP5.E02.tt01	table top	Weaving/Plaiting Interactive	Plaiting activities	42" diameter		LG	
FP5.E06.tt01	table top	Weapons: Stone Tools FP5.E06.ca03	Pick your tool game	42" diameter		LG	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
FP5.E08.tt01	table top	Ceramics interactive	Ceramics activities	42" diameter		LG	
FP7.E01.tt01	table top	Pack rat midden interactive	Interactive: pack rat midden	42" diameter		LG	
FP2.E01.st01	section title	Median Village Exhibits	Median Village	84" x 36"	on case glass	VY	
FP1.E01.ar01-09	artifact labels	Process FP1.E01.ic01	Danger Cave artifact assemblage	(9) 5" x 2"		VY	
FP3.si01	section intro	Dry Caves Learning Lab	Orients visitors to dry caves	60" x 28"		VY	
FP7.si01	section intro	Range Creek	Range Creek	27" x 21"		VY	
FP8.E01.ar01-12	artifact labels	Signs and Symbols	Rock art artifacts	28" x 12" live area:		VY	
FP8.E01.ms01	mindset	Signs and Symbols	Different types of rock art and "styles"	24" x 24"		VY	
FP9.E01.fp01-05	focus panel	Colorado Plateau Cultures	Where they lived, and how they lived	(5) 12" x 12"		VY	
FP9.E01.ms01	mindset	Colorado Plateau Cultures	Region's cultures	24" x 24"		VY	
FP9.E01.gi01-05	graphic images	Colorado Plateau Cultures	Map	(5) 13" x 16"		VY (2 color)	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
LD3.E03.ar01-11	artifact labels	CP Stratigraphy	Rock layer ID's	(11) 16" x 2"		DL	
LD4.E01.pm01	photomural	B&R	Photomural of the Basin and Range	352" x 227"	on GWB	DP	
LD2.E02.pm01	photomural	MRM Plants	MRM mountain meadow	197" x 167"	on substrate	DP	
LD2.E03.pm01	photomural	MRM Glaciation	U-shaped canyon	100" x 123"	on substrate	DP	
LD3.E01.pm01	photomural	CP	Aerial photo of Colorado Plateau	92" x 119"	on substrate	DP	
LD1.E01.gc03	graphic caption	Intro from FP	Identify rocks and artifact sites	5" x 41"	1/4" paint finish substrate	DS	
LD4.E03.ar01-04	artifact labels	B&R Seismograph	IDs describing seismographs above.	64" x 2" live area:	1/8" paint finish substrate	DS	
LD4.E04.ar01	artifact labels	B&R Human Interactions LD4.E04.rc01	Artifact labels	12" x 2" live area: 5" x 2"	1/8" paint finish substrate	DS	
LD4.E04.ar01-02	artifact labels	B&R Human Interactions LD4.E04.rc02	Artifact labels	12" x 2" live area: (2) 5" x 2"	1/8" paint finish substrate	DS	
LD4.E04.ar01	artifact labels	B&R Human Interactions LD4.E04.rc03	Artifact labels	12" x 2" live area: 5" x 2"	1/8" paint finish substrate	DS	
LD4.E04.ar01	artifact labels	B&R Homestead Cave LD4.E10.rc03	Owl pellet label and diagram	38 1/2" x 14" live area: 7" x 5"	1/8" paint finish substrate	DS	
LD4.E04.ar01-06	artifact labels	B&R Homestead Cave LD4.E10.rc01	Label for first Kangaroo rat skull and skin. Includes LD4.E10.gi04	24" x 12" live area: 10" x 5"	1/8" paint finish substrate	DS	
LD4.E04.ar01-06	artifact labels	B&R Homestead Cave LD4.E10.rc02	Label for second Kangaroo rat skull and skin. Includes LD4.E10.gi05	24" x 12" live area: 10" x 5"	1/8" paint finish substrate	DS	
LD4.E04.ar01	artifact labels	B&R Homestead Cave LD4.E10.rc04-08	Label for second Kangaroo rat skull and skin. Includes LD4.E10.gi05	24" x 12" live area: 10" x 5"	1/8" paint finish substrate	DS	
LD4.E07.ar01-13	artifact label	B&R House Range LD4.E07.rc01	Label for trilobites and soft-bodied animals	66" x 2" live area: (13) 5" x 2"	1/8" paint finish substrate	DS	
LD2.E01.gp01	graphic panel	MRM Minerals & Rocks	Labels for slab and minerals	30"x 84" live area: (10) 5" x 2"	3/4" paint finish substrate	DS	
LD1.E01.gi02	graphic image	Intro from FP	Map of Utah- Road map	123" x 132"		DS	

[LD]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
LD1.E01.ip02	Intro panel	Intro from FP	Drive through time body text	38" x 22"		DS	
LD1.E02.gc01-08	graphic caption	Utah Through Time	Era name and time period	(8) 24" x 6"		DS	
LD2.E01.ar01	artifact label	MRM	label for slate slab	5" x 2.5"		DS	
LD2.E01.gi01	graphic image	MRM	Illustration of MRM	144" x 72"		DS	
LD2.E01.ms01	mindset	MRM Minerals & Rocks	Formation of the MRM	26" x 26"		DS	
LD2.E01.qt01	quote	MRM	MRM on the east wall	40" x 18"		DS	
LD2.E01gi02	graphic image	MRM Minerals & Rocks	Diagram of contact metamorphism	36" x 24"		DS	
LD2.E02.ar21	artifact label	MRM	Granite slab	5" x 2.5"		DS	
LD2.E02.ms01	mindset	MRM Plants	MRM plants	26" x 26"		DS	
LD2.E03.ar01	artifact label	MRM	Sandstone slab	5" x 2.5"		DS	
LD2.E03.gi01	graphic image	MRM Glaciation	Process diagram, glacial flow diagrams, timeline, label for rock slab	80" x 60"		DS	
LD2.E03.ms01	mindset	MRM Glaciation	Glaciation	26" x 26"		DS	
LD2.E04.ar01	artifact label	CP	Limestone slab	5" x 2.5"		DS	
LD2.E04.fl01	family panel	MRM	Marine fossil slabs	16" x 16"		DS	
LD2.E04.ms01	mindset	MRM	Fossils and types found in the Middle Rocky Mountains	26" x 26"		DS	
LD3.E01.gi01	graphic image	CP	Colorado Plateau	86" x 107"		DS	
LD3.E02.ar01-18	artifact labels	CP Utah's Time Machine	Precambrian fossils	6" x 36"		DS	
LD3.E02.gi01	graphic image	CP Utah's Time Machine	Biostratigraphy diagram and captions	7" x 36"		DS	
LD3.E02.ms01	mindset	CP Utah's Time Machine	Relative dating	26" x 26"		DS	
LD4.E01.gi01	graphic image	B&R	Illustration of Basin and Range	170" x 60"		DS	
LD4.E01.ms01	mindset	B&R Rock Cycle	Mindset panel describes rock cycle	26" x 26"		DS	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
LD4.E01gi02	graphic image	B&R Rock Cycle	Rock cycle and labels	145" x 106"		DS	
LD4.E03.ap01	activity prompt	B&R Seismograph	Seismometer	12" x 5"		DS	
LD4.E03.ap02	activity prompt	B&R Seismograph	Jump floor graphic	24" x 24"		VY-2	
LD4.E03.ar01	artifact label	B&R Seismograph	Boulder with scarp	5" x 2.5"		DS	
LD4.E03.fp01	focus panel	B&R Seismograph	Earthquake monitoring and recording	24" x 9"		DS	
LD4.E03.gi02	graphic image	B&R Seismograph	Utah map showing wasatch fault	14" x 18"		DS	
LD4.E03.gi03	graphic image	B&R Seismograph	Earthquake map- world	67" x 33"		DS	
LD4.E03.ms01	mindset	B&R Wasatch Fault	Mindset panel describes Wasatch Fault, associated dangers	26" x 26"		DS	
LD4.E06.ms01	mindset	B&R Formation	Mindset panel describes the formation of the Basin and Range	26" x 26"		DS	
LD4.E06gi01	graphic image	B&R Formation	Map/diagram of Basin and Range	10" x 10"		DS	
LD4.E08.ms01	mindset	B&R Island Biogeography	Mindset panel explains island biogeography and how it affects Utah	26" x 26"		DS	
LD4.E09.gi01	graphic image	B&R Plants	Illustration of 5 elevations	297" x 27"		DS	
LD4.E09.ms01	mindset	B&R Plants	Mindset panel describes elevation and plant communities.	26" x 26"		DS	
LD4.E10.ap01	activity prompt	B&R Homestead Cave	Use magnifiers to see layers of the core	6" x 3"		DS	
LD4.E10.fp01	focus panel	B&R Homestead Cave	k-rat specimens to the matrix example	8" x 6"		DS	
LD4.E10.gi01	graphic image	B&R Homestead Cave	Label for sediment core showing climate shift and timeline graphic	64" x 3"		DS	
LD4.E10.gi02	graphic image	B&R Homestead Cave	climate shift and timeline graphic	100" x 5"		DS	
LD1.E01.gi03	graphic images	Intro from FP	Rock and artifact sites	16" x 41"	1/4" paint finish substrate	IJ	
LD1.E02.gp01-08	graphic panel	Utah Through Time	Map and photo of era	40" x 50"		IJ	
LD2.E02.gp01-20	graphic panel	MRM Plants	Cover image of elevational life zones, artifact captions, map of where found, photo of plant in natural habitat	(20) 11" x 14"	1/16" double sided	LG	
LD2.E05gp01-30	graphic panel	CP Plants	Cover image of elevational life zones, artifact captions, map of where found, photo of plant in natural habitat	(30) 11" x 14"	1/16" double sided	LG	

[LD]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
LD4.E04.gi01-24	graphic images	B&R Human Interactions	A series of before and after images w/ captions	(24) 11" x 8"	1/16" double sided	LG	
LD4.E09.gp01-50	graphic panel	B&R Plants	Cover image of elevational life zones, artifact captions, map of where found, photo of plant in natural habitat	(50) 11" x 14"	1/16" double sided	LG	
LD2.E02.gr01-02	graphic rail	MRM Plants	Plant smell interactive and soil profile	(2) 48" x 24"	on MDF (no paperstone)	LG	
LD3.E01.gr01	graphic rail	CP	Formation of the Colorado Plateau.	68" x 11"	on MDF (no paperstone)	LG	
LD3.E01.gr02	graphic rail	CP	CP bioregions	72" x 10"	on MDF (no paperstone)	LG	
LD3.E01.gr03	graphic rail	CP	Erosion table	60" x 8"	on MDF (no paperstone)	LG	
LD3.E01.gr04	graphic rail	CP	Erosion table	72" x 16"	on MDF (no paperstone)	LG	
LD3.E02.gr01	graphic rail	CP Prosauropod Fossil	Contextual image of the landscape	62" x 10"	on MDF (no paperstone)	LG	
LD3.E03.gr01	graphic rail	CP Stratigraphy	Diagram of strat column with layer groupings, layer cake formation explanation and photos of Utah examples	54" x 10"	on MDF (no paperstone)	LG	
LD3.E04.gr01	graphic rail	CP Weathering and Erosion	Relationship of weathering and erosion	50" x 10"	on MDF (no paperstone)	LG	
LD3.E04.gr02	graphic rail	CP Weathering and Erosion	Instructions for the use of the sand dune interactive	34" x 5"	on MDF (no paperstone)	LG	
LD3.E04.gr03	graphic rail	CP Weathering and Erosion	Potholes and pothole organisms	58" x 11"	on MDF (no paperstone)	LG	
LD3.E04.gr04	graphic rail	CP Weathering and Erosion	Crossbedded sandstone	27" x 7"	on MDF (no paperstone)	LG	
LD3.E05.gr01 LD3.E05.ms01	graphic rail	CP Plants	CP plants and their relationship with the land	3'5" x 1'	on MDF (no paperstone)	LG	
LD3.E05.gr02-04	graphic rail	CP Plants	Plant smell interactive and soil profile	30" x 20"	on MDF (no paperstone)	LG	
LD4.E03.tt01	table top	B&R Seismograph	Earthquake interactive	68" x 24"	on MDF (no paperstone)	LG	
LD4.E04.tt01	table top	B&R Human Interactions	Human Interactions	66" x 30"	on MDF (no paperstone)	LG	
LD4.E06.tt01	table top	B&R Formation	Formation diagrams, images	140" x 10"	on MDF (no paperstone)	LG	
LD4.E07.tt01	table top	B&R House Range	House Range and Utah's Cambrian fossils	73" x 8"	on MDF (no paperstone)	LG	
LD4.E09.gr01-05	graphic rail	B&R Plants	Plant smell interactive and soil profile	(5) 48" x 24"	on MDF (no paperstone)	LG	
LD4.E10.tt01	table top	B&R Homestead Cave	Homestead Cave records past fauna and climates, artifact labels	67" x 24"	on MDF (no paperstone)	LG	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
LD1.E03.gr01	graphic rail	Plate tectonics	Structure of the earth and plate tectonics	48" x 10"		LG	
LD4.E07.gr01	graphic rail	LD- PW overlook	LD- PW overlook	32" x 10"		LG	
LD2.si01	section intro	Middle Rocky Mountains (MRM)	Forces that formed the MRM	84" x 18"	in MDF	RT	
LD3.E01.si01	section intro	Colorado Plateau (CP)	Title and subhead	74" x 24"	in MDF	RT	
LD4.si01	section title	Basin and Range (B&R)	Title and subhead	74" x 23"	in MDF	RT	
LD1.E01.ip02	Intro panel	Intro from FP	Drive through time title	33" x 12"	in MDF	RT	
LD1.E01.gi01	graphic image	Intro from LF	Geologic map of Utah with graphic caption	33" x 33"	in slate slab	SB	
LD1.E01.ip01	Intro panel	Intro from LF	Three unique and extreme landscapes title and body text	36" x 35"	in slate slab	SB	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
LF1.E01.ip01	introductory text	Introduction	Title and fact for DNA, Cells, Populations, Organisms, Ecosystems	(5) 27" x 12"		DL	
LF1.E01.ip01	introductory text	Introduction	All living things are related	38" x 24" 25" x 12"		DL title VY body text	
LF1.E01.ip02	introductory text	Introduction	The diversity of life plays out at the ecosystem level	38" x 24" 25" x 12"		DL title VY body text	
LF6.E01.si01	section intro	Ecosystems	Section Intro	24" x 15" 35" x 14"		DL DS	
LF2.si01	section intro	DNA, Amino Acids & Proteins	DNA, Amino Acids & Proteins	35" x 14" 24" x 15"		DL VY	
LF7.E01.pm01	graphic images	Naturalist Lab	naturalist drawings	261" x 60"	on GWB	DP	
LF7.E01.pm02	graphic images	Naturalist Lab	naturalist drawings	108" x 60"	on GWB	DP	
LF7.E01.pm03	graphic images	Naturalist Lab	naturalist drawings	72" x 60"	on GWB	DP	
LF7.E01.pm04	graphic images	Naturalist Lab	naturalist drawings	264" x 60"	on GWB	DP	
LF6.E01.pm01	photomural	Hot Desert- Mojave	Beaverdam Wash showing Joshua tree, creosote bush	156" x 312"		DP	
LF6.E02.pm01	photomural	Cold Desert	Cedar Valley or Fish Springs showing big sagebrush, two-needle piñon, Utah juniper, greater sage-grouse, pronghorn	156" x 312"		DP	
LF6.E03.pm01	photomural	Montane Forest	Steep canyon on Wasatch front showing Gambel oak, Rocky Mountain Maple, aspen, curlleaf mountain mahogany, sub-alpine fir, Engelmann spruce	156" x 312"		DP	
LF6.E04.pm01	photomural	Subalpine-alpine	Rock outcrop and associated tundra at the edge of the treeline showing lichen, bristlecone pine, Engelmann spruce, mat willow, limber pine	156" x 312"		DP	
LF2.E03.gp01	graphic panels	Keratin Investigation LF2.E03.ca01	Artifact labels on mounting panel	22" x 10"	1/2" paint finish substrate	DS	
LF2.E03.gp02-03	graphic panel	Keratin Investigation LF2.E03.ca01	Artifact label on mounting panel	(2) 12" x 10"	1/2" paint finish substrate	DS	
LF2.E03.ms01	mindset	Keratin Investigation	Keratin's importance and where it's found	48" x 18"	1/2" paint finish substrate	DS	
LF2.E04.ms01	mindset	What Keratin Does	Structural proteins and their importance	48" x 16"	1/2" paint finish substrate	DS	
LF3.E01.ms01	mindset	What are Cells	Cells, explains the differences between plant and animal cells.	48" x 20"	1/2" paint finish substrate	DS	
LF3.E02.ms01	mindset	What Cells Can Do	Cell functions and activities	52" x 20"	1/2" paint finish substrate	DS	
LF4.E02.ms01	mindset	Reproduction and Development	Reproduction and development.	60" x 24"	1/2" paint finish substrate	DS	

LF4.E03.ms01	mindset	Feeding and Fueling	Energy flow and feeding	48" x 20"	1/2" paint finish substrate	DS	
LF5.E01.ms01	mindset	Populations: LF5.E01.ca03	Concept of a population. Includes LF5.E01.gi01-05, Lf5.E01.ar01,	96" x 120" live area: 30" x 38"	1/2" paint finish substrate	DS	
LF5.E03.fp01	focus panel	Hominid Evolution	Behavioral evidence for hominid evolution	14" x 8"	1/2" paint finish substrate	DS	
LF2.E04.gp01-03	graphic panel	What Keratin Does	Keratin specimens labels/illustrations	(3) 12" x 16"	1/4" paint finish substrate	DS	
LF5.E03.sp01	story panel	Hominid Evolution	From Kristen Hawkes	11" x 6"	1/4" paint finish substrate	DS	
LF5.E03.gp01-18	graphic panel	Hominid Evolution	Key map for each skull and Reconstructions of each hominid	(18) 7" x 3"	1/8" paint finish substrate	DS	
LF2.E03.ar01-18	artifact label	Keratin Investigation LF2.E03.ca01 (side a)	Keratin specimens	96" x 7" live area: (18) 6" x 3"	1/8" paint finish substrate on case deck	DS	see 3D drawings
LF2.E03.ar01-21	artifact label	Keratin Investigation LF2.E03.ca01 (side b)	Keratin specimens	96" x 7" live area: (21) 6" x 3"	1/8" paint finish substrate on case deck	DS	see 3D drawings
LF4.E01.ar01-10	artifact labels	Organisms: Growth LF4.E01.ca02	Growth	144" x 7" live area: (10) 6" x 3"	1/8" paint finish substrate on case deck	DS	see 3D drawings
LF5.E01.ar01-12	artifact labels	Populations: Phylogenies LF5.E01.ca03 side b	Artifact labels	96" x 7" live area: (12) 6" x 3"	1/8" paint finish substrate on case deck	DS	see 3D drawings
LF5.E01.fp02	focus panel	Populations: LF5.E01.ca03	Genotypic variation	9" x 6"	1/8" paint finish substrate on lift	DS	
LF5.E01.gi06	graphic image	Populations: LF5.E01.ca03	Gene frequency pie charts	6" x 9"	1/8" paint finish substrate on lift	DS	
LF4.E01.ar01-20	artifact labels	Organisms: Diversity LF4.E01.ca02	Diversity, variation, scale	144" x 7" live area: (20) 6" x 3"	1/8" paint finish substrate on lift and case deck	DS	see 3D drawings
LF5.E01.ar01-08	artifact labels	Populations: LF5.E01.ca03 side a	Artifact labels	96" x 7" live area: (8) 6" x 3"	1/8" paint finish substrate on lift and case deck	DS	see 3D drawings
LF2.E03.ms02	mindset	Keratin Investigation LF2.E03.ca01	Variety of keratins	30" x 40"	3/4" paint finish substrate	DS	
LF4.E01.fp01	focus panel	Organisms: Diversity LF4.E01.ca02	Scale	22" x 10"	3/4" paint finish substrate	DS	
LF4.E01.fp02	focus panel	Organisms: Growth LF4.E01.ca02	Allometric growth	18" x 10"	3/4" paint finish substrate	DS	
LF4.E01.fp03	focus panel	Organisms: Growth LF4.E01.ca02	Isometric growth	18" x 10"	3/4" paint finish substrate	DS	

LF4.E01.fp04	focus panel	Organisms: Growth LF4.E01.ca02	Metamorphosis in insects (partial and complete) and frogs	18" x 10"	3/4" paint finish substrate	DS
LF4.E01.fp05	focus panel	Organisms: Growth LF4.E01.ca02	Growth in plants	18" x 10"	3/4" paint finish substrate	DS
LF5.E01.fp01	focus panel	Populations: LF5.E01.ca03	Phenotypic variation	14" x 10"	3/4" paint finish substrate	DS
LF5.E02.ms01	mindset	What Populations Do	What populations do	60" x 24"	3/4" paint finish substrate	DS
LF5.E03.gi02	graphic image	Hominid Evolution	Chimp cognitive research	14" x 8"	on 1/2" paint finish substrate	DS
LF4.E01.ms01	mindset	Organisms: Diversity LF4.E01.ca02	Mindset panel describes diversity, variation, scale. Includes LF4.E01.gi01	144" x 120" live area: 30" x 38" 16" x 16"	on partition	DS
LF4.E01.ms02	mindset	Organisms: Growth LF4.E01.ca02	Growth. Includes LF4.E01.gi02-04	144" x 120" live area: 100" x 80"	on partition	DS
LF5.E01.ms02	mindset	Populations: Phylogenies LF5.E01.ca03	Populations, variation and selection. Includes LF5.E01.gi07-08	96" x 120" live area: 30" x 38" 92" x 80"	on partition	DS
LF5.E01.ms02	mindset	Populations: Phylogenies	Speciation and diversity in lineages	30" x 38"	on partition	DS
LF1.E01.gi10	graphic image	Introduction-Ecosystems	Parade of Life featuring 12 key animals	144" x 96"	on resin panel provided by GC	DS
LF2.E02.gp01	graphic panel	DNA, Amino Acids & Proteins	Includes LF2.E02.ms01, LF2.E01.ms01, LF2.E02.fp01, LF2.E01.gi01, LF2.E02.gi01-03, LF2.E02.ap01-02	352" x 72" live area: 352" x 48"	on resin panel provided by GC	DS
LF7.E01.gi01	graphic caption	Tree of Life	Graphic captions call out common features of major groups	192" x 60"	on resin panel provided by GC	DS
LF7.E01.ms01	mindset	Tree of Life	Tree of life	24" x 28"	on resin panel provided by GC	DS
LF6.E01.gi02	graphic image	Hot Desert- Mojave	Ecosystem location map	12" x 14"		DS
LF6.E01.ms01	mindset	Hot Desert- Mojave	Hot desert	24" x 28"		DS
LF6.E02.gi02	graphic image	Cold Desert	Ecosystem location map	12" x 14"		DS
LF6.E02.ms01	mindset	Cold Desert	Cold desert (elevation, rainfall, temperature) and its inhabitants.	24" x 28"		DS
LF6.E02.qt01	quotes/questions	Cold Desert	Back wall	40" x 12"		DS
LF6.E03.gi02	graphic image	Montane Forest	Ecosystem location map	12" x 14"		DS

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LF6.E03.ms01	mindset	Montane Forest	Mountain forest (elevation, rainfall, climate) and its inhabitants	24" x 28"		DS
LF6.E03.qt01	quotes/questions	Montane Forest	Quote/question on back wall	40" x 12"		DS
LF6.E04.gi02	graphic image	Subalpine-alpine	Ecosystem location map	12" x 14"		DS
LF6.E04.ms01	mindset	Subalpine-alpine	Mindset text describes the alpine ecosystem and its inhabitants	24" x 28"		DS
LF6.E04.qt01	quotes/questions	Subalpine-alpine	Back wall	40" x 12"		DS
LF2.E03.gi01	graphic image	Keratin Investigation	Keratin close-up photos	36" x 31"	wrapped on 1/2" substrate	IJ
LF2.E03.gi02	graphic image	Keratin Investigation	Keratin close-up photos	42" x 33"	wrapped on 1/2" substrate	IJ
LF2.E03.gi03	graphic image	Keratin Investigation	Keratin close-up photos	46" x 36"	wrapped on 1/2" substrate	IJ
LF2.E04.gi01	graphic image	What Keratin Does	Keratin close-up photos	48" x 30"	wrapped on 1/2" substrate	IJ
LF2.E04.gi02	graphic image	What Keratin Does	Keratin close-up photos	49" x 32"	wrapped on 1/2" substrate	IJ
LF2.E04.gi03	graphic image	What Keratin Does	Keratin close-up photos	47" x 40"	wrapped on 1/2" substrate	IJ
LF3.E01.gi01	graphic image	Cells	Animal and plant cell images	42" x 36"	wrapped on 1/2" substrate	IJ
LF3.E01.gi02	graphic image	Cells	Animal and plant cell images	42" x 44"	wrapped on 1/2" substrate	IJ
LF3.E01.gi03	graphic image	Cells	Animal and plant cell images	40" x 43"	wrapped on 1/2" substrate	IJ
LF3.E02.gi01	graphic image	What Cells Can Do	Cell Function close-ups	66" x 56"	wrapped on 1/2" substrate	IJ
LF3.E02.gi02	graphic image	What Cells Can Do	Cell Function close-ups	60" x 58"	wrapped on 1/2" substrate	IJ
LF3.E02.gi03	graphic image	What Cells Can Do	Cell Function close-ups	60" x 56"	wrapped on 1/2" substrate	IJ
LF4.E02.gi01	graphic image	Reproduction and Development	Reproduction and development.	52" x 56"	wrapped on 1/2" substrate	IJ

LF4.E02.gi02	graphic image	Reproduction and Development	Reproduction and development.	75" x 64	wrapped on 1/2" substrate	IJ
LF4.E02.gi03	graphic image	Reproduction and Development	Reproduction and development.	63" x 61"	wrapped on 1/2" substrate	IJ
LF4.E03.gi01	graphic image	Feeding and Fueling	Key creature feeding	48" x 36"	wrapped on 1/2" substrate	IJ
LF4.E03.gi02	graphic image	Feeding and Fueling	Key creature feeding	52" x 56"	wrapped on 1/2" substrate	IJ
LF4.E03.gi03	graphic image	Feeding and Fueling	Key creature feeding	60" x 49"	wrapped on 1/2" substrate	IJ
LF4.E03.gi04	graphic image	Feeding and Fueling	Key creature feeding	67" x 58"	wrapped on 1/2" substrate	IJ
LF5.gi01	graphic image	Populations	Images of Populations: Migration	78" x 66"	wrapped on 1/2" substrate	IJ
LF5.gi02	graphic image	Populations	Images of Populations	96" x 67"	wrapped on 1/2" substrate	IJ
LF5.gi03	graphic image	Populations	Images of Populations	96" x 67"	wrapped on 1/2" substrate	IJ
LF5.gi04	graphic image	Populations	Images of Populations	108" x 66"	wrapped on 1/2" substrate	IJ
LF5.gi05	graphic image	Populations	Images of Populations	90" x 65"	wrapped on 1/2" substrate	IJ
LF4.E02.gp01-02	graphic panel	Reproduction and Development	Pollination interactive: visitors select a pollinator, then try to find the flower it pollinates	(2) 20" x 20"		IJ-2
LF5.E04.gr01	graphic rail	Hominid Evolution	Continental drift maps (showing marsupial and ratite distribution)	32" x10"		L G
LF3.E03.gr01	graphic rail	Economy of Life	Glass tank with living plants and algae	36"x 10"		LG
LF2.E03.gr01	graphic rail	Keratin Investigation	Keratin Investigation/ activity prompt	84" x 36"		LG
LF2.E04.gr01	graphic rail	What Keratin Does	What Keratin Does/ focus panels	120" x 42"		LG
LF3.E01.ap01-ap02	activity prompt	Cells	Build a cell	(2) 8" x 8"		LG
LF3.E01.gr01	graphic rail	What are Cells	3 cell types	113" x 40"		LG
LF3.E02.gr01	graphic rail	What Cells Can Do	Cell functions and activities	67" x 57"		LG
LF3.E02.gr01	graphic rail	What Cells Can Do	What Cells Can Do	156" x 57"		LG
LF4.E01.gr01	graphic rail	Problem of Size	Challenge of being multicellular/ focus panels, mindset, artifact label	93" x 44"		LG
LF4.E02.gr03	graphic rail	Reproduction and Development	Sexual reproduction, growth, activity prompt for pollination interactive	138" x 37"		LG

LF4.E03.gr02	graphic rail	Feeding and Fueling	Feeding and Fueling	138" x 40"		LG
LF5.E01.gr01	graphic rail	What is a Population	Stickleback fish	93" x 46"		LG
LF5.E01.gr02	graphic rail	What is a Population	Harvester ants	93" x 46"		LG
LF5.E02.gr01	graphic rail	What Populations Do	What populations do with projected map	234"x 30"		LG
LF5.E02.gr02	graphic rail	What Populations Do		112" x 30"		LG
LF6.E01.gr01	graphic rail	Hot Desert- Mojave	Hot Desert- Mojave	36" x 12"		LG
LF6.E01.id01	id label	Cold Desert	Ecosystem interactions with food-web overlay- side a	18" diameter		LG
LF6.E01.id01	id label	Cold Desert	Ecosystem interactions with food-web overlay- side b	19" diameter	1/16" mounted to 1/8" steel	LG
LF6.E01.id01	id label	Hot Desert- Mojave	Ecosystem interactions with food-web overlay- side a	18" diameter		LG
LF6.E01.id01	id label	Hot Desert- Mojave	Ecosystem interactions with food-web overlay- side b	19" diameter	1/16" mounted to 1/8" steel	LG
LF6.E02.fl01	family label	Cold Desert	Mormon cricket	30"x 12"		LG
LF6.E02.gr01	graphic rail	Cold Desert	Plants and animals have adapted to the extremes of hot and cold in the cold desert	36" x 12"		LG
LF6.E03.fl01	family label	Montane Forest	Family label about mule deer fawn	30" x 12"		LG
LF6.E03.gr01	graphic rail	Montane Forest	Montane Forest	36" x 12"		LG
LF6.E03.id01	id label	Montane Forest	Ecosystem interactions with food-web overlay- side a	18" diameter		LG
LF6.E03.id01	id label	Montane Forest	Ecosystem interactions with food-web overlay- side b	19" diameter	1/16" mounted to 1/8" steel	LG
LF6.E04.gr01	graphic rail	Subalpine-alpine	Subalpine-alpine	36" x 12"		LG
LF6.E04.id01	id label	Subalpine-alpine	Ecosystem interactions with food-web overlay- side a	18" diameter		LG
LF6.E04.id01	id label	Subalpine-alpine	Ecosystem interactions with food-web overlay- side b	19" diameter	1/16" mounted to 1/8" steel	LG
LF6.E05.ap01	activity prompt	Human Interactions	Talkback	18" diameter		LG
LF6.E05.ms01	mindset	Human Interactions	Human interactions/leave no trace	18" diameter		LG
LF6.E05.sp01	story panel	Human Interactions	Conservation	18" diam.		LG

LF6.E05.sp02	story panel	Human Interactions	Climate change	18" diam.	LG
LF6.E05.sp03	story panel	Human Interactions	Fire ecology	18" diam.	LG
LF6.E05.sp04	story panel	Human Interactions	Invasive species	18" diam.	LG
LF3.E02.qt01-03	quotes/questions	What Cells Can Do	Back panel	(3) 40" x 12"	VY
LF4.E03qt01-03	quotes/questions	Feeding and Fueling	Quotes/questions on back wall	(3) 40" x 12"	VY
LF4.E03qt04	quotes/questions	Feeding and Fueling	Quotes/questions on parapet wall	40" x 12"	VY
LF5.E02.qt01-03	quotes/questions	What Populations Do	Back wall	(3) 40" x 12"	VY
LF5.E03.ms01	mindset	Hominid Evolution	Overview of the latest theories on human evolution	24" x 28"	VY
LF5.E03.qt01	quotes/questions	Ecosystems	West wall	(3) 40" x 12"	VY
LF5.E03.gi01	graphic image	Hominid Evolution	Primate tree	168" x 48"	VY (2 color)
LF5.E03.gi03	graphic image	Hominid Evolution	Map of all finds	30" x 20"	VY (3 color)
LF3.si01	section intro	Cells	Cells	24" x 15"	VY
				35" x 14"	DL
LF4.si01	section intro	Organisms	Organism level of life's organization	24" x 15"	VY
				35" x 14"	DL
LF5.si01	section intro	Populations	Populations	24" x 15"	VY
				35" x 14"	DL

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
NV2.E01.ms01	mindset	We've Always Been Here	Aboriginal culture and sovereignty during pre-Columbian times	58" x 4" 30" x 17"	on curved wood veneer substrate to match GC wall	DL DS	
NV2.E02.ms01	mindset	Contact	Arrival of Fur trappers in the Great Basin	58" x 4" 30" x 17"	on curved wood veneer substrate to match GC wall	DL DS	
NV2.E03.ms01	mindset	Assimilation	Forced assimilation	58" x 4" 30" x 17"	on curved wood veneer substrate to match GC wall	DL DS	
NV2.E04.ms01	mindset	Termination	Termination	58" x 4" 30" x 17"	on curved wood veneer substrate to match GC wall	DL DS	
NV2.E05.ms01	mindset	Living in Cities	Relocation programs attracted Native Americans to cities	58" x 4" 30" x 17"	on curved wood veneer substrate to match GC wall	DL DS	
NV2.si01	section intro	We've Always Been Here	Personal and tribal histories	48" x 5" 30" x 30"		DL VY	
NV3.si01	section intro	Being Indian Today	Being Indian Today	48" x 5" 30" x 30"		DL VY	
NV5.si01	section intro	Utah's Tribes	Utah's Tribes	36" x 36" 24" x 24"		DL VY	
NV5.E02.gi01	graphic image	Shoshone NV5.E02.ca03	Powwow dancers in regalia	72" x 48"	1/2" paint finish on approved conservation substrate	IJ	
NV5.E03.gi01	graphic image	Goshute NV5.E03.ca04	Goshute image	60" x 72"	1/2" paint finish on approved conservation substrate	IJ	
NV5.E04.gi01	graphic image	Southern Paiute NV5.E04.ca05	Southern Paiute image	60" x 48"	1/2" paint finish on approved conservation substrate	IJ	
NV1.E01.gi01-10	graphic image	Introduction	Mural composed of 10 large–scale photographs	(10) 36" x 121"		DP	
NV2.E02.pm01	photomural	Contact	Ute men on horseback- historic image	58" x 125"		DP	
NV2.E03.pm01	photomural	Assimilation	Boarding School image	58" x 125"		DP	
NV2.E04.pm01	photomural	Termination	Termination	58" x 125"		DP	
NV2.E05.pm01	photomural	Living in Cities	Relocated Native americans in an industrial work setting in the city	58" x 125"		DP	

[NV]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
NV2E01.pm01	photomural	We've Always Been Here	Ancient antelope corral at Ibapah (photo to be taken by Kenny Blackbird)	58" x 125"		DP	
NV4.E01.pm01-05	photomural	Homeland Photomural	5 photomurals reflect the landscape of different native homelands. Includes captions	(5) 192" x 96"		DP	
NV6.E01.gp01-gp05	graphic panels	Storytelling Circle	5 scrims with photomurals of storytellers and graphic captions	(5) 84" x 168"		DP	
NV1.E01.gp01	graphic panel	Introduction	Tribal lands and language divisions	60" x 36"	1/16" paint finish substrate	DS	
NV1.E01.ar01-80	artifact label	National Tribes NV1.E01.ca01	Objects and identification of seven geographic groupings	192" x 7" live area: (80) 6" x 3"	1/8" paint finish substrate	DS	
NV2.E01.ar01	artifact label	We've Always Been Here NV2.E01.ic01	Rabbit robe in case	30" x 2" live area: 5" x 2"	1/8" paint finish substrate	DS	
NV2.E02.ar01-02	artifact label	Contact NV2.E02.ic01	Ute saddle and saddle blankets in case	35" x 2" live area: (2) 5" x 2"	1/8" paint finish substrate	DS	
NV2.E04.ar01	artifact label	Termination NV2.E04.ic03	Paiute Vest in case	35" x 2" live area: 5" x 2"	1/8" paint finish substrate	DS	
NV2.E05.ar01-02	artifact labels	Living in Cities NV2.E05.ic01	contemporary Navajo folk art in case	40" x 2" live area: (2) 5" x 2"	1/8" paint finish substrate	DS	
NV3.E01.ar01	artifact label	Being Indian Today NV3.E01.ic04	Mary Black basket in case	35" x 2" live area: 5" x 2"	1/8" paint finish substrate	DS	
NV5.E01.fp02	focus panel	Ute NV5.E01.ca02	Trade and raids sustained the Ute people	36" x 10"	1/8" paint finish substrate on lift	DS	
NV5.E01.sp01	story panel	Ute NV5.E01.ca02	Bear Dance	18" x 18"	1/8" paint finish substrate on lift	DS	
NV5.E03.sp05	story panel	Goshute NV5.E03.ca04	Solar energy	18" x 18"	1/8" paint finish substrate on lift	DS	
NV5.E05.fp05	focus panel	Navajo NV5.E05.ca06	Navajo focus panels	36" x 10"	1/8" paint finish substrate on lift	DS	
NV5.E05.sp01	story panel	Navajo NV5.E05.ca06	The Long Walk	18" x 18"	1/8" paint finish substrate on lift	DS	
NV5.E02.ar01-50	artifact labels	Shoshone NV5.E02.ca03	Shoshone objects	192" x 7" live area: (50) 6" x 3"	1/8" paint finish substrate on lift and case decks	DS	see 3D drawings
NV5.E03.ar01-28	artifact labels	Goshute NV5.E03.ca04	Goshute objects	192" x 7" live area: (28) 6" x 3"	1/8" paint finish substrate on lift and case decks	DS	see 3D drawings

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
NV5.E01.ar01-63	artifact labels	Ute NV5.E01.ca02	Ute objects	192" x 7" live area: (63) 6" x 3"	1/8" paint finish substrate on lifts and case deck	DS	see 3D drawings
NV5.E04.ar01-35	artifact labels	Southern Paiute NV5.E04.ca05	Southern Paiute objects	192" x 7" live area: (35) 6" x 3"	1/8" paint finish substrate on lifts and case decks	DS	see 3D drawings
NV5.E05.ar01-50	artifact labels	Navajo NV5.E05.ca06	Navajo objects	192" x 7" live area: (50) 6" x 3"	1/8" paint finish substrate on lifts and case decks	DS	see 3D drawings
NV5.E01.fp01	focus panel	Ute NV5.E01.ca02	Traditional Ute ways of life relied on their environment.	36" x 10"	3/4" paint finish substrate	DS	
NV5.E01.fp03	focus panel	Ute NV5.E01.ca02	Glass Beads	36" x 10"	3/4" paint finish substrate	DS	
NV5.E01.fp04	focus panel	Ute NV5.E01.ca02	Childrearing/passing on traditional knowledge	36" x 10"	3/4" paint finish substrate	DS	
NV5.E01.fp05	focus panel	Ute NV5.E01.ca02	Contemporary crafts by Fabian Jenks	36" x 10"	3/4" paint finish substrate	DS	
NV5.E04.fl01	family label	Southern Paiute NV5.E04.ca05	point out beaded water bottle in exhibit	18" x 10"	3/4" paint finish substrate	DS	
NV5.E04.fp01-02	focus panels	Southern Paiute NV5.E04.ca05	Basket making, clothing	(2) 36" x 10"	3/4" paint finish substrate	DS	
NV5.E05.fp01-03	focus panel	Navajo NV5.E05.ca06	Navajo focus panels	(3) 18" x 10"	3/4" paint finish substrate	DS	
NV5.E05.fp04	focus panel	Navajo NV5.E05.ca06	Navajo focus panels	36" x 10"	3/4" paint finish substrate	DS	
NV3.E01.sp02	story panel	Being Indian Today	Unique-ness of language	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp03	story panel	Being Indian Today	Inter-relatedness of language	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp04	story panel	Being Indian Today	Loss of language	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp05	story panel	Being Indian Today	Recently introduced native language	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp06	story panel	Being Indian Today	Archivist/ anthropologist who works at the Center at the U of U	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp07	story panel	Being Indian Today	Scientist involved with research related to the elderly and access	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	

[NV]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
NV3.E01.sp08	story panel	Being Indian Today	Goshute teenager from Ibapah describes their everyday life	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp09	story panel	Being Indian Today	Skull Valley Goshute addresses concerns about nuclear waste	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp10	story panel	Being Indian Today	Ibapah Goshute describes how troops changed names into shorter versions	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp11	story panel	Being Indian Today	Shoshone voice describes their participation in ceremonial dance	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp12	story panel	Being Indian Today	Tribal chairperson	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp13	story panel	Being Indian Today	Participant in contemporary Bear Dance	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp14	story panel	Being Indian Today	Participant in contemporary Restoration Dance	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp15	story panel	Being Indian Today	Shoshone handgame gathering	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp16	story panel	Being Indian Today	Shoshone- contemporary issue of Diabetes	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp17	story panel	Being Indian Today	Shoshone- Mae Perry has been involved in revitalization efforts.	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp18	story panel	Being Indian Today	Horserace in August- Navajo	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp19	story panel	Being Indian Today	Skull Valley- Nuclear Waste Story	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp20	story panel	Being Indian Today	White Mesa Bear Dance	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV3.E01.sp21-30	story panel	Being Indian Today	Additional Stories to be collected and transcribed by Kenny Blackbird	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
NV2.E04.tt01	table top	Termination	activity prompt for flip book of documents	5" x 5"		DS	
NV3.E01.ap01	table top	Being Indian Today	Activity prompt to language interactive	12" x 5"		DS	
NV3.E01.ap02	table top	Being Indian Today	Activity prompt urging visitors to contribute to the response book	75" x 18"		DS	
NV3.E01.sp01	story panel	Being Indian Today	Old songs are lost-they have not been recorded or written down	12" x 9 1/4"	on curved wood veneer substrate to match GC wall	DS	
NV2.E01.fp01	focus panel	We've Always Been Here	Linguistic relationships	24" x 9 5/8"		IJ	
NV2.E01.sp01-03	story panel	We've Always Been Here	Dine (Navajo) origin story, from first world to fourth world	(3) 12 1/4" x 9 5/8"		IJ	
NV2.E02.fp01-02	focus panel	Contact	Utes acquire the horse	(2) 12 1/4" x 9 5/8"		IJ	
NV2.E02.sp01-04	story panel	Contact	The Blackhawk War and Ute removal	(4) 12 1/4" x 9 5/8"		IJ	
NV2.E03.fp01-03	focus panel	Assimilation	Boarding schools	(3) 12 1/4" x 9 5/8"		IJ	
NV2.E03.sp01-04	story panels	Assimilation	Navajo story- Boarding Schools	(4) 12 1/4" x 9 5/8"		IJ	
NV2.E04.fp01	focus panel	Termination	focus on laws and policies	12 1/4" x 9 5/8"		IJ	
NV2.E04.sp01-03	story panel	Termination	Story 1: Travis Parishant	(3) 12 1/4" x 9 5/8"		IJ	
NV2.E05.fp01	focus panel	Living in Cities	Salt Lake City was a relocation center in the 1950s and 1960s	12 1/4" x 9 5/8"		IJ	
NV2.E05.sp01-03	story panel	Living in Cities	Relocation story that speaks to the choice of living on the reservation or in the city	(3) 12 1/4" x 9 5/8"		IJ	
NV5.E02.fp01	focus panel	Shoshone NV5.E02.ca03	Nomadic lifestyle	36"x 10"		LG	
NV5.E02.fp02	focus panel	Shoshone NV5.E02.ca03	Treaty of Box Elder	36"x 10"		LG	
NV5.E02.sp01	story panel	Shoshone NV5.E02.ca03	Rios Pacheco	18" x 10"		LG	
NV5.E02.tt01	table top	Shoshone interactive table	interactive table- Buckskin, beads, calico cloth, and hair pipes for touching	75" x 18"		LG	
NV5.E03.fp01-04	focus panel	Goshute NV5.E03.ca04	Goshute focus panels	(4) 36" x 10"		LG	
NV5.E03.tt01	table top	Goshute Interactive table	interactive table	75" x 18"		LG	

[NV]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
NV5.E04.tt01	table top	Southern Paiute Interactive table	Eleanor Tom's small size cradleboard	75" x 18"		LG	
NV5.E05.tt01	table top	Navajo interactive table	Basket made by Joanne Johnson	75" x 18"		LG	
NV6.E01.tt01	table top	Storytelling Circle	table top contains mindset and encourages kids to tell stories	72" x 150"	on GC provided wood seating	RT	
NV2.E05.qt01	quote	Living in Cities	"There are certain advantages the Indians have. We have a place, a sense of belonging." David Box, Ute	48" x 36"		SS	
NV4.E01.qt01-qt05	quotes	Homeland Photomural	5 Quotes reflect people's relationship to their homeland	48" x 36"		SS	
NV4.E01gc01-gc05	graphic captions	Homeland Photomural	Identify homelands	5" x 5"		SS	
NV1.E01.ct01	case title	National Tribes NV1.E01.ca01	Case title	72" x 6"		VY	
NV3.E01.qt01	quote	Being Indian Today	Transition from and closure to stories	48" x 36"		VY	
NV5.E01.ms01	mindset	Ute NV5.E01.ca02	Northern Ute and White Mesa Ute	30" x 40"		VY	
NV5.E02.ms01	mindset	Shoshone NV5.E02.ca03	Shoshone	30" x 40"		VY	
NV5.E03.ms01	mindset	Goshute NV5.E03.ca04	Goshute	30" x 40"		VY	
NV5.E04.ms01	mindset	Southern Paiute NV5.E04.ca05	The Paiute Indian Tribe of Utah.	30" x 40"		VY	
NV5.E05.ms01	mindset	Navajo NV5.E05.ca06	Clans and language define the Navajo people	30" x 40"		VY	
NV1.E01.ip01	intro panel	Introduction	Context for the Native Voices exhibit experience	36" x 30" 60" x 24"		VY body text DL title	

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
SK5.E02.sp01	story panel	Rail Area	next to diagram embedded in floor and North star viewscope	12" x 12"	on COR-TEN steel panel	AS	
SK1.E01.ip01	intro panel	Introduction	Weather is important to our daily lives	36" x 36" 36" x 30"		DL title VY body text	
SK4.E01.pm01	photomural	Astronomy	Night sky enhanced to show as many elements of the solar system as possible. Includes SK4.E01.ms01 and graphic captions	144" x 210"	on GWB	DP	
SK4.E01.ar01-02	artifact labels	Astronomy SK4.E01.ic02	Sun and moon masks	40" x 2" live area: (2) 5" x 2"	1/8" paint finish substrate	DS	
SK4.E01.ar01-03	artifact label	Astronomy SK4.E01.ic01	Moon rocks and asteroids	24" x 2" live area: (3) 5" x 2"	1/8" paint finish substrate	DS	
SK4.E01.sp01	story panel	Astronomy	Paiute story about the Native sky	12" diam.	1/8" paint finish substrate	DS	
SK4.E01.sp02	story panel	Astronomy	Cosmic Serpent team members--Nancy Maryboy, Robert Johnson, etc.	12" diam.	1/8" paint finish substrate	DS	
SK3.E01.fl01	family label	Utah's Dynamic Climate	Clothes magnets	4" x 4"	on magnet	DS	
SK3.E01.fl01	family label	Utah's Dynamic Climate	Weather and what to wear	14" x 14"	on magnetic surface	DS	
SK3.E01.gp03	activity prompt	Utah's Dynamic Climate	Visitors write on disks and add to the weather wall	(50) 6" diam.	on whiteboard	DS	
SK3.E01.gp01	mindset	Utah's Dynamic Climate	Climate change in Utah. Includes SK3.E01.ms01, SK3.E01.ap01, SK3.E0.gi01, SK3.E01.qt01, SK3.E01.ap02, SK3.E01.ar01, SK3.E01.fp01-02, SK3.E01.fp02, SK3.E01.gc01-09	360" x 144" live area: 360" x 96"		DS	
SK3.E01.gi02	graphic image	Utah's Dynamic Climate	Weather extremes	30" x 30"	1/2" paint finish substrate	IJ	
SK3.E01.gi08	graphic image	Utah's Dynamic Climate	Greatest snow on earth	30" x 30"	1/2" paint finish substrate	IJ	
SK3.E01.gi03	graphic image	Utah's Dynamic Climate	Weather extremes	15" x 15"	1/4" paint finish substrate	IJ	
SK3.E01.gi04	graphic image	Utah's Dynamic Climate	Weather extremes	15" x 15"	1/4" paint finish substrate	IJ	
SK3.E01.gi05	graphic image	Utah's Dynamic Climate	Weather extremes	8" x 8"	1/4" paint finish substrate	IJ	
SK3.E01.gi06	graphic image	Utah's Dynamic Climate	Weather extremes	8" x 8"	1/4" paint finish substrate	IJ	
SK3.E01.gi07	graphic image	Utah's Dynamic Climate	Lake effect diagram	15" x 15"	1/4" paint finish substrate	IJ	
SK3.E01.gi09	graphic image	Utah's Dynamic Climate	Snowflake formation graphic images	15" x 15"	1/4" paint finish substrate	IJ	
SK4.E01.gi01	graphic image	Astronomy	Star map w. constellations	44" x 44"	1/4" paint finish substrate	IJ	

[SK]

PANEL CODE	PANEL TYPE	EXHIBIT AREA	CONTENT	SIZE (W x H)	MATERIAL	TREATMENT	NOTES
SK4.E01.gi02	graphic image	Astronomy	Native star chart w/ constellations	44" x 44"	1/4" paint finish substrate	IJ	
SK4.E01.gi03	graphic image	Astronomy	Native star party on Navajo res	12" x 12"	1/4" paint finish substrate	IJ	
SK4.E01.gi04	graphic image	Astronomy	Anasazi rock art ceiling	12" x 12"	1/4" paint finish substrate	IJ	
SK3.E01.gp02	graphic panel	Utah's Dynamic Climate	Weather prediction and Utah and Salt Lake City weather. Includes SK3.E01.fp03, SK3.E01.fl01	108" x 144" live area: 20" x 20"		IJ	
SK2.E01.tt01	table top	Heliostat	Helioscope and how the projection works, focus panel, graphic images and caption	56" diameter 10" wide		LG	
SK5.E01.gr01	graphic rail	Terrace	Measuring weather	60" x 10"		LG	
SK5.E01.gr02	graphic rail	Terrace	Measuring weather	60" x 10"		LG	
SK5.E01.gr03	graphic rail	Terrace	Measuring weather	36" x 10"		LG	
SK5.E01.gr04	graphic rail	Terrace	Renewable energy	36" x 10"		LG	
SK5.E01.gr05	graphic rail	Terrace	Sun angle	60" x 10"		LG	
SK5.E01.gr06	graphic rail	Terrace	Inversions	60" x 10"		LG	
SK5.E02.gp01	graphic panel	Rail Area	graphic panel contains descriptions of different cloud types	(5) 10" x 10"		LG	
SK5.E02.gr01	graphic rail	Rail Area	panoramic viewshed with sunset positions	10'-3" x 10"		LG	
SK4.E01.qt01	quote	Astronomy	Observing stars, astronomies	36" x 24"		VY	

UTAH MUSEUM OF NATURAL HISTORY

INTERPRETIVE OUTLINE

100% FINAL DESIGN DOCUMENTS
PREPARED BY RALPH APPELBAUM ASSOCIATES
SUBMITTED APRIL 2, 2009

Ralph Appelbaum Associates *Project No. 0275*
University of Utah *Project No. 0872-9630*
Division of Facilities Construction Management *Project No. 02243750*

INTERPRETIVE OUTLINE

CONTENTS

LEVEL 2

[CN] CANYON
[UF] UTAH FUTURES
[OB] OUR BACKYARD
[PW] PAST WORLDS

LEVEL 3

[MH] MINERAL HALL
[LK] LAKE
[FP] FIRST PEOPLES
[LD] LAND

LEVEL 4

[LF] LIFE

LEVEL 5

[NV] NATIVE VOICES
[SK] SKY

CANYON

Spanning the length of the building from west to east, a dramatic three-story "Canyon" serves as the institution's main circulation hub , an iconic exhibit and public events venue.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/SPECIMENS	GRAPHICS
CN1 Topo model			Below one of the bridges that spans across the Canyon, visitors can gather around a large topographic model of the State of Utah and surrounding Intermountain Region. The model will serve as a gathering point for large tour groups and serve as a starting point to orient visitors to the museum and the State.				
	CN1.E01.sx01	special exhibit	Topo model with labels highlighting major geographic features, state boundaries, waterways, National and State Parks, city and town names, mountain peaks.				
CN1.E01.gr01		graphic rail	Land Ownership				
	CN1.E01.fp01	focus panel	Focus panel describes land ownership in Utah.	Utah and the Intermountain West are rich with natural and cultural history. Utah's lands are owned and managed by the state, the federal government and its agencies, and private interests. These groups don't always agree on land management issues.	Federal and state agencies manage nearly 80% of Utah's lands. Much of this territory is designated at state and national park land, recreation areas and/or multiple use tracts. It's difficult to balance the needs of recreational users against development and preservation. And there have long been struggles over what to do with various parcels of land (whether to allow cattle grazing, mining and development, or whether to ban motorized travel and preserve the land as wilderness). While many favor preserving land that has true wilderness value, there remains a challenge about where to draw the line – what constitutes wilderness and what doesn't – and who makes those decisions. Some in rural Utah argue they should have a major say in decisions regarding this land, since the outcome will have a great impact on their lives. Others argue that southern Utah is a national treasure belonging to all of us – that its significance far outweighs local interests.		
	CN1.E01.gi01	graphic image	map of state showing parks, monuments, trails, etc.				
	CN1.E01.gc01	graphic captions	Captions for map showing parks		Utah has 45 state parks, 5 National Parks, seven National Monuments, two National Recreation Areas, a National Historic Site and six National Forests. These spectacular areas preserve millions of years of natural history. You can see dinosaur bones, petroglyphs, and lots of wildlife. Please do visit Utah's parks, and remember to visit responsibly, and leave no trace.		
	CN1.E01.sx02	special exhibit	laser pointer tethered to the rail enable visitors to point out features of the map.				
	CN1.E01.ap01	activity prompt	prompts visitors to use the pointer.				
CN1.E01.gr02		graphic rail	Demographics				
	CN1.E01.fp02	focus panel	Focus panel explains Utah demographics and population trends	Utah's population is growing rapidly; most people live in urban areas. Of the 50 states, Utah has the youngest population; one of the highest birth rates; the second lowest death rate; the healthiest population; the highest literacy rate; the highest percentage of high school graduates; and the highest number of people with a college education.	Utah's population is relatively small, but it's growing rapidly. In the 1900s, minorities and immigrants came to Utah, changing the demographic profile. The state's population is young, and increasingly diverse in race and culture. Utah enjoys the nation's highest birthrate at 2.4 percent. And at 28.5 years, Utah has lowest median age in the country. Since Utah also enjoys one of the nation's highest levels of high school graduation (91.2 percent) and since 27 percent of Utahns hold bachelors degrees. The U.S. Census Bureau projects that Utah's population will approach just over 4 million residents by 2030, which places Utah as the fifth fastest growing state. Another telling statistic is that while Utah is the youngest state in the nation and will remain so for the foreseeable future, it is also the second fastest growth area for elderly population growth.		photos of diverse Utah residents; from different parts of the state; bullet pt. Demographics?

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					That's because Utahns live longer. 10 counties in Utah are part of metropolitan areas, and 5 counties are part of micropolitan areas. The micropolitan category defines counties that include an urban area with a population of 10,000 to 49,999 plus surrounding counties that are linked through commuting ties. Much of the population lives in cities and towns along the Wasatch Front, a metropolitan region that runs north-south with the Wasatch Mountains rising on the eastern side. The rest of the state is mostly rural or wilderness. Utah has a higher percentage of people sharing a single religious denomination than any other state. Utah contains 5 metropolitan areas (Logan, Ogden-Clearfield, Salt Lake City, Provo-Orem, and St. George), and 5 micropolitan areas (Brigham City, Heber, Vernal, Price, and Cedar City). Most Utahns are of Northern European descent. http://utah.wedding.net/demographics.html		
	CN1.E01.gi02	graphic image	Photos of Utah residents				
	CN1.E01.gc02	graphic captions	Graphic captions for Utah residents photos				
CN1.E01.gr03		graphic rail	Attractions				
	CN1.E01.fp04	focus	Attractions and unique features of Utah: parks, excavation sites		text to come		
	CN1.E01.gi04	graphic image					
	CN1.E01.gc04	graphic captions					
	CN1.E01.sx03	special exhibit	laser pointer tethered to the rail enable visitors to point out features of the map.				
	CN1.E01.ap02	activity prompt	prompts visitors to use the pointer.				
CN2 Canyon Collections Wall			Visitors see an iconic, 3 story display of specimens and artifacts from the institution's collection located behind an internally lit collections showcase. At the base of this case a layer of interpretive graphics reveal that this seemingly eclectic grouping of objects corresponds to the thematic organization of the museum's eight permanent exhibitions. These graphics and lower level objects provide an advance-organizing experience for the visitor.				
	CN2.E01.ar01	artifact label	Label describes Utah Sky				
	CN2.E01.ar02	artifact label	Label describes Native Voices				
	CN2.E01.ar03	artifact label	Label describes Life				
	CN2.E01.ar04	artifact label	Label describes Past Worlds				
	CN2.E01.ar05	artifact label	Label describes First Peoples				
	CN2.E01.ar06	artifact label	Label describes the Great Salt Lake				
	CN2.E01.ar07	artifact label	Label describes Land				
	CN2.E01.ar08	artifact label	Label describes Utah Futures				
	CN2.E02.qt01-qt04	quotes	Quotes are inscribed on various facets of the North walls of the canyon	about natural history, nature, our relationship with the natural world, Utah			
	CN2.E02.qt04-qt08	quotes	Quotes are inscribed on various facets of the South walls of the canyon	about natural history, nature, our relationship with the natural world, Utah			
	CN2.E02.fp01	focus panel	Focus panel describes the overall organization of the museum. identifies each exhibition and describes the artifacts and specimens that you might see there and the branches of science they represent.	For billions of years Utah has gone through extreme changes that continue today and into the future. You are part of this change, so explore the museum and our collections and find your connections to Utah's Natural History.	The museum is organized into eight thematic exhibitions, including Utah futures. These offer distinct, yet connected, perspectives on our world, past and present. The exhibitions are linked by literal and virtual Trails that emanate from a Trailhead in the Canyon. The Trails lead to outdoor exhibits and trails that take advantage of the new museum's spectacular site, and also to parks, sites, and geologic features across the state. Explore our museum, our site, and our state.		

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CN3 Collections Storage Window			A Collections Window provides a view into the working area of the curators and staff , where they can be seen documenting, preserving and interpreting the institution's collections.				
	CN3.E01.si01	section intro	Section intro describes collections storage; role of research and collections in the museum and in science.	Collecting, conservation and interpretation are essential to understanding our natural world.	This museum is much more than its public exhibitions. The Utah Museum of Natural History's collections form the basis for all of the Museum's educational functions, from public exhibits and programming to scholarly research and publication. The Museum's systematic collections in the fields of earth sciences, biology, and anthropology rank among the largest and most comprehensive for the western United States. While emphasizing the Great Basin and Colorado Plateau, they also include material from throughout the world. These collections are the foundation for research on some of the fundamental phenomena of biological and earth sciences: evolution, ecology, climate change, biogeography, behavior, agriculture, and, if they include the human sciences, culture. Our collections record the past, and give us insights into the future.		
	CN3.E01.pm01	photomural	photomural highlights aspects of the museum's archives, and scientistis cataloguing, researching and interpreting the collections.	The museum is a place of ongoing research and collection.			
	CN3.E01.qt01	quote	Quote about collections located near the window to the collections area				
	CN3.E01.sp01	story panel	Story from collections manager				
	CN3.E01.sp02	story panel	Story from curator or adjunct curator				
	CN3.E01.sp03	story panel	Story from collector/collector's council member				
	CN3.E01.ar01-	artifact labels	Changeable artifact labels		Labels for new acquisitions, newly studied items	Objects to be selected by UMNH	
CN4 Trailheads			Throughout the Canyon, in both pre-pay and pay areas, visitors encounter a set of 6 Trailhead interactive stations which provide tools for planning their day at the museum and offer recommendations for extending their experience beyond the walls of the museum at the end of your visit.	The Trailheads mark the beginning of a larger journey — one that connects visitors to a community of like-minded people and introduces them to the museum's many partners, programs and sites across the State of Utah.			
	CN4.E01.av01-av06	av	6 interactive touchscreen stations where visitors can plan their visit and make connections to trails and sites, partner institutions and resources in Utah.				

UTAH FUTURES

If we can learn from the past and foster our connections to Utah's natural world, we can make informed decisions about a healthy global future.
1. We are connected to the world in ways you may not have imagined. Deep connections with the place we live can help us to understand broader connections globally.
2. The past and the present inform us about our future.
3. Through your decisions and actions, you do change the world.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
UF1Introduction		title wall					
	UF1.E01.ip01	introduction panel	title, grabber, copy block	We can forge a sustainable present and future.	The Utah Museum of Natural History is committed to operating under and promoting sustainability, that is, meeting the needs of the present without compromising the ability of future generations to meet their needs. Residents of this state, like many Americans, realize that the land is under pressure, demands on resources are increasing, open spaces are being lost. What kind of life do we want for ourselves and our children? Can we find a balance in how we live? In this exhibition, you will see how the museum's collections speak to today's challenges, and meet Utahns who are working for a sustainable present and future. An additional may be developed with Simon Heidjens; involving artifacts and/or environmental responses.		
	UF1.E01.av01	av	Av program for intro wall				
UF2 The Carbon Story							
UF2.E01.ca01		case	Visitors see a case with artifacts that don't seem to be related - what's the connection? They learn that these objects from the collections relate to the carbon cycle.			12 objects: Allosaurus Left maxilla #a0875, Calcite Cave formation #a1080, Azurite #a1221, Gambel oak herbarium sheet #a1748, Palmatid2 #a1769, Calcite #a1800, Aragonite #a1801, Cheyenne Jacket w/ Beaded Horses #a1802, Hopi Rain or Wedding Sash #a1803, Ammonite #a1869, mano and Mortar #a1749, Coal #a3141	
	UF2.E01.ms01	mindset panel	Mindset panel explains the carbon cycle.	All life is based on the element carbon. Carbon is the major chemical constituent of most organic matter, from fossil fuels to the complex molecules (DNA and RNA) that control genetic reproduction in organisms	Carbon is a substance that cycles through our world, largely unseen. It feeds us, warms us, provides shelter, propels us from place to place, and changes our climate. Carbon is everywhere - in our bones and teeth, in other living things, and in the non-living world. Carbon cycles between living things and the non-living world, where it's found as CO2 in the atmosphere and oceans, in limestone rocks, and in coal and gas. Today the C02 in the atmosphere is steadily increasing, leading to global climate change.		carbon cycle diagram; CO2 in atmosphere charts
	UF2.E01.gc01	graphic caption	Captions for carbon cycle				Carbon cycle diagram. See www.wikipedia.org/wiki/Carbon_cycle
	UF2.E01.gc02	graphic caption	Captions for carbon dioxide charts				
	UF2.E01.fp01	focus panel	Focus panel explains how plants capture carbon.	Plants absorb carbon dioxide from the atmosphere, and through photosynthesis carbon atoms are incorporated into carbohydrates, or sugars.	Most carbon enters the living world through photosynthesis, the process where plants convert carbon dioxide and water to sugars and oxygen. Animals eat the plants and use the carbon in the sugars for energy and to build their bodies. Other animals eat these animals, and the cycle continues, with carbon eventually returned to the soil after the animals die. The same carbon atoms are recycled endlessly over millions		
	UF2.E01.ar	artifact label	Label for Plant voucher, Quercus gambelii (Gambel oak		These two specimens provide the opportunity to discuss the nature of carbon sequestration over millennia in the fossil form of the plant and over the shorter term in the living pressed plant.	A1748	
	UF2.E01.ar	artifact label	Palmatifid- plant fossil			A1769	

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	UF2.E01.gc03	graphic caption	Graphic caption explains deforestation		By clearing forests, humans reduce the ability of photosynthesis to remove CO2 from the atmosphere, which results in a net increase in atmospheric CO2. Because of these human activities (including burning of fossil fuels), atmospheric carbon dioxide concentrations are higher today than they have been over the last half-million years or longer.		
	UF2.E03.fp02	focus panel	Focus panel text links clothing with the carbon cycle.	The very same carbon taken from atmospheric CO2 by plants is eaten by herbivorous animals to make muscles, skin, hair, or otherwise create/maintain their bodies. Humans use these materials to make clothing.	The carbon within the plant leaves, stems, and sugar are broken down, and then utilized within protein, fat, and other molecules of the deer to help grow muscles, hair, bone, skin, etc. and maintain and repair its body. The deer leather vest here is made of the exact Carbon atoms that the deer ingested from the plants in its forest. Virtually all clothing is made from some sort of Carbon-based material, including this cotton shirt. CO2 from the atmosphere is used with sunlight to produce the cotton within this shirt. The deer vest and the cotton shirt are ultimately produced by sunlight and atmospheric CO2. Our life, and all of those impacted by us, is dependent on a delicate balance between energy and matter.		
	UF2.E03.ar	artifact label			Let's chose an object that includes both a beautifully tanned hide and imagery of plants or animals in beadwork. Then the caption can refer to indigenous traditional ways of honoring the gifts of the natural world. If we chose to go with a parching tray, we can address the changes in range and productivity of pinons--a climate change story.	Embellished clothing made of deer hide and or basket. A1802 Cheyenne jacket, A1803 Hopi rain sash	
	UF2.E03.gc04	graphic caption	Caption for contemporary bear dance photograph or pine nut winnowing photograph				Photograph of a Bear Dance illustrating the
	UF2.E05.fp03	focus panel	Focus panel describes carbonates.	Carbonates act as carbon "sinks" storing carbon in rocks and underwater.	Over long time-scales carbonic acid (a weak acid formed by reactions between atmospheric carbon dioxide, CO2, and water) slowly combines with minerals at the earth's surface. These reactions form carbonates (carbon-containing compounds) through a process called weathering. Large beds of limestone around the world are filled with invertebrate shells made of Calcium carbonate. These shells were made from CO2 in ocean water.		
	UF2.E05.ar	artifact label	Label for carbonate mineral specimen			A1080 calcite, A1221 azurite and malachite, A1800 calcite, A1801 aragonite	
	UF2.E05.ar	artifact label	Label for ammonite			A1869 ammonite	
	UF2.E05.gc05	graphic caption	Graphic caption about the effects of pollution on limestone.		Air pollution from cars and from industrial activity is causing air pollution which also causes damage to limestone structures and statues.		Photograph of acid eroded limestone statues in Italy.
	UF2.E06.fp04	focus panel	Focus panel describes how the analysis of carbon can help scientists identify dinosaur diets.	Carbon is used to identify the diets of ancient creatures.	The carbon cycle has been working for several billions of years. Ancient plants utilized atmospheric CO2 in similar ways that plants do today. Herbivorous animals, such as dinosaurs ate the plants and utilized the carbon in their bodies. Carnivorous dinosaurs then ate the herbivores. Scientists can study the diets of dinosaurs by studying the carbon within their teeth. As the dinosaur tooth grows, it uses the carbon that it obtained from its food to form bone and teeth. By analyzing that original carbon, which is still preserved in many fossil teeth, we can begin to understand which carnivores ate which herbivores, and if certain herbivorous dinosaurs preferred certain types of plants or places of feeding.		
	UF2.E06.gc06	graphic caption	Caption describes graph of isotope rations				Diagram of isotope ratios
	UF2.E06.ar	artifact label	Label for Allosaurus material			A0875 Allosaurus maxilla	
	UF2.E06.ar	artifact label	Label for Camarasaurus material				
	UF2.E06.ar	artifact label	Label for mano and mortar			A1749	
	UF2.E06.ar	artifact label	Carbon sample			A3141	

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UF3 Sustainability			Visitors gather in the center of the space to interact with the choices game, choosing an icon to trigger questions about life choices and reactions that result form various kinds of impact. Billboard style poster panels with inset cases are themed according to science, economics, and community. These panels discuss Utah sustainability efforts, tying to global topics where appropriate. Photographs, stories, and objects from the collections may be included, as well as maps. This is an opportunity to also bring specific place-based stories and projects to the public and offer ways for visitors to get more involved in their communities.	You can make a difference.			
	UF3.E01.ms01	mindset panel	Mindset panel defines sustainability, introduces the 3 pillars.		Balancing the relationships between environmental stewardship, economic development, and social responsibility while meeting the needs of the present without compromising the ability of future generations of people and ecosystems to meet their own needs." Sustainable development is supported by three pillars, representing environmental protection, social development and economic growth, which together support the roof. An additional supporting beam is research. All of these support structures need to be strong and balanced for a sustainable future. This requires partnerships among the institutions of each pillar - locally and globally - nonprofits, governments, activists, researchers, developers, and planners need to be able to work cooperatively.		
UF3.E01.gp01		graphic panel	Science				
	UF3.E01.fp01	focus panel	Focus panel explains sustainable home and garden design, and describes Utah House.	You can build homes and gardens that are energy- and resource-use efficient.	Sustainable homes and gardens use less energy and water, and are made of materials that are friendly to people and animals. A sustainable house can be beautiful, while making little impact on the environment. The Utah House project in Kaysville is a demonstration project for sustainable house and garden design. Utah House is 60% more energy efficient, and uses 70% less water than the average home in the state. It's made from healthy products so indoor air quality is better. The garden is also energy and water efficient, and features native plants.		
	UF3.E01.sp01	story panel	Story from Utah House founder or staffer about impact of the House, future directions.				
	UF3.E01.fp02	focus panel	Focus panel explains ecological footprint and introduces Utah Vital Signs.	Ecological Footprint is a measurement of whether we are living within Earth's resources.	This ecological accounting tool compares a particular human demand on the Earth's biosphere in a given year to the available biological capacity in that year. Such a measure of the supply of and human demand on natural capital is indispensable for tracking progress, setting targets and driving policies for sustainability. The Ecological Footprint of a region includes all the cropland, pasture land, forests, and fishing grounds required to produce the food, fiber, and timber its population consumes, to absorb the wastes emitted ingenerating the energy it uses, and to provide space for its infrastructure. To manage our natural capital wisely, it is important to know how much we have and how much we use. In 2007, Utah became the first state to complete an Ecological Footprint analysis. http://www.utahpop.org/vitalsigns/UVS_Report_v20b.pdf		
	UF3.E01.sp02	story panel	Story from Utah Vital Signs founder or staffer				
	UF3.E01.ic01	inset case	Science-related				
UF3.E01.gp02		graphic panel	Economics				

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	UF3.E01.fp03	focus panel	Focus panel explains the importance of research and introduces the Utah Clean Coal Program.	Research can help us find ways to live more sustainably.	Research on sustainability looks at energy, climate change,transportation, land use, pollution, and ecosytems, among other areas. Much of this research is focused on practical solutions - ways to mitigate harmful conditions and practices, and products to reduce our impact on the planet. Research also helps monitor changes to local and global systems. Researchers are studying how to change people's behavior, to make them participants in the search for sustainability. The University of Utah has an Office of Sustainability that coordinates and encourages sustainable practices, and supports sustainability research. One of the Office's efforts, the Utah Clean Coal Program, does research on supporting the development of technologies for the clean and efficient utilization of coal and options for the mitigation of CO2 emissions. http://www.uc3.utah.edu/		
	UF3.E01.sp03	story panel	Story from Utah Clean Coal researcher				
	UF3.E01.fp04	focus panel	Focus panel explains the importance of voting and introduces HEAL Utah.	You have a voice in the future when you vote on green candidates and issues.	Investigate the people who want to be your mayor and local council members. They make decisions that affect your roads, sewers services, garbage, housing and development, public transit and public health. If you want to push for a green agenda, vote for the candidates you think will take serious steps to achieve environmental sustainability. If we hope to be environmentally sustainable globally, we must act locally. HEAL Utah is a nonprofit group working to encourage people to participate in the democratic process to make informed and sustainable decisions about a healthy environment in Utah. http://www.patagonia.com/pdf/en_US/Environmental_Grants_2008.pdf http://healutah.org/who/aboutus		
	UF3.E01.sp04	story panel	Story from HEAL founder or staffer.				
	UF3.E01.ic02	inset case	Economics-related				
UF3.E01.gp03		graphic panel	Community				
	UF3.E01.fp05	focus panel	Focus panel explains sustainable communities and introduces Daybreak.	Sustainable communities foster energy and social sustainability.	A Sustainable Community iseeks to preserve and enhance people and nature by thoughtful planning, careful use of resources and a reverent approach to life. These attributes create an environment where all may thrive for untold generations. The idea of Sustainable Community is bigger than energy efficiency, it's about encouraging human interaction and interaction with nature. Daybreak Community, in Jordan, is a planned, sustainable community built on surplus mining land. As the Daybreak web site says, "At Daybreak, sustainability means having more balance, more beauty, more connections to nature and your fellow humans. It's about having a better life, today and tomorrow." http://www.centerforsustainablecommunity.org/definesustainability.html http://www.riotinto.com/documents/ReportsPublications/Rio-tinto-sep07-Daybreaks.pdf		
	UF3.E01.sp05	story panel	Story from Daybreak planner or resident				

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	UF3.E01.fp06	focus panel	Focus panel explains eating locally and introduces Utah's Own.	You make choices every day about what to buy and where to buy it; these choices affect our future.	The concept of buying local is simply to buy food (or any good or service) produced, grown, or raised as close to your home as possible. "Food miles" refer to the distance a food item travels from the farm to your home. The food miles for items you buy in the grocery store tend to be 27 times higher than the food miles for goods bought from local sources. In the U.S., the average grocery store's produce travels nearly 1,500 miles between the farm where it was grown and your refrigerator. The Utah's Own program was established to create a consumer culture of choosing Utah products at grocery stores, restaurants; everywhere consumers shop. When Utah consumers purchase locally produced products it builds our Utah economy since a dollar spent on a Utah product creates the effect of adding $4.00 to $6.00 to our Utah economy. In addition, when Utah consumers purchase locally grown products it enhances our Utah environment by protecting our watershed and reducing the carbon footprint of those products. http://www.sustainabletable.org/issues/buylocal/ http://www.utahsown.utah.gov/cons_home.php		
	UF3.E01.sp06	story panel	Story from Utah's Own founder, farmers' market organizer or other eat local advocate.				
	UF3.E01.ic03	inset case	Community-related				
UF3.E01.gr01		graphic rail					
	UF3.E01.in02	interactive - sustainability game	What you see: You approach a metal rail with a set of icons projected on it. On the other side of the rail, on a large curved wall, you see an animated landscape. If you touch and hold an icon, animated messages appear on the landscape scene. For instance, if you touch the car, a highway appears on the landscape. A series of messages appear, exploring the issue of whether we should build more roads. You also see other visitors touching the glowing icons, and what happens to the landscape when they touch a tree, or a factory. Each of the icons and messages is related to a particular Utah issue (development, water, population, etc.) What you get: You find that there are multiple perspectives and opinions about how to achieve a sustainable future.	Your actions and decisions contribute to a sustainable future.			
	UF3.E01.ap02	activity prompt	Visitors are encouraged to hold an icon and trigger the projection				
	UF3.E01.av01	av program	A colorful 3-D animated diorama is a floor-to-ceiling video projection that represents a stylized Utah landscape and is the basis for the sustainability interactive.				
	UF3.E01.av02	av- interative-talkback	At a video recording station, visitors can leave their thoughts on sustainablility and hopes for the future in Utah and the world. Pre-recorded video messages can be played so visitors can hear other perspectives as well as hints and resources for sustainable living.	Your opinion makes a difference! - what does sustainability mean to you now? What did it mean in the past and how will it impact our future?			
	UF3.E01.ap03	activity prompt	Visitors are encouraged to share their thoughts and listen to others.				
UF4 Passage to PW	UF4.E01.qt01	Quote	about the future				
	UF4.E01.qt02	Quote	about the past informing the future				
	UF4.E01.qt03	Quote	about extinctions past and present				

OUR BACKYARD

You can be a naturalist in your own backyard. There is more than one habitat in your backyard.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS/ OWNER PROVIDED	GRAPHICS
OB1 Introduction	OB1.E01.ip01	intro panel (title)	Introduces observatory title- outside room				
OB1 House Area			The house provides habitats for animals and plants. The nearness of the house makes the porch a place of year-round warmth and protection that can't be found anywhere else in the backyard.				
OB1.E01 Front Porch							
	OB1.E01.gp01	graphic panel	The graphic panel shows a swallows nest and modeled swallow peeking out.	The porch offers a perfect place for wasps, hornets and swallows to build their nests.			
	OB1.E01.ap01	activity prompt	Activity prompt encourages families to take a basket and explore the different areas of the space.			baskets	
OB1.E02 Kitchen Area			A wenzscope and magnifiers are at the kitchen table to explore specimens.			wenzscope and magnifiers	
	OB1.E02.gp01	graphic panel	A spider and the webbed creations they make are on a graphic panel in the corner of the kitchen.				spider webs to examine
	OB1.E02.qt01	quote	Quote addresses the hidden discoveries that kids might find indoors				
	OB1.E02.sx01	special exhibit (along back wall)	Twelve fixed jars with live insects			Tarantula, Wolf spider, Jumping Spider, Centipede, Velvet Ant, Beetle (species TBD) Pill bugs, black widow	
	OB1.E02.ar01-ar12	artifact labels	Labels identify insects and a fun fact about them such as where they live, what they eat and where you might find one crawling or flying.				
OB1.E03 Garden			The garden adjacent to the house has a shallow planter box with owner provided plants and garden tools.				
	OB1.E03.sx01-	special exhibit	Planter box				
	OB1.E03.sx02	special exhibit	Magnetic metal panel for flexible graphics				
	OB1.E03.gp03	graphic panel	Graphic panel contains seasonal garden graphics				
OB1.E04 Garden Center							
	OB1.E04.pm01	photomural	Photomural contains the following interactions: pill bugs and millipedes break down organic matter in soil and centipedes and spiders eat smaller soil invertebrates. Harvestmen (daddy long legs) hide on old pots and on rocks. Earthworms aerate garden soil and mice eat roots, seeds and seedlings. Mantids hide on flower stems waiting to catch grasshoppers who are laying eggs in the soil and eating leaves and stems. Birds are attracted by the insects and seeds and bees gather pollen. Wasps and hornets make nests out of ""paper"" and mud on any available surface. Black widows make a messy web in old flower pots.				
	OB1.E04.qt01	quote	Quote describes the mysteries waiting to be discovered outdoors				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS/ OWNER PROVIDED	GRAPHICS
OB2 Tree Area			The tree area is a habitat comprised of many smaller habitats and highlights the living things visitors might find inhabiting the trees in their backyard.				
	OB2.E01.pm01	photomural- (on west wall)	Photomural for the tree area includes: Birds nest in tree branches and eat tree fruit and seeds, owls and squirrels nest in cavities (knotholes and at the base), ladybugs and wasps gather and feed on aphids and caterpillars. Moths are camouflaged on bark during the day and leaf and stick bugs are hidden in their respective elements.				
	OB2.E01.av01	av	Ambient audio sounds are delivered through 3 speakers above the trees. Five speakers installed in each of the trees feature the sound of woodpeckers pecking, owls hooting, robins chirping, mice in their burrow, sap running through a tree. Each of the two benches have sound elements which include earthworms eating dirt and animals burrowing.				
	OB2.E01.sx01	special exhibit	reach in mice burrow, nesting area near base				
	OB2.E01.sx02	special exhibit	textured beetle pathways behind textured bark panel				
	OB2.E01.sx03	special exhibit	model of tree core rings that can be pulled out				
	OB2.E01.sx04	special exhibit	reach in burrow for owl				
	OB2.E01.sx05	special exhibit	oval hole with robin's nest inside				
	OB2.E01.sx06	special exhibit	tree trunks have tree bark replica texture panels of five different trees native to Utah- Pine panel is reddish overlapping small "scales"				
	OB2.E01.sx07	special exhibit	Oak panel is grey-brown deeply furrowed				
	OB2.E01.sx08	special exhibit	Aspen panel is smooth, knotty silver-green				
	OB2.E01.sx09	special exhibit	Willow panel is yellow-orange shaggy, rough				
	OB2.E01.sx10	special exhibit	Maple panel is brown shallow furrows				
	OB2.E01.gc01	graphic captions	Pine panel				
	OB2.E01.gc02	graphic captions	Oak panel				
	OB2.E01.gc03	graphic captions	Aspen panel				
	OB2.E01.gc04	graphic captions	Willow panel				
	OB2.E01.gc05	graphic captions	Maple panel				
	OB2.E01.sx11	special exhibit	Bench with props (provided by owner) with 3 openings for drawers and sounds of earthworms munching				
	OB2.E01.gp01	graphic panel	Graphic panel shows an image of worms making the sound that visitors hear.				
	OB2.E01.sx12	special exhibit	Bench with props (provided by owner) with 2 openings for drawers and the sound of animals burrowing.				
	OB2.E01.gp02	graphic panel	Graphic panel shows an image of animals burrowing as visitors hear the sounds.				
OB3 Underground Crawl			Small crawl spaces give children tunnels to crawl through and a chance to meet life underground through embedded terrarium cases and texture panels that show the stratigraphic layers of soil, roots and chunks of rock.				
Above ground:		South wall					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	ARTIFACTS/ SPECIMENS/ OWNER PROVIDED	GRAPHICS
	OB3.E01.pm01	photomural					
Underground:							
	OB3.E01.pm02	photomural	Underground photomural includes: A mole pokes his nose and front feet out of his burrow. Worms chomp through the uppermost layers of dirt and decaying leaf litter creating a network of tunnels. Tree roots extend throughout the layers and large ground beetles hide in pockets beneath the surface. Mice and voles make nests underground lined with leaves. Micro-soil organisms are visible through exploded views. The lower layers are rocky and have fewer critters living there."				
	OB3.E01.sx01-	special exhibit	king snake	In the walls of the crawlspace are double-sided cases containing live displays			
	OB3.E01.sx02	special exhibit	collared lizard				
	OB3.E01.sx03	special exhibit	ant colony				
	OB3.E01.ar01-ar03	artifact label	Labels identify snake, collared lizard and ant colony				
OB4 Pond Shoreline			The water area is designed to suggest a pond shoreline containing animal and plant habitats that visitors might locally encounter.				
	OB4.E01.pm01	photomural- East wall	Scenic pond shoreline mural including a black-necked garter snake, a marsh wren, Blue darner dragonfly, muskrat and little brown bat				
	OB4.E01.sx01	special exhibit	Shoreline water table				
	OB4.E01.sx02	special exhibit	Animal terrariums- Woodhouse Toad,				
	OB4.E01.sx03	special exhibit	Boreal Chorus Frog				
	OB4.E01.sx04	special exhibit	Tiger Salamander				
	OB4.E01.gp02	graphic panel	Explanation of the woodhouse toad's pondside habitat and daily habits				
	OB4.E01.gp03	graphic panel	Explanation of the boreal chorus frog's habitat and daily habits				
	OB4.E01.gp04	graphic panel	Explanation of the tiger salamander's habitat and daily habits				
	OB4.E01.ap01	activity prompts	Activity prompts encourages kids to look closely, and encourages inquiry as to what lives in and near the water's edge.				
	OB4.E01.gi01-gp06	graphic image	Blue darner dragonfly nymph, Bonneville Cutthroat trout, and a giant water bug, other creatures tbd.				Graphics depict three critters that live in or partially in the water. The following insects and fish are visible "swimming" in the pond: Blue darner dragonfly nymph, Bonneville Cutthroat trout, and a giant water bug.
	OB4.E01.gi07-gi08	graphic images	Tracks in the bottom of the pond show what creatures have been passing through.				Tracks
	OB4.E01.ap02	activity prompts	Activity prompts draws attention to the mural backdrop,encourages kids to look closely, and encourages inquiry as to what lives in and near the water's edge.				

PAST WORLDS

Just as today, ecosystems of the past included producers, consumers, and decomposers cycling energy from the sun. The processes remain the same, while the organisms change over time.
1. Evolution and extinction of species affect diversity through time.
2. Utah has an incredible fossil record.
3. Paleontology is a multidisciplinary approach to studying ancient organisms and ecosystems.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
PW1							
PW1.E01 Introduction							
Intro Panel	PW1.E01.ip01	observatory intro/quote	Introduction on background mural for Lake Bonneville scene	You are about to travel back in time and see some of the plants and animals of Utah's past ecosystems.	Invitation to travel back in time first stop is 11,000 years ago, on the shores of Lake Bonneville. The Past Worlds Observatory is divided into 4 time slices, starting at 11,000 years ago and extending back to 150	Mounted skeletons of Platygonus, Mammuthus adult and baby, Canis dirus, Arctodus simus, Megalonyx, (Pecary will be added later)	outline map of Lake Bonneville and GSL
	PW1.E01.pm01	photomural	Pleistocene photomural				
	PW1.E01.gi01	graphic image	Map of GSL and LK Bonneville Shoreline				
LOWER LEVEL							
Intro Panel	PW1.E02.ip01	observatory intro/quote		Learning about Utah's past is imperative to predicting Utah's future. Utah has an incredible fossil record. Almost all time periods are represented, and new discoveries continue to add to our knowledge of Utah's past.	Utah has an amazing fossil record. It's both complete (almost all time periods represented) and full of amazing finds. Utah, along with the Burgess Shale in Canada and sites in China, is one of few places with Cambrian soft-bodied material, including newly-discovered jellyfish. You can find fossils all over the state, including ice age critters in Park City and Research Park. Utah has one of the best records of the age of dinosaurs, including Cleveland-Lloyd Quarry and Dinosaur National Monument which have been excavated since the mid-1800s to Grand Staircase Escalante National Monument, where perhaps a dozen new dinosaurs have been discovered over the last decade.	recreated rock wall w. embedded fossils	
	PW1.E02.fp01	focus panel	Focus panel explains real vs. cast material	This exhibit features real fossils, and cast bones; is there a difference?	In this exhibition, you will see both real fossils and casts of fossils. Fossils are the remains of ancient life that have been preserved in rock. Casts are not "fakes," but replicas made directly from molds of the real bones. Why display casts if you have the real thing? For large skeletons like the dinosaurs upstairs, real fossil bone can be very heavy and awkward to mount. Also, museums often prefer to have the real fossils available for scientific study, which would be hard if the bones were on exhibit. This exhibition has several types of specimens (the first of their kind described), which are particularly valuable scientifically, and are very rarely on display.		
PW2.E03 Pleistocene Mammals Case			Visitors see a tall case holding Bonneville fauna fossils and learn about the diversity of that fauna, how to tell mammoths and mastodons apart, and about species recognition and sexual selection.				
	PW2.E03.ca01	case	Fossil specimens of mammoths, mastodon skulls and skeletons, Bison antiques skulls, camel skeleton, etc. Fossils of other Cenozoic mammals tbd. Skeletons and cast skulls of C. dirus, and S. fatalis.			30 objects: Mammoth tusk a0128, mammoth skull a0377, baby mammoth jaw a0385, mastadon fossil skull a0471, arctodus simus a1191, bison a1661, a1662, musk ox a1663, a1664, mountain goat a1665, a1666, a1667, a1668, camelups skull a1669, camelups axis a1716, camelups maxilla a1717, smilodon fatalis a1720, canis dirus a1721, bison a1722	
	PW2.E03.ct01	case title	Title and subhead	Just 11,000 years ago, North America teemed with many different mammals, including giant sloths, mammoths, mastodons and cave bears.	Pleistocene 1.8 million years ago to 11,000 years ago The Ice Ages		
	PW2.E03.gi01	graphic image	Dig site image				
	PW2.E03.gi02	graphic image	Dig site image visible from the lab				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	PW2.E03.ms01	mindset panel	Mindset panel describes Pleistocene mammals	There were many mammals in the Pleistocene; some are familiar to us, others less so.	There were lots of herbivores during the Pleistocene. The types of herbivores present depends on the climate, which was much cooler than today. For so many types of herbivores to be present, there must have been lush vegetation, and many different kinds. There are differences in the way that many of these herbivores ate (grazing, browsing, both) and the types of plants they ate. There were many meat eaters, as well, including large saber-toothed cats, dire wolves, and bears that ate plants and meat.		dig site photos, scene with animals
	PW2.E03.fp02	focus panel	Focus panel explains sexual selection in mammoths, mastodons, bison, and musk ox.	Horns, tusks and antlers signal identity for large plant eating mammals.	The horns and tusks you see on the musk ox, mammoth, mastodon, sheep, and buffalo are all used for a very important purpose: mating and recognition of one's own species. Signals such as these allow males to showoff for females, and also prevent closely related species from mating. Similarly, changes within these signals can often lead to the creation of a new species of animal. (BG)		
	PW2.E03.ar	artifact label	Label for mammoth material		One of the most common fossils found in Pleistocene deposits from Utah is the mammoth. Elephant-like, but larger. It had smaller ears, much more fur and a large hump on its back. (BG) Mammoth and mastodon teeth are very different and can be easily identified. The mammoth tooth is almost flat on top, but with undulating ridges running across. The mastodon tooth has six high cones. Both animals grind plant material across their teeth, but since they descended from different ancestors, their teeth look different. Most scientific studies today have determined that both the mastodon and the mammoth eat very similar diets including grass and tree leaves. (BG)	Mammoth skull A0377, tusk A0128, baby mammoth jaw A0385	outline drawing with bones shown
	PW2.E03.ar	artifact label	Label for mastodon material		Mastodons are not common in Utah, more so in Idaho. Specimens have been found here though. Similar to mammoths, but differed in being stockier, flatter faces, and lacking the large hump. (BG)	skull A0471	outline drawing with bones shown
	PW2.E03.ar	artifact label	Label for musk ox material		Musk oxen thrive in cold climates. During the Pleistocene when the climate was colder in Utah, musk oxen were common. But as the climate changed to be warmer, they could not tolerate it and went locally extinct. Today, they are found only in the mountains of Asia, where temperatures are still cold. (BG) These very hairy and shaggy animals were very common on the shores of Lake Bonneville. The UMNH has one of the largest collections of fossil musk ox skulls in the world. They fed on ground plants including grass and sedges. (BG)	skull A1663, partial skull A1664	outline drawing with bones shown
	PW2.E03.ar	artifact label	Label for Ovis canadensis material		Another ancient herbivore is the mountain goat. Its most common remains are in the form of its horns, which are large and durable. These animals lived the same way modern mountain goats live, eating plants from the tops of the Wasatch Front. However, these mountain goats went extinct in Utah, and those on today's Wasatch and Uinta ranges are reintroduced.	skulls A1665, 1666, 1667, 1668	outline drawing with bones shown
	PW2.E03.ar	artifact label	Label for Camelops material		Not as common are camels. It is hard to believe that camels actually walked on the shores of the Salt Lake Valley.	partial skull A1669; axis A1716; maxilla fragment A1717	outline drawing with bones shown
	PW2.E03.ar	artifact label	Label for Bison material		Bison is another common member of the Bonneville fauna. It is closely related to the modern Bison bison and probably led a similar lifestyle, living in herds and grazing ground plants. There is no evidence thus far for the very large horned Bison latifrons in Utah, only Idaho. (BG)	partial skulls A1661, A1663, A1722	outline drawing with bones shown
	PW2.E03.fp01	focus panel	Focus panel text discusses different predator techniques. (with map of find and photo of Park City site, diagrams/illustrations of skulls with features noted)	How did these top Ice Age predators hunt? Their skulls offer clues.	The two top predators during the Pleistocene age of Utah were the Dire wolf and the Saber-toothed cat. The skulls of these predators were very different, each employing a different set of weapons to take down their prey. Both of the animals had large jaw muscles, indicated by the large crest on top of the head. The larger the crest, the larger the muscles that attached there. Fossil remains of these animals from Utah are fragmentary. The skulls you see here are from La Brea.	Smilodon and Canis dirus skulls	map of find and photo of Park City site, diagrams/illustrations of skulls with features noted

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	PW2.E03.ar	artifact label	Label for Canis dirus material		The dire wolf probably had a life style similar to the modern grey wolf, but it differed as well. Its limbs are shorter and slightly stockier than the grey wolf, suggesting that it ran slower. Running fast may not have been necessary if they hunted large prey. Dire wolves may also have been prolific scavengers, because their back teeth–the molars–show lots of evidence for bone grinding. (BG)	A1721a-? Canis dirus cast skull and real skeleton	outline drawing with bones shown
	PW2.E03.ar	artifact label	Label for Arctodus material		The giant short-faced bear was a formidable predator, being larger than the grizzly. Although it also likely had habits similar to modern bears that eat both plants and animals on a regular basis. This is called being an omnivore. (BG)	A1191 partial skull	outline drawing with bones shown
PW2.E04 Herbivore/ Carnivore				You can use your hands and eyes to make discoveries about Ice Age mammals by identifying the meat and plat-eaters at an Ice Age dinner party and putting together a baby mammoth skeleton			
	PW2.E04.si01	section intro	Title and subhead on wall		Utah's fossil record		
	PW2.E04.qt01	quote/question	Quote/question on back wall				
	PW2.E04.ap01	activity prompt	Put together the baby mammoth skeleton.	Connect the bones and put the baby mammoth back together.		cast baby mammoth skeleton with interactive armature	
PW2.E04.tt01		table top					
	PW2.E04.gp01-gp05	graphic panel	Panel contains graphics of meal images for cave bear, sloth, mammoth, dire wolf, bison/camel				
	PW2.E04.gp06-gp10	graphic panel	Image placecards for each animal with highlight of teeth to give visitors a hint of their prefered meal				
	PW2.E04.gp011-gp15	graphic panel	graphics for seat that identify each animal				
	PW2.E04.in03	interactive	Ice Age Dinner Table	Herbivores and Carnivores make different choices at mealtimes.	The visitor uses a rotating finger wheel to dial-in one of three possible meal images into view within a round window that represents a dinner plate. Ratchets in the turning mechanism provide centering for meal images within windows and also offers resistance between selections.		cave bear, giant ground sloth, mammoth, dire wolf, bison or camel
	PW2.E04.av01	av	sounds of chewing are activated when the correct match of herivores and carnivores to their meals of choice.		When the right meal is selected a sound is heard followed by a short audio description.		
	PW2.E04.ap03	activity prompt	prompts visitors to match the mammal with their dietary habits		Can you tell the plant eaters from the meat eaters? Hint: the meat-eaters have sharp teeth like knives or scissors.		
UPPER LEVEL							
PW2 Lake Bonneville							
	PW2.si01	section intro	Section intro orients visitors to the Lake Bonneville ecosystem.	The Ice Age of Utah would have looked like a strangely familiar place, but with exotic animals and lusher vegetation. A world similar to ours, yet hauntingly different.	If you could travel back 11,000 years, there would be (of course) no museum; you would be standing on the shores of an enormous Ice Age Lake, Lake Bonneville. You would see mammoths and mastodons, sabretooth cats, camels, giant ground sloths, and dire wolves. Some of these animals would look very familiar, others would be unfamiliar. As you look at their skeletons, try to imagine seeing them alive, as the first humans in the Salt Lake area did. What happened to these Ice Age animals? Many went extinct, others have relatives in other parts of the world. Musk ox live in Asia today, elephants live in Africa and Asia, sloths live in South America.		timeline graphic, map of Bonneville fossil localities
PW2.E01 Lake Bonneville Fauna			Visitors see skeletons of Ice Age animals, and learn how animals very like today's lived in a very different climate.				
	PW2.E01.pm01	photo mural	Background mural depicts Lake Bonneville approximately 12,000 ya. Focus is on the lake and surrounding plants.		caption: shore of Lake Bonneville, 11,000 years ago, Provo Shoreline Equivalent		
PW2.E01.gr01		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	PW2.E01.ms01	mindset panel		12,000 years ago, animals much like those alive today lived in what is now Salt Lake City such as bears and wolves. Many of these species are still alive, but some are extinct. Others, like the Mammoth and Sloth have relatives that live elsewhere in the world today.	During the Ice Ages, local glaciers filled Utah's canyons, including Big and Little Cottonwood Canyons, and melt from these glaciers fed into a giant lake, Lake Bonneville that filled much of the Great Basin. On the shores of the lake lived mammoths, mastodons, giant ground sloths, sabertooth cats, and cave bears. Their bones are found along the Wasatch Front in gravel quarries, and even in Research Park, near the museum. Ice Age North America has been called a "cold Serengeti" - what happened to these large mammals? Some left descendants here, but many became extinct. The Ice Age climate was colder and wetter, and conifer trees now found naturally at higher elevations grew around the shores of the lake.	Mounted skeletons of A0129 Platygonus, A0130 Mammuthus adult and A0898 baby, A0134 Canis dirus, A0136 Arctodus simus, A0131Megalonyx,	image of scene with animals, dig site photos
PW2.E01.id01		id label	Who's who illustration/label identifies the animals represented by skeletons, and indicates their roles in the ecosystem, and where the fossils were found photos of the area today already done.	Just like ecosystems of today, the animals of the Pleistocene were part of an energy flow, divided into producers, carnivores and herbivores.	Platygonus, Mammuthus adult and baby, Canis dirus, Arctodus simus, Megalonyx, Smilodon, Bison, Teratornis name, scientific name, size, what it ate, other connections/fun facts tbd. Foodweb: The Pleistocene is distinguished by its "mega-fauna" - giant beavers and ground sloths, mammoths and mastodons, enormous bears. Yet, like today, these big creatures were supported by a myriad of plants and animals. North American looked more like an African savannah, with sabertooth cats attacking bison or mammoths. The plant eaters were either grazers (eating grass, like horses do today) or browsers (leaf eaters, like giraffes) or both.		fleshed out images of each animal, foodweb graphic with captions
	PW2.E01.gc01	graphic caption	Graphic captions accompany graphs and charts of climate change	The earth's climate has changed dramatically in geologic time, and now in historic time. Understanding past climate change may help us understand the consequences of global warming.	Scientists distinguish "icehouse" earth (today we live in an icehouse earth) and "greenhouse" earth. Most of the millions of years of earth's history has been greenhouse earth. The icehouse is relatively recent (the past 2 million years); we humans and these Ice Age mammals evolved in an icehouse earth. By studying ancient ice cores and micro-organisms, scientists learn about the abrupt changes from icehouse to greenhouse, and how they affect life on Earth. Recently humans have introduced tremendous levels of carbon dioxide into the atmosphere, causing climate change on a global scale. Similar changes proceeded ancient shifts from icehouse earth to greenhouse earth. Are we accelerating a possible shift? Climate change as the Ice Age became warmer may have contributed to the extinction of the large mammals at the end of the Ice Ages. Some scientists have speculated that the coming of humans, hunting these large animals, may have contributed to their extinctions.		timeline/graph of past climate fluctuations
PW2.E02 Bison Attack			Visitors see a dramatic mount of a sabretooth cat attacking a bison, and compare this attack to that of modern big cats			Mounted skeletons of Smilodon, Bison antiquus, Teratornis above	
PW2.E02.gr01		graphic rail	Bison Attack				
	PW2.E02.ms01	mindset panel	Mindset panel describes the scene, gives the evidence for Smilodon attack, and cites modern analogies.	We infer the behavior of extinct animals from that of their living relatives.	You're watching as a sabertoothed cat attacks a bison. Smilodon was a powerfully built predator, but scientists aren't sure how it hunted, or whether it hunted in packs. Recent scientific work suggests that they used their	Mounted skeletons of A0133 Smilodon, a2302 Bison Latifrons,	with fleshed-out images of Smilodon and Bison, photograph of modern similar attack
PW2.E02.gr02		graphic rail	Predator Techniques				
PW2.E02.rc01		rail case	Predator Techniques			Smilodon a1659, Canis dirus skulls a1660	
	PW2.E02.fp02	focus panel	Focus panel text discusses different predator techniques. (with map of find and photo of Park City site, diagrams/illustrations of skulls with features noted)	How did these top Ice Age predators hunt? Their skulls offer clues.	The two top predators during the Pleistocene age of Utah were the Dire wolf and the Saber-toothed cat. The skulls of these predators were very different, each employing a different set of weapons to take down their prey. Both of the animals had large jaw muscles, indicated by the large crest on top of the head. The larger the crest, the larger the muscles that attached there. Fossil remains of these animals from Utah are fragmentary. The skulls you see here are from La Brea. (BG)		map of find and photo of Park City site, diagrams/illustrations of skulls with features noted

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PW2.E02.fl01		family label	Family label about sabertooth cats	Sabertooth cats were good hunters.	Imagine if your canine teeth were more than 4" long! If you were a sabertooth cat, you would be a powerful predator, with strong legs, and a slashing bite. You might have heard of Smilodon, the Ice Age sabertooth. Did you know that there were many different sabertooths, here in North America, and in Australia and South America?	cast discovery saber-tooth	images of thylacosmilus, South American sabertooths
PW2.E05 Bird Evolution			Standing at the rail in Lake, overlooking Past Worlds, visitors can see the skeletons of large fossil birds (*Teratornis*), and other, earlier fossil birds in the distance.				
PW2.E05.gr01		graphic rail					
	PW2.E05.ms01	mindset panel	Mindset panel reviews bird evolution.	Birds evolved from small meat-eating dinosaurs.	Birds evolved from meat-eating dinosaurs. They are now arguably the most successful group on the planet, diverse in size and habitat, ranging over most of the world and in the oceans. Bird bones are light, and rarely fossilize, so the bird fossil record is not extensive. More bird fossils have been found since 1990 than in the previous centuries, and our understanding of bird evolution is growing. Early members of the bird lineage like Archaeopteryx, have many dinosaur features. These early birds gave rise to birds like Presbyornis, a water bird related to ducks, and Teratornis, an Ice Age vulture.	a0900 Teratornis, a0894, a0376 Presbyornis, a0825 Archaeopteryx	bird evolutionary tree; images of Teratornis, Presbyornis, Archaeopteryx; image of raptor dinosaur
	PW2.E05.gi01	graphic image	birds on exhibit are highlighted on a tree of birds.		caption: tree of birds		
	PW2.E05.ar	artifact label	label for Teratornis		Teratornis had a wingspan of 12 feet! This large bird preyed on mammals and, some scientists think, fish. It was an active predator, not a scavenger like modern condors and vultures. Although Teratornis looks like a giant condor, it is more closely related to hawks and eagles according to dna analysis. Early humans lived at the same time as Teratornis - imagine seeing this giant condor flying overhead. Teratornis bones have been found in middens (garbage dumps) of early humans, showing that they were hunted for food. The remains of hundreds of Teratornis have been found at Rancho La Brea tar pits.		Teratornis image, condor image, outline drawing with bones shown
PW3 Eocene							
	PW3.E01.pm01	photomural	artists mural	forest showing palms, sumac, sycamore, ferns, walnut, fig trees; small horse Hyracotherium peeping through trees; Copelemur primates in trees	caption for artist's mural		
PW3.E01 Eocene Lakeshore			Visitors see the residents of an Eocene lakeshore, and see how that ecosystem resembles modern ecosystems.			Eocene lakeshore with fossil mounts uintathere, Patriofelis,Copelemur, Presbyornis; Presbyornis nests, tracks, and eggs on shore; croc nest on shore; stromatolite reef with caddis fly swarm	
	PW3.si01	section intro	Section intro orients visitors to the Eocene exhibits.	The Eocene was warm and tropical; many different kinds of mammals evolved to fill niches left by the dinosaurs.	Now you're at the shores of an ancient lake, about 50 million years ago. At this time, a series of large lakes covered much of the west. It's warm, almost tropical, and there are some familiar trees, like sycamores and palms. Some of the animals, like the plants, look familiar - can you spot the lemur-like primate? Some animals, like crocs and turtles will seem as if they haven't changed at all. You can see them in the underwater part of this tableau.		map, timeline graphic
PW3.E01.gr01		graphic rail	Looking over Eocene lakeshore				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	PW3.E01.ms01	mindset	Mindset panel describes the Eocene ecosystem, the detailed preservation in lakes, and notes that this is one of the first ecosystems with large mammals.	50 million years ago in Utah, strange mammals lived in and around an ancient lake. This is one of the first ecosystems in which large mammals dominated.	In the Eocene, about 47-50 million years ago, a series of lake-filled basins formed in Utah, Wyoming, and Colorado. They grew and shrank, and eventually filled in, fine sediments burying an incredibly rich array of fossils, from plants to fish, insects, and mammals. The lake was deep, and probably lacked oxygen, so the remains didn't decay. In these exceptional conditions, plants and animals that rarely become fossils were preserved, including an early bat (and its last meal!). The Eocene climate was warmer and more tropical than today's, and palm trees grew along the shores of the lakes. This sub-tropical lake ecosystem is one of the earliest with large mammals, like the plant-eating uintathere seen here.		digsite photos, scene with animals
PW3.E01.id01		id label	Identifies mammals on the Eocene lakeshore; foodweb graphic with captions				
PW3.E01.gr02		graphic rail	Eocene mammals			uintathere a0896, (Patriofelis will be added after opening), Northarctus a0807, Presbyornis and nest a0376, Presbyornis flying a0894, croc nest	fleshed out images of Eocene mammals and photos of modern analogues
	PW3.E01.fp01	focus panel	Focus panel discusses mammals filling roles played by dinosaurs in ecosystems	The Green River is one of the first ecosystems with large mammals.	About 55 to 50 million years ago, in the Eocene, mammals evolved rapidly. This is shown both in the fossil record, and in recent molecular studies of the mammal phylogenetic tree. This rapid evolutionary burst might be related to changing, warmer climates, and the evolution of new kinds of plants. Many of the mammals of the Eocene are members of extinct lineages, like the uintathere. Others, like Copelemur, are members of living lineages (in this case primates). One of the earliest horse and the first bat are known from Eocene rocks. Although these animals make look unfamiliar, they are playing recognizable ecological roles. The uintathere is a plant-eater, browsing on leaves and plants like rhinos do, Patriofelis, a creodont, is a meat eating predator, and Copelemur, a lemur-like primate, feeds on fruit and leaves in the trees.		
PW3.E02 Eocene Tableau			Visitors stand "underwater" to see the teeming life of the Eocene lake, represented in models and real fossils. They observe the micro-and macroscopic life of the lake and learn how hydrocarbons formed.			a0893 crocodile mount, a0895 hyracotherium	
	PW3.E02.sx01	special exhibit	Eocene tableau				
	PW3.E02.in02	interactive	Stratigraphy interactive—visitors pull out eight stratigraphy layer drawers to see the Green River fossil sequence. Layers include: hydrocarbons/shale, vertebrate poop, Undichnus, fish fossils, ostracods, sediment, partial crocodile, leaves, turtle	The drawers represent layers of the Green River system - pull them out to see what's in them and what's older.			
	PW3.E02.ap01	activity prompts	Instructions for stratigraphy game		Pull out the drawers to find out more about the layers of the Green River lake.		
	PW3.E02.gc01-gc08	graphic caption	Captions identify each of the eight layers of the drawers.				
	PW3.E02.ar	artifact label	Label for hydrocarbon layer.	The hydrocarbon layer is composed of the bodies of millions of microscopic plants and animals.	Hydrocarbons or oil shales are dark, black and shiny. This layer comes from microscopic organisms that die and accumulate in the bottom of the lake. The most common organisms include ostracods, diatoms, and algae. The carbon in these animals bodies collects and over time changes into hydrocarbons. Hydrocarbons (oil and natural gas) are (unfortunately) a vital and non-renewable resource. It takes millions and trillions of these microscopic plants and animals to make oil and natural gas. (BG w. MKG editorializing)	specimen tbd	
	PW3.E02.ar	artifact label	Label for vertebrate poop layer.	In the lake system, one animals poop is another animal's energy source.	This layer of medium to dark brown lumps and "slug-like" shapes represents the poop of vertebrates that lived in the lake. The lake is a self-contained environment; the energy in the lake stays there. After fish, turtles and crocodiles eat, their body retains some of the energy, but some is excreted as poop. This becomes a fuel source for other organisms. (BG)	specimen tbd	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	PW3.E02.ar	artifact label	Label for Undichnus layer.	This layer is the trace fossil left by a fish tail on the lake bottom.	Undichnus is a trace fossil. You can see it as a thin sinusoidal line depressed into the sediment. Trace fossils record the activity of animals - their footprints, the wiggles they make through sand, their burrows. Sometimes all that remains of an organism is a track. The track here was made by a fish tail oscillating from side to side as it swims. We don't know which fish made this track, but there were many fish swimming in the lake 50 million years ago. (BG)	specimen tbd	
	PW3.E02.ar	artifact label	Label for fish fossils.	Several layers of mass burials have been found in the lake.	Some of the lake layers record what might be mass burials. This layer of sediment shows many Knightia fish lying in different sizes. There are many different sizes of fish, but they are all one species, Knightia sp. We aren't sure if all the fish died together or how long it took. (BG)	specimen tbd	
	PW3.E02.ar	artifact label	Label for ostracod layer.	Scientists can use ostracods, small shelled animals, to decide if a layer is older or younger, since the kinds of ostracods in the lake change over time.	Ostracods are small clam-shaped animals, but more closely related to crabs. This is a dense layer of ostracods, one of the most common animals in the ancient lake. These are *Hemicyprinotus watsonensis.* Ostracods are animals related to crabs and shrimp that have a hinged shell like a clam. Layers of the lake are aged by changes in the type of ostracod higher or lower in the lake sediments. This layer comes from the middle age of the lake. (BG)	specimen tbd	
	PW3.E02.ar	artifact label	Label for sediment layer	Most of the ancient lake layers are sediments without fossils.	Most of the geologic record doesn't contain fossils; it's layers of sediments are barren like this one. Paleontologists must look through lots of sediments before they find any fossils. Fossils are rare and must be	specimen tbd	
	PW3.E02.ar	artifact label	Label for crocodile layer.	Several kinds of crocodiles and caimans are known from the ancient lake; they were among the top predators.	This is the skeleton of a partially disarticulated crocodile skeleton. Crocodiles were one of the dominant predators of this ecosystem. There are usually fewer predators in ecosystems, so finding a fossil predator preserved is rare. (BG) The presence of crocodiles in the lake indicates that the climate then must have been tropical.	specimen tbd	
	PW3.E02.ar	artifact label	Label for leaf layer.	Leaf fossils in the lake come from the trees that lived along its shores.	This is a layer of leaf impressions scattered across the sediment. The leaves preserved in the lake tell us what kinds of trees lived on the lake margins 50 million years ago. There are many examples of leaves that look very similar to modern trees. Do you think this leaf layer was caused by seasonal shedding of leaves off trees? This is an example of a question that a scientist would ask of this site. (BG) Can you spot the sycamore leaf?	Platanus wyomingensis, Swartzia wardelli, Engelhardtia uintaensis, Acer lesquereuxi, Populous wilmattae	
	PW3.E02.ar	artifact label	Label for bird layer	Not just animals that lived in the lake are preserved in the lake.	Not just aquatic animals like fish and turtles are preserved in the lake. Sometimes flying animals such as birds or bats fall into the lake while trying to catch insects or fish, and sink to the bottom, get covered with sediment, and become preserved in the fossil record. Only a handful of bats have been recovered from these Eocene fossil lakes. Birds are more common, and feathers are abundant in some areas. (BG)	feather a1753	
	PW3.E02.ar	artifact label	Label for turtle layer.	Turtles, common in lakes today, lived in the ancient lake.	In the ancient lake, like in modern lakes, turtles are quite common. Unlike in most deposits, where turtles are represented by only shells and pieces of shells, the turtles in this lake are usually whole skeletons. (BG) Several different kinds of turtles lived in the lake, including soft-shelled turtles and snapping turtles.	Echmatemys a2097	
	PW3.E02.ar	artifact label	Additional artifact labes for forthcoming specimens.				
	PW3.E02.qt01	quote	Quote addresses the passage of time revealed in stratigraphic layers				
PW3.E02.gr01		graphic rail	Stratigraphy				
	PW3.E02.fp01	focus panel	Focus panel for stratigraphy basics.	Sediment stacks in layers like a book with the oldest layers on the bottom and the youngest on the top.	In lakes, sediment falls through the water and is deposited at the bottom. Sediment layers build up, one on top of another. Anything that falls through the water (a plant leaf, a dead fish) gets buried in the sediments. If the sediments aren't disturbed, the bottom layers are older and the top layers are younger.		stratigraphic column of Green River formation

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	PW3.E02.gc09	graphic caption	Graphic captions for the Green River ecosystem diagram.	The Green River is one of the best known fossil ecosystems.	Paleontologists reconstruct ancient ecosystems by analyzing the fossils found in a particular site and comparing the animals and plants to modern analogies. Information on the diet of fossil animals comes from coprolites and from analysis of preserved gut contents. Because the preservation is so good in the Green River Formation, members of the ecosystem like dragonflies, crayfish, shrimp, and plants are preserved. There are 25 species of fish, ranging from small minnows to massive gars, which were 6 feet long and armored in giant diamond-shaped scales. There are even stingrays preserved in the sediments of Fossil Lake, though modern freshwater stingrays are restricted to the Amazon basin in South America. Many of the fish (and other organisms) are concentrated in particularly rich layers that show massive die-offs in the lake community. The sediments of the Green River add to the details of the ecosystem. Geologists distinguish upland forests deposits, shoreline, carbonate mounds left by caddis-fly covered stromatolite reefs, and nearshore and deep lake environments		Green River geologic column/chart; photos of Green River sediments
PW3.E02.id01		id label	scene id for Eocene tableau	Reconstructed underwater scene based on Eocene fossils and sediments	models of stromatolites, bowfin, crayfish, gar, caiman, Hyracotherium, softshell turtle, school of fish, snapping turtle, crocodilians, mosquitoes, damselflies, caddisfly		fleshed out reconstructions, foodweb graphic and captions
	PW3.E02.fp02	focus panel	Focus panel shows how hydrocarbons formed in the Green River formation.	Need an object or remove this text. Maybe a sample of oil shale from Bonanza utah?	The term oil shale is sedimentary rock that release petroleum-like liquids heated. Oil shale was formed millions of years ago by deposition of silt and organic debris on lake beds and sea bottoms. Oil shales in the Green River Formation produce oil and natural gas. Oil shales form in lakes like Lake Uinta when large quantities of plants and animals (ostracods, diatoms, algae) accumulate on the lake bottom. Oil shale in the Green River Formation is found in five sedimentary basins: Green River, Uinta, Piceance Creek, Sand Wash and Washakie. The first three have undergone some significant investigation and attempts to commercialize the oil shale reserves since the 1960s. Over long periods of time, heat and pressure transformed the materials into oil shale in a process similar to the process that forms oil; however, the heat and pressure were not as great. Oil shale generally contains enough oil that it will burn without any additional processing, and it is known as "the rock that burns".	specimen tbd	
PW3.E02.gr02		graphic rail	Underwater Ecosystem				
PW3.E02.rc01		rail case	Eocene material			specimens tbd	
	PW3.E02.ar	artifact label	Touch a stromatolite		stromatolite ID Stromatolites in Eocene Green River Formation: ABSTRACT Ronald C. Surdam, J. L. Wray, L. L. AAPG Bulletin Volume 62 (1978) The stromatolites in the Green River Formation are of two types--algal or tufa. The algal stromatolites are similar both in internal fabric and external morphology to the stromatolites at Shark Bay, Australia. The tufa stromatolites are similar in internal fabric and external morphology to the tufa deposits at Mono Lake, California. The algal stromatolites in the Green River Formation commonly form thin sheets. The thickness of these sheets can be related to the topographic gradient at the site of deposition. In contrast, the tufa deposits are mound shaped (bioherms). The position of these mounds commonly is related to faults associated with tectonically active areas in the ancient lake basins	stromatolite touch fossil tbd	diagram of stromatolite; photo of Green River stromatolite reef faces
	PW3.E02.ap01	activity prompt	Please touch				

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	PW3.E02.ms01	mindset panel	Mindset panel describes the underwater ecosystem of Green River	Fossil preservation of this Eocene lake is astounding, allowing us to reconstruct the details of this ancient underwater ecosystem.	Here you are looking into the waters of ancient Lake Uinta. We can piece together this scene, because the fine-grained siltstones and limestones of the Green River formation preserve thousands of fossils, primarily fish and plants. There are 25 species of fish, ranging from small minnows to massive gars, which were 6 feet long and armored in giant diamond-shaped scales. There are even stingrays preserved in the sediments of Fossil Lake, though modern freshwater stingrays are restricted to the Amazon basin in South America. Many of the fish (and other organisms) are concentrated in particularly rich layers that show massive die-offs in the lake community. Many of the animals, like the gar, caiman, and the turtles, are identical to their modern relatives, allowing us to infer their behavior with confidence.		foodweb diagram
PW3.E02.fl01		family label	family label for tableau		Can you see the crocodile? Crocodiles have been around for a long long time. This one lived millions of years ago, in Wyoming. The crocodile fossil tells us that Wyoming must have been hotter and wetter then, more like parts of Asia or Africa today.		
	PW3.E02.sx01	special exhibit	pollen and dinoflagellates and magnifier/ microscope		instructions for magnifier/microscope		
PW3.E03 Green River Case			Visitors see trace fossils, and fossils of Green River fish, insects, and plants				
PW3.E03.ca02		case	Case with Green River fossils and trace fossils: fish, crocs, turtles, plants, insects, etc. (Undichnus)			45 objects	
	PW3.E03.ct01	case title	Title and subhead		Green River fossils Green River formation extends through Utah, Wyoming, and Colorado; these basins were lakes; now they hold fine-grained sediments that record fine details of the plant and animal life in and around the lakes.		photo of Green River formation, dig site
	PW3.E03.ms01	mindset panel	Mindset panel describes Green River diversity	In the Green River formation, we find astounding fossils that record the biology and behavior of vertebrates that lived in the lake.	The early Eocene was the final episode of warm "greenhouse" climates on Earth, when the climate was warmer from the tropics to the poles (alligators could live above the Arctic Circle). Partly because of these warm climates, Eocene animals, plants, and insects were very diverse. This amazing diversity is recorded around the globe, from Germany, to South Africa, to the Western United States. The Green River lakes covered 50,000 square miles of Western North America, and are one of the richest fossil localities in the world. Green River deposits preserve the fine details of more than 60 different kinds of mammals, fish, reptiles, and birds, and more than 150 different plants.		
	PW3.E03.ar	artifact label	Artifact label describes Green River fish and rays.	Many kinds of fish have been discovered in the Green River lake system.	Fish were one of the most abundant organisms in the Green River lake system. The most common group of fish found in the lake are the bony fish. These are fish that have calcium-hardened bones like humans. Which fish do you think ate each other? Freshwater rays, relatives of the sharks, have been recovered from the Green River Formation. This great specimen shows the wing and head shape very well. Preservation of this quality is scarce in rays because their bones are cartilage, not hardened bone like ours or those of bony fish. (BG) Do these fish look like modern fish, say a perch or a herring? Some are related to those modern fish. plus artifact ids	A1470, 1471, 1472, 1473, 1475, 1476, ray A1469	
	PW3.E03.ar	artifact label	Describes Green River plants	Green River, known for its fish fossils, is also a rich source of plant fossils, which in turn give us clues about the past climate and ecosystem.	The magnificent fossil leaves preserved in the Green River Formation do not reflect the aquatic ecosystem, but instead are terrestrial organisms that fell into the lake. (BG) The Green River plants include palms, cat-tails, sycamores, and other familiar plants from North America, but also some that are today more common in, or restricted to, eastern Asia. More than 150 genera of plants are represented. About 30% of the genera are endemic to the region. The climate appears to have been more subtropical than at present, much more like the Gulf Coast region of today. There are also woodland forms, such as hackberry, sycamore and sumac as well as lakeside forms like willow and cottonwood. plus artifact ids	A1479, 1751, 1752, 1754, 1755, 1756, 1757, 1758, 1759, 1760, 1761, 1762, 1763, 1764, 1765, 1766, 1768, 1770, 1771, 1774, 1775, 1781, 1777, 1780, 1790, 1791, 1792, 1793, 1794, 1795, 1796, 1797, 1798, 1799	

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	PW3.E03.ar	artifact label	Describes Green River insects and arthropods		The insects and arthropods from the Green River Formation are just as spectacular as the plants or fish. The preservation of some fossils is good enough to allow not only identification to family and subfamily, but will sometimes show color patterns, wing venation, and sex-related characters. Unlaid eggs have been identified in some crane fly fossils! Among the insects found are caddisflies, represented by carbonate mounds up to 9 m tall and 40 m in diameter formed in the nearshore environment of Eocene Lake Gosiute. These mounds formed as stromatolites and sediments covered a core of larval cases. Caddisflies hatch all at once, leaving their cases behind. Other Green River insects are dragonflies, crickets, wasps and beetles. Many kinds of spiders are also known from Green River. plus artifact ids	insects A1767, 1772, 1773, 1776, 1778	
PW4 Late Cretaceous							
	PW4.si01	section intro	Section intro orients visitors to the Cretaceous exhibits.	You have now traveled back to southeast Utah in the age of dinosaurs, about 75 million years ago. Much of what we know about this area and time comes from the recent work of UMNH researchers, and many of these dinosaurs and other fossils are new to science. You'll see a hadrosaur with preserved skin, a baby hypsilophodontid, and the latest discoveries.	These dinosaurs come from the Kaiparowits Formation of the Grand Staircase National Monument. They lived in Utah about 75 million years ago. The climate was humid, subtropical, with lots of ponds, lakes, and rivers, like today's Mississippi Delta. Nearly every species paleontologists are able to identify from this time in southern Utah is a new species. (BG) We have discovered a fair amount about this ecosystem - from the plant-eating dinosaurs and insects, to meat-eating dinosaurs, small mammals, turtles, lizards, and fish. On this platform we've divided the meat eaters and the plant eaters - can you spot the differences? "The region is a kind of last Eden of dinosaur paleontology in North America."" Scott Sampson The Kaiparowits formation is one of the best records of late Cretaceous land life between 76 and 74 million years ago. In the Grand Staircase Escalante National Monument, the Kaiparowits is represented by mudstones, siltstones, and sandstones, the remains of ancient streams and levees. Today Grand Staircase is dry, red rock country, but in the late Cretaceous, when a large seaway split the continent, it was part of "West America," a moist and humid environment."		map, timeline graphic
	PW4.E01.qt01	quote/question	Quote/question on west wall	about the Cretaceous environment/ecosystem			
PW4.E01 Meat Eaters			Visitors see skulls and skeletons of some of the meat-eaters who lived in what is now Grand Staircase Escalante National Monument about 75 million years ago, and will learn how these members of the GSENM Cretaceous food chain made their livings				
	PW4.E01.pm01	photomural	artist's mural showing conifers, araucaria, shrubs		caption for mural: southeast Utah 75 million years ago		
PW4.E01.gr01		graphic rail	Carnivore dinos from the Kp				
	PW4.E01.ms01	mindset	Mindset panel describes the carnivorous dinosaurs from the Kp.	Raptors (feathered dinosaurs), the ancestors of birds, flourished at the end of the age of dinosaurs.	The skeletons of carnivorous dinosaurs are not very common in the Kaiparowits Formation, but paleontologists have been able to tell that they were diverse. At least five different types of carnivorous dinosaurs have been discovered, the majority of which are raptor dinosaurs, likely covered in feathers during life (3-4 types of raptors). The largest carnivore is a new species of tyrannosaur. Additionally a giant crocodile closely related to the modern Alligator dominated the aquatic environments. Together, these carnivores managed to make use of all available food sources from tiny mammals, and lizards to giant hadrosaurs and ceratopsians, to gar fish and crocodiles.	Cast mounts of tyrannosaur a0155, juvenile tyrannosaur a0839, Deinosuchus mount, Hagryphus a0119, dromaeosaurid a0116, velociraptor (Sauronithdestes) a0142, Brachychampsa a0841, Aviaurus a0842,	recreated scene with animals
PW4.E01.gr02		graphic rail	Carnivore touch teeth			4-5 touchable cast specimens tbd	

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	PW4.E01.fp01	focus panel	Focus panel outlines carnivore niches, hunting and scavenging, and points to skeletal evidence.	Large and small theropods probably filled different niches.	The theropods groups in the Kaiparowits are the same as are found in other areas of northern North America, but different species. Large and small theropods likely filled different niches, killing different animals; all were scavengers. We don't know the diet of some theropods. The skeletons shown here are all new species. (BG) Hagryphus, an ostrich-sized, fast predator, might have eaten small mammals and reptiles. Troodontids had long legs, large eyes that faced front, and may have chased down small animals. Tyrannosaurs would have killed most anything that they were able to catch, obviously the larger the tyrannosaur the larger prey could be killed. The Deinosuchus would have eaten anything that got too close to the water.		
	PW4.E01.sx01	special exhibit	Touchable casts of meat-eater teeth and jaw				
	PW4.E01.ap01	activity prompt					
PW4.E01.id01		id label	Who's who illustration/label w/ color changing film sliders identifies the meat-eaters; photos of a modern analogous scene are compared to the scene in the mural.				fleshed out tyrannosaur, Hagryphus,dromaeosaurid, Deinosuchus, velociraptor, foodweb graphic and captions
PW4.E01.gr03		graphic rail	Juvenile T-rex				
PW4.E01.fl01		family label	Family label about the juvenile T. rex.		One of the skeletons in front of you is a young tyrannosaur (relative of T. rex). Can you spot the one that looks like a mini T. rex? Tyrannosaurs were about 3 feet long when they hatched, and grew to more than 40' long!		
PW4.E02 Plant Eaters			Visitors see skulls and skeletons of plant-eating dinosaurs from GSENM, including new finds, and learn about signaling structures and sexual selection.				
PW4.E02.gr01		graphic rail	Herbivores				
	PW4.E02.ms01	mindset panel	Mindset panel text describes the herbivores found in the Kp.	There were many different plant-eating dinosaurs in this ecosystem; they probably ate different plants or different parts of plants.	Many plant-eating dinosaurs are known from the Kaiparowits Formation, including Parasaurolophus, the very large duckbill Gryposaurus, and several horned dinosaurs. The environment of southern Utah during this period would have provided copious amounts of plant material for the herbivores, which came in a variety of sizes from giant 30 foot long hadrosaurs to 6 foot long pachycephalosaurs and hypsilophodontids. Therefore, all of the plant eaters probably divided up food resources from among different levels of the forest--each in its own niche just like animals today. Hadrosaurs and ceratopsians both developed specialized teeth for chewing plant material. Evidence in the fossil record shows that the number of teeth increased and grew closer together over time, resulting in a grinding surface. Hadrosaur teeth are smaller and more numerous than ceratopsian teeth. Ceratopsian teeth also have two roots, but hadrosaurs have one. (BG) Ceratopsians (horned dinosaurs) have teeth with double roots, long narrow beaks and shearing teeth, plus powerful jaws. They were probably browsing on tough plants, cropping with their jaws and using their teeth to tear up the plants. They had dental batteries of closely packed rows and columns of teeth, so their jaws could function like scissors even if individual teeth got worn down.	Ornithomimus, Utahceratops, Parasaurolophus, Gryposaurus	
PW4.E02.id01		id label	Who's who illustration label		Paleontologists once thought ornithomimids were predatory meat eaters. Now, the thinking is that they were plant-eaters. The evidence comes from a find of ornithomimids with gastroliths (stomach stones), perhaps indicating that they had gizzards. Their snout resemble those of ostriches, and contain a hard sheath (like your fingernails) that might have been used to filter plants from lakes and rivers or snip off leaves pr small herbaceous plants. Additionally, through their evolution, they have lost all their teeth making them ineffectual predators of large prey.	mounted skeletons of Ornithomimus A0117, Utahceratops A0114, Parasaurolophus a3148, Gryposaurus A0844; Centrosaur (tbd) Troodon and Hypsilophodon add later. Foodweb graphic and captions.	

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PW4.E02.gr02		graphic rail- lower level	Plant Eater Jaws	Comparison of Feeding Strategies and Jaws			
	PW4.E02.fp01	focus panel	Focus panel discusses hadrosaur and ceratopsian teeth and diet.	Hadrosaurs and ceratopsians had different feeding strategies. Look at the teeth and explore how they ate.	Hadrosaurs and ceratopsians both developed specialized teeth for chewing plant material. Evidence in the fossil record shows that the number of teeth increased and grew closer together over time, resulting in a grinding surface. Other herbivorous dinosaurs simply shredded, rather than grinding plant food. The evolution of similar chewing styles in different groups occurred independently as each group evolved. We can tell this by looking at differences in the jaws. Hadrosaur teeth are smaller and more numerous than ceratopsian teeth. Ceratopsian teeth also have two roots, but hadrosaurs have one. (BG)		illustration of hadrosaur jaw, ceratopsian jaw; diagrams of jaw action
PW4.E02.rc01		rail case	Plant Eater Jaws		Hadrosaur and ceratopsian jaws and teeth	jaws and fossils	images of fleshed out raptors
	PW4.E02.ar	artifact label	Label for hadrosaur material		Hadrosaurs had dental batteries, too, but with rows of replacement teeth under each exposed tooth. In some hadrosaurs, the individual teeth are so pressed together that they are like a giant file. Hadrosaurs chewed and ground up plant material. Fossilized stomach contents of hadrosaurs contain needles and branches of pine trees, the leaves of broad-leaved trees, and seed and fruits.	Gryposaurus I. dentary A1495. (to be confirmed) isolated hadrosaur tooth w. root A1498	outline drawing w. bones shown
	PW4.E02.ar05	artifact label	Label for ceratopsian material		Ceratopsians (horned dinosaurs) have teeth with double roots, long narrow beaks and shearing teeth, plus powerful jaws. They were probably browsing on tough plants, cropping with their jaws and using their teeth to tear up the plants. They had dental batteries of closely packed rows and columns of teeth, so their jaws could function like scissors even if individual teeth got worn down.	(to be confirmed) ceratopsian dentary w. teeth A1497; isolated ceratopsian tooth A1499	outline drawing w. bones shown
PW4.E02.gr04			Sexual Selection				
	PW4.E02.fp02	focus panel	Focus panel explains signaling structures and sexual selection	The horns and frills of ceratopsians, and the crests of hadrosaurs, are visual signals for others of their kind.	Modern animals use size, adornment, behavior, and color to distinguish between the sexes. The crests and large noses of hadrosaurs and the frills and horns of ceratopsians might have been sexual signals. If this was true, we would expect that males and females would have different size, shape or color display structures. We can't tell the color of hadrosaur and ceratopsian males and females, but we do see variations in frill and crest size and patterns. Most paleontologists attribute these differences in crest shape and size to different species. Research is still on going to help determine the role of sexual/species selection in dinosaur ecology. Ceratopsian horns and frills, as well as hadrosaurs, were not fully developed until they were adult. They might have used their frill and horns for dominance, defense, and display. Like living antelopes, chameleon, and deer, ceratopsians may have used their horns within their own species for territorialism and mating rights.	Chimaera, Utahceratops, Parasaurolophus a3148, Gryposaurus	fleshed out images of the dinosaurs; photos of chameleons, male and female deer
PW4.E02.gr03		graphic rail	Hypsilophodontid and pachycephalosaur				
PW4.E02.rc02		rail case	Rail case: hypsilophodontid and pachycephalosaur material				
	PW4.E02.ar01	artifact label	Label for hypsilophodontid material		These two specimens represent most of the known material of the Kaiparowits hysilophodontid. Their hands were short and stubby suggesting that they did not use them very much. The foot is long and slender, demonstrating that they could run fast. (BG) Modified.	hypsilophodontid feet A1481a-b, hand A1482	outline drawing w. bones shown

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	PW4.E02.ar	artifact label	Label for pachycephalosaur material		Pachycephalosaur domes are the thick headed part of the skull that most often get preserved. We think that the pachy from the Kp is similar to *Stegoceras*. These are specimens of a skull dome from a pachycephalosaur. Scientists think that these domes were used to ram one another, although most paleontologists shy away from the idea of head to head combat. The back of pachycephalosaur skulls are ornamented with various bumps and spikes, depending on the species. These are specimens of bumpy ornamentation on the back of the pachycephalosaur species from the Kaiparowits. (BG) Modified.	pachycephalosaur domes A1484, 1483; skull fragment A1486; skull A1485	outline drawing w. bones shown
	PW4.E02.fp04	focus panel	Focus panel describes the hypsilophodontid and pachycephalosaur finds	There are small herbivorous dinosaurs in the Kaiparowits ecosystem. These dinosaurs are not as well known as the larger herbivore species.	Other fragmentary herbivores that are found in the Kaiparowits Formation are the pachycephalosaurs, and hypsilophodontids. Paleontologists at the UMNH are finding more remains every year to fill in the gaps of our knowledge. Hypsilophodontids are distantly related to hadrosaurs (duck-billed dinosaurs) and were fast runners. Their fossils are fragmentary from the Kp formation, although we have enough to name a new species. Pachycephalosaurs are related to ceratopsian (horned) dinosaurs. They walked on two legs and had leaf shaped teeth similar to the Hypsilophodontids. On top of their heads was a thickened skull, which is what their name is based on “thick headed lizard”. (BG) These dinosaurs had leaf shaped teeth for shredding plant material.		fleshed out hypsilophodontid, pachycephalosaur
	PW4.E02.qt01	quote/question	Quote/question at base of Cretaceous platform		about diversity/sexual selection		
PW4.E03 (lower level)	**LC Tableau**		Visitors see a detailed recreation of the plants and some of the small animals that lived in GSENM about 75 million years ago.				
	PW4.E03.av01	av	Late Cretaceous soundscape				
	PW4.E03.pm01	photomural	Late Cretaceous photomural		swampy backdrop of the Late Cretaceous		
	PW4.E03.sx01	special exhibit	Cretaceous tableau		fallen log with mammals, snake and lizards; small dinosaur scavenging a ceratopsian carcass; empty dinosaur nest w. broke eggshell; stream with turtles, guitar fish, dead gar, dragonflies; ant nest near stream		
PW4.E03.gr01		graphic rail					
	PW4.E03.in01	interactive	Drawing activity				
	PW4.E03.ap01	activity prompt	Prompt for draw dinosaurs	Help us recontruct one of our new dinosaurs.	Pick one of the dinosaur skeletons, and draw what it might have looked like in life. Did it have feathers? Claws? What color was it? Paleontologists work with artists to recreate what dinosaurs looked like in life. Here's your chance to be a paleo-artist. When you're done, drop your picture in the slot and we'll add it to the dino art gallery.		skeletons of new finds dinos tbd.; photo of Scott working with John Moore
	PW4.E03.in02	interactive	Make a rubbing of dino skin				
	PW4.E03.ap02	activity prompt	Prompt for make a rubbing	Make a rubbing of dino skin	Make a rubbing of this piece of 75-million-year-old dino skin! Rub gently with your pencil, and the pattern of the skin will appear on the paper.	skin fossils tbd	
	PW4.E03.in03	interactive	Smell interactive				
	PW4.E03.ap03	activity prompt	Prompt encourages visitors to sniff				
PW4.E03.gr02		graphic rail					
PW4.E03.id01		id wheel	ID wheel describes ecosystem players and where they get their food.				ecosystem players, foodweb with captions
PW4.E03.rc01		rail case	Case with eggshells, teeth			eggshell A1487a-j, theropod tooth A1457, tooth-marked bone A1458, tooth A1488, rib A1650, femur A1489	body outline w. bone

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	PW4.E03.ar	artifact label	Label for eggshell		A nest of broken dinosaur eggs - Eggshell is very abundant in the Kaiparowits Formation. We have not found a nesting site yet, only broken pieces of various styles and textures.	A1487	body outline w. bone
	PW4.E03.ar	artifact label	Label for theropod teeth		Troodontid scavenging on a carcass -Theropod (carnivorous) dinosaurs and crocodiles and beetles scavenged on the dead animals within the Kp Formation. Paleontologists know this because they find pieces of fossil bone with tooth marks and feeding trails of beetles. Broken theropod teeth and crocodile teeth are found within the sites and within bones.	A1457, a1458, a1488, a1650	body outline w. bone
	PW4.E03.ar	artifact label	Label for croc tooth, hypsilophodontid femur		This bone from a small herbivorous dinosaur (hypsilophodontid) was found with a crocodile tooth embedded inside. This is proof that a crocodile bit into the animal. We don't know if the crocodile hunted the hypsilophodontid, or just scavenged an already killed animal. (BG) This last bulleted text represents at least three fossils.	A1489	body outline w. bone
PW4.E03.rc02		rail case	Rail case with leaves, non-dinosaur animals			lizard jaws, mammal jaws, leaf fossils; mammals and reptiles- UMNH to provide dimensions	body outline w. bone
	PW4.E03.ar	artifact label	Label for ant nest		Ant nest(s) Ants also lived in lush swampy environment of southern Utah 75 Ma. Just like ants today, the ants that made this nest lived underground in tunnels and chambers. The nests were buried when a river levee broke, flooding the surrounding land.	ant nest A1454	body outline w. bone
	PW4.E03.ar	artifact label	Label for plant material		Trees and shrubs with lush leaves were found in Utah 75 million years ago. Man of the plants found there are new to science with leaf patterns not seen today. There is still a lot to learn about the plants that supported this ecosytem.	leaves A1490, 1491, 1492, 1493; wood A1494	
	PW4.E03.ar	artifact label	Label for mammal material		Mammals were not large-bodied during the Cretaceous, as they are today, but they were quite diverse in southern Utah, with at least 21 species present.	jaws A1652, 1653; teeth 1654, A1655 (objects tbd)	body outline w. bone
	PW4.E03.ar	artifact label	Label for lizards and snakes		Lizards and snakes Lizards and snakes were also present in southern Utah 75 Ma. There are several lizards known including ones related to today's alligator lizard and komodo dragons (only much smaller). (BG)"	lizard jaws A1656, 1658, 1657 (objects tbd)	body outline w. bone
PW4.E03.gr03		graphic rail	Kaiparowits Ecosystem				
	PW4.E03.ms01	mindset	Mindset text describes the ecosystem and compares it to its modern analog, as well as to GSENM today; also outlines the trophic levels and players in the ecosystem.	The Kaiparowits ecosystem of 75 Ma worked like a modern ecosystem, but with different players.	Today Grand Staircase is dry, red rock country, but in the late Cretaceous, when a large seaway split the continent, it was part of "West America," a moist and humid environment like today's Mississippi delta. This area has been well-studied over the last 18 years, and many different dinosaurs, fish, turtles, small mammals, lizards, insects, and plants have been found. Even plants chewed by insects have been found, as well as ant nests.		
	PW4.E03.in04-in05	interactive	Smell interactive				
	PW4.E03.ap04-ap05	activity prompt	Prompt encouragesvisitors to sniff				
PW4.E03.rc03		rail case	Rail case: stream dwellers			turtle shell pieces, gar scales, sturgeon material, Amia material	

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	PW4.E03.ar	artifact label	Label for turtles		There were lots of different organisms living in the aquatic environments including crocodiles, alligators, turtles, and fish. The types of animals living in streams and ponds during the Cretaceous have not changed much through today. However, new species have evolved and others went extinct. (as captions to the scene illustration) - Two turtles are lying in or near the water There are many different types of turtles in the Kp formation, probably because there was so much water. Most often, only pieces of turtle shell are found as evidence for these animals, but the UMNH has several complete turtles (See the large case nearby). The most common type of turtle in the formation was the soft-shell turtle. One of the rarer turtles was the mud turtle	kinosternid shell fragments A1455, 1456; trionychid shell fragments A1459, 1460	with diagram of scene
	PW4.E03.ar	artifact label	Label for fish		These gars obtained very large size (six to eight long) and were covered in lots of scales made of bone, unlike more typical fish scales. These gar scales are probably the most common vertebrate fossil from the Kp formation. Gars ate other fish, but also could have likely eaten small crocodiles and soft-shell turtles. These large gars are closely related to those found today in Louisiana Sturgeon and amiid fish in stream Other large fish lived in the streams with the gars	gar scales A1550; amiid vertebrae A1461, 1462, 1463a-c; sturgeon element A1651	body outline w. bone
PW4.E03.ca05		case	Case with Kaiparowits vertebrate and invertebrate diversity.			49 objects- ankylosaur partial skeleton, Gryposaurus skull cast, Jelle tyrannosaur skull cast, tyrannosaur partial leg, Hagryphus hand, turtle shells, crocodilian material, clam bed section, dinosaur skin, baby hadrosaurid	
	PW4.E03.ms02	mindset panel	Mindset panel reviews Kaiparowits diversity.	These fossils reflect the diversity of organisms that have been found in the Kaiparowits formation.	The Kaiparowits Formation has only been actively searched for dinosaurs since the year 2000. Since then over 8 new species have been identified. The formation has also yielded an incredible number of other organisms such as mammals, lizards, turtles, and crocodiles. Other magnificent fossils include brand new plant species as well as dinosaur skin. (BG)		
	PW4.E03.gi01	graphic image	digsite photo, reconstructed scene with animals				
	PW4.E03.ar	artifact label	Label for ankylosaur material		Armored dinosaurs are rare in the formation. The majority of fossils are of these pieces of armor called scutes. These protective bones were embedded in the skin of individuals to help prevent predation. Ankylosaurid dinosaurs come in two groups, those with large heavy tail clubs and those without. Both forms lived in southern Utah during this time. The bony scutes that are shown are the most common fossils found of these dinosaurs, because each individual would have had hundreds of these bony scutes embedded in their skin. (BG)	ankylosaur scutes A1278	body outline with bones
	PW4.E03.ar	artifact label	Label for Gryposaurus material		Duckbilled dinosaurs were the most common dinosaurs in southern Utah 75 Ma. This new species *Gryposaurus monumentensis* was one of the toughest with jaws more robust than most any other duckbilled dinosaur known. (BG)	Gryposaurus skull cast A1276	body outline with bones
	PW4.E03.ar	artifact label	Label for tyrannosaur material		Tyrannosaur dinosaurs were the dominant predator of the Kaiparowits ecosystem. This specimen is the best skeleton found so far, but belongs to a juvenile tyrannosaur. Despite its young age, there is enough evidence to prove that it too is a new species. This femur, or thigh bone, from an adult tyrannosaur shows how much larger these predators can get. (BG)	fibula A1855, leg bones A1279, pubis A1845,ishium A1846, vertebrae A1847, 1848, 1849, 1850, 1851, 1853, 1854, 1852	body outline with bones
	PW4.E03.ar	artifact label	Label for Hagryphus material		The first new dinosaur to be named from Grand staircase Escalante National Monument was this hand, *Hagryphus giganteus.* Paleontologists here at the museum used proportions of the hand to determine that it was a new species. (BG)	hand skeleton (cast)A1551	body outline with bones
	PW4.E03.ar	artifact label	Label for Parasaurolophus		tbd UMNH	skull A0113	body outline with bones
	PW4.E03.ar	artifact label	Label for ceratopsian skin material		Ceratopsian skin has recently been found on a new species of horned dinosaur. Its texture is different from that of hadrosaurs, looking more like large interconnected diamonds.		body outline with bones

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	PW4.E03.ar	artifact label	Label for the baby hadrosaurid.		This wonderful specimen is one of the most complete dinosaurs discovered to date in GSENM. It is a completely articulated baby (~1-2 yr old) duckbilled dinosaur (probably Gryposaurus). Interestingly, when the juvenile was buried in a river channel 75 Ma, an impression of the floppy decaying skin on its belly was preserved in the sediment.	A0378	body outline with bones
	PW4.E03.ar	artifact label	Label for Kaiparowits turtles.		Turtles are the most common vertebrate fossils found in Kaiparowits Formation. There are many different kinds including soft-shell turtles, mud turtles, species related to snapping turtles, and even groups of turtles that are extinct today. Paleontologists have currently identified 9 species from the Kaiparowits Formation. (BG)		body outline with bones
	PW4.E03.ar	artifact label	Label for softshell turtle material		Soft shell turtles are still alive today, and some of the species that we find in the Cretaceous are closely related to those found today in Louisiana. They are easily recognized by the pot-holed texture on their shell. (BG)	trionychid, Heloplanoplia sp. nov. A1468	body outline with bones
	PW4.E03.ar	artifact label	Label for baenid turtle material		Baenid turtles are extinct today, but were very common in the Cretaceous. They is easily recognized by the large bumps on the shell. (BG)	Denazimys nodosa A1711	body outline with bones
	PW4.E03.ar	artifact label	Label for Basilemys? turtle material		Basilemys praeclara? Is a turtle that lived its life like a tortoise, walking on the land. It had a very thick shell, characterized by the “sand dune-like” bumps. This turtle grew to large size, as demonstrated by the shell present, and also defended itself with armor inside its skin. (BG)	Basilemys praeclara A1466, 1568	body outline with bones
	PW4.E03.ar	artifact label	Group label discusses Kaiparowits crocodilians.		Crocodilians were well represented in the Kaiparowits ecosystem. There were at least four kinds present at one time in the area ranging in adult size from three feet to over 35 feet long. Most of the crocodilians are more closely related to alligators than to true crocodiles.		body outline with bones
	PW4.E03.ar	artifact label	Label for Brachychampsa material		Brachychampsa This crocodilian is small and ate mostly hard food such as turtles and small gar fish. Its back teeth are bulbous and rounded to help break through shells and scales.	specimen tbd	body outline with bones
	PW4.E03.ar	artifact label	Label for Deinosuchus material		Deinosuchus This was the largest crocodilian in the Kaiparowits ecosystem. It could have eaten almost anything it wanted including dinosaurs. The upper jaw bone (maxilla) displayed shows how large the teeth would have been when alive. (BG)	maxilla A1467	body outline with bones
	PW4.E03.ar	artifact label	Label for goniopholid material		This is a primitive kind of crocodile that grew to at least 30 ft long. Most of the remains thus far have come from these rectangular bony armor scutes from the back of the animal. (BG)	scutes A1710, 1715	body outline with bones
	PW4.E03.ar	artifact label	Label for clam bed material		Large beds of clams are known from the Kp Fm. These clam beds are important because they tell us that large populations of clams were living in the rivers of southern Utah 75 Ma. They also are important because it gives evidence of large storms that swept through the region, flooding rivers, and killing these clams. (BG)	specimen tbd	body outline with bones
	PW4.E03.ar	artifact label	Label for hadrosaur skin material		The Kaiparowits Formation is becoming one of the best places in North America to study dinosaur skin. Around 20 dinosaur sites/in Kp have been located that contain skin impression. What is seen on the rock is not the real skin, but instead it is an impression of the skin in the sediment made right when the dinosaur died and fell into the river. (BG) Hadrosaur skin is the most common type found. It is made of small pebble-like scales most commonly, but also includes larger scales of different shapes. The different shaped scales may have been for ornamentation in a similar way that animals like giraffes have different patterns. (BG)	A1277a-c, 1464, 1465	body outline with bones
PW4.E04 Gryposauraus Underfloor Display and Activities wall			Gryposaurus displayed in a case set into the floor creates the center of this space.			a0844	
	PW4.E04.in02	interactive	Puzzle interactive; visitors unscramble the quarry map to match the floor				reference dwg.
	PW4.E04.ap01	activity prompt	Activity prompt for the Gryposaurus puzzle	Can you unscramble the pieces to match the dinosaur in the floor?	When paleontologists excavate a fossil site, an important step is to document where each fossil occurs. We've scrambled the map of the dinosaur behind you. Can you unscramble the pieces and fix the map?	Note: need to review interactive w. UMNH; reset is?	

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	PW4.E04.ms01	mindset	Mindset panel describes the finding and excavating of the specimen and explains why soft tissue preservation is so informative; the preservation of skin (bacterial involvement) and patterns of the hadrosaur "scales."	Fossils are preserved in a variety of ways from articulated to disarticulated; fossils of soft parts like skin are amazing discoveries. Paleontologists use a grid to map fossil skeletons.	This Gryposaurus was discovered in 2001 and excavated over the next three years. The skeleton was found articulated (all together), encased in extremely hard sandstone that had to be removed with a rock saw. The site is located at the top of a three story hill in an area of GSENM called The Blues. A lot of the bones had to be helicoptered out because of their large size and the 3 mile hike into the site. Skin was revealed on several portions of the body, but most commonly associated with vertebrae. In fact, the entire tail is covered with skin. The total skin including patches throughout the body might approach, but this is a quick educated guess, 30 sq ft. During excavation, the skeleton was carefully mapped using a grid system so that it could be reconstructed just as you see it laid here.		
	PW4.E04.ap02	activity prompt	Activity prompt for hadrosaur skin touch specimen			#a1277a-c or 1464, 1465	
	PW4.E04.ap03	activity prompt	Activity prompt encourages visitors to step into the gryposaurus footprint cast.				
PW4.E05 Ceratopsian Evolution			Visitors see a series of cast skulls illustrating trends in ceratopsian evolution, and learn about ceratopsian diversity, Cretaceous biogeography, and sexual selection.			Display of cast ceratopsian skulls is mounted according to an evolutionary tree of centrosaurs and chasmosaurs.	
PW4.E05.gr01		graphic rail	Ceratopsian Evolution				
	PW4.E05.ms01	mindset	Mindset text gives an overview of ceratopsian anatomy, and reviews the forces that drove ceratopsian evolution, with ceratopsian phylogeny graphic.	Ceratopsian dinosaurs used their horns and frills in display.	Every species of ceratopsian has different horns and frills. Ceratopsians evolved and diversified rapidly in North America in the Cretaceous due to a combination of environmental change and "malleable" display structures. In all ceratopsians, only the frills and horns changed significantly; the rest of the skeleton remained the same. This exhibit shows the two main lineages of ceratopsians: the chasmosaurs and the centrosaurs, each distinguished by varying sizes and shapes of their horns and head shields. Look at the family tree and figure out some of the differences. The vast majority of information in the text to the left is found on the ceratopsian display. Visitors can identify differences themselves, and the skulls are divided into two groups already, with labels.		
	PW4.E05.gi01	graphic image	Maps w/captions				
	PW4.E05.gc01	graphic captions	Graphic captions explain Cretaceous biogeography using maps of North America, with ceratopsian distribution as a line of evidence	Climate and landscape shape the distribution of plants and animals.	During the Cretaceous, an inland sea split the continent several times. The Seaway was created as the Pacific and North American tectonic plates collided, causing the Rocky Mountains to form in western North America. With high global sea levels during the Cretaceous, waters from the Arctic Ocean in the north and the Gulf of Mexico in the south met and flooded the central lowlands, forming a sea that transgressed (grew) and regressed (receded) over the course of the Cretaceous. The seaway split the continent into "East America" and "West America" - the ceratopsians shown here lived in the narrow slice of continent that was "West America". BG-what about the ceratopsian tooth from Maryland?- I don't know about that tooth. But it is reasonable to assume that ceratopsians lived across NA.		
PW4.E05.gr02 Ceratopsians		graphic rail	Ceratopsians				
	PW4.E05.fp01	focus panel	Chasmosaurs	Chasmosaurs have long brow horns and long frills.	Chasmosaurs have longer brow horns than nose horns, and a very long frill often with large holes in it. Their snouts are longer and shallower than those of centrosaurs. Chasmosaurs didn't have frill spines, but small triangle-shaped bones at the edge of the frill. They are larger than centrosaurs, as a rule. You might know Triceratops, one of the last chasmosaurs. Chasmosaurs have been found in Alberta, Montana, Utah, New Mexico, and northern Mexico.		

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	PW4.E05.fp02	focus panel	Centrosaurs	Centrosaurs have short brow horns and frills, the rest of their skeletons look a lot like those of Chasmosaurs.	Centrosaurs have small brow horns and long nose horns, and short frills often with spikes. There are variations - Achelousaurus and Pachyrhinosaurus don't have nose horns as adults; they have knobby bones covering their noses instead. Centrosaurs have been found in Alaska, Southern Alberta, Montana, and Utah.		
	PW4.E05.ar01	artifact label	Label for Protoceratops			Protoceratops cast skull A0200	body outline
	PW4.E05.ar02	artifact label	Label for Zuniceratops			Zuniceratops cast skull A0847	body outline
	PW4.E05.ar03	artifact label	Label for Diabloceratops			Diabloceratops cast skull A0121	body outline
	PW4.E05.ar04	artifact label	Label for Eric ceratopsian			Eric ceratopsian cast skull A0399	body outline
	PW4.E05.ar05	artifact label	Label for Centrosaurus			Centrosaurus cast skull A0204	body outline
	PW4.E05.ar06	artifact label	Label for Styracosaurus			Styracosaurus cast skull A0205	body outline
	PW4.E05.ar07	artifact label	Label for Einiosaurus			Einiosaurus cast skull A0202	body outline
	PW4.E05.ar08	artifact label	Label for Achelousaurus			Achelousaurus cast skull A0203	body outline
	PW4.E05.ar09	artifact label	Label for Pachyrhinosaurus			Pachyrhinosaurus cast skull A0201	body outline
	PW4.E05.ar10	artifact label	Label for Chasmosaurus			Chasmosaurus cast skull A0209	body outline
	PW4.E05.ar11	artifact label	Label for Pentaceratops			Pentaceratops cast skull A0198	body outline
	PW4.E05.ar12	artifact label	Label for Anchiceratops			Anchiceratops cast skull a3249	body outline
	PW4.E05.ar13	artifact label	Label for Torosaurus			Torosaurus cast skull A0882	body outline
	PW4.E05.ar14	artifact label	Label for Triceratops			Triceratops cast skull A0208	body outline
	PW4.E05.sp01	story panel	Scott Sampson discusses his work on ceratopsians; what drew him to the group; how cool they are				photo of Scott in the field or office
PW4.E06 Therizinosaurs/ Early Cretaceous			Visitors see skeletons of 2 meat-eaters that turned to herbivory. They can look at fossils from the Cedar Mountain Formation in a nearby case, and learn about the importance of that age to dinosaur studies.			Cast mounts of Falcarius a0124 and Nothronychus a0123	
PW4.E06.gr01		graphic rail	Therizinosaur Evolution				
	PW4.E06.ms01	mindset	Mindset text describes how meat-eating dinosaurs evolve into herbivores and outlines implications for body size	Some kinds of meat-eating dinosaurs evolved into plant-eaters.	These dinosaurs are transitional forms - dinosaurs from the raptor lineage that became plant-eaters. They are therizinosaurs; two of the three definitive North American therizinosaurs fossils are from Utah. (BG) Paleontologists are not sure if the group originated in Asia or North America; the oldest therizinosaurs are found from about the same time on both continents. Falcarius is the most primitive known therizinosaur and shows the most raptor features. Nothronychus was first found in New Mexico in the late 1990s. It, like later therizinosaurs, is bigger than Falcarius. These bigger plant eaters had shorter tails and large guts; they balanced on their hind legs and grabbed branches with their arms. Therizinosaurs, like all other heavily herbivorous dinosaurs, attained large body size probably because of the physical requirements of processing plant material. Their guts/belly became larger, along with their bodies. Falcarius is still in the early stages of the herbivorous transition and has a much smaller body than the more derived therizinosaurs. Its body is closer to a carnivorous raptor's.		

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	PW4.E06.fp01	focus panel	Focus panel text points out transitional features on the specimens so visitors can "see evolution in action."	Look closely and you can see the transitional features of these dinosaurs.	Falcarius is about 13' long, with sharp claws - yet scientists think it ate plants as well as meat. Look at its teeth- they look like little leaves, not like curved blades. Leaf-shaped teeth are found in other plant-eating dinosaurs and are good for shredding plants. Can you find the dinosaur's hips? Plant eaters need bigger digestive systems than meat-eaters since plants are harder to digest. Falcarius' pelvis is expanded sideways to accommodate a larger gut. Look at Nothronychus' claws - the dinosaur is named for them (sloth-like claw), because they look like the claws of giant ground sloths. Nothronychus probably used its claws to pull down branches, as giant ground sloth did.		map of North America showing location of therezinosaur finds; Falcarius skull; Nothronychus skull; Falcarius pelvis; fleshed-out dinos
PW4.E06.gr02		graphic rail	Therizinosaur Features				
PW4.E06.fl01		family label	family label, humans as omnivores vs. Falcarius and Nothronychus	What do your favorite food? If you were one of these dinosaurs, it would be green plants.	These dinosaurs have 3 fingers with long claws, like their raptor relatives, but they were pulling down plants, not catching prey. These dinosaurs evolved from meat-eaters, but are becoming vegetarians.		illustration of child, Falcarius, Nothronychus, raptor dinosaur
	PW4.E06.ar01	artifact label	Label for Falcarius			Falcarius mount A0123	
	PW4.E06.ar02	artifact label	Label for Nothronychus			Nothronychus mount A0124	
PW4.E06.ca04		case- Cedar Mountain Formation	Case holds fossils from the Cedar Mountain Formation, including a primitive mammals skull, unnamed ankylosaurid/nodosaurid, theropod fossils, Falcarius fossils, sauropod fossils, iguanodontian fossils, crocodilian fossils.			11 objects: sauropod limbs, iguanodontian skull and dentaries, ilium; ankylosaurid femur; fossil fern, carnosaur tooth, brachyosaur tooth, pterosaur trackway	
	PW4.E06.ms02	mindset	Mindset text describes the importance of the early Cretaceous to dinosaur studies, and outlines the importance of Cedar Mountain Formation.	The animals in this case are transitional between the Late Jurassic and the Late Cretaceous.	This time period (124-114 Ma) is becoming one of the most important in the North American dinosaur record. These fossils come from the Cedar Mountain Formation in Utah. The Early Cretaceous of North America contained animals that were a mix of those found earlier in the Jurassic and then later in the Cretaceous. All of these fossils come from the Cedar Mountain Formation (~124 Ma- 95 Ma), the most productive (fossiliferous) group of sediments from this time in North America. The fauna includes sauropods (long-necked dinosaurs), iguanodontians (the ancestors to the hadrosaurs), ankylosaurs, and primitive raptor dinosaurs. (BG)	photo of site being worked, reconstructed scene with animals	
	PW4.E06.ct01	case title	Title and subhead	The Cedar Mountain Formation is one of the few rock formations in North America from the early Cretaceous.	Cedar Mountain Fossils Early Cretaceous, 127 to 98 million years ago Cedar Mountain, discovered in 1944, was thought to lack dinosaurs. In the 1990s, dinosaurs were discovered, including the therezinosaur Falcarius, ankylosaurs, and sauropods.		
	PW4.E06.ar	artifact label	Label for sauropod material		After the Jurassic, long-necked dinosaurs began to decline in diversity; of the three groups that existed in the Morrison Formation, only two survived into the Early Cretaceous. At the end of the Cedar Mountain Formation, the sauropods disappeared from North America. (BG)	sauropod femur A1240	body outline with bone
	PW4.E06.ar	artifact label	Group label for iguanodontian material		Within the Late Jurassic CLDQ, the primitive Camptosaurus is found. During the Early Cretaceous we find iguanodontians that have evolved closer to hadrosaurs. Their jaws have increased the number of teeth, faces elongated, and they have become much larger. They process plant food better. (BG) Juvenile dentary Teeth became more numerous in the mouths of iguanodontians. This helped them to process food. - Juvenile skull the skulls look similar to those of other iguanodontians found in South Dakota. However, these fossils are still being studied to figure out if they are a new species. - Large ilium: these iguanodontians grew to very Large, as evidenced by This Large ilium, or hip bone.	iguanodontian dentaries A1242, A1236, juvenile skull A1238, ilium A1239	body outline with bone
	PW4.E06.ar	artifact label	Label for ankylosaurid material		These animals that were around during the Jurassic do not make much of a change in appearance. However, one of the largest armored dinosaurs ever discovered lived in Utah, 124 Ma.	Ankylosaur femur A1241 + other material to be added in 2009	body outline with bone

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	PW4.E06.ar	artifact label	Label for theropod material		The herbivores did not live alone. This time for theropods is incredibly important because it is the end of the group of dinosaurs closely related to Allosaurus from the Jurassic, the beginning of the tyrannosaurs, and the start of the great diversification of the raptor dinosaurs. (BG) Large theropod All that we have now are teeth of a large carnivorous dinosaur. This animal will be very important in determining the pattern of extinction and evolution of large theropods. Undescribed raptor These vertebrae are the first clues to the identity of one of the earliest raptor dinosaurs. It is closely related to a raptor from Wyoming called Deinonychus. Falcarius utahensis This raptor dinosaur changed its habits from a meat eater, to eating plants. This is the earliest stage discovered of the transition. Luckily, hundreds of Falcarius individuals are known ranging in size from baby to nearly adult, though no full adult has yet been found. (BG)	theropod tbd, raptor vertebrae tbd , Falcarius a0125	body outline with bone
	PW4.E06.gi01	graphic image	map showing quarry location; photos of quarry				
	PW4.E06.gc01	graphic caption	Graphic captions describe the Crystal Geyser quarry.		Largest concentration of a raptor dinosaur in the world. Possibly Hundreds of individuals rest there. Scientists do not know exactly what happened there, but possibilities range from drought to poisoning by a spring. (BG)		body outline with bone
	PW4.E06.ar	artifact label	Label for crocodile		The crocodile seen here is a primitive form that is transitioning to the more familiar types of crocodiles we see in the Late Cretaceous. (BG)	croc skull and armor A1237	body outline with bone
	PW4.E06.ar	artifact label	Label for cynodont		This very primitive mammal is from a group of the first mammals to evolve. It is one of the best preserved mammal skulls of this type in the world. Its presence in the Cedar Mountain Formation shows that the group had not been outcompeted by other mammals. This is another example of how important the transitional faunas of the formation is	cynodont material tbd	body outline with bone
	PW4.E06.ar	artifact label	Label for fossil fern			fossil fern a2537	
	PW4.E06.ar	artifact label	Label for tooth			carnosaur tooth a2623	
	PW4.E06.ar	artifact label	Label for tooth			a2624 brachyosaur tooth	
	PW4.E06.ar	artifact label	Label for trackway			a2625 pterosaur trackway	
PW4.E07	**New Finds**		Visitors see the latest finds and learn about the museum's ongoing research programs.				
PW4.E07.gr01		graphic rail	New Finds				
	PW4.E07.sp01	story	Story: Bucky, Lindsay or other UMNH paleontologist discusses new finds; what it's like to find dinos new to science				
	PW4.E07.fp03	focus panel	Focus panel describes the new dinosaur species, includes map of Utah w. GSENM highlighted and fleshed-out image	GSENM is "the last major dinosaur graveyard to be explored;" This quote is so not true. It should not be included. UMNH researchers have recently described several new kinds of dinosaurs.	UMNH scientists described a new kind of plant-eating dinosaur named Gryposaurus monumentensis (the name means "hook-beaked lizard" and monumentensis is for GSENM, where it was found. The dinosaur was a very large duck-billed dinosaur; it's the largest dinosaur known from the Kaiparowits ecosystem. It had very large jaws and hundreds of teeth. Researchers from the Alf school found the skull and showed it to UMNH scientists, who went searching for the rest of the skeleton. The head might have rolled into a bend of a river, where it was partially buried. Because the right side of the skull was exposed, some bones floated away.		site photos, photos of UMNH crews at work
special exhibit changeable framework	PW4.E07.ms01	mindset	Mindset text in bulletin board style shows field photos, newspaper reports, and images from papers describing new finds.	UMNH staff and students are currently researching the Kaiparowits ecosystem, and finding new kinds of dinosaurs and other animals.	Pending new find, Having scientific papers on display may be a neat thing. There are certainly a number to choose from now. The hypsilophodontid paper should come out next year, along with the ceratopsian descriptions. Note: RAA to provide graphic format for UMNH to produce labels		
	PW4.E07.ar	artifact label	Temporary artifact labels for specimens			a0399 Eric's ceratopsian skull	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
PW4.E08 Dino Dig			Visitors use tools and their hands to uncover cast fossils of Kaiparowits specimens. They can also map the "quarry" and don dino masks and tails to battle it out in the dino arena.				
	PW4.E08.pm01	photomural					
	PW4.E08.in01	interactive	Interactive dino dig: visitors scrape away a matrix of sand, sawdust, paraffin to reveal casts of fossils from the Cretaceous of Utah; adjacent tool chests store brushes and other tools			specimens tbd	illustrations of the bones in the pit and the animals they come from (skeleton and fleshed out)
PW4.E08.gr01		graphic rail	Be A Paleontologist				
	PW4.E08.ap01	activity prompt	activity prompt for dino dig	You can be a paleontologist - use your eyes and hands to discover fossils from Utah's Kaiparowits Formation.			photo of paleo crew at work in the field
PW4.E09 Late Cretaceous			Visitors view a case of fossils from the North Horn Formation, and read about the fossils and about dinosaur extinctions.				
	PW4.E09.ca03	case	Case with fossils from the North Horn Formation			16 objects: T. rex tooth and skull, Alamosaurus vertebrae, Torosaurus frill, hadrosaur humerus and tooth, ankylosaur scute, crocodile vertebrae, crocodile jaws and teeth, turtle shell	
	PW4.E09.gp01	graphic panel					photomural of quarry ; map of Utah in the Cretaceous; reconstructed scene with animals
	PW4.E09.ct01	case title	Title and subhead	The North Horn formation is one of few formations that span the Age of Dinosaurs into the Age of Mammals.	North Horn Formation Fossils 70 to 55 million years ago. The end of the Age of Dinosaurs		
	PW4.E09.ms01	mindset	Mindset text discusses the environment and significance of the North Horn Formation	Utah's North Horn Formation spans the end of the dinosaurs and the beginnings of the Age of Mammals.	During the time when the Kaiparowits Formation was laid down, Utah was near an ocean, and the environment of southern Utah was a lush, wet plain. However, by the end of the Cretaceous, mountains were rising in Utah creating a different environment for the organisms that lived here. The North Horn Formation records a large ancient mountain valley where rivers washed into the valley floor, then out of the mountain system. The composition of the North Horn fauna was similar to that of earlier in the Cretaceous of southern Utah, but only in that the types of animals were the same. There were still crocodiles, turtles, mammals, lizards, and several types of dinosaurs. However, the species changed over time, retaining the same roles as their predecessors. (BG)		timeline graphic; map of Utah showing location of North Horn outcrop
	PW4.E09.ar	artifact label	Label for T. rex material		T-rex skull and skeleton This is the first T-rex from Utah. It is nick named “Big Blue” because of the bluish color of the bones. There are several bones from the skull and skeletal elements. (BG) Association of T-rex and Alamosaurus Utah is the only place in the world where T-rex and a long necked dinosaur (sauropod) are found together in the same formation. This is important because in all likelihood T-rex fed on the Alamosaurus, thereby adding another victim to the T-rex feeding list. (BG)	T. rex tooth A1451; skull cast A1271; vertebrae A1272, 1273; post-orbital and squamosal A1274; tibia A1275	body outline with bone
	PW4.E09.ar	artifact label	Label for Alamosaurus material		Return of the giants During the Late Jurassic and the Early Cretaceous giant long necked dinosaurs roamed over Utah. They were one of the most common forms of dinosaurs. Then, they disappeared around 100 Ma. In the Latest Cretaceous long necked dinosaurs, such as Alamosaurus, came back to North America after dispersing from South America. (BG) This is a long neck dinosaur related to Jurassic forms such as Brachiosaurus. It lived not only here in Utah but also in New Mexico and Texas. (BG)	Alamosaurus vertebra A1448	body outline with bone

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	PW4.E09.ar	artifact label	Label for Torosaurus material		The only horned dinosaur known from the North Horn Formation is Torosaurus utahensis. It is closely related to Triceratops but quite distinct because of the large holes in its head shield, or frill. The large frill on this dinosaur gave it the distinction of having the largest skull of any land dwelling animal, ever. (BG)	Torosaurus frill A1453	body outline with bone
	PW4.E09.ar	artifact label	Label for hadrosaurid material		Duck-billed dinosaurs are not known very well from Utah during this time. We only have scrappy remains of these dinosaurs, including this partial upper arm bone and tooth. (BG)	hadrosaurid tooth A1452 and humerus A1443, 1444	body outline with bone
	PW4.E09.sx01	special exhibit	Magnifier for handrosaur teeth- displayed next to a1452				
	PW4.E09.ar	artifact label	Label for ankylosaur material		The only evidence that we have of armored dinosaurs is a single scute, or piece of armor. However, this is evidence they were around. (BG)	ankylosaur scutes A1447	body outline with bone
	PW4.E09.ar	group label	Group label for crocodile material		Just like earlier in the Cretaceous, crocodiles played an important role in the ecosystem. (BG)	croc vertebrae A1449, 1450, jaws w. teeth A1446	body outline with bone
	PW4.E09.ar	artifact label	Label for turtle material		Turtles were also around at this time. This is a piece from a soft-shelled turtle. (BG)	A1445	body outline with bone
	PW4.E09.gp02	graphic panel					
	PW4.E09.gi01	graphic image	photo of outcrop w. boundary; various extinction scenarios				
	PW4.E09.gc01	graphic captions	Graphic captions discuss dinosaur extinctions, and the K/T boundary at North Horn.		The North Horn Formation was laid down at the end of the Cretaceous and on into the Neogene Period, this is the time after most dinosaurs went extinct. In many places around the world a coal or a special clay layers marks the boundary for the end of the Cretaceous, but here in the North Horn, the boundary lies somewhere in the middle of this sediment body (picture showing approximate boundary). Scientists have not been able to pinpoint the K/T extinction line yet. All we know is that below this sandstone nonavian dinosaur eggshells are found, and above it, they disappear. (BG) What caused the extinction of the dinosaurs? At the end of the Cretaceous, a mass extinction (at least 75% of all living species die off) occurred.		photo of outcrop w. boundary; various extinction scenarios?
					Not just dinosaurs died - flying reptiles and marine reptiles went extinct, and other marine animals, marine mollusks, and land plants were hard hit. Scientists have proposed a number of ideas, including meteorite impact, and large-scale volcano activity, We may never know the answer to what killed the dinosaurs - the fossil record is an incomplete recording of past events and life, and it's hard to explain selective extinctions (mammals and non-dinosaur reptiles seemed to survive whatever the event		body outline with bone
PW5 Late Jurassic							
	PW5.E01.pm01	photomural	Artist's mural		caption for mural: San Rafael Swell, 147 million years ago		
	PW5.si01	section intro			Now we've traveled back to 147 million years ago, to central Utah. This slice of time portrays the Cleveland-Lloyd Dinosaur Quarry, near Cleveland, Utah in the San Rafael Swell. The Quarry, which dates to approximately 147 million years ago, is the site of a massive dinosaur graveyard. It has produced at least 9 different dinosaur species, from plant eaters to meat eaters. More scientific studies have been performed on this fossil locality, in an attempt to determine how the dinosaurs died, than on any other site in the world. And yet the mystery is still UNSOLVED. Here you'll see the fossil evidence, and draw your own conclusions about this Jurassic murder mystery.		timeline graphic, map
	PW5.E01.qt01	quote/question	Quote/question on west wall				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
PW5.E01 **Predators or Scavengers (Stegosaurus, Marshosaurus, Ceratosaurus)**			Visitors see 2 meat-eaters circling a Stegosaurus carcass and can decide for themselves whether they are seeing scavengers or predators at work. A smaller carnivore lurks, waiting for an opportunity to grab its share.	The Cleveland Lloyd quarry is a massive dinosaur graveyard; although well-studied, it's still a mystery.			
PW5.E01.gr01		graphic rail	Predator or Scavenger				
	PW5.E01.fp01	focus panel	Focus panel text explains the diversity of meat-eaters found at Cleveland-Lloyd, and gives visitors clues to help assess their feeding strategies.	The diverse meat-eating dinosaurs of the Cleveland-Lloyd quarry used different feeding strategies (hunting vs. scavenging).	Here you see two large meateaters circling a Stegosaurus while a small predator lurks, hoping to grab a bite. We don't know if these animals were predators or scavengers, but it's unlikely they would have passed up an available		
PW5.E01.id01		id label	Who's who illustration/label, foodweb graphic with captions			Marshosaurus A0110, Stegosaurus a0108, Coelurus A0902, Ceratosaurus A0106, Barosaurus a0105, Allosaurus a0107, Archaeopteryx A0825 above	
PW5.E02 **Did Dinos Hunt in Packs? (Allosaurus and Barosaurus)**			Visitors can walk all the way around a dramatic mount showing a pack of adult and juvenile Allosaurus attacking a Barosaurus.				
PW5.E02.id01		id label				cast skeletons of Barosaurus and Allosaurus A0107, 0901, Juveniles 0109, 0400, 0401, 0402	
PW5.E02.gr01		graphic rail	Pack Hunting				
	PW5.E02.fp01	focus panel	Focus panel text outlines the evidence for pack hunting and bullying and invites visitors to form their own conclusions	There is evidence that some dinosaurs hunted in packs.	Allosaurus may have hunted in packs. They lived with some of the largest dinosaurs ever - large sauropods like Barosaurus and Camarasaurus, and armored Stegosaurus. Could one Allosaurus have killed one of these large animals? These theropods may also have relied on numbers to bring down the large sauropods and armed stegosaurs, much like a pack of wolves or African wild dogs do. Possible fossil evidence for allosaur pack hunting can be found at Cleveland Dinosaur Quarry. Here vast numbers of allosaurs of all different ages were caught in a dinosaur graveyard. Along with them were bones of sauropods and stegosaurs, and the smaller camptosaurs. However, the allosaur bones are the most common fossil in the deposit. According to some paleontologist this is indeed good evidence for pack hunting for allosaurs. For others, the fact that so many allosaurs are present in the quarry does not mean that they pack hunted, simply that the allosaurs died in the same spot. Similar fossil beds containing "packs" of carnivorous dinosaurs have been found in Alberta, and studied by Phil Currie, a theropod expert from the Royal Tyrell Museum in Alberta. Has recently found a large bonebed containing what he thinks is a "pack" of tyrannosaurs known as Albertosaurus. Adult and juvenile Allosaurus may have pursued different hunting strategies, with juveniles chasing small prey and adults working together to bring down larger prey.		
	PW5.E02.fp02	focus panel	Focus panel asks why are there so many allosaurs at Cleveland-Lloyd.	Allosaurus is the most common dinosaur at CLDQ - it's unusual for a predatory dinosaur to dominate.	Allosaurus is not just the most numerous predator at Cleveland Lloyd, it's the most numerous dinosaur! More than 12,000 bones have been excavated from the quarry since 1927, and about two-thirds are Allosaurus bones. The usual ration of predators to plant-eaters is 1:10. What's happening at Cleveland Lloyd? The allosaurs from this quarry include all ages. There were animals from only a little over three feet in length to those more than 25 feet long and weighing more than two tons.		
PW5.E02.gr02		graphic rail	Allosaurus Foot Puzzle				
	PW5.E02.rc01	rail case				Allosaurus Foot a1718	
	PW5.E02.in01	interactive	Visitors assemble an Allosaurus foot puzzle next to a display of disarticulated bones; rail is located in front of foot of adult Allosaurus skeleton.			disarticulated Allosaurus foot interactive a1719	diagram of foot w. labeled bones

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	PW5.E02.ap01	activity prompt	activity prompt for Allosaurus foot activity				
PW5.E02.gr03		graphic rail	Barosaurus Biology				
	PW5.E02.fp03	focus panel	Focus panel describes Barosaurus and what we know of sauropod biology.	Sauropods are very large, long-necked plant eating dinosaurs. They are the largest land animals ever.	Because they were so tall, sauropods could feed in the tallest trees, out of reach of smaller plant-eating dinosaurs. Their long necks had more bones than other dinosaurs (12 to 17 vs. 9 or 10) and these bones were light, with hollowed out chambers. Sauropods such as Barosaurus and its kin had long, whip like tails. Did they use these in defense? Some paleontologists think so, others think they might have cracked their tails to signal other sauropods, or to scare attackers with the loud noise. Barosaurus is closely related to Diplodocus and Apatosaurus. Like them it had long, pencil-shaped front teeth. It is very difficult to know for sure if a fossil animal was predated upon or simply scavenged. Therefore, it is hard to know if a fossil adult sauropod was killed or died of other causes and then eaten. Lots of adult sauropod bones have bite marks, indicating it was eaten by carnivores. The only way to know if an animal was attacked by a predator is to have the animal live, the wound partially heal, and a piece of tooth still in the wound. This strict and rare evidence is scientifically necessary to say that predation was likely. Given the large size of adult sauropods, it is unlikely that they would have been attacked, but it is uncertain."	Barosaurus skeleton	
	PW5.E02.gc04	graphic caption	Graphic captions describe Cleveland-Lloyd herbivores and ask why so few?		Plant-eating dinosaurs found at the quarry include Stegosaurus, Camarasaurus, Barosaurus and Camptosaurus. There are not that many plant-eaters compared to the total number of dinos. Some scientists think that they were staying around a watering hole during a drought. They stayed until they died from something (dehydration, starvation, murder, etc). Their bones are found concentrated in the bottom of the quarry layer, but also dispersed throughout in lesser concentrations.		images of fleshed out dinos; graphs/charts of # of herbivores in comparable formations
PW5.E02.gr04		graphic rail	Environments				
	PW5.E01.ms01	mindset	Mindset text describes the environment of the Cleveland-Lloyd Dinosaur Quarry		The CLDQ was deposited in a flood plain pond. We don't know if there was vegetation around, because the only plant remains within the quarry are tiny pieces that might have washed in with water. The area surrounding the quarry is dotted with evidence of permanent lakes, but there is evidence that the pond with the fossil deposit was ephemeral, it dried up occasionally, or alternatively, it filled up occasionally. The climate would have followed that of the Morrison generally. (BG) Within Utah, the Morrison Formation — the stack of sediments that holds all of the fossils seen in this exhibit - — was deposited under a semi-arid, highly seasonal climate, with extensive floodplains, lakes and rivers. Vegetation likely thrived near the water sources, yet may have dwindled further away. There were also massive volcanoes to the west that periodically deposited volcanic ash over this area of Utah. (BG) The mystery about Cleveland-Lloyd is how so many allosaurs came to be deposited here. We don't know why. Cleveland-Lloyd represents a snapshot of the world that we don't know about. It was arid, but productive vegetation grew along the rivers. There were large rivers, but no flowers. Flowers didn't appear until after the dinosaurs were extinct. The trees were large conifers and there is some debate as to where the vegetation was. Why were there so many large animals here? The allosaurs were carnivores along with the plant eaters Brontosauraus and Camarasauraus. They were deposited in the Morrison formation. We haven't solved these mysteries. (SS)		reconstructed scene with animals
PW5.E03 Solve the Mystery of the Quarry			Visitors see fossil and geologic evidence - clues to the mystery of the quarry and decide which of the 4 scenarios the clues support.				

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	PW5.E03.qt01	quote/question	Quote/question on west wall about Cleveland-Lloyd or fossil mysteries				
	PW5.E03.pm01	photo mural	Cleveland-Lloyd quarry map photomural: distribution and taphonomy		caption for map: date, scale		
	PW5.E03.ms01	mindset	Mindset text outlines the mystery and introduces scenarios and invites visitors to solve the mystery; with quarry map.	Although the Cleveland-Lloyd quarry is one of the most-studied localities, scientists aren't sure why it's a massive dinosaur graveyard. Which scenario makes sense to you?	Lots of dinosaurs died at the quarry, and, although many scientists have studied the quarry, we still don't have a definitive answer to the mystery of the quarry. The four scenarios are: volcanic ash, flood, drought, and predator trap. If a large volcanic eruption happened, animals are buried rapidly as they were in life (think of Pompeii). Their skeletons aren't disarticulated as they are at the quarry. A predator trap is often a swamp in which prey animals become stuck, and attract predators. The large proportion of predators at the quarry supports this hypothesis. At predator traps, the bones are often preserved upright, which we don't see at the quarry. When there is a drought, animals tend to gather at scarce watering holes. The quarry might represent a watering hole, where you would find predators and prey together in search of water. The evidence for a drought at the quarry includes a progressive rate of burial, as some animals died, others fed on and/or trample their carcasses. A flood might have buried the dinosaurs all at once.		scenarios paintings
	PW5.E03.av01	av- Paleontologists	Voices of paleontologists discussing their theories of the CLQ mystery.	Decide for yourself which scenario best explains the Cleveland Lloyd Quarry.	Visitors watch as a group of paleontologists discuss how the Cleveland-Lloyd Quarry formed - was it drought, predator trap, volcanic ash, or flood? There is evidence for all 4 scenarios from the condition, number and type of fossils, from the geology of the quarry, and from changes to the bones after death. Each scientist points to particular rocks or fossils that support the scenario they espouse, and refers to the painted reconstructions of each scenario. These items are found in adjacent case and graphics, so visitors can refer to them as they walk down the ramp and view the evidence from the quarry. The video draws visitors into a scientific debate, and leaves them with the sense that science is a process of ongoing inquiry, not a closed book.	4 voices at 3 min. each	
	PW5.E03.gi01-gi04	graphic image	reconstructions of scenarios				
	PW5.E03.fp01	focus panel	Focus panel text reviews the 4 scenarios.	The clues give hints, but not definitive answers. Use your judgment and evaluate the scenarios. We need to discuss this set up since visitors will come from either the top or bottom. This could be included with the talk-back interactive as a review before they made their selection.	Clue Volcanic ash Flood Drought Predator trap Are the bones articulated? Yes Yes No Maybe Are there are a high number of predators? Maybe Maybe Maybe Yes Is this quarry in a lake or a river? Lake River Lake Lake Are there tooth-marked bones? No No Yes Maybe Are there broken and crushed bones? Maybe Maybe Yes Maybe Are there mostly young animals? Maybe Maybe Yes Maybe Are there bone pebbles? No Yes No No Is there bone rotting? No No Maybe Maybe		
	PW5.E03.in01	interactive- penny drop	Visitors drop a coin into the tube under their favorite scenarios.				
	PW5.E03.ap01	activity prompt	Prompt for penny drop	Cast your vote - which scenario makes sense to you?	Vote by putting a penny in the tube under your favorite scenario. How does it stack up to the other scenarios? Query for UMNH - do we have to say where the money goes?		
	PW5.E03.ca06	case- CLDQ	Cleveland-Lloyd collection case holds fossils from the quarry related to taphonomy, dinosaur diversity, and sediments.			27 objects	

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	PW5.E03.fp02	focus panel	Focus panel text explains taphonomy and describes the taphonomic features found at CLDQ.	This case is filled with clues (fossil and geologic evidence) to the mystery of the quarry.	This case is filled with objects that give clues to the Cleveland Lloyd Dinosaur Quarry mystery. These are the same clues that paleontologists use during studies of the quarry. Paleontologists look at the various clues, including numbers of dead dinosaurs, types of dinosaurs, condition of bones, etc. Scientists compare modern conditions of dead animals in different death scenarios to understand the patterns that develop from them. This is called taphonomy. Taphonomy is the study of all events associated with an organism from the time of death until a paleontologist excavates it. Other lines of evidence include the sediments of Cleveland Lloyd, the diversity and percentages of dinosaurs, and what we don't find at the		
	PW5.E03.ar	artifact label	Label text discusses tooth marked bone.		Gauges in bone usually mean that the tooth of a carnivorous animal scraped along the bone during feeding. Paleontologists use this information to show that the carcass was eaten. We don't know if the carnivorous animal that left the tooth mark killed the prey or is scavenging the last bit of meat from a bone. Only a few of the bones found at CLDQ have tooth marks, Could it be from an abundance of meat for carnivores to eat or from the animals being buried a short time after death? (BG) This is a metatarsal (foot bone) from the long-necked herbivorous dinosaur Camarasaurus. The deep grooves on the bone were made from a carnivorous dinosaur scraping its teeth on the bone to obtain all the meat possible. This is a vertebra from an Allosaurus. Was the animal that left this tooth mark a cannibal or another species of carnivore?	Camarasaurus metatarsal A1065, Allosaurus vertebrae A0891, Allosaurus vertebra A1064	body outline w. bone
	PW5.E03.ar	artifact label	Label text discusses broken bones.		Paleontologists find two types of broken bones, those bones broke before fossilization and those broken after. Bones broken after becoming a fossil tend to break at nearly 90 degree angles. Bones broken before fossilization form different angles with artifact labels Again separate these out. Allosaurus ilium #12101 This Allosaurus ilium is missing its entire upper blade. Allosaurus ilium #8240 This Allosaurus ilium is complete, showing how much of the other bone is missing. Allosaurus ribs This is a broken rib and this is an unbroken rib. bone fragment Some bones are broken so much that we cannot recognize them, such as this piece. (BG)	Allosaurus ilia, broken rib, unbroken rib, bone fragment There may be another large example to be included. A1712, 1714,	body outline w. bone
	PW5.E03.ar	artifact label	Label text discusses crushed bones.		If the ground is hard, a bone may crush when stepped upon. These two bones were found next to one another, both crushed in the middle. It is likely based on proximity within the quarry and relative size that these belong to the same Allosaurus. With artifact labels This is a crushed femur (upper leg bone). This crushed tibia (lower leg bone) was found right next the femur, and maybe from the same animal. (BG)	Allosaurus femur A0889, Allosaurus ilium A0888, A0887	body outline w. bone
	PW5.E03.ar	artifact label	Label text discusses bone rotting.		Sometimes under wet conditions bones can rot like a piece of wood as portrayed in these examples. When paleontologists see this type of change to fossil bones we know that the bone was exposed to either great humidity or to wet conditions such as a lake or mud. (BG) The texture on this bone is lumpy, not like the smooth surface of other non-rotted bones. other examples tk artifact labels	theropod tibia, sauropod vertebral fragment A1713; Allosaurus humerus A1063	body outline w. bone
	PW5.E03.ar	artifact label	Label text discusses vertebrae			a0891 Allosaurus caudal vertebrae	body outline w. bone
	PW5.E03.ar	artifact label	Label text discusses bone in nodules.		Nodules made of calcite are common in the quarry. These very hard rocks are started by bacteria breaking down meat from around bones, which increases the pH of the area. Then calcite that naturally flows through ground water or in pond water will form around the bone or groups of bones. If this interpretation is true, then it may mean that there was still lots of meat on the dinosaur bones when they were buried. (BG) artifact labels Caudal vertebra surrounded by calcite nodule	caudal vertebrae in calcite nodule, other examples to be selected	body outline w. bone

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	PW5.E03.ar	artifact label	Label text discusses articulated segments.		Not all of the carcasses found in CLDQ are scattered. Some sections of bodies are found to be in articulation. Articulation is the way the bones would have fit together during the animals life. Most of the sections found articulated were tail vertebrae. (BG) artifact labels (need more info) What other info is needed. Barosaurus tail series Allosaurus caudal vertebrae	Barosaurus tail series a0467	body outline w. bone
	PW5.E03.ar	artifact label	Label text discusses associated carcasses.		Even though the map makes all of the bones look jumbled there are large amounts of bone close together that go to one animal. This tells us that the animals were not completely mixed up after death, and that some carcasses were allowed to decay with minimal disturbance. (BG) artifact label This partial juvenile allosaur skull was found in near-articulation demonstrating that it was buried before it completely decayed.	Allosaurus partial skull Maybe add an associated pelvis.	body outline w. bone
	PW5.E03.ar	artifact label	Label text discusses pathologies.		Pathologies, not clues to the taphonomy Just like humans and animals today, dinosaurs broke legs, got infections and diseases that left marks on their bones. Shown here are examples of Allosaurus bones from the CLDQ that show maladies. Paleontologists do not use these examples of injury to decipher the mystery of CLDQ because the Allosaurus was injured well before it died in Emery County. When a bone breaks or is infected, the body makes the area swell with more bone and once the injury is alleviated the body slowly reabsorbs the bone. (BG)	Allosaurus toe bone A1068, fused vertebrae A1071, other examples to be selected	body outline w. bone
	PW5.E03.ar	artifact label	Label for Allosaurus foot bones.		This is an infected toe bone from an Allosaurus. Notice how the bone has grown very large and lumpy. This foot bone has a large lump on the middle shaft. This may be caused from a small fracture to the bone during running or fighting. These vertebrae are fused together for an unknown reason. They are possibly diseased as opposed to injured.	Allosaurus foot bone A1070	body outline w. bone
	PW5.E03.fp03	focus panel	Focus panel discusses allosaur growth and age distribution		Determining the age of the animals preserved in fossil bonebeds is important because it can give clues to the mode of death, as well as some behaviors. For instance, if the dinosaurs in this quarry were of different age groups, one migh suggest that they represent a herd and died in a quick flash flash flood or volcanic eruption. If, however, there is a missing age group, then something else could have happened. The CLDQ has more juveniles than adults. We determine which ages are present by comparing the number of one type of body element. (BG)		body outline w. bone
	PW5.E03.ar	artifact label	Label for Allosaurus series			Allosaurus femura A3079 tbd	body outline w. bone
	PW5.E03.fp04	focus panel	Focus panel discussed the diversity of CLDQ dinosaurs, and what clues that gives us.	There are nine kinds of dinosaurs known from Cleveland-Lloyd, and most are meat-eaters.	There are nine species of dinosaurs found at the CLDQ. Two-thirds of the bones uncovered are from Allosaurus, the largest carnivore of the Jurassic period. Also present are plant-eating Stegosaurus, Camarasaurus and Camptosaurus. Two small carnivores found at the quarry areas Stokesosaurus and Marshosaurus. Barosaurus is another long-necked dinosaur found at the quarry. A nearly complete theropod skeleton of the first Ceratosaurus denticulatis is known from the site, which happens to be the type specimen of the species. And a single arm bone (Humerus) from the large carnivore Torvosaurus is known. Where is the rest of the skeleton?? This is an unusually high percentage of predators; they probably only made up 10% of the total dinosaur population in life. (BG)	Stokesosaurus, skull, Camptosaurus skull, Allosaurus skull, Barosaurus skull, Stegosaurus skull, Camptosaurus skull, Coelurus skull, Torvosaurus skull	fleshed out images of all dinosaurs from CLDQ; illustration/diagram of juvenile and adult Allosaurus (compare to adult and child human)
	PW5.E03.ar	artifact label	Label for Camptosaurus cast skull		This is Camptosaurus, a plant eater that walked on two legs and was an ancestor to the duck-billed dinosaurs.	Camptosaurus cast skull A0836	body outline w. bone
	PW5.E03.ar	artifact label	Label for Stokesosaurus cast skull		Stokesosaurus was a small carnivorous dinosaur known from fragmentary remains here at the quarry.	Stokesosaurus cast skull A0830	body outline w. bone

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	PW5.E03.ar	artifact label	Label for Ceratosaurus cast skull			Ceratosaurus cast skull A0828	body outline w. bone
	PW5.E03.ar	artifact label	Label for Camarasaurus cast skull			Camarasaurus cast skull A0834	body outline w. bone
	PW5.E03.ar	artifact label	Label for Barosaurus cast skull			Barosaurus cast skull A0833	body outline w. bone
	PW5.E03.ar	artifact label	Label for Coelurus cast skull			Coelurus cast skull A0831	body outline w. bone
	PW5.E03.ar	artifact label	Label for Stegosaurus cast skull			Stegosaurus cast skull A0835	body outline w. bone
	PW5.E03.ar	artifact label	Label for Torvosaurus cast skull			Torvosaurus cast skull A0827	body outline w. bone
	PW5.E03.ar	artifact label	Label for Marshosaurus cast skull			Marshosaurus cast skull A0829	body outline w. bone
	PW5.E03.ar	artifact label	Label for Allosaurus cast skull			Allosaurus cast skull A0826	body outline w. bone
	PW5.E03.ar	artifact label	Label text discusses what is missing.		There are several animals that are normally found in an ecosystem that do not appear in the CLDQ assemblage, such as aquatic animals. One crocodile tooth was found in the quarry. Turtle shell from one or two turtles was also found. Since these animals are found in aquatic environments…Where are the other aquatic animals? No fish or amphibians have been found. Could this be a clue to the puzzle? (BG) artifact labels This is the only Crocodile tooth from CLDQ. These are examples of turtle shell found in the CLDQ. They are from the extinct turtle Glyptops.	crocodile tooth, turtle scutes A1066, 1670, 1671, 1672	body outline w. bone
	PW5.E03.ar	artifact label	Artifact label explains what we learn from CLDQ sediments.	We study the sediments at the quarry to find out about the environment when the dinosaurs lived.	The sediments found at the quarry indicate what the environment was like at the time they were deposited. They show that CLDQ was a floodplain pond. The fossils occur in a 1-m-thick fine-grained calcareous mudstone This type of rock is not characteristic of a river channel or a levee. BG, "no limestone either" Suarez's work and alternating mudstones and limestones? how much detail to give here?		
	PW5.E03.ca08	case	Visitors walk over a Cleveland-Lloyd quarry recreation with bones floating free of matrix and learn about the environment of deposition and taphonomy: deposition and taphonomy	The quarry is a complex jumble of bones. All types and sizes of bones are present.	This is what the quarry would look like if all of the sediment were removed from the ground but the bones remained in their place. Notice how complex the layout is. That is why it takes so much data for paleontologists to decipher a quarry mystery.		
	PW5.E03.gi05	graphic image	Quarry map with highlighted areas accompany the recreation		caption for map, artifact ids		
	PW5.E03.gi06	graphic image	Dig site CLDQ				
	PW5.E03.gi07	graphic image	Dig site CLDQ				
PW7.E01 Paleo-Prep Lab			Visitors view the lab through a large window; they can watch a video about preparation, and leave questions for the prep lab staff. There is a step for younger visitors to stand on so they can see into the lab.				
PW7.E01.gr01		graphic rail					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	PW7.E01.ms01	mindset	Mindset text describes the process of preparation, illustrated with a photo series of field to cleaned up fossil	Uncovering and piecing together fossil bones is a long, slow process. Staff and volunteers are working on unveiling some of the museum's latest finds.	Look through the glass wall into the lab. The glass controls the dust, noise and ventilation, but lets you see such apparatus as the huge fume hood used to work with epoxy and solvents. You can also see the wheeled A-frame lifting system that moves fossil-bearing rock into working position. In the rear of the lab is the sand box used in holding pieces of bone together while the glue resets the bones. All the systems needed to operate a working laboratory have been installed: electricity, plumbing, a sink to wash specimens, and a pneumatic line for air tools. (this is from the description of the Carnegie lab; to be revised when lab layout and equipment is finalized) Fossil preparation techniques have remained the same for a hundred or so years. You need to remove the matrix (surrounding rock) by scraping, grinding, or dissolving it with acids. Then you need to stabilize the fossil material. The tools to do this include hand-held scrapers, picks, hand-held grinders, air-abrasive units, water guns, acids for dissolving soluble matrix, stiff and soft brushes to remove rock and dirt particles, and glues and stabilizers.		
	PW7.E01.av01	av	Paleo prep AV (existing: A Fossil's Journey)				
	PW7.E01.gc01	graphic caption	running time and title				
PW7.E01.gr02		graphic rail	Fossil Prep				
	PW7.E01.gp01	graphic panel	Update-able panel to tell visitors about new projects and work going on in the lab		pending ongoing work		
	PW7.E01.sp01	story panel	Story: preparator, collections manager or volunteer on hardest/longest/most rewarding preparation job; why being a preparator is so great				
PW7.E01.gr03		graphic rail	Talk Back		caption: running time and title		
	PW7.E01.in01	interactive - talkback board	Visitors can leave questions for the preparators on a bulletin or "talk back" magnetic surface; this could also be a place for preparators to post photos and ongoing projects.				
	PW7.E01.ap01	activity prompt	Prompt encourages visitors to leave a question for the preparators				
PW8	**Earth Lab**		The Earth Lab is both a classroom and an exploration space. The lab features an interactive wall with blown up diagrams of a map of the state of Utah, the rock cycle and the geologic time scale. Visitors can manipulate magnetic puzzle pieces related to these concepts. The mineral collection can be taken out from the cabinet and examined under magnifiers.				
PW8.E01 Minerals							
	PW8.E01.gp01	graphic panel	Mineral characteristics graphic				
	PW8.E01.gc01	graphic captions					
PW8.E02 Triassic Plants		Triassic Plants	fossils of Triassic plants from Utah are displayed in the cabinets and can be taken out and used for docent facilitated programs.	Before the rise of flowering plants, forests were filled with relatives of today's ferns and conifers.	Triassic Plant Fossils 250 to 200 million years ago Triassic forests include lush ferns, conifers, and cycads.	22 fossils total	
	PW8.E02.gp01	graphic panel					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	PW8.E02.ms01	mindset	Mindset text describes Triassic forests.	Forests have not always been made up of the trees humans associate with forests. In the distant past, such as near the beginning of the Mesozoic, forests were made up of gymnosperms and more commonly tree ferns.	Forests have not always been made up of the trees humans associate with forests. In the distant past, such as near the beginning of the Mesozoic, forests were made up of gymnosperms and more commonly tree ferns. These plants would have been the base of the Triassic food web. (BG) A note on plant fossils - you rarely find the whole plant, you find parts. Scientists give these parts different names, and sometimes eventually the parts are found to belong to a single plant. This is why the bark and the leaves of a plant might have different names. And on the plant fossil record, all major groups of seed plants (as opposed to ferns and their allies, which reproduce by spores) except flowering plants had appeared by the Triassic.		reconstructed scene with plants
	PW8.E02.ar01	artifact label	Group label text describes ferns.		Many different types of small ferns lived in the southwest 225 Ma. These ferns lived in much the same way that ferns today live. They needed lots of water and produced spores. Some ferns grew to tree size. They had distinctive bark and sturdy trunks. Artifact ids BG - can you see the spores? would be nice to point out to visitors	fern leaves 1881, 1567	
	PW8.E02.ar02	artifact label	Group label text describes gymnosperms.		Conifer type trees were becoming common, replacing the ferns from the Paleozoic. (BG) The Chinle formation outcrops frequently in Utah and Arizona. It is best known from the Painted Desert region where its striking displays of reds, greys, tans, yellows and lavender are prominently displayed. Better known than the formation itself are the countless petrified trees found within it, primarily in the lower Petrified Forest member. Many of the trees seem to have been washed in by floods, and show signs of water wear.	tree trunks A1844, 1884, 1885, 1886, 1887, 1888, 1889, a3210, a3212, a3214, a3215, a3216, a3217, a3222, a3223, a3224, a3225, a3226	
	PW8.E02.ar03	artifact label	Group label describes cycads			a3221, Mystery plant a3213	
PW8.E03 Rock Cycle							
	PW8.E04.pm01	photomural	photomural of Rock Cycle				
	PW8.E04.gi01	graphic image	Geologic time scale and map of Utah				
	PW8.E04.gi02	graphic image	Map of Utah				
	PW8.E04.ap01	activity prompt	Activity prompt encourages visitors to interact with the magnet wall.				
	PW8.E04.gc01	graphic caption	caption for map				

MINERAL HALL

The mineral collection is highlighted alonside the ongoing collections of the museum.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/SPECIMENS	GRAPHICS
MH			At the second level a hallway traverses the north side of the Canyon connecting to the Changing Exhibits Gallery. Embedded in the walls of this passage is the institution's mineral collection, set into dramatically lit wall niches that visitors can explore as if they are discovering the minerals embedded in the 'geology' of the building.				
Mineral Collection	MH1.E01.si01	section intro	Section intro for minerals	Minerals are diverse in shape, color, form and chemical composition.	The Earth is made up of 92 different chemical elements. Through billions of years of geologic processes, these 92 elements have combined in different ways to yield a wide variety of minerals. The different chemical compositions give minerals an enormous variety of colors, shapes, and other characteristics. New materials are discovered every year. Minerals are the building blocks of rocks. Minerals give us pigments for dyes and paints, metals like lead for batteries and copper for insulation, salt, and, of course, gemstones. You have minerals in your body that help strengthen your bones and keep your cells running.		
	MH1.E01.qt01	quote	Quote related to the minerals of Utah				
North Wall	MH1.E01.ic01	inset case	Inset case holds Utah minerals				
	MH1.E01.fp01	focus panel	Focus panel describes Utah minerals	Utah is a treasure trove of minerals.	During the past billion years, geologic events and processes have created Utah's diverse mineral resources. In each of the state's geologic provinces (Basin and Range, Colorado Plateau, Middle Rocky Mountains), different geologic processes resulted in different kinds of minerals. More than 523 different kinds of minerals have been found in Utah. Of these, Utah is the type locality for 45 mineral species, meaning that Utah is the first place they were discovered (and for some, is the only place they have been found). Utah's state mineral is copper, and the state gem is topaz.		map of Utah showing counties, location of mines
	MH1.E01.sp01	story panel	Story from mineralogist				
	MH1.E01.ar	artifact labels	Labels for Utah minerals			43 specimens total- Topaz, Red beryl, Bixbyite, Jamesonite, dolomite, and quartz, Halite, Pseudobrookite, Aurichalcite, Azurite ball, Austenite, Aragonite helectite, Aragonite "dogtooth", Florite, Goethite psuedo after pyrite, Cobaltite, Malachite (2), Sulfur, Goethite stalactitic, Vivianite, Phillipsburgite mixtite, Conichalcite olivenite, Stibnite altering to stibiconnite, Stibite altering to valentinite, Linarite with Caledonite, Magnetite, Gypsum, Olivenite, Stilbite, Celestite, Calcite cave growth, Aragonite cave growth, Metavariscite, Crandalite, Tryolite, Molybdenite, Quartz on pyrite and sphalerite matrix, "cactus" gypsum,	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/SPECIMENS	GRAPHICS
						Durangite, Hematite psuedomorph after magnetite, Psuedobrookite, Quartz, Halite, Tetrahedrite, Wulfenite and calcite, Azurite and Malachite pseudomorph after gypsum	
	MH1.E01.gi01	graphic image	Map of Utah and places of mineral origin				
	MH1.E01.pm01	photomural	Photomural tbd				
	MH1.E01.ic04	inset case	Inset case holds minerals of different colors			51 specimens-Pyrite, Fluorite, Sphaerocobaltite, Spodumene var. kunzite, Azurite, Aragonite, Beryl var. Aquamarine, Willemite, Smithsonite on calcite, Actinolite, Malachite slab, Torbernite, Dioptase, Apophyllite, Prehnite, Brazilianite, Sulfur, Brazilianite, Wulfenite, Orpiment, Rhodochrosite, Rose quartz, Smithsonite, Beryl var. Morganite, Ruby in zoisite, Elbaite, Vanadinite, Almandine, Copper, Copper with silver, Eosphorite, Fluorite, Aragonite floss, Hopeite, Okenite, Adularia, Wolframite, Wolframite, Manganite, Cassiterite, Smoky quartz, Smithosonite, Limonite-Goethite, Fluroite, Celestine, Azurite, Barite, Crocoite, Erythrite, Wulfenite, Grossular, Mimetite, Quartz var. amethyst, Rhodonite	
	MH1.E01.fp04	focus panel	Focus panel describes variety in mineral color	There are more than 5000 different minerals. They are all colors of the rainbow (and black, white and clear), and grow in many shapes.	Because of their wide range in chemical composition, minerals are found in every color of the rainbow plus black, white and colorless. To add to the fun, a single mineral can have a variety of colors caused by even a few parts per million of an element present as an impurity. Quartz for example can be colorless, rose, purple, smoky or even yellow. Fluorite, tourmaline and beryl exhibit even greater variety of color. Here you'll see the remarkable variety of colors in the mineral world - how many colors do you see?		
	MH1.E01.fp05	focus panel	Focus panel describes variety in mineral shape.		Minerals have an amazing variety of crystal shapes and ways that crystals grow together to form rosettes, radiating clusters, twins, and other spectacula arrays. You might think of minerals as being crystals - regular geometric shapes - and that's usually true. But sometimes minerals have irregular and even rounded shapes, and these may resemble organic shapes.		
	MH1.E01.gi02	graphic image	crystal shape diagrams				
	MH1.E01.gc01	graphic caption	graphic caption explains minerals shapes				
	MH1.E01.ar	artifact labels	Labels for minerals of different colors				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/SPECIMENS	GRAPHICS
South wall	MH1.E01.ic02	inset case	Inset case holds crystals large and small			27 specimens- Gypsum fishtail twin, Quartz, Tourmaline var. schorl with quartz, Topaz, Stibnite, Corundum var. sapphire, Galena, Tourmaline var. elbaite, Microcline var. Amazonite, Fluorite with calcite, Pyrite, Stibnite, Apatite, Apatite (2), Corundum (2), Tourmaline var. elbaite, Rutile, Pyrite, Gypsum, Quartz, Microcline, Galena and Spahlerite, Flourite, Topaz, Rutile	
	MH1.E01.ar	artifact labels	Labels for crystals large and small Note: label format will align with other collections labels. name location credit line scientific formula in very small type				
	MH1.E01.fp02	focus panel	Focus panel describes crystals large and small	Most mineral crystals are small, but occasionally, under exceptional conditions, very large crystals form.	Atoms in a mineral are organized in a geometric pattern specific to that mineral. If the atoms come together in an open space while the crystal is forming, the crystal will have a distinct geometric shape. For example, quartz crystals are hexagonal, and fluorite crystals are shaped either in a cube or a hexagon. Because of the special conditions crystals need to grow, sharp transparent crystals are relatively rare, and large crystals are especially rare. One of the largest crystals recorded is a beryl from Malakialina, Madagascar more than 54' long , 11 /2' in diameter, and weighing about 860,000 pounds! Here you see large and small crystals of the same mineral - note that the geometric shape is the same regardless of sixe. refs: Palache, American Mineralogist, Volume17, pages 362-363, 1932 Rickwood, American Mineralogist, Volume 66, pages 885-908, 1981		
	MH1.E01.ic03	inset case	Inset case holds gemstones			119 specimens: Quartz var. amethyst, Rose qyartz, Varascite, (3), Andaluscite (5) Beryl var. Aquamarine (4)Beryl var. Emerald (4), Caved figurine, blue topaz, blue topaz (3), Golden topaz (2) Imperial (golden) topaz (2), Carved figurine, rose quartz, Gold (nugget) Gold in quartz, Elephant with gemstones, Spodumene var. Kunzite (3), Yellow Spodumene (2), Corundum var. Ruby (4), Corundum var. Sapphire, Star Sapphire, Corondum var. Sapphire, Diamond (6), Opal inplay, Opal (3), Garnet (9), Green garnet, Tourmaline var. elbaite (10), Turquoise (9), Corundum var. Ruby (2), Cuprite (2), Sphalerite, Clear Quartz, Fluorite (2), Opal (2), Varascite, Quartz var. Citrine, Fire agate (5), Quartz var.	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/SPECIMENS	GRAPHICS
						Quartz var. amethyst (5), Clear Quartz, Sphalerite (2), Morganite with Aquamarine, Morganite with Tourmaline, Beryl var. Morganite, Beryl var. Aquamarine, Tourmaline var. Rubellite.	
	MH1.E01.fp03	artifact group label	Group label describes gemstones		People have long prized gemstones for their color and beauty, and have associated them with mystical values such as medicinal, good and bad luck, protection, and prophecy. The most valuable gemstones are generally cut and polished from single crystals of hard, durable minerals. The harededst mineral is diamond, and diamond has optical properties that capture light in a faceted stone and sparkle brilliantly. Ruby and sapphire (variations of the mineral corundum) are softer than diamond, but harder than most minerals, with beautiful rich colors. Beryl (emerald, aquamarine, morganite and heliodor), tourmaline, topaz and garnet are even softer, but can be faceted into gemstones. Much softer and less durable minerals such as turquoise, variscite, and lazurite (lapis lazuli) are typically ground and polished into rounded cabochons. Gemstones can be carved into objects of art, as well. Here you see a variety of polished gemstones with the minerals in their natural state.		
	MH1.E01.ar	artifact labels	Labels for gemstones				
	MH1.E01.ic05	inset case	Inset case holds filamentary/acicular/radiating minerals		Crystals are sometimes elongated in one crystal direction and form clusters of needle-like acicular crystals or intertwined filamentary crystals. Often the elongated crystals grow from a single point to form radiating clusters.	11 specimens- millerite, cuprite, boulangerite, mesolite, stibnite, gypsum, creedite with fluorite, scolectie with green apophyllite, wavellite, epodite, cavansite	
	MH1.E01.ar	artifact group label	Labels for minerals				
	MH1.E01.ic06	inset case	Inset case holds twinning/ reticulation/rosettes minerals		Occasionally two or more crystals will grow so they share a common face or penetrate each other at a particular angle, usually resulting in the appearance of a mirror image of each other. This is called twinning. If multiple twins are present to form knee-shaped steps, the twinning is referred to as reticulation. Occasionally crystals cluster to form rosettes.	10 specimens- cerussite, chrysoberyl, calcite, gypsum, barite heart, staurolite, fishtail gypsum, Japan law twins quartz, aragonite with sulfur, stilbite	
	MH1.E01.ar	artifact group label	Labels for twinning/ reticulation/rosettes minerals				
	MH1.E01.ic07	inset case	Inset case holds phantoms/inclusions/zoning minerals		Sometimes a crystal will stop growing, but then start again later to leave the appearance of a crystal inside a crystal. The inner crystal is referred to as a phantom and is occasionally seen in fluorite and quartz. If the inner crystal is a different mineral than the outer crystal, it is called an inclusion. Sometimes the chemical impurities that control color will change during the growth of a crystal and result in color zoning.	5 specimens- yellow and blue fluorite w. chalcopyrite inclusions, rutile in quartz, calcite w. sand, tourmaline var. elbaite (2)	
	MH1.E01.ar	artifact group label	Labels for minerals				
	MH1.E01.ic08	inset case	Inset case holds pseudomorph minerals		Pseudomorph means “false form”. The original mineral gets exposed to a new chemical environment where it is not stable. It changes composition, but retains the shape of the original mineral. For example, the sulfur in pyrite is replaced by OH to form goethite. Thus the sample is called a goethite pseudomorph after pyrite.	5 specimens- goethite after pyrite, tincalconite after borax, calcite pseudomorph after glauberite, calcite psuedomorph after ikaite (2)	

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	MH1.E01.ar	artifact group label	Labels for pseudomorph minerals				
	MH1.E01.ic09	inset case	Inset case holds botryoidal, mammilary, stalactitic, dendritic minerals		Sometimes minerals deposit as rounded crusts in open spaces. If the rounded knobs are small like grapes, they are referred to as botryoidal. If larger, they are called mammilary. If the shape is elongated like the growths in a cave, it is stalactitic. If a mineral grows into a thin crack, it often forms in a tree-like dendritic shape that is often mistaken as a fossil.	5 specimens- hematite, smithsonite, aragonite, malachite, dendritic tbd	
	MH1.E01.ar	artifact group label	Labels for minerals				
	MH1.E01.ic10	inset case	Inset case holds minerals of different shapes and habits			25 specimens- Grossular, Franklinite, Magnetite, Tennantite, Wulfenite (2), Descloizite, Gypsum, Bixbite, Scheelite, Pyrite (2) Dolomite, Andradite, Almandine, garnet (2), Calcite, Molybdenite, Boleite, Azurite, Wulfenite, Zircon, Beryl var. Aquamarine, Danburite, Axinite	
	MH1.E01.ar	artifact group label	Labels for shapes and habits		The shape of a crystal is based on the way the atoms are stacked in the mineral and the rate at which the separate crystal faces grew. There are six basic crystal systems defined by the symmetry of the crystals and the length of the crystal axes. However, 32 variations have been identified within these systems. In addition, crystals can have different habits (such as prismatic or elongated, tabular or bladed) or a combination of crystal forms (such as a cube modified by an octahedron or a trisoctahedron). The shapes are fascinating and also a valuable aid in identifying a mineral.		
	MH1.E01.ic11	inset case	Inset cases holds fluorescents; w. 1" viewing slit and light, long wave UV, case at child-friendly height			3 specimens- sodalite, fluorite (2)	
	MH1.E01.ar	artifact group label	Group label describes fluorescents with prompt to push button for lights		Under normal diaylight, fluorescent minerals often look drab and colorless, but in the dark under an ultraviolet light they glow brightly with dazzling colors. This special behavior happens because some of the electrons in the mineral's chemical elements absorb some of the energy from the ultraviolet light and jump into a higher energy level in the atom. They are not stable there, so they quickly drop back into their original energy level. As they do this, they give back the energy they absorbed in the form of bright light of a distinct color. This fluorescence is not only beautiful, but has great practical value and is the basis of fluorescent lights, older TV screens and the “electroluminescent” light for cell phones, watches and car instrument panels. In this exhibit, you'll see minerals under regular light, then watch them dazzle under shortwave and longwave UV light.		
	MH1.E01.ap01	activity prompt	Activity prompt explains how fluorescents are activated by UV lights and tells visitors to push the different lights to observe the reaction.				
	MH1.E01.ic12	inset case	Inset cases holds fluorescents; w. 1" viewing slit and light, short wave UV; case at child-friendly height			7 specimens- calcite with willemite, willemite with calcite, scheelite, calcite, adamite, quartz geode, witherite,	

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	MH1.E01.ar	artifact group label	Group label describes fluorescents with prompt to push button for lights		Under normal diaylight, fluorescent minerals often look drab and colorless, but in the dark under an ultraviolet light they glow brightly with dazzling colors. This special behavior happens because some of the electrons in the mineral's chemical elements absorb some of the energy from the ultraviolet light and jump into a higher energy level in the atom. They are not stable there, so they quickly drop back into their original energy level. As they do this, they give back the energy they absorbed in the form of bright light of a distinct color. This fluorescence is not only beautiful, but has great practical value and is the basis of fluorescent lights, older TV screens and the “electroluminescent” light for cell phones, watches and car instrument panels. In this exhibit, you'll see minerals under regular light, then watch them dazzle under shortwave and longwave UV light.		

LAKE

Truly understanding GSL will change your relationship with this unique terminal lake, and inspire pride, wonder, and stewardship.
1. GSL, a hub of life, plays a critical role of hemispheric importance for millions of migratory birds.
2. GSL and its wetlands nourish and filter aquatic ecosystems and support the city's water cycle.
3. As a terminal lake, GSL holds the memory of every drop of water that ever entered it.
4. The lake is dynamic and changing; historic human impacts have dramatically altered the lake.

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			In the Great Salt Lake Observatory, floor and wall treatments make visitors feel that they are in the lake. From this perspective, they see migratory birds and wetland and shoreline dioramas, trace the water cycle through Salt Lake City's watershed, and explore human impacts through an AV program. At a large topographic lake model, visitors can go back in time to see what one of the larger precursor lakes looked like in the valley; at the window they can look through viewscopes to see out to these ancient shorelines.				
LK1	**Introduction**	title wall	Introduces the observatory title				
LK1.E01.gp01		graphic panel					
		exhibit intro	Salt precipitation grabber panel w. quote/question/fact; invites visitors to explore this amazing resource here at the museum and in the area		title quote or question or amazing fact www.yosemite.ca.us/john_muir_writings/steep_trails/chapter_8.html		
	LK1.E01.ip01	intro panel	Intro explains what visitors will see and do at intro panel and in exhibition	Great Salt Lake is a unique and amazing resource - it affects our weather, and supports millions of migratory birds. What you don't know about the lake will surprise you.	You're watching as salt crystals form - just as they do in the evaporation ponds around Great Salt Lake. In this exhibition, you will walk around the Great Salt Lake, see some of the amazing plants and animals that live in and around the lake, and explore the wetlands and shoreline habitats. Did you know that the lake's wetlands support millions of migratory birds? You will be able to recreate the past levels of the lake, and see its relationship to the water cycle. Finally, you'll see objects made by people who lived around the lake more than 10,000 years ago, and you'll hear from modern residents as they discuss the lake and its future.		
LK2 Great Salt Lake Ecosystem							
	LK2.E01 About the Lake		Visitors see the residents of the lake (micro and macro), hear the sounds of the lake and the shore, and smell the lake's characteristic odors. Visitors see the living micro-life of the lake's North and South arms displayed in glass tubes, and can examine the organisms in detail under microscopes. They will discover some of the plants and animals that live in the lake's wetlands and shoreline in full-scale dioramas, and can see for themselves how wetlands act as a sponge, holding and filtering water.				
Lake Floor	LK2.E01.sx01	special exhibit	Map of Great Salt Lake, past shorelines and surrounding areas imbedded in floor.				map of GSL with 27 call outs
	LK2.E01.gc01-gc27	graphic captions	captions mark landmarks		call outs include Antelope Island, Dolphin Island, Gunnison Island, Hat Island, Stansbury Island, Carrington Island, Fremont Island; Ogden, Weber, Bear and Jordan Rivers; past lakes (Provo, Bonneville, Gilbert, Stansbury), cities and towns (Delta, Nephi, Richfield, Park Valley, Wendover, Salt Lake City, Provo, Ogden, Tooele, Snowville, Logan, Milford)		
	LK2.E01.av01	av	GSL soundscape- Visitors can hear the soundscape at several points in the observatory: while standing on the lake map, in front of the wetlands diorama, and in front of the shoreline diorama. Ideally, the soundscape is slightly different in each area, so visitors get a sense of the variety of life (and sound!) of the lake.		The program has an ambient or background layer consisting of sounds like: waves hitting a shore wind blowing through marsh plants or over playa salt foam blowing at West Rozel Bay the beat of bird wings overhead rustling of small mammals through wetland plants Specific noises, include: dragonfly wings leopard frog calls bird calls: eared grebe, loggerheaded shrike, California gull, Wilson's phalarope, Northern harrier, American avocet, black-necked stilt, snowy plover, savannah sparrow, white pelican, white-faced ibis, yellow-headed blackbird, Northern shoveled, common golden eye, Western meadowlark, long-billed curlew tiger beetles moving over playa mosquito hum		

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LK2.E01.gp01 North Arm of the Lake		graphic panel					
	LK2.E01.si01	section intro	Section intro explains how the lake is Great (size), Salt (chemistry) and a terminal lake.	The Great Salt Lake holds the memory of every drop of water that's been in it.	The Great Salt Lake is the largest salt lake in the Western Hemisphere, and the 4th largest in the world. It's larger than the state of Rhode Island! Great Salt Lake is the remnant of freshwater Lake Bonneville, a great ice age lake. As the climate warmed and the lake shrunk, water evaporated, and the lake became salty. Although the Lake is "great, " it's only about 20' deep, so a rise in lake level can spread over a wide area, potentially causing flooding. Great Salt Lake is a terminal lake - no rivers flow from it. A causeway across the lake, completed in 1959, has effectively split the lake into 2 - a North arm and a South arm.		
	LK2.E01.ap01	activity prompt (on si panel)	Prompt for walk around the lake	You can follow the outline of the lake, and the giant lakes that preceded it, on the floor.	{need to scale this activity to map) Take a walk around Great Salt Lake! The lake formed from an enormous freshwater lake tens of thousands of years ago- see if you can find its outline in the floor. The lake grew and shrank over time, you can walk around the different lakes and see how much the lake has changed. You can also walk in the lake - the pink part is the North Arm and the blue the South.		outline map of lake
	LK2.E01.ms01	mindset		The north arm of Great Salt Lake is saltier than the south arm; very few creatures can live under these conditions.	The north arm of GSL is an extreme environment. Two kinds of bacteria do thrive in the north arm: Halococcus and Halobacterium (halo means salt). Some of these bacteria can make their own energy using a red protein - when the bacteria are productive, the red protein gives the north arm a pink glow. Brine shrimp have been found in the north arm, but some scientists think they are transients rather than residents. Algae also live in the North Arm; the species Dunaliella salina produces beta-carotene which makes the water look red. The North Arm isn't salty enough for these algae to do really well; they do better in the salt evaporation ponds.		photos of north arm (relatively pink and relatively not pink); photos of bacteria
	LK2.E01.in01	interactive	What's that smell				
	LK2.E01.ap02	activity prompt	instructions for what's that smell interactive		Press and sniff		
	LK2.E01.gc01	graphic caption	Graphic caption explains the origin of the causeway and its effect on the lake	The construction of the causeway separated the lake into 2 very different habitats.	In 1959, a causeway across Great Salt Lake replaced the original railroad trestle across the lake. The causeway effectively divided the lake, limiting water flow between the north and south arms. The south-arm brine became less salty than the north-arm because all three of the major tributaries (the Bear, Weber, and Jordan Rivers) flow into the south arm. The north arm mainly received salty water that moved through the causeway from the south arm. The south arm became higher, about 3 1/2 feet higher than the north. The water in the south arm became stratified, with heavier saltier water sinking to the bottom, and less salty water at the surface. Before the causeway, the lake waters and inhabitants were homogeneous; after the causeway, the lake essentially became 2 different habitats, a very salty, less diverse north arm, and a less salty, more diverse south arm.		photos of pre-1959 trestle, photos of causeway under construction, satellite image of lake today; satellite image of lake pre-causeway
LK2.E01.gp02 South Arm of the Lake		graphic panel					
	LK2.E01.si02	section intro	Section intro explains how the lake is Great (size), Salt (chemistry) and a terminal lake.	The Great Salt Lake holds the memory of every drop of water that's been in it.	The Great Salt Lake is the largest salt lake in the Western Hemisphere, and the 4th largest in the world. It's larger than the state of Rhode Island! Great Salt Lake is the remnant of freshwater Lake Bonneville, a great ice age lake. As the climate warmed and the lake shrunk, water evaporated, and the lake became salty. Although the Lake is "great, " it's only about 20' deep, so a rise in lake level can spread over a wide area, potentially causing flooding. Great Salt Lake is a terminal lake - no rivers flow from it. A causeway across the lake, completed in 1959, has effectively split the lake into 2 - a North arm and a South arm.		
	LK2.E01.ap03	activity prompt (on si panel)	Prompt for walk around the lake	You can follow the outline of the lake, and the giant lakes that preceded it, on the floor.	{need to scale this activity to map) Take a walk around Great Salt Lake! The lake formed from an enormous freshwater lake tens of thousands of years ago- see if you can find its outline in the floor. The lake grew and shrank over time, you can walk around the different lakes and see how much the lake has changed. You can also walk in the lake - the pink part is the North Arm and the blue the South.		outline map of lake

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	LK2.E01.ms02	mindset	South arm inhabitants		The lake's freshwater sources all flow into the south arm, and it's less salty than the north arm (3-16% vs. 16-28%). But it's still 3-5 times saltier than the ocean! Compared to the North Arm, the South Arm of the Great Salt Lake teems with life. The primary producers are algae and photosynthetic bacteria. Algae float in the water column, and are the primary producers. lanktonic producers are mostly algae; a dozen or so species are known from the lake. Many of these algae are diatoms. There are also cyanobacteria in the plankton layer and at the bottom of the lake. When the water is clear, the bottom dwelling benthic producers are very active, producing an algal mat where brine fly larvae graze. Brine shrimp also live in the South Arm, as do corixids, or "water boatmen." Algae bloom in the winter. Brine shrimp and brine fly larvae eat the algae in the spring; brine shrimp reproduce in the summer. Migratory and resident birds eat the brine shrimp and the brine flies.	South Arm Winogradsky column	South Arm foodweb; photos of algae, bacteria, brine flies and larvae, brine shrimp, corixids
	LK2.E01.in02	interactive	What's that smell				
	LK2.E01.ap04	activity prompt	instructions for what's that smell interactive		Press and sniff		
LK2.E01.gr03 North Arm Biota		graphic rail	North Arm Biota				
	LK2.E01.sx02	special exhibit	North arm Winogradsky column contains live display with microscope and attached monitor				(with photos of north arm, relatively pink and not, photos of bacteria, instructions for microscope use
	LK2.E01.ar01	artifact label	artifact label describes cyanobacteria and algae			slide of cyanobacteria and algae	
	LK2.E01.ar02	artifact label	artifact label describes rust nonsulfur photosynthetic bacteria			slide of rust nonsulphur bacteria	
	LK2.E01.ar03	artifact label	artifact label describes red/purple photosynthetic bacteria and green photosynthetic bacteria			slide of photosynthetic bacteria	
	LK2.E01.ar04	artifact label	artifact label describes the Winogradsky column		How many layers can you see in the tube? The museum collected water and sand from the North arm of Great Salt Lake. In this column, the different microlife forms separate out into layers. At the top are cyanobacteria and algae, using oxygen, below them, in a non-oxygen zone, are photosynthetic bacteria. Each layer is its own habitat, with different chemical and organic materials; the layers interact, with nutrients moving from one layer to another.		
LK2.E01.gr04 South Arm Biota		graphic rail	Brine Shrimp live display				
	LK2.E01.sx03	special exhibit	South arm tube with microscope and attached monitor			6 slides: bacteria; brine flies, brine fly pupae, brine shrimp, brine shrimp cysts, algae	
	LK2.E01.ar05-ar10	artifact label	artifact label discusses brine shrimp		Brine shrimp, sold to gullible comic book readers as "sea monkeys" are probably the best known inhabitants of the lake. Brine shrimp are crustaceans with multiple larval stages. Their thick-walled eggs, called cysts, can survive for a long time if kept dry, hundreds of years even. Adult brine shrimp feed on the phytoplankton and graze on the benthic algal mat. Their feces provide the core for the oolitic sands of the lake. Brine shrimp are an important part of the GSL ecosystem; they are food for millions of migrating birds, and the basis of a multi-million dollar brine shrimp egg industry. - specific features to look for	a2257 brine shrimp eggs, a2260 brine fly pupae, and 4 tbd	photos of brine shrimp, brine shrimp cysts and eggs
	LK2.E01.gi01	grahic image	photomicrographs of diatoms				
	LK2.E01.gi02	grahic image	food web diagram				
LK2.E01.fl01		family label	family label panel - brine shrimp	Brine shrimp thrive in salty water; millions of them live in Great Salt Lake.	Can you see the brine shrimp swimming in the tube? Brine shrimp like to live in salty water, so Great Salt Lake is a perfect home for them. Would you have one as a pet? A large kind of brine shrimp is sold as "sea monkeys" that you can raise at home.	touchable model of brine shrimp	sea monkey ad, brine shrimp illustration/photo
LK2.E02 Lake Habitat-Wetlands			Visitors will see a reconstruction of a wetland habitat, and learn how wetlands filter water.		GSL and its surrounding habitats include extreme environments that make a healthy GSL. Wetlands are teeming with life, but also play the important role of filtering and nourishing the watersheds on the western Wasatch Front.		

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	LK2.E02.sx01	special exhibit-diorama	Bird and animal habitat; area closes to rail allows visitors to see underwater; foreground includes aquatic insect windows, chub and carp underwater, amphibians and tadpoles underwater, great blue heron striking at fish/amphib. underwater Species represented include marsh marigold, bulrush, duckweed, hornwort, pondweed, rushes, cattails, crayfish, mosquito, tiger salamander, dragonfly, heron or other bird and nest, chub and carp, garter snakes, muskrat and/or beaver, leopard frog, mink, yellow-headed blackbird, marsh hawk, marsh wren, ibis, meadow vole, water strider, diving beetle; includes soil/plant cross section; place reference Bear River Refuge or Shoreline Preserve. Includes filtration plant/soil section. Possible scenes: soil/marsh plant section vole runways/tunnels dragonflies perching on cattails leopard frog eating a mosquito muskrat eating cattail roots eared grebe nest				
	LK2.E02.pm01	photomural	Wetlands photomural of Bear River Refuge or Shoreline Preserve showing reeds, cattails, bulrush, spikerush, cattail, arrowgrass, reeds, birds flying overhead		caption/credit for photomural		
LK2.E02.gr01		graphic rail	Wetlands Ecosystem				
	LK2.E02.ms01	mindset	Mindset panel describes the wetland and its role in the watershed, and in migrations.	Wetlands are teeming with life, and support millions of migratory birds. The wetlands also play a critical role in the Salt Lake City watershed.	Wetlands are, as you would expect wet, with water, soils that hold water, and plants adapted to living in water. You find wetlands at the transition of land and water ecosystems, like at the shores of a lake or river. The wetlands around Great Salt Lake are marshes; marshes teem with life, and provide food and places for migratory birds to breed and nest. Wetlands filter water, and their water-loving soils hold water, like a sponge, releasing it under dry conditions. Less than 1.5% of Utah's land area is wetlands; 3/4 of the state's wetlands are in the Greater Great Salt Lake ecosystem. Wetlands - essential to our watershed and to millions of plants and animals - are threatened by development. captions for foodweb		wetland foodweb, photos of Utah and SLC wetlands; map of Utah wetlands 1920s and today
LK2.E02.gr02		graphic rail	Filtration				
	LK2.E02.id01	id label	Graphic id calls out and describes particular plants and animals and their connections.		where do they get their energy, where are they found (where to spot them), name, fun fact	marsh marigold, wild iris, crayfish, mosquito, dragonfly, heron or other bird and nest, chub and carp, garter snakes, leopard frog, mink, yellow-headed blackbird, muskrat, meadow vole	
LK2.E02.gr03		graphic rail	Wetland Adaptation				
	LK2.E02.fp01	focus panel	Focus panel describes animal and plant adaptations to life in wetlands.	Plants and animals adapt to living in wetlands in different ways.	Wetland plants need to find ways to get oxygen in a water saturated environment. Underwater plants (submergents) have extra air pockets on their roots or stems to store oxygen. Plants that live partly in and partly out of the water (emergents) get their oxygen from a tube that goes above the water surface. Floating plants "breathe" through the parts of their leaves that are above water. Different animals have different adaptations to life in the wetlands. Birds and mammals have webbed feet that help them swim. Some birds, like ducks, have wide bills they use to filter food from the water. Other birds have long legs suitable for wading, and long necks that can help grab fish and other prey under water. Wetlands mammals have oily fur that repels water. Some mammals can hold their breath under water - beavers and muskrats can hold their breath for about 15 minutes.		close-up photos or illustrations of air spaces on stems and roots, photo of floating plants; photo of duck foot, beaver foot; duck bill; long-necked wading bird
LK2.E02.fl01		family label	Family label about insect adaptations	Bugs swim, dive, and even skate across watery habitats.	Did you know that bugs live on and under water? Can you see the water strider? Its oar-like legs help it skate on the surface of the water. Look under the water for the diving beetle. It grabs a bubble of air before it dives so it can stay under water longer.	water strider and diving beetle models	photo of water strider and diving beetle
LK2.E02.tm01		trail marker			Sustainability trail - wetlands restoration, links to Nature Conservancy Shorelands Preserve and Bear River Preserve; Inland Sea Shorebird preserve		

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	LK2.E02.in01	interactive	This interactive demonstrates the filtering mechanism provided by a wetlands root system.		• Set into the wetlands scenic the interactive cabinet has trapezoidal plan with an inclined acrylic top revealing an inclined plane below. A crank handle is positioned on the long side toward the back of the cabinet. • Transparent balls are used to represent water and larger black balls to represent pollution particles. • The filtering demonstration: As the balls roll down the plane many of the large marbles are caught in cages. The cages are comprised of multiple arrangements of three pins set into the plane surface. The water balls pass through and around the cages and fall into a collection area at the foot of the plane. Some pollutant balls bypass the cages and also collect with the water balls.		
	LK2.E02.ap01	activity prompt	instructions for filtration interactive		Visitors lift a bin of marbles and pour them into the top of the interactive, then lift a barrier panel to let the marbles flow through the "wetland." Clear "water" marbles flow through; black "pollutant" marbles are filtered out.		
	LK2.E02.fp02	focus panel	Focus panel accompanies soil cross-section and describes filtration process.	Wetlands act as a sponge, soaking up water, and as a filter, removing contaminants.	Wetland soil contains not just dirt, but also minerals and organic material. Organic material is the remains of plants and animals. The rich soil and the plant life of wetlands both filter water and absorb water. Like a giant sponge, wetlands absorb incoming water from rain, rivers, runoff from spring melt and precipitation, and groundwater. Wetlands hold the water they absorb in wet periods, and release it to the surrounding areas when it's dry. So wetlands act as a buffer against extremes of drought and flooding. Wetlands also filter surface and ground water, removing harmful phosphates, metals, and agricultural runoff. The plants take up these materials so they don't contaminate rivers and groundwater.		with diagram of soil and plants
LK2.E03 Lake Habitat- Shoreline			Visitors will see a diagrammatic diorama of the lake's shorelines, and learn the importance of shorelines and playas.				
	LK2.E03.sx01	special exhibit	Shoreline reconstruction; reconstruction is a transect from lake to playa to pickleweed zone to saltgrass zone to greasewood zone Species include tiger beetles, spiders, grasshoppers, pickleweed, salt grass, salt bush, greasewood, iodine bush, inkweed, shadscale, snowy plover, northern harrier, American avocet, vole, badger, Savanah sparrow Possible scenes: soil cross section showing tiger beetle burrow, vole runway fox menacing snowy plover nest avocets feeding northern harrier flying overhead (after voles) vole eating grasshopper or Mormon cricket harrier nest?				
	LK2.E03.pm01	photomural	Shoreline photomural depicting the view from within the lake looking out		caption/credit for photomural		
LK2.E03.gr01		graphic rail	Shoreline Ecosystem				
	LK2.E03.ms01	mindset	Mindset panel describes the shoreline ecosystem zones and their importance.	The shores of Great Salt Lake are home to many plants and animals adapted to live in salty areas.	The shores of Great Salt Lake are home to many plants and animals adapted to live in salty areas. These playas, salt flats, and salt marshes are not as lush as the wetlands, but still support food webs. Where rainfall has lowered salt levels, plants like pickleweed , iodine bush, and greasewood grow, providing food and shelter for bugs, birds and other animals. The animals eat the plants' seeds, rather than the plants themselves. Different plants can withstand different levels of salt in the soil, so they tend to be found in zones depending on the concentration of salt. The main zones around the lake are: playa, pickleweed, saltgrass, and greasewood. caption for foodweb		shoreline foodweb
LK2.E03.gr02		graphic rail	Salt				
LK2.E03.rc01		rail case	Salt crystal specimen display			salt crystal a2258	
	LK2.E03.ar01	artifact label	Artifact labels explains the salt industry.		Great Salt Lake includes 15 natural salts. On an average day, nearly 4 1/2 billion tons of salt are in solution in the lake. Salt and other minerals are extracted from the lake through evaporation from diked ponds. Common salt (NaCl) from the lake is used in cattle feed, food processing, water softeners, and highway salt. It isn't used for table salt.		includes aerial photos of lake and evaporation ponds; photo of spiral jetty.

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	LK2.E03.gc02	graphic caption	Graphic captions describes the Bonneville salt flats and their formation.		The Bonneville Salt Flats are a 30,000 acre expanse of hard, white salt crust. Near the center, the crust is almost 5 feet thick in places, with the depth tapering off to less than 1 inch as you get to the edges. The Bonneville Salt Flats are comprised of approximately 90% common table salt. The Salt Flats have been home to speed racing events since the 1930s.		photos of salt flats, speed events
LK2.E03.fl01		family label	Family label about the snowy plover		Can you see the baby birds in their nest? They are snowy plovers. The nest may not look like much of a nest - it's a shallow hole lined with pebbles or shell pieces. The plovers come to the salty shores of the lake to feed on brine shrimp, and to lay their eggs.		photo of nest, baby plovers
LK2.E03.gr03		graphic rail	Adaptation				
	LK2.E03.fp01	focus	Focus panel discusses animal and plant adaptations to life along the shoreline.	Plants and animals adapt to life along the salty shores of the lake.	Animals and plants of the shorelines and salty playas have special adaptations for dealing with salty soil. The plants (known as halophytes) often have specialized cells that store salt. Salt grass secretes salt crystals out to the surface of its leaves. Iodine bush stores salt in its succulent segments. Shadscale is covered with hairs that secrete salt. When the hairs are full, they burst, covering the leaves with salt. In this very open environment, animals need to find places to live, hide, store food, and raise young. Voles tunnel under the soil and store salt grass seeds underground. Northern harriers build nests low to the ground; they fly over the playa in search of prey.		photos or illustrations of salt grass w. salt on leaves, iodine bush, vole in tunnel
LK2.E03.id01		id label	Graphic id describes particular plants and animals and their connections.		where do they get their energy, where are they found (where to spot them), name, fun fact		tiger beetles, spiders, grasshoppers, pickleweed, salt grass, greasewood, iodine bush, inkweed, shadscale, snowy plover, northern harrier, American avocet, vole, badger
LK2.E04 Migrations			Visitors see a graphic montage of the changing seasons of the lake, and the different faunal and floral inhabitants and visitors at each season.	GSL plays a critical role of hemispheric importance for millions of migratory birds.			
	LK2.E04.ms01	mindset	Primary text introduces migrations and describes the lake's importance in the Pacific and Central flyways; includes brine shrimp as important food source.	The Lake is a vital stop for many birds' yearly migrations.	Great Salt Lake is designated as a Western Hemisphere Shorebird Reserve, a recognition of its importance to millions of birds who stop here every year. Birds migrate to take advantage of longer days in the north for breeding season, and warmer climate and food availability in the south the rest of the year. Most migration routes are north-south. GSL is critical to the Pacific and Central flyways; more than 30 species of birds use the lake every year. They nest in the marshes, rest and refuel, and feed on brine shrimp and brine flies. Waterbirds like duck and geese stop at Great Salt Lake as they migrate between Canada and Mexico and South America. The lake is home to the world's largest breeding population of California gulls. "It's like the lonely gas station on Route 66 for birds." Don Paul, biologist		
	LK2.E04.in01	interactive	Migration map with routes		migration map captions: Pacific and Central flyways, location of GSL, birds that use the different flyways		
	LK2.E04.gi02	graphic images	Migration map				
	LK2.E04.gc02	graphic captions	captions identify birds and their relationship to the GSL				
	LK2.E04.ap01	activity prompt	Prompt for map interactive		touch a bird to see its migration route		
	LK2.E04.gi01	graphic images	Images of migratory birds, their homes and migration destinations, the numbers that visit the lake annually, and what they do/feed on at GSL.				
	LK2.E04.sx01	special exhibit	Models of flyway/migratory birds (10-15 ea.): white pelican (fly in straight line or v formation), white-faced ibis (fly in straight line w. neck extended), tundra swan (fly in straight line or v w. neck extended)		American white pelican: pelicans use their big bills to scoop up fish. They build nests on Gunnison Island, and fly south for the winter. White-faced ibis: this ibis breeds in the lake's freshwater marshes. GSL hosts the world's largest population of this bird. Tundra swan: While some populations winter in the GSL region, migrants move south in the early winter to the Pacific coast of CA and cross country to the Northeast, particularly New Jersey. Migrants return to the Great Salt Lake after the first thaw of their wintering region and arrive around April.		

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LK2.E05 People and The Lake			People and the Lake spans two areas of the gallery. On an interactive tabletop, visitors watch an AV program about the lake's resources and the impacts of human use of the lake and watershed. On the ramp connecting LK with FP, two inset cases hold artifacts created by the lake's earliest human residents. Visitors learn how and where these peoples made a living, and of their possible role in large mammal extinctions.				
LK2.E05.gp01		graphic panel	On ramp between LK and FP				
	LK2.E05.fp01	focus panel	Focus panel discusses prehistoric and historic use of the lake.	The archaeological record tells us that Great Salt Lake and its resources was a magnet for prehistoric people. We don't feel the same pull - why?	Paleoarchaic peoples came to the lake and its marshes to fish, hunt, and find freshwater. Some lived around the lake shores, others had hunting camps on the shore, on Antelope Island, or in nearby caves. The first Europeans arrived in 1700, some 9000 years after the paleoarchaic people. These explorers were followed by trappers, including Jim Bridger and Kit Carson. Brigham Young and his followers arrived in 1847, and established Salt Lake City. In the late 1800s and early 1900s, a number of large resorts thrived on the lake's shores. Saltair, the best known, had the world's largest dance pavilion and a roller coaster. Tourists and residents thronged to these resorts until the 1930s, when the lake level fell. With the lake at 4200 feet, Saltair was almost a quarter mile from the lake's edge. Lake Bonneville/Great Salt Lake, its extensive wetlands, and the riverine systems that fed the lake have been important economic resources for people for over 11,000 years. The high saline content of the Great Salt Lake precluded the possibility of fishing, so archaeologists believe that the greatest amount of effort was spent in the acquisition of marshland resources (both floral and faunal). Important food plants prior to the arrival of white settlers included cattail, pickleweed, and wheatgrass. Numerous waterfowl, eggs, small mammals, and insects were easily found in the nearby marshes. Fish and fresh water mussels were taken from the nearby rivers and bison frequented the extensive grasslands just north of the lake. Local plants critical for hunting and basketry technologies were bulrush, milkweed, common reed, and willow. The lake region also contains stone and mineral resources that were exploited. The eastern Great Basin contains an unusually high number of obsidian sources—an important, high quality toolstone created through volcanic activity. Clays in the region were used to make c These factors combined appear to be an idyllic setting for hunting and gathering peoples; food was available year-round, high quality toolstone was attainable within a short traveling distance, and habitation sites could be located near plants used in domestic technologies. However, scholars (Madsen and Janetski 1990:2) argue that “from an evolutionary ecological perspective, Great Basin wetlands are neither ‘good’ nor ‘bad,’ Basin lakes and marshes are not ‘better’ than Basin uplands and terrestrial resources are not ‘better’ than lacustral resources….Basin wetlands vary in size, composition, and reliability, as do adjoining areas of foothill and mountain environments. They vary in productivity and proximity to other necessary resources.” Regardless of the region’s equanimity to other resource localities, it is evident in the archaeological record that use of the Lake Bonneville/Great Salt Lake’s marshland and riverine environments shifted over time. Paleoarchaic settlement in the region was high but slowly tapered off until by the Protohistoric period when settlement in the area was comparatively decreased. One exception is Utah Lake, which contained an extensive fishery and sustained a year-round sedentary community of Utes known as the Timpanogots. In the historic period, focus shifted from the marshlands and rivers surrounding the lake to the lake itself. Not long after the arrivals of the Mormon settlers, salt production geared up to become an important industry; other industries that followed included potash, magnesium, and brine shrimp production. Recreation on the Great Salt Lake was largely focused on the buoyant nature of the water and many lakeside resorts developed along the shoreline as early as the late nineteenth		artist's recreation of early lake residents

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					On the west desert the salt flats became the ideal setting for world land speed records as late as 1970.		
LK2.E05.ic01		inset case	Inset case holds prehistoric and historic artifacts made by lake dwellers				
	LK2.E05.ar01-ar04	artifact group label	Paleoarchaic Sites associates with the Great Salt Lake Paleoarchaic (ca. 11,400-7000 BC)		During the Paleoarchaic period Lake Bonneville extended as far as the Provo (14,500-13,500 y.a.) and the Gilbert (11,000-10,000 y.a.) shorelines (see Curry's map). "In terms of wetland ecology high lake levels at this time would have greatly restricted fresh water marshes to a thin band along the eastern mountains. Westward of the thresholds containing productive inset marshes, the waters of [Lake Bonneville] would have been salty...exceeding the salinity of the ocean by several times." (Fawcett and Simms 1993:7) The Paleoarchaic people were highly mobile hunters and gatherers. To date, there is no direct evidence that the people who exploited the Lake Bonneville region hunted mammoth, mastodons, and other mega fauna although these animals did inhabit the region during the Late Pleistocene. After the extinction of the mega fauna, large game animals, such as bison and deer, were likely preferred but were not hunted exclusively; small game was captured opportunistically as well. Groundstone tools have rarely been found at North American Paleoarchaic sites (none have been found in Utah) suggesting that foods which required intensive processing were not actively sought. Most Paleoarchaic sites in the eastern Great Basin are located within the now-extinct Lake Bonneville marshland system suggesting that resources found in this environmental zone were highly sought after, although direct evidence is lacking.	a0644, a2835, a2836, a2837	
	LK2.E05.ar05-ar23	artifact group label	Archaic Sites Associates with the Great Salt Lake (ca 7,000 BC-AD 400)		By the Archaic period, Lake Bonneville had shrunk considerably. "Great Salt Lake fluctuations likely had great consequences for marsh structure and human settlement. Regressive lake levels in a shallow "skillet" such as the Great Salt Lake created increased area for freshwater marshes and other wetland ecosystems to develop between the confines of the lake edge and the mountains. Conversely,…lake levels could flood tremendous amounts of potential marsh habitat with brackish water. Given the shallow gradient of the land surface along the Great Salt Lake, short term fluctuations significant to humans should be expected. This is especially relevant when considering the periods after 1500 BP when lake fluctuations approximate those we see in the historic period. (Fawcett and Simms 1993: 8-9). Between 7000 and 6000 BP there is considerable evidence for a significant drying and shrinking of the Great Salt Lake. Such low levels would have created enormous wetlands along the eastern shores as fresh water flooded the areas along the Wasatch Front. After 6000 BP the lake began expanding again until it reached a maximum extent around 3500-2000 BP. Virtually all of the flat terrain along the eastern shores would have been flooded leaving little room for wetlands. Human use would have been curtailed, but to what extent is unknown. A preliminary examination of upland sites in the Wasatch Mountains east of the Great Salt Lake, the Grouse Creek area, and the Raft River Mountains north of the Great Salt Lake suggest an increase in use of upper elevations during this time. (Fawcett and Simms 1993: 9-10) In the early Archaic, lowland sites in the eastern Great Basin were almost exclusively located in marshland settings. People lived in caves and rockshelters adjacent to fresh water springs on the periphery of the Great Salt Lake. People collected local plants, such as pickleweed, burroweed, cattail, willow, and bulrush. Some were consumed while others were used to make mats, baskets, and other woven objects. Animals hunted in the immediate area include rodents, marsh avian, and insects. By the Middle Archaic, around the time of the lake expansion, population had increased and people were increasingly exploiting upland zones, away from the lake basins; this was likely part of a seasonal round of exploiting both uplands and lowlands at peak times of the year. In the Late Archaic, people who lived in the marshlands narrowed their diet to only a few plant species and marshland game may have been hard to	a0506, a0507, a1031, a1032, a1034, a2200, a2203, a2208, a2209, a2839, a2840, a2842, a2843, a2844, a2845, a2846, a2847, a2848, a2849,	

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					The loss of resource availability resulted in the abandonment of a large number of lake-periphery sites. In general, however, food choices did not change dramatically from the early Archaic; foraging and collecting a wide array of plants and animals, including bison, continued to constitute the food base (Madsen 1982).		
	LK2.E05.ar24-34	artifact group label	Late Prehistoric Sites Associated with GSL Fremont (ca. AD 400-1400)			Late Prehistoric Fremont: a2202, a2204, a2206, a2850, a2194; clam pendants a2851, a2852, a2853, a2854, a2855, a2856	
LK2.E05.ic02		inset case	Inset case holds prehistoric and historic artifacts made by lake dwellers				
	LK2.E05.ar01-ar13	artifact group label	Late Prehistoric Sites Associated with Promontory (ca. AD 400-1400)		During the Fremont and later Late Prehistoric periods people depended on a wide array of marsh plants including bulrush, cattails, mustard, chenopods, plantago, and marsh grasses. Common animal resources include fish (probably caught in traps along the rivers), ducks and other shore birds, muskrats, and fresh water mollusks. Bison bones are also quite common in these sites. Most of these resources were collected seasonally, probably in the spring and again in the fall (Madsen 1989:50)." Some resources, such as cattail rhizomes, had a greater degree of nutrition in the winter; their starch content is highest from the late fall to the early spring (Madsen 1982:208; Madsen 1997). In fact, of the many plants available to people living in this environmental zone cattail has the highest caloric return rate, even after processing. This would make it the highest ranked wild plant among the available choices (Simms 1984: Table 2).	Late Prehistoric Promontory: Jar a2857, Main shafts a2859-a2861, Mat a2862, Skin a2863, Feather in cordage a2864, Incised tooth a2865, Braid a2866, Moccasins a2867, Seed basket a2867, Water jars a2870, a2871	
					The adaptive strategy of the Great Salt Lake Fremont has typically been seen as one that is heavily dependent on hunting and gathering, contrasting in this regard with Fremont peoples in other regions. However, it is likely that this generalization is an artifact of research and the paucity of intact sites due to early urbanization of the Wasatch Front. The presence of ample water from the Wasatch Mountains and the climactic tempering effects of the lake suggest the northern Wasatch Front would have been favorable for Fremont agriculture. Reassessment of sites east of the Great Salt Lake clearly show some Fremont were as heavily reliant on farming as any Fremont known. The presence of very large wetlands in the Great Salt Lake region would affect the expectations for or against an agricultural strategy in different ways. On the one hand wetland resources would have fostered increased diversity in Fremont lifeway, with some Fremont possibly opting out of the agricultural strategy in favor of full-time hunting and gathering. On the other hand, the wetland resources would have supplemented agricultural strategies pursued outside of the wetlands themselves, but in close proximity to insure use of such wetlands. The decision to utilize cultigens is probably not restricted to an either or proposition, but rather expressed in a variety of settlement strategies. Some of the pressures acting upon foraging strategies in this case would be the costs, benefits, and constraints of variables such as group size and movement in light of the handling transport, and storage costs/benefits of wild or domestic resources (Fawcett and Simms 1993:18, almost verbatim).		

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					The mid to late-1200s was a tumultuous time for the local farmers. The transition to the Protohistoric period is characterized by an apparent abandonment of agriculture, less investment in architecture and ceramics, and a shift to increased mobility. This would have been a difficult time for the part-time horticulturalists; a large migration of hunter-gatherers would have increased competition for the wild resources that allowed variability, and thus flexibility, to be a part of the Fremont diet. One group that lived coevally with the Fremont farmers was those of the Promontory Culture who arrived in the area around AD1200-1300. Current research (Ives 2008, personal communication) suggests that these hunter gatherers came from subarctic Canada and were heavily dependent on bison and local marshland resources. Whether they stayed in the area and mixed with later migratory groups or moved on before the Numic expansion is unknown at this time. Either way, evidence of the Promontory Culture is brief in the eastern Great Basin.		
	LK2.E05.ar13-ar15	artifact group label	Protohistoric Sites Associated with the GSL Shoshonean (ca AD 1400-1825)		The shift to a cool/dry environment featuring winter rainfall after AD1350 is more difficult to translate into lake level, but judging from state temperature and precipitation in the historic period, cool dry intervals around the turn of the century and a less marked interval at mid-century both correlate with low levels of the Great Salt Lake. This was a time when farmers and foragers were presented with a fundamentally different suite of circumstances and decisions. It is no wonder archaeologists detect a more marked cultural change at this time (Fawcett and Simms 1993:12-13, verbatim). After around 600 years ago the Fremont archaeological complex can no longer be found in the eastern Great Basin. Most scholars believe that the end of the Formative way of life was caused by a combination of environmental degradation and a slow population replacement of indigenous Fremont groups by newly arriving hunter-gatherer groups. The best current evidence suggests that the predecessors of the historic aboriginal groups in the Great Salt Lake region arrived in the area about 500-600 years ago. The subsistence adaptation of historic Shoshonean groups (Shoshone, Goshute, Ute, and Paiute) was probably very similar for the Late Prehistoric people. In general, subsistence resources from the lake were based on a mixture of wild flora and fauna, especially waterfowl, small mammals, and fish. It was based on the movement of small groups from one area to another as differing resources became available. Occasionally when local resources were particularly abundant these small groups came together to participate in a variety of social activities (Madsen 1980; Simms and Heath 1990). The Shoshoni seemed to have depended less on lake, river, and spring edge resources than did previous groups, but there were exceptions such as the virtually sedentary Ute of Utah Lake. Historic accounts and the archaeological record suggest that the eastern Great Salt Lake area may have been a buffer-zone between the Shoshone and Ute tribes around this time although both groups likely used the area as hunting and gathering grounds. Rather than concentrating on the lake margins, the Shoshoni also settled in the mountainous areas to the east. The Goshute settled on the south and southwest end of the lake.	Seed basket a2869, Water jars a2870, a2871	

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	LK2.E05.ar05	artifact group label	Historic Use of the GSL 1824-1950		The earliest European-American to see and record the Great Salt Lake was a trapper named Jim Bridger in 1824; several important trapping/exploration parties led by John C. Fremont, Jedediah Smith, Stansbury, and Gunnison followed soon after. The importance of the lake as an economic and recreational resource was not lost on the Mormon settlers. Early industries that developed on the lake include salt, potash, brine shrimp, and magnesium production. For recreational use, elaborate bathing resorts were developed on the lake and the smooth, open race course on the salt flats was the premier location for world land speed records. The Great Salt Lake is also the home of one of the greatest examples of earthworks art in North America. The earliest recording of salt use was in Father Escalante's 1776 journal, which noted that local Indians used the surrounding salt deposits, likely for meat preservation. However, salt as a commodity did not come into play until early settlers arrived in the Salt Lake Valley. Around 1847 the first commercial salt boiling operation was established on the shores of the Great Salt Lake. Within a few years salt was being extracted thru the use of artificial evaporation ponds, one of several methods still used today. In the years 1860-1895, the demand for crude salt in the silver refining industry resulted in a dramatic increase in salt production. By the years 1880-1915 there were twenty different companies producing salt on the shores of the Great Salt Lake. The famous Morton Salt Company established a competitive foothold in the area in 1918 and has been a predominant force ever since. In spite of the large quantities of salt found here, Utah produces only 1 percent of the nation's salt supply-this statement may need updated numbers (Clark and Helgren 1980) Not long after the arrival of the Mormons to the Salt Lake Valley in 1847 the lake became popular as a place for swimming because of the extreme buoyancy of the water. By the late 19th century, nine resorts were clustered on the south shore and two on the east shore. Although not the first resort to be built, the most famous by far was Saltair. The Saltair resort and railroad was built in 1893; the largest stockholder was the LDS church whose first presidency wanted to provide a place for wholesome entertainment. When finished, Saltair was an architectural wonder. The entire complex measured over 1,000 feet from tip to tip and wings on either side of the pavilion extended crescent-like onto the lake. When it opened the resort's main attractions were swimming and dancing; the ballroom was so big it was advertised as the largest in the world. Sometimes people would stay all day, swimming and relaxing in the morning and afternoon and dancing all night until the last evening train back to Salt Lake (McCormick and McCormick 2002).		
LK2.E05.qt01		quote	quote about how prehistoric people used the lake				
	LK2.E05.gp02	graphic panel					
	LK2.E05.in01	interactive	Lake talk back board where visitors engage in a dialogue about the lake; possible framing questions: who owns the lake? what do you love/hate about the lake? where were you when _____? The talkback board is a flexible format so the questions can change, responding to current issues/legislation, or to visitors' suggestions for questions.				
	LK2.E05.ap01	activity prompt	Prompt encouraging visitors to respond to the lake.				
LK2.E05.gr01		graphic rail	People and the Lake				
	LK2.E05.av01	av	The People and the Lake video explores current and historic human interactions with the lake, from management, to industry, to recreation. Visitors will find that the lake means many things to many people. Visitors stand around a circular tabletop display and watch a series of interviews with different Salt Lake experts and local residents. They hear differing opinions on the lake's value and what makes it fascinating.		The program consists of a series of short interviews. Topics include resource extraction, recreation, Salt air, brine shrimp harvesting, birding, rowing, sailing; natural and man-made historic changes. The interviewees might include: a duck hunter, biologist, geologist, local historian/long-time resident, lake manager/planer, representative from Macro or other industry, rancher, birder, brine shimmer, sailor, artist, and activist/conservationist. The interviews are punctuated with historic and new images (Salt air, graduate students at work on the lake, etc.)		

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	LK2.E05.ms01	mindset	Mindset panels describes human interactions, and human's complex relationship to the lake; includes inspirational quotes. Sample quote: To travelers so long shut among the mountain ranges a sudden view over the expanse of silent waters had in it something sublime. Several large islands raised their rocky heads out of the waves. . . . Then, a storm burst down with sudden fury upon the lake, and entirely hid the islands from our view. John C. Fremont, Report of the Exploring Expedition to the Rocky Mountains, 1845	"People have been using the lake and surrounding habitats ever since the first Paleo-archaic people arrived in the area more than 11,000 years ago.	In historic times, birders, hunters, boaters, swimmers, and hikers have found recreation opportunities at the lake. Industries use the lake, too, extracting salt and minerals. The brine-shrimp industry harvests brine-shrimp eggs, for use as fish food, and exports them world wide. The shrimp you eat in a Salt Lake City restaurant may have been raised on brine shrimp eggs from the lake! The state of Utah owns the lake. The people of Utah own the water in the lake and the bottom under the definition of GSL as "Navigable Waters of the US;" the shoreline is largely privately owned. The lake supports wildlife, provides opportunities for jobs and recreation, yet scientists are just beginning to understand how the lake works. How can we manage the lake and make decisions for its future? Sample quote: "To travelers so long shut among the mountain ranges a sudden view over the expanse of silent waters had in it something sublime. " Several large islands raised their rocky heads out of the waves...Then, a storm burst down with sudden fury upon the lake, and entirely hid the islands from our view." John C. Fremont, Report of the Exploring Expedition to the Rocky Mountains, 1845		with beauty shots of various lake locations, including industry; or maybe it's beauty shots of different views of the lake
	LK2.E05.gc01	graphic captions	Graphic captions accompany photos of lake resources and extraction.		Extractive Industries and Resources: **Brine Shrimp:** Brine shrimp can live in wild fluctuations in salinity. The female can both lay eggs and give birth to live young. Brine shrimp are used to feed shrimp farmed in countries, especially Southeast Asia. The farmed shrimp are then imported to the U.S. Over 10 million pounds of brine shrimp eggs are collected every year. http://www.deq.utah.gov/Issues/GSL_WQSC/docs/related_fact_sheets/GSLBrineshrimp.pdf (source for the above figure) **Brine Flies:** Birds eat the brine flies. Migratory birds along the Pacific Flyway come to feed on the flies and then travel south. **Minerals:** A company called Mineral Resources International sells trace minerals from the lake that are then used to make health food and skin care products that are sold over the world. **Salt:** The salt industry uses underwater canals (without the use of pipes) to collect water in evaporation ponds near Promontory Point. **Oil:** There is now oil drilling near the Spiral Jetty. Recreation: The lake is used for recreational boating and for crew. The Saltair resort, once located on the lake, was known for dancing.		with photos of shrimp harvest, mineral extraction, salt ponds, boating, biking, rowing, evaporation ponds
	LK2.E05.ms02	mindset	Mindset panel explains the state of what we know about the lake, and poses questions about its future management.	We need to more about the lake to be able to make informed decisions about it in the future.	We still have a lot to learn about the lake, and some of our past efforts to manage the lake have proved disastrous. Recently, local activist, conservation, and scientific groups decided to join forces to better understand and study the lake, and formed the Great Salt Lake Institute. Although our scientific understanding of the lake and its inhabitants is growing, we need to be able to link that knowledge to legal and civic action to effectively manage the lake for future generations. Salt Lake City and the Wasatch Front are growing rapidly - what effect will that growing populations (and the increased roads and water use) have on the lake? High levels of mercury were found in the lake - what does this mean to the lake's migratory bird population, and to us? Do we value the lake properly?		photos of pumping stations; satellite images of lake at recent highs and lows
	LK2.E05.sp01	story panel	Story from scientist		Bonnie Baxter or Rob Baskin		
	LK2.E05.sp02	story panel	Story from activist		Lynn deFreitas		
	LK2.E05.sp03	story panel	Story from artist		Rosalie Winard or Terry Tempest Williams		
LK2.E05.tm01		trailmarker	Link to evaporation ponds				
LK2.E06 Watershed/ Watercycle			Visitors see a video montage of beauty shots of particular points in the water cycle; surrounding graphics explain the details of the water cycle and locate the watershed. Visitors see how water moves through the GSL water cycle and demonstrate the importance of watersheds.				
LK2.E06.gr01		graphic rail					
	LK2.E06.av01	AV- Watershed	A cylindrical station features a tabletop AV display of evocative and beautiful images and natural sounds: snow falling, ice melting from trees, mist on the lake, rain clouds, Bear River. Surrounding the display, graphics and diagrams explain the Salt Lake City water shed and how water cycles through the region.	Salt Lake City is one of the few places where you can see the water cycle; the lake plays a critical role in it.	A short looping video program gives visitors a sense of how water cycles through the Salt Lake City Watershed. It shows water at various points from clouds above the city to water flowing into sewers. The program should start with clouds and rain, snow on mountaintops, then move to rivers, lakes and runoff, then to evaporation and ending/starting with clouds. The images should be of recognizable local places; brief captions will appear on the screen (e.g. icicle, Little Cottonwood Canyon).		

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	LK2.E06.gi01	graphic image	Graphic diagrams, maps, and illustrations explain the water cycle and locate the key points of the Salt Lake City watershed.				
	LK2.E06.gc01	graphic caption	Graphic captions accompany water cycle and watershed diagrams and maps.	A healthy watershed includes natural habitats from mountaintops to wooded canyons, to marshes and lakes.	The Wasatch Front is one of the few places where you can witness the entire water cycle: water evaporates off the lake creating rain and snow in the mountains, which precipitates or flows down into rivers and streams and returns to the lake. Note that water changes state (from rain/snow to water to water vapor) as it moves through the water cycle. Great Salt Lake's watershed covers about 20,000 square miles. 60% of the city's water comes from the watershed.		
LK3 Dynamic Lake			Visitors manipulate a model of the valley, and watch as, over time, the lake grows and shrinks, culminating in today's terminal lake. They can refer back to the map inlaid in the floor and the remains of these shorelines, rings in the mountains surrounding Salt Lake City, can be seen out the window (highlighted by graphic markers) and on an adjoining photomural. Visitors see how geologists use sedimentary cores to study the lake's pasts, and explore the details of the core with microscopes.				
LK3.E01 Lake Formation							
LK3.E01.gr01		graphic rail	Lake Formation				
	LK3.E01.in01	interactive	Visitors turn a crank to select a time, and watch as the model fills to one of the precursor lake levels (Bonneville, Provo, Gilbert, Stansbury). The lake model includes landmarks (capitol, temple) and you-are-here (the museum).	The lake has changed dramatically over time; today's lake is a small remnant of the precursor lakes.	• The History of the formation of the Great Salt Lake is modeled in this interactive by changing the water level across a topographic map within a six-foot circular acrylic tank. The map replicates the Salt Lake City Region and illustrates area topography and includes models of the Utah state capitol building and Kennecott Stack. • Surrounding the tank is a cantilevered circular graphic rail. Graphics that represent six time periods from 24,400 BP to today are shown on a raised part of the rail that can be rotated in two directions. A three-dimensional pointer inside the movable part of the rail is fixed to the side of the tank. • By rotating the raised panel the water level in the tank is adjusted in response to the selection of different time periods. Six different historic levels can be modeled ranging from the high of Lake Bonneville through to the Great Salt Lake's 1963 historic low. Distinct shorelines are created by the intersection between the water level and the topographic map. • A ratchet mechanism provides resistance between setting positions.		
	LK3.E01.ap01	activity prompt	Activity prompt for lake model				
	LK3.E01.ms01	mindset	Mindset panel reviews the lake's formation and history.	Thousands of years ago, the Great Salt Lake was an enormous freshwater lake.	Great Salt Lake is a remnant of an ancient freshwater lake, Lake Bonneville, that stretched over 20,000 square miles of what is now Utah, Nevada, and Idaho between 32,000 and 14,000 years ago. Lake Bonneville was more than 1000 feet deep, and what are now Utah's mountain ranges were islands. Although the climate was cooler and wetter, the lake did rise and fall with varying rainfall and evaporation. About 16,800 years ago, the lake rose above the level of Red Rock Pass in Idaho, its only outlet, and the lake flooded into the Snake River Basin. The weight of Lake Bonneville caused the earth to depress - it's still rebounding today! A timeline of the Great Salt Lake 22,200 B.C.: Lake Bonneville, Stansbury level, 245 feet deep. 16,000 B.C.: Lake Bonneville, Bonneville level, 1,020 feet deep, as the climate becomes wetter. 14,800 B.C.: Lake Bonneville breaks through at Red Rock Pass, Idaho, making an outlet into the Snake Drive Drainage. Its level rapidly decreases. 14,200 B.C.: Lake Bonneville, Provo level, 640 feet deep.		maps showing extent of precursor lakes

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					10,800 B.C.: Lake Bonneville, Gilbert level, 75 feet deep, as a drier climate exists.8,000-10,000 B.C.: The modern Great Salt Lake emerges. A.D. 1776: Spanish explorers Escalante and Dominguez hear tales of a bitter sea that connects with Utah Lake. 1824: Jim Bridger and Etienne Provost become the first recorded white men to see the lake. 1843: John C. Fremont and Kit Carson explore the lake and visit Fremont and Antelope islands. 1847: First pioneers bathe in the lake. 1870: Lakeside and Lake Shore, the first two bathing resorts on the Great Salt Lake, emerge. 1873: The lake level reaches a historic high of almost 4,212 feet above sea level. 1890: Dropping lake levels decrease crowds to the lakeshore resorts. 1896: State gets ownership of the lake. 1903: Lucin railroad causeway cutoff is built near Promontory. 1963: The lake level drops to 4,191 feet above sea level. 1964: Most of the causeway to Antelope Island is built. 1969: The Antelope Island causeway opens. 1983: Rising lake levels close the Antelope Island causeway. (It was also temporarily washed out during numerous storms from 1969-1983.) 1986-87: Lake level almost reaches 4,212 feet. 1993: The causeway to Antelope Island reopens after reconstruction. (from the Deseret News, Thursday August 5, 1999)		
LK3.E02 Sedimentary Core			Sediment Core				
	LK3.E02.sx01	special exhibit	sedimentary core with monitor and attached microscope	viewing sands under a microscope.		core tbd, slides of algae, ash, sands, oolitic sands, mud, bacteria;	
	LK3.E02.ap01	activity prompt	microscope/magnifier prompt				
LK3.E02.gr01		graphic rail	Sediment Core				
	LK3.E02.fp01	focus panel	Focus panel accompanies the core exhibit to discuss the how the core was collected and what we can learn from the core.	Once you know how to read the layers, a sedimentary core is a time capsule for the lake.	The core was collected as a test of drilling equipment. 1) Here is some metadata for the core: location: 41°5.713'N, 112°22.051'W water depth: 8.08m date cored: 12 August 2000 sediment interval: ~1.50m to 3.05m below the lake floor age estimate: this core hasn't been thoroughly dated, so we don't have high accuracy. However, based upon correlation with other cores and a few marker beds, the white layer at about 120cm depth likely dates to 11,600 years before present. There are finely-laminated sediments from the remnants of Lake Bonneville below that layer, and postglacial/Holocene lake sediments above. Rough guesses for ages of the top and bottom of the core might be 7-8,000 yr and 13-14,000yr, respectively. 2) there are no beds of pure salt; however, the pore waters are saturated with salts and several crystals have precipitated on the core surface. There may be a thin layer of the Mazama/Crater Lake eruption ash (7676yr) in this section, depending on whether the core covers that time interval, but it would take some work to find it--the Mazama doesn't stand out in the GSL cores. There are no other tephras present in this interval.		with core diagram; map showing core location

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					The core is like a snapshot of the lake's history - some layers were left by lakes even older than Lake Bonneville. Earthquakes caused large areas of the lake bottom, especially near Fremont Island to become deep basins, essentially salt evaporation ponds, that quickly deposited salt to the thick sections we see in the cores. Above this, the lake Bonneville sediments occur, but are only a few inches thick. The lack of thickness of Bonneville deposits are contrasted by their occurrence three times. That is, Bonneville filled, then dried out at least three times!! The sediments are observed as clastic (sandy, salty, clay) layers clearly demarcated from the ash deposits above and below it. Ash layers represent volcanic activity. In the modern lake sediments found in the core, a mineral called anhydrite has become to form. This mineral is present in the lake today, but because of water and sediment pressure, it remains in solution. After the cores dried out and were released from pressure the anhydrite has formed large radiating crystals projecting from the side of the core.		
	LK3.E02.gc01	graphic captions	Graphic captions describe oolitic sands and how they form.		Oolitic sands, or ooids are small light-colored, oval grains. They are built up of layers of calcium carbonate around a central core. The core might be a mineral grain of a brine shrimp fecal pellet. They form because the lake is surrounded by limestone rocks; the calcium in those rocks dissolves in the lake water. When the concentration gets high, the calcium begins to precipitate out of the water around a core. Wind and water roll the pellet around the lake floor, and more calcium carbonate is added in concentric layers around the core. (see sectioned ooids) The largest ooids are found on the west shore of Antelope Island. Oolitic sands are a little slippery, because the egg-shaped pellets roll under foot. There are oolitic beaches in other areas (mostly warm ones like the Bahamas or Indonesia, where the water is shallow and warm, and there are lots of waves to roll the pellets around).		with diagram of oolitic sand formation; map of GSL showing where to find oolitic sands; photo comparing size of GSL ooids to Bahamas ooids, photo of oolitic sands
	LK3.E02.ap02	activity prompt	Activity prompts for oolitic sand activities.		compare oolitic sand and regular sand using hand lens; look at sectioned ooids; possible layers to find oolitic sand, brine shrimp eggs, sand, brine flies	a2256 oolitic sand, a2259 lakeshore sand,	
LK3.E03 GSL Viewshed							
	LK3.E03.gp01	graphic panel					
	LK3.E03.fp01	focus panel	Focus panel to the left of the window describes geoantiquities	Geoantiquities are a natural record of Earth history that documents environmental change on local, regional and global scales.	Geoantiquities are large-scale records of Earth history. You can see some of them out the window - the ancient shorelines left by the lakes that preceded today's Great Salt Lake. This area has other geoantiquities, including the Stockton Bar, a ridge of gravel, is the largest remnant of Lake Bonneville's shoreline. The bar can tell us about climate conditions from 28,000 to today. Preserving geoantiquities is a challenge - they are often targeted by developers or extractive industry. Salt Lake's gravel and sand industry depends on geoantiquities - the ancient beaches and shores of GSL's precursor lakes. They form from ancient geologic processes. In the case of geoantiquities within the Salt Lake valley, most were formed by storms and geography acting on sediments within Lake Bonneville. Other geoantiquities include glacial morranes.		
	LK3.E03.gi01	graphic image	photos of shorelines with shorelines labeled, photos of Stockton Bar, sand and gravel mining; http://www.geotimes.org/june03/feature_record.html - lot of good images here				
	LK3.E03.gc01	graphic caption					
LK.av01		av	Demonstration area AV				

FIRST PEOPLES

For 11,500 years, Utah's ancient peoples made life decisions based on their physical and social environments. Archaeologists discover these choices through the study of material culture.

1. Archaeologists study artifacts to learn about ancient peoples' behavior.
2. Like you, ancient peoples behaved distinctly based on where they lived.
3. In this region, archaeologists distinguish Numic, Formative, Desert-Archaic, and Paleo-Archaic "complexes."

Utah's Ancient Peoples tells the story of the prehistoric residents of Utah using evidence of ancient technology, settlement, subsistence, and exchange. Case studies throughout the observatory highlight the cultural history of the region. Visitors also see how archaeologists reconstruct how ancient peoples lived through studying the artifacts they left behind. Visitors can be archaeologists, too, making their own inferences, and participating in hands-on activities around the Median Village dig site reconstruction and elsewhere in the Observatory. In the Current Research area, visitors will discover that archaeologists work with other scientists to reconstruct past climates and ecosystems, and will learn about the Museum's recent work at Range Creek.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
FP1 Introduction			This observatory has 2 entrances, and exhibits at each introduce one of the main themes of the observatory. Coming from land, visitors are inspired by the process of archaeological discovery. The other introductory exhibit invites visitors to compare their handprints to ancient rock art images of hands, and to leave their handprint on a heat-sensitive surface.				
FP1.E01							
	FP1.E01.ip01	intro panel-	Title, grabber, text	Archaeology is the scientific study of peoples of the past - their culture and their relationship with their environment	People have lived in what is now Utah for the past 11,500 years, making decisions based on their social and physical environments. Archaeologists study the objects left by past peoples to understand their behavior. Interpretation changes, the objects remain the same - they are the facts. These data have 3 dimensions - time, space, and behavior. It's important to locate objects in space and time; in this gallery you'll see how archaeologists do this, and how the interpret ancient objects to learn how Utah's ancient peoples made their livings, settled, and traded.		photomural of an active archaeological site w/team at work; photo of Danger Cave
FP1.E01.ic01		inset case	Case for Danger Cave object assemblage			a0508, a0517, a0520, a0528, a0537, a0540, a0545, a0582, a0589, a0998, a0999, a1000, a1009, a1010, a1011, a1017, a1028, a3117, a3118	
	FP1.E01.ar01-ar19	artifact label	Label for Danger Cave artifacts				
	FP1.E01.pm01	photomural	Archaeologists at work in Danger cave				
	FP1.E01.gc01	graphic caption	Caption for photo mural				
	FP1.E01.qt02	quote/question	Quote/question adjacent to ramp coming down from Land				
	FP1.E02.ip01	intro panel- Rock Art	Title, grabber, text Introductory panel made of pressure-sensitive material shows rock art hand prints (negatives and positives) and invites visitors to compare their own hand prints to the rock art, and to imagine the lives of the peoples who carved their hand prints in stone thousands of years ago.	Thousands of years ago, early Utahns carved handprints into rocks and canyon walls.	Rock art is difficult to interpret - we can never know what the intent of the artist was, or who the artist was, or what they intended to represent. Yet rock art, like the thumb prints in an ancient mug, or a carefully mended moccasin, connect us directly to the people of the past. This human connection, and desire to understand our cultural history, is key to archaeology. Add your handprint to the panel, and connect to Utah's past.		collage of rock art hand images
	FP1.E02.pm01	photomural	Rock art photomural				
FP2 Reading a Site and Architecture			The Median Village reconstruction answers the questions "what did people live in," "how do archaeologists know?" and "what do archaeologists do?" and lets visitors become archaeologists through hands-on activities. Visitors sift for pot sherds with a special hand held interactive and turn on the grid gobo to map the site. Visitors can enter the site and lift discovery objects to learn how the site was used.				
	FP2.E01 Median Village Reconstruction						
	FP2.E01.pm01	photo mural	Photomural of Median Village surroundings on back of case.				

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	FP2.E01.gc02	graphic caption	Caption for photomural				
	FP2.E01.st01	section title	Section title for Median Village exhibits.	title and subhead	You are looking at a recreation of part of an actual archaeological site. You'll see how archaeologists analyze a site, and use your own eyes and hands to make observations. You can climb into the site and look at its features up close.		
	FP2.E01.sx01	special exhibit	Median Village site reconstruction				
	FP2.E01.in01	interactive- lift panel	Visitors lift pottery shards				
	FP2.E01.ap01	activity prompt		Why so many pottery fragments?	This might have been where pottery was made, or the storage area, or a household with a lot of pots. What's your guess?		illustration of scenarios
	FP2.E01.gi01	graphic image	illustration of scenarios of use/ discovery				
	FP2.E01.in02	interactive- lift panel	Visitors lift panel with points				
	FP2.E01.ap02	activity prompt		Why are all the points in one pit house?	This might have been where points were made, or perhaps they were just discarded here. What do you think?		illustration of scenarios
	FP2.E01.gi02	graphic image	illustration of scenarios of use/ discovery				
	FP2.E01.in03	interactive- lift panel	Visitors lift panel with burnt corn cobs				
	FP2.E01.ap03	activity prompt		What might the burnt corn cobs mean?	Corn didn't come from the supermarket, it was grown. The burnt cobs might be in what was a fireplace. Alternatively, this area might have been where refuse was dumped.		illustration of scenarios
	FP2.E01.gi03	graphic image	illustration of scenarios of use/ discovery				
FP2.E01.gr01		graphic rail					
	FP2.E01.in02	interactive- Mapping A Site	Gridding interactive; visitors activate a gobo that projects a light grid over a defined area of the site, then map a section using a magnet pen on a surface with magnetic particles beneath it..				
	FP2.E01.ap04	activity prompt	Activity prompt for mapping activity	Press the button to light up a grid.	Draw what you see in each grid. This is what archaeologists do when they map a site. Recording the information before you start digging is critical.		photo of archaeologists mapping a site
	FP2.E01.in01	interactive- Sifting	Visitors sift through sand to find pot sherds.				
	FP2.E01.ap05	activity prompt	Activity prompt for sifting activity	Turn the handle of the drum.	Turn the handle of the drum, and watch the pottery shards emerge. Archaeologists in the field use large sieves to sift through cubic feet of dirt. This way they catch every bit of physical information from the site.		photo of archaeologist sifting for artifacts
FP2.E01.gr02		graphic rail					
	FP2.E01.ms01	Mindset	Mindset text describes the site and the fieldwork done there, and invites visitors to explore for themselves.	Archaeologists use both fieldwork and laboratory analysis to form hypotheses about how peoples of the past lived. You can use some of these techniques to "study" the Median Village site recreation.	This is a full-scale recreation of part of Area B of the Median Village site in the Parowan Valley. Median Village is a Fremont site that was abandoned about A.D. 1050. The site you see here represents the 1968 work. The trench you see is a test trench dug by a backhoe. A test trench gives archaeologists a sense of what types of objects and features they might encounter throughout the site. Area B includes several pit structures, some with central firepits, and several storage structures. Textiles, ceramics, chipped stone artifacts, ground stone artifacts, and worked bone artifacts were found at Median Village. A lot of vertebrate bones were found at Median Village, more than at other Fremont sites, perhaps indicating a greater reliance on hunting. Study of Median Village has contributed to our understanding of regional variation in the Fremont culture. this is mostly from Marwitt, Median Village and Fremont Culture Regional Variation		photos of Median Village being worked, aerial view of Median Village; photos of types of artifacts found there

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	FP2.E01.fp01	focus panel	Focus panel text discusses the Fremont of Median Village	The people who lived at Median Village grew corn, beans, and squash, and hunted large and small animals.	Median Village (AD 900-960) is situated at 5850 ft and is located on a gently sloping alluvial fan that originates at the mouth of Summit Canyon. The occupants of Median Village grew corn and probably beans and squash as well. The evidence for this is charred corncobs, and a granary found on the site. In addition to farming they relied heavily on hunting mule deer, mountain sheep, jackrabbits, and birds. The great quantity of bone scrap suggests that hunting was an important part of their diet. It is probable that the village was occupied year round. People lived in pithouses and stored their corn through the winter months in a large, rectangular, coursed-adobe, surface structure (Marwitt 1970). The pithouses at Median Village were substantial enough to presume that the amount of effort put forth to construct them indicates their intention of occupying that locality for several years. The presence of a surface granary indicates a desire for long term storage of consumables through the winter months. Another indication of year round use is the fact that the granary is not hidden; there is no need to conceal food storage if at least some of the residents will be around to guard it from raiding outsiders.		photos of corn cobs, granary, animal bones, pithouses
	FP2.E01.sx02-sx04	interactive-Be An Archaeologist	Be an Archaeologist interactive: visitors analyze the site with various configurations of artifacts	People lived at Median Village over many years; they left the village and came back, rebuilding on top of the old village.	What you see: a stack of clear panels hinged at the top with a map of the site on the top panel and layers of the site beneath. What you do: lift up the panels to reveal different layers of the site, and the artifacts and structures revealed there. What you get: an understanding of the principle of superposition		
	FP2.E01.ap06	activity prompt	Activity prompt for be an archaeologist interactive	Reveal the layers of the site.	Lift the panels to see the layers of the site. Which do you think is the oldest layer? Can you arrange the panels to match the site in front of you?		photo of archaeologists working a site, preferably handling artifacts
	FP2.E01.rc01	rail case	Rail case holds objects from Median Village			31 objects- A2714-2745	
	FP2.E01.ar	artifact label	Group label for Median Village objects				
	FP2.E01.in03	interactive-Touch artifacts	Visitors touch real objects typical of Fremont sites.			5 objects- A2749-53	
	FP2.E01.ar	artifact label	Label and please touch for touch objects		label and please touch--prompt should focus on meaning? (e.g. if you find a corn cob, what do you think it means? if you see charcoal in the dirt and charcoal represents burnt objects, what does this charcoal tell you about the site? Etc.		
FP2.E01.gr03		graphic rail					
	FP2.E01.rc02	rail case-Architecture	Rail case holds objects related to structures and architecture			4 objects- A2746-48, A2451	
	FP2.E01.ar	artifact label	Label for architecture objects				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP2.E01.gc01	graphic captions	Graphic captions describe architectural styles and functions, and distinguishes communal from individual or family structures.		Ancient peoples created different kinds of structures, from temporary brush shelters to houses, storage structures, and above-ground pueblos. They also used caves as shelters. Fremont village sites include deep circular and square pithouses and adobe surface structures, which were typically used as granaries. The Ancient Puebloans built pithouse, and a combination of pit structures and above ground pueblos. A pit-house is a structure dug into the ground. Many different peoples built pit houses, including the people of the American Southwest, including the ancestral Pueblo, the ancient Fremont culture, the Cherokee, the Inuit, the people of the Plateau, and ancient residents of Wyoming. Usually, all that remains of the ancient pit-house is a dug out hollow in the ground, roofbeams and any postholes that held the posts that supported the roof. Walls and roofs were made of poles, brush, and clay. Archaeologists used to think ancient peoples lived in the pit houses, now they think the pit houses were probably used for storage.		architectural drawings (plan and section) of each type of dwelling pithouses, jacal structures, adobe structures, caves; masonry structures; ceremonial structures; rendering of brush shelter
	FP2.E01.qt01	quote/question	Quote/question on rail		about how people lived; quote from tribe about ancestors?		
FP3 Dry Caves- (Learning Lab)							
	FP3.si01	section intro	Section intro orients visitors to dry caves	Utah, like the rest of the Southwest, is a good archaeological natural laboratory because the climate is dry, and objects don't rot. Pieces of cotton, woven materials, and sandals made from plants have all survived.	Utah's dry caves are like time capsules, preserving layers of detail of prehistoric inhabitants. Pieces of cotton, woven materials, leather, and sandals made from plants have all survived. The cave record tells us there were people living in Utah more than 11,000 years before present.		
FP3.E01 Dry Caves			Scenic cave recreation with inset cases shows visitors examples of cave preservation.				
	FP3.E01.sx01	special exhibit	Scenic construction of cave interrior with inset cases				
	FP3.E01.ic01	inset cases	Danger Cave			a3110, a3111	
	FP3.E01.ar	artifact labels					
	FP3.E01.ic02	inset cases	Promontory Cave			a3112, a3113	
	FP3.E01.ar	artifact labels					
	FP3.E01.ic03	inset cases	Cowboy Cave			a3115, a3116	
	FP3.E01.ar	artifact labels					
	FP3.E01.ic04	inset cases	Hogup caves- 4 petrie dishes of preserved material			a#tbd	graphic blow-up of petrie dish contents.
	FP3.E01.gi01-gi04	graphic images					
	FP3.E01.ar	artifact labels					
FP3.E02 Sudden Shelter/ Stratigraphy			At the recreation of Sudden Shelter stratigraphy visitors see points found at different layers. Real points are displayed in inset cases to the right of the sand stratigraphy. A photomural/diagram of Sudden Shelter gives context to the sand layers.				
	FP3.E02.pm01	photo mural	Photomural of Sudden Shelter				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP3.E02.ms01	mindset	Mindset text explains relative dating	Before the discovery of absolute dating techniques, archaeologists relied on relative dating to order events. Stratigraphy is based on the principle that lower layers are older than the layers above.	Prior to the discovery of absolute (direct) dating techniques, archaeologists depended on relative (indirect) dating techniques to give temporal order to past events. Relative dating of a sequence of rocks or artifacts tells us which is older and which is younger, but not how much older or younger. In archaeology, several relative dating techniques are used, typological classification and stratigraphy being the most common. Each method has its own criteria, assumptions, and restrictions. For instance, for stratigraphy, the criteria is that the layers must be definable; the assumption that the Law of Superposition holds true, and the restriction that the sequence not be altered.		
	FP3.E02.ic01	inset case	Sudden Shelter stratigraphy points		A total of 453 projectile points was recovered in the 1974 excavation. Of these, 411 are sufficiently complete to be identified with a particular class. The 411 points were classified into 12 types; 8 fit into an existing named series and 4 were new types defined during the analysis. An examination of change through time of the projectile point density suggests variations in the intensity of occupation at the site within the three occupation periods represented: Sudden Shelter I, Sudden Shelter II, and Sudden Shelter III. In Sudden Shelter I, Pinto series points predominate until replaced by the Elko series; at this time point density increases, later there is a decrease in use of the shelter but 3 new points are introduced. In Sudden Shelter II, the point types change significantly with an increased use of the Sudden-side notch point. At the beginning of Sudden Shelter III, the Gypsum and San Rafael side-notch points coincide with increased occupancy of the site.	level 1: A0328, level 3: 0246, 0251-53, level 5: A0240-1, 0245, 0255-6, A0259-60, 0262-65, A0267, 0283, level 6: 0269-70, 0272, 0275-7, level 7: A0249, 0254, 0257, 0258, 0266, 0271, 0274, 0278-82, 0284-95, level 9: A0244, 0296-301, level 14: A0247, 0261, 0303-5, level 15: A0308-10, 0312-17, 0319, level 16: A0236, 242, 318, 320, 321, level 20: A0322-3, level 21: A0324-27, level 22: A0233	
	FP3.E02.ar01-ar22 (one per level)	artifact label	Group label in each case describes the different types of points found at Sudden Shelter (associated w. inset cases and diagram)				
	FP3.E02.gi02	graphic image	Diagram of stratigraphy				
	FP3.E02.sx01	special exhibit	sand stratigraphic column with embedded cast points; a stratigraphic diagram of Sudden Shelter indicates the layers.				
	FP3.E02.gi01	graphic image	Graphic depicts the 22 sand layers				
	FP3.E02.fp01	focus panel	Focus panel explains stratigraphy and describes why Sudden Shelter is such a good example.	Sudden Shelter cave, in Sevier County, is one of the best examples of stone point stratigraphy. Sudden shelter is unique due to its tight stratigraphic distribution of projectile point types. It, better than any other reported site, clearly demonstrates a succession of several widely known lithic technologies and introduced several projectile point types previously unknown at the time. (MK)	Stratigraphy is the study of rock and soil layers. The layering of deposits follows the Law of Superposition, which states that the oldest deposit is on the bottom of a column of sediments and the most recent deposit is on the top, barring any disturbance to the layers. This method orders layers according to assumed time of deposition, it doesn't indicate when an object was made. Sudden Shelter was excavated by the University of Utah in 1974 to recover archaeological information that was about to be destroyed due to road construction. It was discovered that this rock shelter in Sevier County had exceptionally rich and well-stratified Archaic components that date back to 8000 B.P. Sudden shelter is unique due to its tight stratigraphic distribution of projectile point types. It, better than any other reported site, clearly demonstrates a succession of several widely known lithic technologies and introduced several projectile point types previously unknown at the time.		photos of Sudden Shelter dig, photos of site,
FP3.E03 Theater			When classes aren't using the classroom, existing films are shown, including the Range Creek video.				
FP3.E04 Absolute Dating							

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP3.E04.ic01	inset case	Inset case with Promontory moccasins			a2539, a2541, a2543, a2557, a2547, a2549, a2551, a2538, a2558, a2542, a2556, a2546, a2548, a2555, a2554	
	FP3.E04.ar01-15	artifact label					
	FP3.E04.ar16	extended artifact label			This moccasin was C14 dated to 725 cal. BP, calibrated midpoint AD1281, 2 sigma range AD 1223-1303	a2553	
	FP3.E04.gp01	graphic panel					
	FP3.E04.ms01	mindset	Mindset text reviews absolute dating and explains C14 dating.	Absolute dating methods let archaeologists date artifacts, sites, and events in calendar years. Unstable elements decay at known, constant rates; they can be used to date artifacts and associated organic material.	Archaeologists need to place objects in the contexts of space and time. Absolute dating, developed after the discovery of radioactivity, allows them to associate a numerical date with an object or rock/soil stratum. Absolute dating methods include radiocarbon (C14) dating, potassium argon dating, and dendrochronology; C14 is the technique archaeologists use most. Elements like carbon and potassium have different isotopes (same atomic number, different atomic weight). Some of these isotopes are unstable, changing to a more stable form, this "decay" process can take seconds or millions of years, and occurs at a stable rate. If you assess the amount of the isotope and the decayed form remaining now, you can count back to when the object was made. Like relative dating, absolute has its criteria, assumptions and restrictions.		C14 decay chart, examples of a range of objects dated radiometrically
	FP3.E04.gc01	graphic caption	Caption for C14 dating diagram	Unstable elements decay at known, constant rates; they can be used to date artifacts and associated organic material.	Radiocarbon dating is a type of ratiometric dating. Elements like carbon and potassium have different isotopes (same atomic number, different atomic weight). Some of these isotopes are unstable, changing to a more stable form, this "decay" process can take seconds or millions of years, and occurs at a stable rate. The half life is the amount of time it takes for 50% of the volume of an unstable isotope to decay. The half life of C14 is 5,730 years, so it's very useful for dating archaeological objects. Organic objects (made of plants or bone, or leather, or feathers) contain carbon, so a C14 date is considered a direct date for that object. Criteria: You must know the original amount of radioactive carbon present, the amount now present, and the rate of decay. Assumptions: the presumed half life of 5,730 years is correct Restrictions: the atmospheric ratio of C14 to C12 must be constant; the ratio of carbon isotopes in the material must not have changed except by radioactive decay; there should have been a rapid and complete mixing of C14 through the various carbon reserves.		diagram of C14 decay
	FP3.E04.fp01	focus panel	Focus panel recounts moccasin dating story		The style and context of the promontory moccasins led to conflicting theories about when and by whom they were made. University of Utah scientist Julian Steward discovered the moccasins in the early 1930s. Steward, a pioneering American archeologists, suggested that the Promontory Cave artifacts indicated that a unique culture was present around the Great Salt Lake between the time of the prehistoric Fremont horticulturalists and the historic Shoshone, but unrelated to either. When carbon dating was carried out on one of these mocs, scientists were surprised to learn that they were much older than originally thought. The unusual puckered-toe moccasins from this site have been radio-carbon dated to between AD 1100 - 1600 AD.		
FP4 Subsistence and Settlement			Visitors see tools used for farming, hunting and gathering, and will learn how ancient peoples used them to acquire, process, and store food. Visitors will see how the different strategies ancient people used in different habitats.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP4.E01.ca07	case	Case with subsistence objects from Montane, Mojave, Marshlands and Lacustral, Foothills and Pinyon Juniper regions			115 objects	
	FP4.E01.pm01	photomural					
	FP4.st01	section title	Title and subhead	To stay alive, ancient peoples needed to get, process, and store food.	This section of the exhibit shows you how ancient peoples made a living, and some of the tools they used. Some were farmers, some were hunters and gatherers, and some did both, depending on the time of year and the resources available. As you look at these ancient objects, imagine what it would be like to make a living in a world without supermarkets, or metal tools.		
	FP4.E01.ms01	mindset	Mindset text describes subsistence in the eastern Great Basin/Colorado Plateau		People don't distribute themselves randomly over the landscape - there are reasons they live where they do. People tend to live near sources of food and water. Optimal Foraging Theory is a set of models that lets archaeologists predict where people might have settled, and how they might have lived in a particular location. For instance, the prey choice model predicts that people will try to find and eat food with the most calories in the least amount of time. Modeling prehistoric behavior also relies on the study of modern societies; we can infer that ancient peoples behaved in similar ways and made similar choices.		map of region showing Mojave, marsh/lacustral, foothills/p-j, montane zones; photos of these zones today
	FP4.E01.fp01	focus panel	Focus panel on Mojave subsistence and settlement	Anasazi living in the Mojave were farmers who also used wild resources.	The Mojave Desert extends into southwestern Utah in the St. George Basin. This area is low and dry, with creosote bushes. The growing season is long, and there is little rainfall. The Anasazi people in this region depended on farming (corn, beans, and squash) and hunted deer and mountain sheep. They also gathered cactus, sunflower seeds, cattails, and yucca. They might have roasted agave and prickly pear. People could make a living year-round in the marshlands. Cattails are especially nutritious, and the starchy rhizomes are a good source of calories. Seeds, pollen, and rhizomes were either roasted or dried and made into cakes or mush. Utah's Great Salt Lake and Utah Lake were major sources of fish, and the marshes and meadows around the lakes provided cattail, reed, bulrush, sedge, sunflower, and prickly pear cactus. Marsh animals like muskrats, otter, beaver, ground squirrel, frogs, and insects were hunted. Small animals were caught in traps and nets. Fish were caught in nets, weirs, and basket traps. Hook and line were also used. Near Bear River, bison grazed on extensive grasslands, and ancient people hunted them, butchering the animals with choppers.		map showing location of vegetation zone; cross section of Great Basin/Colorado plateau showing elevation range; maps of sites
	FP4.E01.ar	group label	Group label for Mojave farming			corn A2320a-b, beans A2348; squash A2349; hoe A2350;	
	FP4.E01.ar	group label	Group label for Mojave hunting and gathering			A2351-3; A2360, A2359; knife A2358	
	FP4.E01.ar	group label	Group label for Mojave food preparation/storage			bowl A2354; olla A2355; mano A2356; metate A2357	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP4.E01.fp02	focus panel	Focus panel discusses climate change and coping behavior	When drought kills corn crop, people need to choose how to cope.	There are four coping strategies: moving to a new location, eating and growing different foods, trading for food, and storing food. Kiet Siel in Navajo National Monument was home to farmers who lived in cliff dwellings. In the last half of the 13th century, arroyos were cut into farm land and the water table dropped, followed by the Great Drought of 1276-1299. How did the Kiet Siel people respond? Over time, family living spaces got smaller, and storage spaces got bigger. With food supplies unreliable, people stored food.		
	FP4.E01.fp03	focus panel	Focus panel on marshland/lacustral subsistence and settlement	Marshes and lakes along the edge of the Great Basin were rich sources of plants, fish, shellfish, and birds. People living near lakes or in marshes moved frequently, and didn't have permanent settlements.	People could make a living year-round in the marshlands. Cattails are especially nutritious, and the starchy rhizomes are a good source of calories. Seeds, pollen, and rhizomes were either roasted or dried and made into cakes or mush. Utah's Great Salt Lake and Utah Lake were major sources of fish, and the marshes and meadows around the lakes provided cattail, reed, bulrush, sedge, sunflower, and prickly pear cactus. Marsh animals like muskrats, otter, beaver, ground squirrel, frogs, and insects were hunted. Small animals were caught in traps and nets. Fish were caught in nets, weirs, and basket traps. Hook and line were also used. Near Bear River, bison grazed on extensive grasslands, and ancient people hunted them, butchering the animals with choppers.Fremont people lived along major rivers and creeks. These sites don't have substantial architecture, and food remains are mostly wild resources. Very little corn is found, suggesting that farming was either done elsewhere or rarely done. The people probably lived in shallow pithouses and wickiups. Their lifestyle was semi-mobile as they followed animal migrations or foraged for plants in season.		map showing location of vegetation zone; cross section of Great Basin/Colorado plateau showing elevation range
	FP4.E01.gp01	graphic panel					Illustration of net in use
	FP4.E01.ar	group label	Group label for marshland/grasslands food obtaining, processing, transport			A0588, 0590, 0587, 0530, A2314,	
	FP4.E01.gp02	graphic panel					
	FP4.E01.ar	group label				2315-2319	
	FP4.E01.ar	group label	Group label for lacustral and riverine food obtaining, transport and processing			A2332-40, 2342-3, 2323-31, 2077, 2345, 2344, 2346, 2347	
	FP4.E01.fp04	focus panel	Focus panel on foothills/plateau subsistence and settlement	The foothills are good for farming, and also rich in wild resources.	In the foothills of the eastern Great Basin and Uinta Basin (4800-6000 feet), the Fremont lived in large farming villages. They gather wild plants like wheatgrass, Mormon tea, wild rye, Indian rice grass, big sagebrush, bitterroot and acorns from Gambel oak. In the summer, they gathered berries. Pine nuts were eaten starting in the Formative Period. The Fremont farmed corn, beans, and squash, and relied heavily on corn. They developed a drought-resistant form of corn "dent maize." Fremont farmers hunted rabbits, elk, mountain sheep, and antelope to get protein. Fremont villages were located near water and good farm land. They preferred the sandy soils of alluvial fans. Many sites were occupied year round. The earliest Fremont farming sites were small (1-3 pithouses) farmsteads. The farmsteads were used for a few years, then the farmers moved on to new soil.		map showing location of vegetation zone; cross section of Great Basin/Colorado plateau showing elevation range
	FP4.E01.ar	group label	Group label for foothillls/plateau gathering			2383, 2088, 2090, 2379, 2393a-l, 2394; 2395; 2396; 2440-42	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP4.E01.ar	group label	Group label for foothills/plateau hunting			2382, 2401-2, 2414-5, 2421,	
	FP4.E01.ar	group label	Group label for foothills/plateau farming			2397a-d, 2398, 2400, 2384-88; 2389-92; 1352; 2380-81; 2422-23	
	FP4.E01.ar	group label	Group label for food preparation and serving			2416, 2418; 2425, 2426, 2429;	
	FP4.E01.fp05	focus panel	Focus panel on montane subsistence and settlement	In Utah's mountains , wild plants and animals attracted people to gather and hunt. People didn't live in the mountains, but camped to collect resources.	Mixed conifer forests grow from 8000 to 10,000 feet in Utah's mountains, interspersed with meadows and marshes. There are also aspen forests, and, above 12,000 feet, tundra. It's hard to live year round in the mountains, but there are medicinal and food plants, such as wild onion and bitterroot, to gather and animals like mountain sheep, elk, and marmot to hunt. In Utah, mountains higher than 8000 feet were used strictly as hunting and gathering locales. It is thought that Fremont and Ancestral Pueblan period farmers traveled in family groups from the basin and foothills after the harvest and camped where seeds could be collected. In bad crop years, people might have gone to the mountains in summer to pick berries, and hunt animals.		map showing location of vegetation zone; cross section of Great Basin/Colorado plateau showing elevation range
	FP4.E01.ar	group label	Group label for montane hunting			foreshaft bundle a1324, projectile points a2407, a2408, a2409, a2410, a2411, a2412, a2413	
	FP4.E01.ar	group label	Group label for montane gathering			a2056, a2419, a2420, a2443, a2444, a2445,	
	FP4.E01.gp03	graphic panel					
	FP4.E01.sp01	story panel	Story panel, hunting strategies in the Great Basin		Broughton interview w. S. Trimble		
	FP4.E01.gp04	graphic panel	contains ar13				
	FP4.E01.ar	artifact label				Arrow a0740	
FP5 Technology							
	FP5.st01	section title	inside case	When they think of technology, most people think of things like computers and space shuttles. But to an archaeologist, technology is anything humans have invented to make a job easier.	In this exhibit area, you will see examples of baskets, pots, sandals, stone tools and weapons, and jewelry made by Utah's ancient peoples. Again, there people didn't have metal, and they formed all these items by hand. Note the craftsmanship, and the details of the decoration. Some items were clearly re-used and repaired.		
FP5.E01 Basketry			A tall case holds baskets and the tools used to make them. Visitors will see the different basket-making techniques and materials used by Great Basin and Colorado Plateau cultures.				
	FP5.E01.ca07	case	Case with artifacts			32 objects	
	FP5.E01.pm01	photomural					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E01.ms01	mindset	Mindset text explains source materials, use, overview of how made and what made.	Prehistoric peoples made different kinds of baskets for daily use - including mats, baskets, bags, fish traps, and cradleboards.	The term basketry is used to define objects that are manually woven without a frame or a loom. This can include, but is not limited to, baskets, mats, bags, headwear, fish traps, and cradleboards. Baskets are used for storage for food and household goods; they are flexible and portable, and can be made in almost any size. There are three ways used to make a basket in the Colorado Plateau and eastern Great Basin: coiling, twining, and plaiting. All start from the center of the bottom of the basket. (MK, paraphrased) To produce a basket, the weaver must determine in advance the overall shape and size of the desired piece. Next, and at the proper time of year, the weaver must gather the right raw materials. While the inventory of potential raw materials in the Great Basin is relatively large, it has been demonstrated that only a small percentage of available plants was actually used for basketry manufacture in any one subregion of the Great Basin (Adavasio 1986a:203). These ancient basketmakers were probably women.	Broom a2055	
	FP5.E01.ar	artifact label	Group label for intro objects				
	FP5.E01.ar	artifact label	Group label for construction objects			A2057, a2059, a2060, a2061, A2099	
	FP5.E01.fp01	focus panel	Focus panel describes twining.	Twining techniques are often employed to create containers, mats, bags, fish traps, cradleboards, hats, and clothing.	Twining is defined by weaving horizontal elements (wefts) around stationary vertical elements (warps). Twining techniques are often employed to create containers, mats, bags, fish traps, cradleboards, hats, and clothing. There are three ways to arrange weft rows and each produces a distinct result. In close twining the rows are so tightly spaced that the warps are completely or almost completely concealed. In open twining the weft rows are spaced at intervals so that the warps are exposed intermittently. Open and close twining is used to conceal and expose warps; usually the intention of this technique is a decorative pattern. (MK w. some paraphrase)		diagrams or illustrations of twining, close and open twining
	FP5.E01.ar	artifact label	Group label for twined objects			a2052, A2062-6	
	FP5.E01.fp02	focus panel	Focus panel describes coiling.	To make a coiled basket, you lay one coil on top of another, spiraling up, then bind the coils together with lashing or stitching.	There are three types of wall construction in the coiling technique: close coiling, open coiling, and open and close coiling. In close coiling the foundation is bound tightly together by the stitches. In open coiling the foundation is not bound closely together. Open and close coiling incorporates both techniques, usually as a decorative element. Stitches are the active elements in coiled basketry. They may consist of a strip of wood, bark, leaf, or plant fiber. In coiled basketry stitches are described as simple, intricate or wrapping. Intricate stitching is only used with open coiling. The simple stitch can be interlocking, non-interlocking, or split. The slant of the stitch indicates the work direction. Slants that move down to the left(/) indicate a right to left work direction. Stitches that slant down to the right (\ ) indicate a left to right work direction.		coiling illustrations/diagrams; photos or illustrations of different foundations
	FP5.E01.ar	artifact label	Group label for coiled objects			A2067-76; A2078, A2054	
	FP5.E01.fp03	focus panel	Focus panel text describes plaiting.		Plaiting is a subclass of basket weaves in which all elements are active. Strips pass over and under each other at a more or less fixed angle (about 90 degrees). This technique can be used to make a large number of objects including containers, bags, and mats. It is incredibly flexible and the least complex of the weaving structures. There are two types of plaiting: simple and twill. In simple plaiting the weaving elements pass over each other in single intervals forming a checkerboard pattern. In twill plaiting, the weaving elements in one set pass over two or more elements in the other set forming a herringbone pattern.		plaiting diagrams
	FP5.E01.ar	artifact label	Group label for plaited objects			A2080-a2085, a2087	

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	FP5.E01.gp01	graphic panel					
	FP5.E01.sp01	story panel	Story panel describes small seed processing		Geib interview by S.Trimble		
	FP5.E01.gp02	graphic panel	contains ar06				
	FP5.E01.ar	artifact label	Label for Cowboy Cave basket			A0404	
Textiles FP5.E02			Visitors see woven textiles, and the tools and fibers used to make them. They learn how ancient textiles were made, and see a video of contemporary weavers.				
	FP5.E02.ca07	case	Case with artifacts.			52 objects	
	FP5.E02.pm01	photomural	back of textile case				
	FP5.E02.ms01	mindset	Mindset text reviews weaving technology and uses.	Ancient peoples wove clothes, blankets, and bags from plant fibers, and yarns made from animal and human hair.	Textiles are flexible or pliable fabrics constructed from spun plant or animal fibers by various weaving, looping, netting, plaiting, or braiding techniques. The fabrics were used for bags, cloths, blankets, and, later, rugs. The record is complete enough that we know what Anasazi Basketmaker people wore, including fringed hip aprons for women, cotton shirts (with and without sleeves), fur and feather robes, and possibly breechcloths for men. Clothing from the Fremont and the earlier Archaic people of the eastern Great Basin has not been well preserved in the archaeological record. Pieces of leather, suggesting hide clothing, and fur robes are all that have survived. Fremont rock art panels suggest that kilts were worn by men; whether these were woven textiles or hide is unknown at this time. (MK w. some paraphrasing)		
	FP5.E02.fp01	focus panel	Focus panel text explains the preparation of fibers.		Bast fibers came from the stem of the plant and were used to make a fine cordage, which was later woven. Ethnographic accounts of leaf preparation may provide clues as to how they were prepared prehistorically. At Acoma and Laguna (Zuni Pueblos) leaves were crushed and the fibers cleaned by scraping. The Cochiti pit roasted the leaves and then chewed them to free the fibers cleaned by scraping and the Tewa boiled and then chewed the leaves. After fibers have been extracted from agave, yucca, etc., they must be spun and twisted into yarn. Two sets of fibers are held together at one end and spun one direction then twisted together in the opposite direction. Heavier yarns are made by increasing the number of single strands by twisting together to or more yarns.		illustrations/diagrams of bast making; photos/illustrations of agave, yucca, other plants; spinning diagrams
	FP5.E02.ar	artifact label	Group label for bast and leaf fibers			2145, 2136,2128, 2108, 2111	
	FP5.E02.ar	artifact label	Group label text describes seed fibers.		Aboriginal southwestern cotton is known as Gossypium hopii. It was carried, in all probability, in the form of raw fibers and finished textiles up the west coast of Mexico and into the southwest between AD1 and 300. There is no evidence of the cultivation of cotton north of the Hohokom region before AD1100. Somewhere along the line the plant was modified by humans from a perennial to an annual capable of maturing at high elevations and surviving arid conditions without irrigation. The Anasazi probably harvested the plant by picking the unopened bolls and spreading them on rooftops to ripen in the sun. Fiber and seed were then removed and stored in the houses until needed. Before being spun into yarn the cotton had to be ginned (separated from the seeds) and carded (combing or arranging the fibers more or less parallel to one another in loose pads).	A2109, 2089, 2110, 2118, 2119, 2120, 2121, 2122, 2123, 2137, 2139, 2140, 2146, 2430, 2432, 2536	illustrations/diagrams of ginning, drying; photo/illustration of cotton plant

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
					One way of preparing cotton for spinning was to place the mass of unginned cotton between the folds of a blanket and to beat the blanket with a three pronged switch. The beating loosened seed from fiber and caused the latter to adhere to the surface of the blanket from which it was scraped. The marked preference for cotton is one of the differences that distinguishes Anasazi textiles from those made by the Sinagua, Salado, and probably Hohokom and Mogollon neighbors to the south, who apparently used yucca and apocynum fiber yarns in about equal amounts to cotton fibers.		
	FP5.E02.ar	artifact label	Group label describes fur and feather textiles		Plant fiber yarns generally served as the basis of which fur or feathers might be wrapped to make soft, warm material for blankets and robes. Fur yarn was made by cutting the skin of small animals into narrow strips 1/8" -1/4" wide. One end of the strip, caught between the strands of yucca yarn, was then wound tightly around the yarn as it was being twisted. Turkey feathers wrapped around a fiber string core produced a yarn even softer and lighter than the fur yarn.	A2107, 2129	
	FP5.E02.gp01	graphic image					weaving diagram displayed next to the rabbit robe
	FP5.E02.gi03	graphic image	weaving diagram is displayed on the deck				
	FP5.E02.ar	artifact label	Group label for yarns and hair		Long sashes were braided by the Anasazi Basketmakers from soft yarns spun from the hair of domestic dogs. Judging from the present record, wool yarns were not commonly used for fabrics other than ornamental sashes or ties. Wool did not come into general use until after the introduction of domestic sheep by the Spaniards in 1540 [date needs to be confirmed]. Human hair was a ready source of fiber; unspun hanks of hair are not uncommon in sites of all prehistoric periods.	A2141, a2134	
	FP5.E02.ar	artifact label	Group label for dyes			A2143, a2754, a2149,	
	FP5.E02.fp02	focus panel	Focus panel for looped, netted, braided objects.		The most common single-element processes are looping and netting. Looping is when one long yarn is interworked on itself. Netting involves knotting the yarn on itself after a loop has been made. In simple looping a row of loops is fashioned along a stick or cord. Successive rows are added by drawing the free end of the element through one of the loops and crossing it over itself as it moves on to form the next loop. Looping was used to make bags, socks, belts, nets, and possibly hats. Braiding is used to refer to the interlacing of a single set of elements all trending in one direction from a point or line. Elements are not linked, looped, knotted, or wrapped about each other but simply pass over and under their neighbors following an oblique course to the edge of the piece where they turn back on the opposite diagonal. Braiding has been used since Basketmaker times in making sandals, mats, and bands as well as the more flexible string or yarn items known here as textiles.		diagrams of looping, netting, and braiding
	FP5.E02.ar	artifact label	Group label for non-loomed/looping objects			A2150, 2124, 2125, 2127, 2126	
	FP5.E02.ar	artifact label	Group label for woven objects.			A2131, A2133, a2132, a2152, a2153, a2154, a2155	
	FP5.E02.gi03	graphic image	illustrations of tunic and breechcloth				
	FP5.E02.ar	artifact label	Group label for weaving tools and materials.			A1868, A2112-17; A2151, A2431	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E02.gp02	graphic panel	contaings gi01				Illustration/ diagrams of weaving on a loom; and parts of a loom
	FP5.E02.gc01	graphic caption	Caption text explains weaving on a loom; accompanies artifact display (woven textiles, loom tools).		We do not have the archaeological evidence to pinpoint the exact time when loom weaving began in the Southwest, although it probably followed closely on the heels of the introduction of the cotton plant. The backstrap loom was used for narrow width textiles such as tumplines, skirt and apron bands, cradle bands, belts, and long straps. Horizontal and vertical looms were used for wide textiles such as shirts, kilts, and blankets. It is believed that the vertical and backstrap looms were the basic types used by prehistoric people. In fact, the vertical loom may have even been an Anasazi invention sometime in the PIII period. The vertical yarn, known as the warp, is secured to the loom while the horizontal yarn, known as the weft, is woven in between the warps. The warps are manipulated by a shed rod and one or more heddle rods. The heddle pulls alternate warps so that the weft may easily pass through. The manner in which the weft passes trough the warp dictates the type of weave created.		
FP5.E02.tt01		table top	Weaving and Basketry				
	FP5.E02.in01	interactive	Interactive: weaving and plaiting activities	Woven and plaited objects have many uses.	What you see: tabletop with 6 stations; each has a different activity; examples of prehistoric weaving and basketry (showing different uses from sandals to winnowing baskets) are in the center case, in relationship to the appropriate activity (I.e. sandal proximal to sandal activity) What you do: pick a station, and plait the tethered nylon cords following the diagrams to twine, plait, cordage What you get: the satisfaction of accuracy.		
	FP5.E02.ap01	activity prompt	Prompts for cordage activities				diagram of activity
	FP5.E02.ap02	activity prompt	Prompts for build a basket activity				diagram of activity
	FP5.E02.ap03	activity prompt	Prompts for weaving activity				diagram of activity
	FP5.E02.av01	av			People could make a living year-round in the marshlands. Cattails are especially nutritious, and the starchy rhizomes are a good source of calories. Seeds, pollen, and rhizomes were either roasted or dried and made into cakes or mush. Utah's Great Salt Lake and Utah Lake were major sources of fish, and the marshes and meadows around the lakes provided cattail, reed, bulrush, sedge, sunflower, and prickly pear cactus. Marsh animals like muskrats, otter, beaver, ground squirrel, frogs, and insects were hunted. Small animals were caught in traps and nets. Fish were caught in nets, weirs, and basket traps. Hook and line were also used. Near Bear River, bison grazed on extensive grasslands, and ancient people hunted them, butchering the animals with choppers.Fremont people lived along major rivers and creeks. These sites don't have substantial architecture, and food remains are mostly wild resources. Very little corn is found, suggesting that farming was either done elsewhere or rarely done. The people probably lived in shallow pithouses and wickiups. Their lifestyle was semi-mobile as they followed animal migrations or foraged for plants in season. These sites don't have substantial architecture, and food remains are mostly wild resources. Very little corn is found, suggesting that farming was either done elsewhere or rarely done. The people probably lived in shallow pithouses and wickiups. Their lifestyle was semi-mobile as they followed animal migrations or foraged for plants in season.		
	FP5.E02.gp03	graphic panel	contains at01				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E02.at01	av title	Question/grabber		How did they make…		
	FP5.E02.gp04	graphic panel	contains ar??				
	FP5.E02.ar	artifact label				a3205, a3206, a3207	
FP5.E03 Ornament			Visitors will see examples of jewelry, and learn about the precise techniques involved in making beads.				
	FP5.E03.ca04	case	Case with ornaments			168 total objects	
	FP5.E03.ms01	mindset	Mindset text describes the different kinds of ornaments made and materials used, and describes the tool kit.	Using few, simple tools, ancient peoples made an astounding array of precise ornaments	Objects of personal adornment were made from many materials, such as stone, shells, bone, seeds and, to a lesser extent, ceramics and fossils. While styles may have changed over time, the basic technique for manufacturing beads has remained relatively constant. The tool kit to produce most pieces of prehistoric jewelry is rather simple considering the diversity and precision of some of the products. Such a kit would include drills, grinding slabs, files, saws, reamers, engravers, cutting blades, and hammers, though not all would be necessary for producing any given kind of jewelry.		
	FP5.E03.ar	artifact label	objects of personal adornment (connected to mindset)			A1330a-b, A2038, 2032, 1879, 2037, deer phalanges A2755	
	FP5.E03.ar	artifact label	Group label for intro objects				
	FP5.E03.ar	artifact label	Group label for effigy pendants			A2024, 2025, 2026	
	FP5.E03.fp01	focus panel	Focus panel describes Paleoarchaic ornament and manufacture		Ornaments from the Paleoarchaic period are extremely rare. In many instances it is unclear if pieces were, in fact, ornaments or served some other purpose. Those that have been found were manufactured from bone, teeth, minerals, and shell, not unlike those found during the following Archaic period. The oldest known ornaments from this period in North America are from the Linindenmeir site in Colorado and the Tule site in Nevada, both dating to circa 11,000 BC. From the lowest levels of Danger Cave a tooth pendant was recovered during archaeological excavations. The tooth is an incisor from an ungulate with an encircling groove cut near the tip of the root. The grove was intended for a pieces of cordage in order to suspend the piece. The ornament dates to 8,300 BC.		
	FP5.E03.ar	artifact labels	Artifact label for Paleoarchaic ornament (connct to fp)			A0996	
	FP5.E03.fp02	focus panel	Focus panel describes Archaic ornament and manufacture		A preference for bone, teeth, and claws as the base material for ornament continues in the Archaic period; their pleasing form and color, hardness, and derivation from beasts of size, strength, and swiftness has encouraged their use as ornaments in many parts of the world (Jernigan 1978:11). It is during this time that fossils, hooves, horn, wood, and seeds begin to be used as ornament, although the latter two could have been used but did not survive in the archaeological record. Ornament made from teeth and bone were typically not modified much from their original shape, likely because the natural form was preferred. Many forms consist of bone tube beads and pendants made from drilling holes into unmodified pieces. In contrast, shell (from as far away as the California coast), stone, and minerals--and some bone--were shaped into beads and pendants. In one rare and early example, unfired clay was molded and perforated, possibly for use as beads. Complete pieces are exceptionally rare at this early period. The ornament technology of the Archaic people was simple but speaks with a pleasing immediacy of derivation of the sea and the earth and the animals and a blurring of distinctions between humans and the rest of the natural world (Jernigan 1978:18).		
	FP5.E03.gi01	graphic image	technical drawings shows how disc beads were made				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E03.ar	artifact label	Group label for Archaic ornaments			a0379, a2040-3, a0407, a0574, a0991-2,a1038, a1058, a1267, a1390-1, a1504-5, a1525-29, a1547, a1581-89, a1603, a1617, a1629-31, a1635-39, a1641-2, a1645-47, a1925, a2533-a2535, a2043	
	FP5.E03.fp03	focus panel	Focus panel describes Fremont ornament and manufacture	Fremont were the masters of bone ornament.	The Fremont did not restrict themselves to bone when manufacturing ornament; in fact, there are many fine examples of stone ornament made by the Formative-period people who lived in the eastern Great Basin. However, bone is the most ubiquitous material found in Fremont ornamentation. Pendants and disc beads appear to have been the preferred form although bone "seed beads" and tubular beads were popular as well. Other forms of ornamentation found at Fremont sites include bone tinkler cones and rings. Tinkler cones were loosely attached to a piece of clothing or a bag within close proximity of one another so that when the person moved the cones would strike one another creating a pleasant sound. Bone rings were made by scoring large animal bone and snapping or cutting the discs from the bone. These rough discs were then smoothed, shaped, and polished to the desired sheen.		
	FP5.E03.ar	artifact label	Group label for Fremont ornaments			a2433, a2044; a2045-a2046, a2047, a1926, a1927-a1937, a1938-a1940-a1952, a1953-a1959, a1960-a1964, a1965-a1966, a1968-a1975, a1976, a1977, a1978-a1980, a1981-a1983, a1984-a1986	
	FP5.E03.fp04	focus panel	Focus panel describes Ancestral Pueblan ornament and manufacture	Ancestral Pueblans were masters of stone ornament technology.	Although there are many fine examples of Anasazi bone, seed, and shell ornament, their preference for stone as the medium of choice is clear. Stone jewelry was often manufactured from materials that were found in the artist's region such as turquoise, serpentine, quartzite, gypsum, shale, hematite, and lignite. If a particular medium was not locally available it could be traded in. Forms of Anasazi jewelry consisted of shaped beads, pendants, and rings. The latter was not common in the Anasazi region with the exception of Chaco Canyon and bracelets were rare, especially as the distance from the Hohokom region increased. Beads and pendants came in a large variety of shapes and even took on the form of animals (often called effigies), although the latter was uncommon among the Anasazi compared to other Southwest groups. Small tab pendants were commonly used as earrings and as repeated elements at intervals on necklaces of disc beads. Bead bracelets and earrings were popular among the Anasazi as well (Jernigan 1978).		
	FP5.E03.ar	artifact label	Group label for Ancestral Pueblan ornament			a1988, 1989, 1990-2011, 2012, 2013-2034, 2036, 2039, 2048, 2049, 2104	
FP5.E04 Footwear			A table case displays shoes and sandals, allowing visitors to study their details up close. Visitors will see that shoes change over time, and vary regionally.				
	FP5.E04.ca05	case	Case with artifacts; includes typology example using Anasazi sandals			27 objects	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E04.ms01	mindset	Mindset text gives an overview of footwear technology and use.	Utah's prehistoric peoples made a variety of shoes and sandals; they had practical features as well as stylistic attributes.	Like you, prehistoric peoples wore shoes and sandals (only they made their own). Four styles of moccasins have been found in cave sites north of the Great Salt Lake: the Fremont moccasin, the Hogup moccasin, the hock moccasin and the Promontory moccasin. (MK) Moccasins were made from the hides of animals, and had multiple pieces that were sewn or lashed together. The Ancient Puebloans wove sandals from plant fibers. Sandals had a sole, and variations on toe and heel straps. The dry climate of the Southwest preserved these perishable items, giving us an additional window into how these peoples lived.		
	FP5.E04.ar	artifact label	Label text describes how Hock moccasins were made and used.		The “hock moccasin” was cut from the hock of an artiodactyl by girdling the leg at two points and removing the hide like a skin tube. The toe was sewn with 2-ply, S-twist sinew and when the foot was placed inside the heel would fit where the hide curved naturally. The moccasin was secured to the foot using a hide strip that was wrapped around the ankle. This style of moccasin from Hogup Cave dates to about AD 420 and between 2950-2050 BC from Danger Cave. (Aikens and Madsen 1986) (MK)	a1805	
	FP5.E04.ar	artifact label	Label text describes how Hogup moccasins were made and used.		The Hogup moccasins, named after Hogup Cave where they were found, were made with a three piece pattern. The style consists of a single piece of hide that is folded up over the foot and sewn together across the toe, up the center of the instep from the toes to the ankle, and up the back to about mid-ankle. To this footpiece is added an outer sole, sewn flat on the basic piece, and an ankle wrap, sewn around the upper part of the basic pierce giving the moccasin a boot-like appearance. The cross toe seam and the instep seam are strongly puckered. A hide string is attached at the back of the ankle, above the heel, and probably served to lash the ankle wrap around the ankle and lower calf. This style of moccasin was only found in one stratum, which was dated to 650 BC (Aikens 1970) (MK)	a2628, a2629	
	FP5.E04.gi01	graphic image	illustrations/diagrams of Hock moccasins				
	FP5.E04.ar	artifact label	Group label for Fremont moccasins	Fremont moccasins were made from the front legs of deer or antelope.	The Fremont moccasin is made from cut hide from the forelegs of deer or antelope; the hide was girdled just below the knee and above the hoof and cut, leaving a tube. This technique resulted in hobnails made from the animal’s dew claws on the sole of the moccasin, usually located at either side of the ball of the foot pointing toward the heel and on either side of the heel or under the instep. Two additional pieces of hide were attached to the sole and sewn together on the top diagonally. The moccasin was held in place with a complex lashing technique around the sides and ankle with a hide tie string. A yellow to reddish cast on some moccasins suggests that some may have been painted (Aikens and Madsen 1986). The Fremont moccasin dates from 650 BC to AD 420, the late Archaic to early Fremont period. (MK w. MKS edits)	a1806, a1808	
	FP5.E04.gi02	graphic image	illustrations/diagrams of Fremont moccasins				
	FP5.E04.ar	artifact label	Group label text describes how Promontory moccasins were made and used.		In all of the Promontory style moccasins, at least two parts were used: a lower part (A) and a gusset or insert (B). In most cases an upper part is added (C) as well and a few have separate tongues (D). The majority of specimens found at the Promontory site have a lower part constructed from bison hide, although some use deer and antelope hide as well. The gusset is usually of the same material as the lower part, but is of a thinner material. In all but 4 of the specimens the hair has been removed. There were five basic stitches used in sewing together the individual parts of the moccasin. However, the stitching used to attach the gusset was often the most ornamental and of the finest quality.	Promontory moccasins a1810, a1813, Hide with cutours for gusset a1815, Needle a1816, Awl a1818, Scraper a1860	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
					On a number of specimens the gusset stitch is adorned with porcupine quill or basketry material. The typical lining consisted of leaving the fur on the inside of the shoe. In addition to, or sometimes in place of, the fur separate pads of cedar bark, grass, or other fur was placed inside. The Promontory moccasins date to approximately AD1250. (MK w. MKS edits)		
	FP5.E04.gi03	graphic image	illustrations/diagrams of Promontory moccasins				
	FP5.E04.ar	artifact label	Group label for twined and composite sandals		Ancient Pueblo weavers made sandals using three basic weaving techniques:plain weave, twining, and plaiting. Plain weave and twining were done on a simple loom, possibly a belt loom. In twined sandals the wefts work as pairs or triplets and are twisted as they pass over and under the vertical warps; in the most basic of twining techniques the final outcome is very similar in appearance to the plain weave when packed tightly. The warp and weft of the finely-crafted Basketmaker sandals were often made out of finely spun and twisted yucca cordage. Warps for the twining technique were likely set up on a simple, but highly effective, belt loom. (MK w. MKS edits)	Sandal- twined a1819, Sandal composite 1823, Comb 1864	
	FP5.E04.gi04	graphic image	illustrations or diagrams of twined, composite, plain woven and plaited sandals				
	FP5.E04.ar	artifact label	Group label for plain weave sandals		In most of the Anasazi sandals using a plain weave, the warp (the static element) is tied to itself to create an oval shape. The weft (the active element), usually made of narrow, whole yucca leaves, is then passed over and under the warp, creating a crossing pattern in the center of the sole.	Sandal plain weave 0229,	
	FP5.E04.ar	artifact label	Group label for plaited sandals		Plaiting, on the other hand, was a free-form technique. In the plaiting technique both the warp and weft elements actively cross over one another either in a 1:1 interval (simple plaiting) or in 2:2 or 2:3 intervals (chevron, herringbone, etc.) (MK)	a1831-a1835 Last	
	FP5.E04.ar	artifact label	Group label for sandal tools and making		Yarn or cordage was made from yucca leaves after the leaf was broken down into loose fibers by methods that included soaking, pounding, shredding, boiling, freezing, chewing, and scraping. The loose fibers are drawn into a long continues strand by spinning. Spindles came into use about AD 500, but without a spindle, fibers can be rolled against the thigh with one hand while the other lengthens the strand as it is twisted. (MK)	Spindle whorl a1874, Cordage bundle 1863, 1862, Netherstone 1867, Yucca bundle stage 3 a1866, Yucca bundle stage 1, a1873	
	FP5.E04.fp01	focus panel	Focus panel text explains Anasazi sandals typology.	If we look at how Ancient Pueblo sandals changed over time, they seem to have become less complicated in design; we might expect the opposite.	The change in style and technique of Ancient Puebloan sandals from Basketmaker II to Pueblo III is a good example of why cultures do not always act according to our own prescribed notions of “progress.” The earliest northern Ancient Puebloan sandals are from the Basketmaker II period (AD1-500). These sandals have square heels and toes and were woven in a complex twining and wrapping technique. The most finely woven sandals are from the Basketmaker III Period (AD500-750). In this style the toes are scalloped and the heels are puckered. The sandals have a smooth, ribbed interior surface and sometimes a raised geometric pattern on the sole. Variety of design during this time included two types of weave in a single sandal, one or two types of weave and woven-in color, color painted on the finished surface, and the insertion of extra cords to wrap around the warp and create a raised geometric deign.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
					During the Pueblo I and Pueblo II periods, sandals were built thick and coarse with rounded or pointed toes using plain weave technique. By the Pueblo III Period sandals trended towards a finer, plaited weave using split leaves. Without the assistance of absolute dating techniques or other diagnostic artifacts (e.g. ceramics), an archaeologist, understandably so, might switch the order of the sandals based on preconceived notions of how technology should have progressed.		
	FP5.E04.ar	artifact label	Group and artifact labels for Anasazi sandals (connected to focus)			a0214,a 0218, a0223, a0231	
FP5.E05 Weapons			Visitors see prehistoric and historic weapons, and learn how they were used and how they work. They will also see how weapons change over time.				
	FP5.E05.ca03	case-	Case with artifacts; visitors will see stone points, spears, atlatls, and bows and arrows and will learn how they were made, and about the physics of weaponry. Case includes the Great Basin projectile point sequence.			83 objects	
	FP5.E05.ms01	mindset	Mindset text explains the evolution of prehistoric weapons.	Weapons were crafted precisely for optimal performance; weapons changed over time to be more efficient, and hunt different kinds of animals.	Prehistoric weapons were precision instruments. Years of experimentation, meticulous craftsmanship, and skill went into their design and manufacture to create the most efficient killing machine. Four prehistoric weapon systems that use stone projectile points are the thrusting spear, the throwing spear, the atlatl/dart, and the bow and arrow. The Clovis point, the oldest known point style, would have been used with a spear. Paleoindians at this time hunted very large animals; when these went extinct at the end of the Ice Age, hunters needed a weapon for hunting smaller, faster game. Thus, hunters abandoned the throwing, and possibly thrusting, spears for the atlatl--a higher velocity, more accurate weapon that could travel longer distances. Bows replaced the atlatl - why? The game animals were the same. Bows shoot the point faster and farther. This shift in technology suggests that the bow duplicated and more successfully carried out the function of the atlatl . (MK w. MKS edits)		
	FP5.E05.gi01	graphic image	photos/illustrations of 4 projectile point "weapon systems"				
	FP5.E05.gp01	graphic panel					photo of oldest spear find
	FP5.E05.ar	artifact label	Group label text describes spear morphology and use, materials.		Likely due to their perishable nature, shafts of thrusting and throwing spears have rarely been found in the archaeological record of North America. The oldest spear found so far is from a sinkhole in Florida; the spear was radiocarbon dated to ca. 12,200 BP. The spear was used to kill an extinct species of giant land tortoise, whose shell was found surrounding the spear on a ledge 85 feet below the surface. The Clovis point, as the currently oldest known point style, would have been used with this weapon class. Archaeologists believe the points were hafted to short shafts, which in turn were mounted into sockets on heavier spear shafts. This provided for "reloadable" spears. The Clovis point may have been used with the atlatl. (MK)	a0643, a0645-a0647, a0649-a0650	
	FP5.E05.gp02	graphic panel					atlatl diagrams or illustrations, rendering of atlatl being used

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E05.ar	artifact label	Group label text describes atlatl morphology and use, materials.		The word atlatl comes from the Nahuatl language (Uto-Aztecan) meaning spearthrower. Atlatl technology is ancient in the Old World (as early as 20,000 years ago) and probably diffused to the New World along with the first Americans (Justice 2002), although evidence of the first atlatl in North America does not appear until 8000 BP. The atlatl was a spear throwing device, the basics of which are a stick with a handle or finger grip and a hook on the opposite end to engage the end of a dart. A weight can be attached to the board with sinew lashings and the presence of notches on the board of some atlatls suggests either the intention to shift the weight or allot for a variety of stone sizes (i.e., adjust the weight). Atlatl spurs could be carved from the main shaft or made of groundstone or bone and lashed to the main shaft. We think the atlatl was the first weapon in North America that used mechanical principles instead of relying solely on the strength and skill of its user. The dart was usually constructed of hardwood with a stone projectile hafted to its distal end. Early atlatls were unfletched (feathers) but later atlatls incorporated this technique. (MK)	a0663, a0664, a0666, a0674, a0676, a0678, a0679, a0683, a0975, a1327	
	FP5.E05.gp03	graphic panel					bow illustration showing parts; arrow illustration
	FP5.E05.ar	artifact label	Group label text explains bow and arrow morphology and use, materials.		A bow usually consists of 2 equal, flexible arms, separated by a rigid center grip. The bow is braced by a string that connects the ends of the arms. To make a bow a log was split in half with a wedge. The bark was peeled or scraped off and the bow was shaped with a stone adze. A final shaping was probably completed by scraping. Nocks were sometimes cut into the ends with a stone saw and shaped with an abrader. (paraphrased from MK) A Great Basin arrow consists of a projectile point (stone, glass or metal) inserted into a notch in a hardwood foreshaft and secured with sinew. The foreshaft, in turn, connected to a cane main shaft with fletching (feathers) on the end. The cane was gathered several months in advance to allow time for drying and may have been straightened by heating at the joints and holding in position while it cooled. The cane joints were smoothed with a stone knife and/or abrader. A v-cut was nocked out of the proximal (fletching) end of the arrow to receive the string. Feathers were trimmed and attached to the main shaft with sinew. (Watts 2001) Bow strings most frequently were made of sinew (animal back or leg tendon), rawhide, or gut. Occasionally, plant fibers, such as yucca, nettles, milkweed, and dogbane were used. Well-made plant fiber string is superior to string made of animal fibers because it holds the most weight while resisting stretching and remaining strong in damp conditions. However, plant fiber strings are generally much more labor intensive to make than animal fiber strings, and the preference in the recent past was for sinew, gut, or rawhide. (2007 Iowa State Archaeologist) (edited from MK material)	Projectile point type 3 a0654, a0685, a0714, Cordage a0655, Mainshaft a0702, Projectile point type 2 a0713, a0715, Projectile point type 1 a0730, a0732, a0733, a0734, Projectile point type 2 a0731, a0738, Bow fragment a1621, a1622, a1624, Foreshaft a2404, a2405, a2406.	
	FP5.E05.ar	artifact label				dogbane plant specimen a2098	
	FP5.E05.ar	artifact label	Group label for recent bow and arrow objects			a0690, 0691, 0694-96, a0938, a0939, a0940	
	FP5.E05.gp04	graphic panel					projectile point sequence timeline
	FP5.E05.fp03	focus panel	Focus panel text explains how the projectile point sequence works and its significance.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.ar	artifact label	Group label for tools			a0538, a0680, a1033, a1620, a1626, a1627, a0511, a0706, a0673, a0653	
	FP5.E05.ar	artifact label	Group label for point typology			a0243, a1723-a1725, a1727-a1731, a1733-q1747, a2092, a2106	
	FP5.E05.av01	av	Stone tools and weaponry AV		Visitors hear the sharp sound of rock against rock as an expert flint knapper crafts a point by chipping flakes from a stone core.		
	FP5.E05.gp05	graphic panel					
	FP5.E05.at	av title	Question/grabber		How did they make…		
	FP5.E05.gp06	graphic panel	contains ar145-a146				
	FP5.E05.ar	artifact label	Group label for Clovis items			a0651, 1379	
FP5.E06 Stone Tools			In the lithics case (opposite side of Weapons case) visitors see chipped and ground stone tools, and watch a flint knapper at work on video.				
	FP5.E06.ca03	case	Case with artifacts; visitors see chipped stone tools (points, drills, scrapers, fleshers, and choppers) and the stones they are made from, and learn the how-tos of making and using chipped tools. They also see ground stone tools (manos , metates, abraders, polishers, axes, adzes, mortars and pestles, bead shapers, files, grinding slabs, saws, and stone balls), and learn how these tools were made and used.			137 objects	
	FP5.E06.ms01	mindset	Mindset text describes lithics technology and use.	Prehistoric peoples chipped and ground stone to make tools; different kinds of stone are used in these processes. Stone tools were often reworked and repurposed.	Lithic technology is a term used to describe the production of stone tools. The word lithic comes from the Greek word lithos, meaning stone. Tools that are flaked are often referred to as chipped stone tools, while those that were ground are referred to as groundstone tools. (MK) Arrowheads, or projectile points, are easy to recognize. Other stone tools are harder to recognize - sometimes they just look like rocks. Ancient peoples used stone to make hammers, choppers, axes, and adzes. These tools were made by grinding or chipping. Ground stone tools often have grooves and scrapes in them. The material ground generally consists of a coarse-grained stone, such as sandstone or basalt, that is abrasive. Chipped stone tools hold an edge better than a ground stone tool, and the edge can be sharpened; chipped stone tools are made from fine-grained rocks. Selecting the right rock was critical.		
	FP5.E06.fp01	focus panel	Focus panel text explains how to make chipped stone tools.		There are two ways to make a chipped stone tool; the first is percussion (striking a stone core with a hard object). Percussion involves the use of a hammer made from antler, wood, or stone. The source stone (core) is given a sharp blow, causing it to fracture in the shape of a cone; this cone shaped fracture represents a Hertzian Cone of Force. This detaches a thin section of stone called a flake. (MKS) Only certain kinds of stone break in a predictable fashion; stones used for "knapping" are largely made of silica and behave like glass when hit with a directed force on a small surface area. In the second way, pressure flaking, pressure is applied to the stone's surface causing chips to flake off. Pressure flaking is usually used to finish of bifacial (flaked on both sides) tools.		photos of source materials; illustrations/diagrams of tool-making; diagram/illustration of Hertzian cone of force
	FP5.E06.ar	artifact label	Group label for process objects			1386, 1387, 1393, a1403, a1404 (show last), a1406, 1540, a1594, a1676, a2756	
	FP5.E06.gp01	graphic panel	contains artifact label ar08-ar11				
	FP5.E06.ar	artifact label	Group label for drills			a1604, 1574, 1597,	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E06.ar	artifact label	Group label for points			a1358, 1369, 1542, 1543, 1456, 1570, 1573, 1576-78, 1580, 1590-92, 1596, 1599, 1602, 1608, 1610, 1612, 1673-5	
	FP5.E06.ar	artifact label	Group label for bifaces			a1381, 1382, 1538, 1539, 1598, 1607, 1609	
	FP5.E06.ar	artifact label	Group label for choppers/scrapers			a1384, 1385, 1680	
	FP5.E06.ar	artifact label	Group label for scrapers			a1410-13, 1416, 1516, 1522, 1524	
	FP5.E06.fp02	focus panel	Focus panel text describes ground stone tools source materials, manufacture, use.		Ground stone tools include manos, metates, abraders, polishers, axes, adzes, mortars and pestles, bead shapers, files, grinding slabs, saws, and stone balls. The first step (as in chipped stone tools) is locating appropriate stone for the final product. Rocks may be found on the landscape or quarried from bedrock formations. Rock size and weight are more important selection criteria for some tools than for others. For example, a metate can be no larger than the rocks available and a mano no wider than the width of the metate. The stones need to be the right texture, and they have to be durable. For example a coarse-grained rock may be chosen for an abrader because it is rough enough to remove material from the surface of another item. A polishing stone, such as those used for ornament manufacture, must be smooth enough to polish rather than abrade and the rock grains need to be well cemented and hard enough to create a surface that polishes without disintegrating into an abrasive powder. (MK with MKS edits)		
	FP5.E06.ar	artifact label	Group label for abrading, smoothing, and polishing tools			a1378, 1377, 1690, 1685	
	FP5.E06.ar	artifact label	Group label for grinding and pulverizing tools			a1523, 1396, 1392, 1521, 1388, 1389, 1677, 1678, 1679, 1397, 1398, 1684	
	FP5.E06.ar	artifact label	Group label for percussion tools			a1409, 1681, 1682, 1683, 1613, 1686, 1687, 1688, 1689	
	FP5.E06.gp03	graphic panel	contains ar95-ar96				
	FP5.E06.ar	artifact label	Group label for spinning tools			a2195, 2138	
	FP5.E06.gp02	graphic panel	contains ar97-ar98				
	FP5.E06.ar	artifact label	Group label for perforating, cutting, and scraping tools			a1408, 1407	
	FP5.E06.gp04	graphic panel	contains ar99-ar144				
	FP5.E06.ar	artifact label	group label for pipes			a1399, a1400, a1401, a1615	
	FP5.E06.ar	artifact label	group label for pendants			a1394, a1395, a1693, 1694-1709	
	FP5.E06.ar	artifact label	group label for stone balls			a1125,-a1127, a1338-a1339, a1500-a1503, a1506-a1509, a1515, a1517	
	FP5.E06.ar	artifact label	artifact label for buzzer			a1691	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E06.ar	artifact label	artifact label for beads			a1692, a1510-1514	
	FP5.E06.gp05	graphic panel	artifact label				
	FP5.E06.sp01	story panel	Story panel: interpretation: warfare in the Southwest				
	FP5.E06.gp06	graphic panel	with ar129				photograph of an atlatl
	FP5.E06.ar	artifact label	fending stick connected to story			fending stick a1875	
FP5.E06.tt01		table top	Tools				
	FP5.E06.in01	interactive	Pick your tool matching game; visitors match tools to activities	Like you, ancient peoples used different tools for different uses.	What it is: table top with 3 concentric rings; outer ring has graphics of different activities and the question what tool would you use for? Middle ring has mounted tool models(axe, large point, small point, pestle, hammer, bone tool); center ring covers speaker What you do: rotate the center ring to match tool to activity/use (i.e. what tool would you use to grind corn?) What happens: when you line up the right tool to activity, you hear a sound (arrow hissing through air, grinding stone against stone)		
	FP5.E06.av01	av	Tools Interactive sound for right match		Audio recording for sounds of tools in use.		
	FP5.E06.ap01-ap06	activity prompt	Activity prompt for the pick your tool game				
	FP5.E06.gi01-gi06	graphic images	Illustrations of people in tool-using poses, but without the tools in their hands.				
FP5.E07 Ceramics			Visitors will see how ceramics were made and decorated in a video of a modern artisan using prehistoric techniques. Then, they can compare styles and detail of pot decoration, and be an archaeologist to identify and assemble pot shards.				
	FP5.E07.ca06	case	Case with artifacts; visitors will see pottery shards and vessels, some repaired, and learn the decisions involved in making pottery, as well as its uses. Includes typology display.			86 objects	
	FP5.E07.pm01	photomural	back of case photomural				
	FP5.E07.ms01	mindset	Mindset text describes pottery making.	Making pottery is complex, and involves knowledge of clays, forming, and firing	Pottery requires expertise in materials, forming, and firing. The process of creating ceramics is a complex one and it is only through expert knowledge of the symbiotic relationship between clay type, construction methods, and firing methods that the potter will be successful. The process begins with collecting the clays and crushing the temper. The vessel is then formed (using construction and then finishing techniques), decorated, and fired. Things don't always go as planned, even for the most experienced of potters and a firing mishap can ruin many hours of what can only be considered a "labor of love." Accidents happened for the prehistoric inhabitants too and pots that have cracked were often repaired by drilling holes on either side of the crack, tying the two pieces together, and filling the holes with pitch. (MK)		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E07.fp01	focus panel	Focus panel text explains how to prepare the materials, describes temper.		For low-fired wares (below 800 degrees C) --all prehistoric pottery in North America-- almost any naturally occurring clay can be used, but must be chosen carefully. Natural clay that fires well may not be soft enough to shape. Conversely, clay that is easy to shape (highly plastic) may crack during drying. Most natural clays are very soft or plastic; one of the first discoveries ancient potters made was adding material (temper) to the clay to ensure it dried and fired evenly. Clay is heavy and difficult to transport, so many prehistoric potters probably obtained their clays from sources close to their residences. Typically, the potter would remove coarse particles from the clay, then knead in the temper. The kneading also removes any air bubbles, which can be disastrous during the firing process. (paraphrased from MK)		photos of different types of clay and temper; photo of kneading clay
	FP5.E07.fp02	focus panel	Focus panel text describes how vessels are formed, includes modeling and coiling techniques.		New World potters formed their vessels by hand by modeling, coiling, or molding. Modeling involves shaping a mass of clay into a rough proximity of the desired vessel shape. Sometimes modeling was used just for the base of the vessel, whereby the clay was pressed into a basket and the body built using the coiling technique. The coiling technique involves building the vessel into the desired shape from the base up with long, rope-shaped coils of clay. This is the most common method of construction used in the North American Southwest. The molding technique consists of pressing a flat, circular mass of clay paste into a concave mold or placing it over top of a convex mold.		diagrams/illustrations of shaping and finishing pots
	FP5.E07.gp01	graphic panel	contains ar01-ar04				
	FP5.E07.ar	artifact label	Group label for construction objects			a1284- a1285 (modeling) 1286- a1287 (coiling)	
	FP5.E07.fp03	focus panel	Focus panel text describes how vessels are finished, including polishing scraping techniques.		Vessels were scraped with a stone or pot sherd when they had dried to the ""leather hard"" stage. . The tool leaves parallel scratches on the inside of the pot. Another way to finish a vessel is to polish the surface with a stone. Polishing leaves a soft, lustrous finish (and is very time consuming).		
	FP5.E07.ar	artifact label	Group label for scraped vessels			a1291-3	
	FP5.E07.ar	artifact label	Group label for polished objects			a1288-90	
	FP5.E07.fp04	focus panel	Focus panel text describes how vessels are decorated, including incised, applique, punched, biochrome, polychrome and slip techniques.		Prehistoric potters decorated the outside of pots by incising, applique, punching, impressing, and painting. More than one technique can be used on a given pot. Incising involves cutting into the soft clay with a sharp object or a fingernail. Appliqué is applying elements to the vessel, such as the Fremont “coffee bean” design. Impression is when the potter presses another object onto the soft vessel (such as cordage or the back of a fingernail) and painting is when pigments (vegetal or mineral) are applied. (paraphrased from MK)		
	FP5.E07.ar	artifact label	Group label for punched objects			a1313, 1314, 1375, 1633	
	FP5.E07.ar	artifact label	Group label for incised objects			a1294, 1295	
	FP5.E07.ar	artifact label	Group label for impressed objects			a1157, 1309, 1316	
	FP5.E07.ar	artifact label	Group label for appliqued objects, figurines			a1296-1301, 1306, 1307, 1315, 1634, (Comparison) a1302-04	
	FP5.E07.ar	artifact label	Group label for pigments and brushes			a2096, 2095, 1519, 3134	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E07.ar	artifact label	Group label for bichrome objects			a0607, a0610, 0620, 0621, 0622, 0624, 0628-0629, 0631, 0634, 0636,-0638, 0640, 0642, 1305, 1340, 1341, 1346, 1351, 1354, 1357, 1365, 1649, 2448, 2449, 2450,	
	FP5.E07.ar	artifact label	Group label for polychrome objects			a1308, 1311, 1312, 1317, 1518, 1360, 1648	
	FP5.E07.fp05	focus panel	Focus panel describes firing and repair	Ancient peoples used open fires, not kilns to fire their pottery.	Archaeologists assume that most potters in the Great Basin and Colorado Plateau used the open firing technique because only a small number of kilns has ever been found (nine are located in the south-central Mesa Verde area). In fact, very few unequivocal examples of open firing have been found either (5 in the Kayanta Anasazi region and one in the Mesa Verde Anasazi region) [Sullivan 1988; cf. Hurst, personal communication 2007]. Although open firing requires little or no building and maintenance of structures, it requires a high degree of skill. The most critical factor is controlling the rate of firing and the atmosphere. This can be done through choice of fuel, use of insulation, and by careful placement of the fuel and vessels so as to regulate the flow. With all forms of open firing it is virtually impossible to control the atmosphere after firing has begun. Firing mishaps did occur, and pots (as you probably know) can be fragile. We can see on some pots where they have been repaired.		
	FP5.E07.gp02	graphic panel	contains ar69-ar70				
	FP5.E07.ar	artifact label	Group label for firing mishap/repair		Archaeologists assume that most potters in the Great Basin and Colorado Plateau used the open firing technique because only a small number of kilns has ever been found (nine are located in the south-central Mesa Verde area). In fact, very few unequivocal examples of open firing have been found either (5 in the Kayanta Anasazi region and one in the Mesa Verde Anasazi region) [Sullivan 1988; cf. Hurst, personal communication 2007]. Although open firing requires little or no building and maintenance of structures, it requires a high degree of skill. The most critical factor is controlling the rate of firing and the atmosphere. This can be done through choice of fuel, use of insulation, and by careful placement of the fuel and vessels so as to regulate the flow. With all forms of open firing it is virtually impossible to control the atmosphere after firing has begun.	a1280, a3133, a1281, a1284-a1287	
	FP5.E07.gp03						
	FP5.E07.sp01	story panel	Story from Steve Simms on ceramics and residential mobility				
	FP5.E07.gp04	graphic panel					
	FP5.E08.ar	artifact labels				a3136, a3135	
FP5.E08 Typology							
	FP5.E08.ca06	case				10 objects	
	FP5.E08.pm01	photomural	back of typology case photomural				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E08.ms01	mindset	Mindset text describes the principles of typology, the surface treatment typology seen in the case.	Archaeologists use typology to create relative sequences of objects.	Archaeologists use typology to create relative sequences of objects. They sort ceramics into typologies based on their technological (clay, temper, etc.), , and stylistic features (cord marking, painting, etc.). That is, the surface characteristics of the pottery sherds (general color, manipulation marks, decoration, etc.) are used to segregate sherds into different categories or types. Types record basic function (serving versus ceremonial wares) and can be associated with specific cultural groups. Because the surface characteristics (like clothing styles) change over time, types are useful for assigning calendar dates to their associated sites, an important consideration when other dating techniques are not available. In this case you will see typologies for Hopi Mesa and Mesa Verde Anasazi. Look at the different colors of clays and decoration, and the types and designs of the decoration.		images of design motifs, diagram of pos showing fields, interior, rim, neck, bottom
	FP5.E08.gi01	graphic image	Timeline rail for typology		dates and events		
	FP5.E08.fp01	focus panel	Focus panel for BIII	These are the first painted pots in the Kayenta region.	AD 600-750 Lino Black-on-white is the first occurrence of paint-decorated pottery in the Kayenta region. Design elements are simple, often duplicating basketry stitch design. Life designs, the walking circle, dots, and simple lines are common. As a rule, designs are restricted to bowl forms and are bottom-oriented or floating. Design fields and their organization are in uncomplicated panels.	a1356	map, style highlight diagram
	FP5.E08.fp02	focus panel	Focus panel for PI	This pottery style is characterized by fine lines.	AD750-900 Kana'a Black-on-white is recognized primarily by its fine lines, which often exhibits overlapping ends and are often in parallel series of 3 to 10 lines. Filler triangles, sometimes with hooks, and ticked and barbed lines are common. Design fields are simple and on bowls they are on the interior and rim rather than being bottom oriented. Bowl and jar rims maybe be painted.	a1342	map, style highlight diagram
	FP5.E08.fp03	focus panel	Focus panel for PII	This style features bold geometric designs.	AD1000-1150 Sosi Black-on-white style is recognized by the presence of solid, bold elongated black lines, often with appended triangular and stepped elements, that cover large portions of the vessel. Bowl exteriors and vessel rims are generally unpainted.	a2446	map, style highlight diagram
	FP5.E08.fp04	focus panel	Focus panel for PIII		AD1200-1300 Tusayan Black-on-white style exhibits a wide range of design elements, including the introduction of curvilinear design formats. This style has 3 basic layouts: the band, the offset radial composition, and a more complex "multiple Y frame." Band designs with framing lines above and below the band and massive lines framing large design fields consisting of triangles, sawtooths, scrolls and hatching are typical. Offset radial composition is made up of lines of varying width; their arrangement suggests interweaving.	a1348	map, style highlight diagram

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E08.fp05	focus panel	Focus panel for PIV		AD 1325-1625 (PIV) Jeddito B/Y originates in the Kayenta Anasazi/Hopi region of northern Arizona. It was produced in the Hopi villages, primarily on Antelope and Third Mesas, during the Pueblo IV period. Bowls are highly polished on both surfaces and no slip or wash was applied. Paint was almost exclusively mineral-based. Decoration varies greatly in skill of execution of designs. Bowl interiors and jar exteriors were always decorated; bowl exteriors decorated more often in later periods with isolated, asymmetrical designs or figures; and jar interiors were sometimes painted on interior of flared lip and, rarely, spattered inside. Some vessels exhibit stippling and/or engraving. Vessels exhibit tight geometrical designs early on, which opened up during transitions in later types.	a1804	map, style highlight diagram
	FP5.E08.fp06	focus panel	Focus panel for San Bernardo Polychrome	The influence of Franciscan missions in the Hopi area resulted in new pottery forms imitating European ceramics.	AD1625-1740 The influence of Franciscan missions in the Hopi area resulted in new pottery forms imitating European ceramics, new fuel used in firing (dung) new designs, and new values associated with pottery (i.e., an increasing secularization of ceramics and discouragement of ceremonial use). Of paramount importance was the Pueblo revolt of 1680 and the wave of immigrants into Hopi country, which had a profound affect on the course of Puebloan ceramics. Vessel shapes and functions are heavily influenced by the Spanish and later in the 17th century by the Tewa, particularly in the plain wares. Although some painted jars show a distinct Tewa influence (geometric patterns dominate), many of the decorated wares maintain the design tradition of the Sikyatki Polychrome. One change from the former tradition is that Mission period Sikyatki-style bowls have red rims (usually in conjunction with black ticking) whereas the earlier period vessels had undecorated rims.	a2626 or 2627tbd	map, style highlight diagram
	FP5.E08.fp11	focus panel	Focus panel for Payupki Polychrome	Keresan refugees influenced Hopi potters.	AD1680-1780 A major new pottery type arose during the troubled years of the Pueblo Revolt when the Hopi were hosts to large numbers of refugee Rio Grande Puebloans (Keresan speakers), such as the Zia. The design motif used on Hopi vessels is markedly Keresan in style. Feather motifs abound and there is an overall emphasis on painted versus negative design. The composition is dominated by heavy geometric forms painted in primary black and red. There is a particular interest in paneled layouts.		
	FP5.E08.fp07	focus panel	Focus panel for Pollaca Polychrome - Early	This time marks a transitional period in Hopi ceramics-a time of experimentation with new shapes and designs.	1820-1860 This time marks a transitional period in Hopi ceramics-a time of experimentation with new shapes and designs. Keresan influence remains but is less influential than the Zuni forms and motifs. Realistic floral and animal motifs, as well as lacy curvilinear decorative elements to embellish and frame the primary composition, are adopted from the Spanish from a decidedly Hopi perspective. Some Hopi pots are replicas of Zuni pots, suggesting intermarriage between the two Puebloan groups. This variant separate neck designs are the norm and there is a tendency to contrast the neck design with that of the body, such as a geometric body composition with animal or plant designs on the neck. The most common body design is a zonal layout broken into four panels-typically the large panels share a similar design as do the small panels. Jar rims are typically painted red until ca. 1850 when rims color changes to black.	a0604	map, style highlight diagram

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	FP5.E08.fp08	focus panel	Focus panel for Pollaca Polychrome - Late	During the 1860s drought forced the Hopi to migrate to the Zuni Pueblo, which heavily influenced the design of Hopi pottery.	Zuni Modified Variant 1860-1890 The adaptation of katsina costumes and masks into secular pottery designs is a Hopi invention. Although not new to this period it became a favorite subject. There is good inferential evidence that the commercialization of Hopi pottery began at this time, sometime in the 1880s. Design layouts for the Zuni Modified Variant designs were placed as if on a flat canvas with minimal concern for the negative forms created by their juxtapositions. With the exception of an arabesque style common to stew bowls most other compositions during this time are less complex than those during the previous two Polacca variants. Simple zonal layouts for jars and bowls increase significantly. Katsinas, birds, and floral motifs on bowls grow in popularity-breaking with the geometric orientation of the earlier variants.	a0972	map, style highlight diagram
	FP5.E08.fp09	focus panel	Focus Panel for Early Sityatki Revival/ Sityaki Revival	Sityatki polychrome is one of the most exquisite pottery styles.	AD1375-1625 New decorative motifs as well as stylistic changes appear during this period. Potters experimented with splattering, stipple and drybrush for the first time. The very formal, precise angular compositions are replaced by sweeping curvilinear designs. A profusion of naturalistic and abstract animal and plant motifs are used, especially abstracted birds and bird parts. Sityatki Polychrome uses black and red mineral paint on yellow ware.	a0974, a2447	map, style highlight diagram
	FP5.E08.fp10	focus panel	Focus panel for Hano Polychrome	Nampeyo revived older styles of Hopi pottery, starting the modern Hopi pottery tradition.	1890-1942? The beginning of the Hano Polychrome ceramic tradition is attributed to the Hopi-Tewa potter Nampeyo. Although she had likely been trading her pottery at trading posts since she was a young woman, the decade of the 1880s saw Nampeyo reach her full flower because it was during this time that Nampeyo abandoned the Zuni-like pottery, common within the Mesas. Nampeyo and her husband had visited the nearby prehistoric ruins, where Nampeyo saw the sherds of the beautiful pottery made three centuries previously. She discovered the clay and how to form and paint it. She also began to adapt the beautiful motifs to use in her own pottery. Nampeyo is given credit for starting the revival of Hopi pottery, the so-called “Sikyatki Revival.” She was influenced by designs from not only prehistoric and historic Hopi, but cultures other than Hopi. In a sense, she revived Hopi pottery; but since her work and pottery of today differ greatly from that of the Sikyatki periods, she is credited with the birth of contemporary Hopi pottery, now called Hano Polychrome.		map, style highlight diagram
	FP5.E08.ar01-ar11	artifact labels	Label for each example of typology				
	FP5.E08.sp01	story panel	Story panel: Hopi potter discusses influence of older pottery styles, pottery traditions				
	FP5.E08.av01	av	Ceramics and weaving AV		The ceramics video shows potters making pots using coiling, molding, and modeling, then finishing them. Some pots are decorated with incised, punched or painted designs before firing.		
	FP5.E08.gp01	graphic panel					
	FP5.E08.at01	av title	Question/grabber		How did they make…		
	FP5.E08.gp02	graphic panel					
	FP7.E08.ar	artifact label				a3204	
FP5.E08.tt01		table top	Ceramics				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP5.E08.in01	interactive	Ceramics interactive: decorate a pot, piece together a pot	The patterns you make reflect your individual preferences, and your culture.	What you see: a tabletop with 4 replica pots in the center; 2 stations with blank pot graphics and tethered decorating tools, 2 stations with a partial pot on an armature on the perimeter What you do: decorating: pick a station, and use the stamps and tools to decorate the pot graphic; you might choose to copy the pot in the center, or develop your own design; cues encourage you to look at the center pots - where are the different design elements? what are they?; piecing together: look carefully at the pot sherds in the bin - which might fit the gaps in the pot? try to see if you can put the pot back together What you get: artistic satisfaction, satisfaction of completing a pot	shells, obsidian, flints	
	FP5.E08.ap01-ap04	activity prompt	Prompts for ceramics activities.				
	FP5.E08.gi01-gi04	graphic image	Images showing processes of formation and decoration of ceramics				
FP6 Trade			Visitors will see objects traded, their sources, and the material they are made from. Accompanying labels will explain the three steps archaeologists use to source the objects and determine if they were traded.				
	FP6.E01.ca02	case	Case with artifacts; visitors will see source materials (obsidian, coral, turquoise, shell) and objects traded, and will learn why archaeologist think trade occurred. Using maps and how-to pointers, visitors will see the steps of describing exchange: sourcing, plot the relationship between source and terminal, and interpretation. A sourcing hands on activity walks them through this process.			66 objects	
	FP6.E01.pm01	photomural	back of trade case photomural				
	FP6.E01.ms01	mindset	Mindset text reviews trade and how it's interpreted.	Ancient peoples exchanged goods through trade, gift-giving, and tribute. Archaeologists analyze the source of the item and maps its journey, then interpret how the exchange was organized.	(Sharer and Ashmore 1993, Renfrew and Bahn 1996, Ericson and Earle 1982) An exchange system is one of several methods by which humans acquire goods and services not normally available to them locally. Exchange includes trade, gift giving, tribute, and any other means of moving objects from one person or group to another. A common distinction is drawn between local and long-distance exchange. To describe exchange, the archaeologist has three interrelated tasks: (1) to source the commodities of exchange, (2) to plot the relationship between the source and the terminal, and (3) to reconstruct or interpret the organization of the prehistoric exchange.		
	FP6.E01.gc01	graphic caption	Caption text explains plotting sourced goods.		The ability to identify the point of origin of a raw material or object is essential to establish the presence and/or extent of prehistoric exchange. The most common techniques use other scientific disciplines, such as biology and geology, to establish an unequivocal source determination. After the sources of artifacts have been identified, several approaches may be used to describe the spatial patterning in the materials and to suggest the possible exchange mechanisms operating prehistorically. Two common approaches are regional point scatters and regression analysis.		point scatters, regression analysis
	FP6.E01.ar	artifact label	Group label for species analysis		One way to determine the source of an artifact is inherent in the object itself. Analysis of an object that came from something living (such as a shell pendant) may be identifiable to genus or species. Taxonomic identification is very useful in determining the known habitational extent and, thus, the source of an organism.	Olividae a1328, 1418, 2156-58, 2196, Haliotis 2161-62, 2164-2166, Glycymeris 2159, 2167-2170, Corn 2171, Turkey 2245	
	FP6.E01.gp02	graphic panel					microscopic image of thin section

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP6.E01.ar	artifact label	Group label for thin section analysis (Petrographic)		The material from which an artifact is made is a far better guide than its style (which can be copied) to determine the place of origin. Whole exchange systems can be reconstructed, or at least the movement of goods can be investigated, if the materials in question are sufficiently distinctive for their sources to be identified. Since the middle of the last century techniques have existed for cutting a thin section of a sample taken from a stone object or potsherd to determine the source of the material. It is made thin enough to transmit light and then, by means of petrological examination with a light microscope it is usually possible to recognize specific minerals that may be characteristic of a specific source.	a2172, a2163 (to be confirmed)	
	FP6.E01.gp01	graphic panel					point scatters and regression analysis,
	FP6.E01.ar	artifact label	Group label for XRF analysis		In X-ray fluorescence (XRF) spectrometry, the specimen is bombarded with X-rays or high-energy electrons. The resultant spectra lines or peaks are characteristic of the elements present in the specimen. The height of the peaks is directly proportional to the amount of each element - these are converted to quantitative parts per million figures by comparing them with rock standards of known chemical composition. (http://www.obsidianlab.com/faq.html#xrf_how) XRF is most often used for sourcing obsidian and other fine-grained, volcanic rock. Years of XRF sourcing of obsidian from Fremont sites indicate that obsidian sources most exploited by the Fremont were from volcanic sources in western Utah and in Malad, Idaho.	obsidian points a2300, 2827-34	
	FP6.E01.gi02	graphic image					diagrams of different kinds of trade
	FP6.E01.gc02	graphic caption	Graphic captions explain reconstructing trade patterns.				
	FP6.E01.gp03	graphic panel					map of Baker village and trade routes; photo of site
	FP6.E01.ar	artifact label	Group label for Baker Village items			pendants a2214-17; shell beads a2218-23; trilobite pendant a2224, pot sherds a2225-7, obsidian a2228-9	
	FP6.E01.fp01	focus panel	Focus panel discusses Baker Village and central place exchange	Baker Village, in Nevada, was apparently a settlement where Fremont traded with peoples from east and west.	There is very little evidence for market places in Utah's prehistory. However, some archaeologists think that some of the larger villages were used as central places for exchange during certain times of the year, especially during festivals. For historic Native Americans, trade fairs or festivals were important mechanisms for intervillage and long distance exchange in the Southwest. Baker Village is a Fremont habitation site located on the western edge of Snake Valley in Nevada and is the western-most Fremont farming village site known to date. The Baker Village occupants appear to have had well established relations with peoples to the east and west. Materials obtained from the east, where ties appear to have been the strongest, include trilobite fossils and crinoids, obsidian, and Fremont ceramics. Evidence of connections to the west consists primarily of marine shell and possibly turquoise.		
	FP6.E01.gp04	graphic panel	Freemont exchange				Freemont exchange diagram
	FP6.E01.ar	artifact label	Group label for Fremont trading objects			a1325, 2174-79, 2181-2183, 2192, 2193, 2197, a2762	
	FP6.E01.ar	artifact label	Group label for Fremont game pieces			a2184-91	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
FP7 Range Creek/ Current Research			Visitors will see objects and artifacts from Range Creek, and learn about current archaeological research at the University of Utah. The initial exhibition will contain materials related to the story of environmental and fire regime changes in Range Creek over time. These exhibits are flexible, and will change providing an ongoing window into the work of the University and the museum.				
	FP7.si01	section intro			This exhibit area features the University's and the Museum's work at Range Creek -a canyon in which hundreds of spectacularly undisturbed archaeological sites preserve evidence of the Fremont cultural complex. Range Creek is unique - it was on privately owned land until 2001, and almost undisturbed. Now, a multidisciplinary team of scientists is studying Range Creek and its sites. You'll learn about some of the latest insights, and see artifacts from this remarkable canyon.		
	FP7.E01.pm01	photomural	Range Creek photomural				
	FP7.E01.gc01	graphic caption	Caption for photomural				
	FP7.E01.ms01	mindset panel	Mindset panel describes Uof U, UMNH interdisciplinary research at Range Creek	Many different scientists and fields of study work to piece together the story of Range Creek, a spectacular site in northeast Utah.	The Range Creek Archaeological Project is part of a large, multi-year project designed to identify and document archaeological sites in a spectacular, remote desert canyon near Price, Utah. Range Creek is a tributary of the Green River, and is similar to nearby Ninemile Canyon. It contains hundreds of Fremont archaeological sites including adobe and masonry granaries, pithouse villages, caches and cists in rockshelters, and amazing rock art panels. An interdisciplinary group of scientists from the University of Utah and sister institutions are studying Range Creek. This work includes site identification and analysis, study of plant remains to shed light on past climates, and zooarchaeologists are identifying the animal bones. Approximately 145 archaeological sites were identified and recorded during the 2002 and 2003 field seasons. Hundreds of Fremont archaeological sites that have not yet been recorded include adobe and masonry granaries, pithouse villages, caches and cists in rockshelters, and amazing rock		
	FP7.E01.ca08	case	Case displays objects and artifacts that illuminate the interdisciplinary work underway at Range Creek relating to paleo-environment and changing fire regimes in the area.			23 objects	
	FP7.E01.fp01	focus panel	Focus panel describes environmental reconstruction at Range Creek.	Shifts in effective moisture creates changes in plant communities. Their fossil remains provide a window into changing climate at Range Creek.	Dendroclimatology uses the sametree rings as dendrochronology but looks at the variation in the rings as a consequence of environmental changes across time. Wider rings indicate a year with favorable growth conditions (plenty of water and a long frost-free season); very narrow rings, the opposite. A black smudge is evidence of a fire. Examination of the rings creates a picture of how the climate has changed. Core samples show changes in pollen types and frequencies over time (as determined by radiocarbon dating and the presence of volcanic ash falls), allowing paleoecologists to reconstruct transformations in regional vegetation. Cut bank studies focus on the alluvia (sediments) that are exposed when the water level of an area drops and exposes the bank. These are similar to the studies of core samples, but the cut banks allow scientists to examine broad expanses of the alluvium, facilitating the study of fluvial hydraulics, pollen, and fire history of Range Creek. These people lived here a thousand years ago and they were impacted by climate and water, and they dealt with these climatic changes. There are opportunities for us to apply those lessons today.		
	FP7.E01.sp01	story panel	Story panel: Andrea Brunelle				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP7.E01.gi07	graphic image	Graph with embedded micrographs of charcoal illustrates fire frequency in Range Creek during Fremont and post-Fremont periods.				
	FP7.E01.ar	artifact label				tobacco bundle a1789	
	FP7.E01.ar	artifact label	Group label text describes corn farming and use at Range Creek		Visitors can make correlations between corn in the landscape (corn cobs and granaries), corn pollen in the core, and corn seeds in the midden. Along with digging stick and mano/metate, a full picture of corn and its use is created.	Corn a1784-1785	
	FP7.E01.ar	artifact label	Soil core			a3251	
	FP7.E01.ar	artifact label	Manos			1786, 1787	
	FP7.E01.ar	artifact label	Digging stick			a1788	
	FP7.E01.ar	artifact label	Midden			a3252	
	FP7.E01.ar	artifact labels	Petrie dishes			6 petrie dishes with midden macrofossils	
	FP7.E01.gi01-gi03	graphic image	Photographs of corn pollen, squash, cultivated bean pollen.	Visitors learn about the movement of plants within elevational gradients as effective water changes with climate change.	Caption text explains the movement of plants within elevational gradients.		
	FP7.E01.gi04-gi06	graphic image	Photographs of various indigenous fire management approaches—why and how people burn (Jim O'Connell photos, other slash and burn photos, and wild fires at Range Creek.				
	FP7.E01.ar	artifact label				burnt bone 1783	
	FP7.E01.ar	artifact label	Group label explains the evidence from charcoal		Charcoal recovered in both pack rat middens and soil cores reveals the nature of fire over time in Range Creek. Fire is both a natural-occurring and human-set phenomena. Following the departure of Fremont people in Range Creek, an enormous increase in charcoal signifies a major change in fire frequency. Two scenarios could explain this shift:1. The Fremont may have burned to maintain the land while occupying the area, keeping the fuel load low. Upon their departure, increased fuel load led to major wild fires. 2. Alternately, Ute people occupying the area after the Fremont may have practiced slash and burn cultivation to raise tobacco.	a1782 (2 lumps)	
	FP7.E01.fp02	focus panel	Focus panel text explains dendrochronology	Tree ring dating is a very useful absolute dating technique in the Southwest.	Tree-ring dating involves cutting cross-sections of tree trunks, like slicing bread, and then counting the number of rings from the bark-side inward to determine the exact age of the tree. This method is very precise temporally, allowing archaeologists to date the year a piece of timber was cut. Also known as dendrochronology,tree-ring dating is based on variations in thickness of annual growth rings, which reflect variations in the climate during the lifetime of a tree. Over relatively long periods of time (about 30 years), this pattern of tree-ring thickness variation is unique and allows the matching of prehistoric samples with a master sequence (those from a known cutting date).		
	FP7.E01.ar	artifact label				Wood slice a3080, a2081, a3082 wood a3083, a3084, a3085	
FP7.E01.tt01		table top	Pack Rat Midden				
	FP7.E01.in01	interactive	Interactive: pack rat midden Microscope and slides to view core and midden materials: grass, corn, corn pollen, charcoal, other diagnostic plant pollens	Pack rat middens preserve a record of past ecosystems.	What you see: tabletop with central case holding packrat midden; perimeter ring with inset magnifiers What you do: move around the table to the different magnifier stations and see the evidence in the midden (grass, corn, corn pollen, charcoal, other plants); adjacent to each magnifier is a caption explaining what that piece of evidence tells us		pack rat midden
	FP7.E01.ap01-ap05	activity prompt	Prompt for midden activity		caption for photomural		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP7.E01.gi01-gi05	graphic image					Graphics of pack rat midden elements
	FP7.E01.qt01	quote/question	Quote/question on east wall near Range Creek exhibit				
FP 8 Signs and Symbols			Visitors see a case with stick and ceramic figurines, and large rock art images, and are asked to contemplate the meaning of these ancient symbols. On an adjacent magnet board, they can match petroglyph styles to regions of Utah, and compose their own rock art walls with words and graphics.				
	FP8.E01.pm01	photomural					
	FP8.E01.ic01	inset case-Iconography	objects related to rock art iconography and first people ideology			a1616, a3086, a3087, a3088, a3089, a3090, a3091, a3092, a3093, a3094, a3095, a3096	
	FP8.E01.ar01	artifact label	boulder with rock art symbols				
	FP8.E01.ms01	Mindset panel	Mindset panel discusses iconography	Iconography is a symbolic representation embedded within an image or object that can be used as a form of communication or to reflect a belief system.	Iconography can be seen in many forms: rock art, figurines, and ceramic designs are a few examples. As a method of communication iconography in rock art can direct people to a certain destination, mark the presence of a particular clan, or function as territorial warnings, such as in the head hunter panels in northeastern Utah. Symbolism in ceramic design could communicate a story or be a mark of the potter's clan. Imbuing meaning to objects from a past culture is an inherently difficult, if not impossible, task. The diversity of types of verbal, written, and material meanings within any society suggests that it is naïve to assume that archaeologists can reconstruct the indigenous meanings of the past (Hodder 1999:77). There are at least two different ways in which material culture comes to have meaning. The first is through cultural rules of representation. The second is through practice (e.g., gender roles in economic activities). For example, a cultural rule that dictates a division of labor between men and women, with women responsible for corn grinding, could result in the metate becoming a symbol of women's contribution to that society.		
	FP8.E01.fp01	Focus panel	Focus panel text explains different types of rock art and "styles"; discusses what we can and can't know about rock art, the cultures, and the artists.	While we can't know the significance or meaning of rock art, it offers tantalizing clues to ancient life.	The term "rock art" refers to images rendered on immovable natural rock surfaces, such as bluff faces, cave walls, and large boulders. Painted images are called pictographs. Pecked, carved or incised images are petroglyphs. Occasionally these techniques were combined to produce painted petroglyphs. The Southwest region of the United States has the greatest concentration of rock art in the Americas. The oldest rock art in Utah with a known date is an incised pebble from an 8,700 year old level in Cowboy Cave. Survival of ancient paintings is attributable to use of mineral pigments, most commonly manganese, hematite, malachite, gypsum, limonite, clays and various oxides. The best preserved pictography is found under sheltering overhangs and in caves.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
					Archaeologists study rock art to learn about 1) technology and technique, 2) regional styles (By identifying rock art styles and analyzing their distribution, we can help assess style zones based on other classes of materials.) 3) dating (Establishing the age of individual rock art elements and regional style complexes have been notoriously difficult, and one reason many archeologists have neglected rock art in the past. Sometimes we can place individual rock art motifs at a single site into relative order, if the images are superimposed, or if images on the same rock face display different degrees of weathering. Some images illustrate ""datable"" subject matter (i.e., mastodons must be Paleoindian; horses or firearms must be historic).) and 4) why it was made/what it symbolizes (While much of this has to be speculation, oral traditions of modern Native American cultures often shed light on the meaning of rock art). mostly from What is rock art and what can it tell us about the past? By George Sabo III and Deborah Sabo Arkansas Archeological Survey		
	FP8.E01.st01	story panel	Sally Cole discusses rock art				
	FP8.E01.in01	interactive	Magnetic board with rock art symbols				
	FP8.E01.gi01	graphic image	photos showing 3 main styles of rock art: Barrier Canyon (Buckhorn Wash), Fremont (McConkie Ranch in the Uinta Basin is a really good one-the Three Kings Panel), and one Anasazi representation (Basketmaker II from the San Juan/Canyonlands area				
	FP8.E01.gc01	graphic caption					
	FP8.E01.gi02	graphic image	rock art symbols				
	FP8.E01.gc02	graphic caption					
	FP8.E01.ap01	activity prompt	Prompts for rock art activity	Compose your own rock art! What story do you want to tell?	America's first artists left paintings and carvings on rock surfaces, perhaps as early as 10,000 years ago. These prehistoric images, known as rock art, have been found in 41 of the 50 states, as well as in Canada and Mexico. Some of the rock art images are maps showing routes to hunting areas, gathering areas, water sources or just the best way to cross the mountains. Many of the panels are calendars, these are designed to work with light and shadows on certain dates, such as solstice, equinox or cross quarter days. These calendars may have marked the days for ceremonies; or simply let people know which days were best for planting corn and beans. Other panels tell stories; some religious or ceremonial panels. These are often shamanistic and contain "ghost" or "spirit figures". Compose your story using the symbols on the board.		
FP9 Great Basin/ Colorado Plateau Cultures			Introductory text describes the region's cultures and locates them in space and time; images of key artifacts, sites, and structures from each culture are displayed with maps and timelines.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP9.E01.ms01	mindset	Mindset text introduces the region's cultures.	In this region, archaeologists distinguish Paleo-Archaic, Archaic, and Formative" complexes." These peoples lived at different times, and in different parts of the state.	Utah's prehistory is as diverse as its scenic topography, covering a period of more than 11,000 years. Archaeological sites have been identified in all corners of the state illustrating the ancient people of Utah were able to adapt to deserts, high mountains, badlands, and marshes. The first people living in Utah are called the Paleo-Archaic. At about 8000 years ago, changes in weaponry styles and subsistence patterns mark the beginning of the Archaic period. During the Archaic, people were hunters and gatherers, and nomadic but they also lived in semi-permanent small villages and caves. During the Archaic (8000-2500 years ago), people made a variety of basketry for plant collecting and various stone spear and dart tips used in hunting. In the Formative Period (AD500-1300), people relied on corn farming, and their lifestyles became increasingly sedentary. These people made pottery, and used bows and arrows to hunt.		image of artifacts in gallery
	FP9.E01.fp01	focus panel	Focus panel text describes Paleo-Archaic, where they lived, and how they lived.	The first settlers in Utah were Paleo-Archaic people who moved often in search of resources to hunt and gather.	Paleo-Archaic people in Utah experienced a very different climate than today; it was the end of the last Ice Age, and climates were colder and changed rapidly. These early Utah settlers hunted the megafauna (mammoths, mastodons, bison) as well as smaller game; they also fished. Paleoarchaic people moved among base camps that may have been occupied for weeks at a time; they may have used rockshelters or caves. The fluted point is the characteristic Paleo-Archaic technology. It was attached to a thrusting spear, or perhaps an atlatl.		image of artifacts in gallery, map showing where they lived, notable sites
	FP9.E01.fp02	focus panel	Focus panel text describes early Archaic people, where they lived, and how they lived.	Early Archaic sites are known from caves on the perimeter of Great Salt Lake; these people used the rich marsh and wetland resources to survive.	7000BC-5000BC The temperatures at the start of this phase were cold, then became warmer than today. Pine forest grew at lower elevations than today. In the Great Basin, early Archaic sites are almost always in marshes; people lived in caves and rock shelters near freshwater springs around Great Salt Lake. As the megafauna died out, people began eating seeds. Seeds need to be processed, by roasting or milling. The early Archaic people hunted with atlatl, and gathered cattail, bulrush, prickly pear cactus, and pickleweed. Some of these were eaten, others used to make mats, baskets, and other woven objects. People were still nomadic, but beginning to stay longer in one place.		image of artifacts in gallery, map showing where they lived, notable sites
	FP9.E01.fp03	focus panel	Focus panel text describes middle Archaic people, where they lived, and how they lived.	Middle Archaic people had a seasonal round of movement between upland and lowland; they used a variety of resources in these places.	6000-2000BC During this time, temperatures rose, and there were fewer sources of water, until the Neoglacial at 2500 BC, when temperatures cooled and the climate became wetter. Utah Lake formed after 5000 BC and was an important prehistoric fishery. In this period, people increasingly used upland resources, and spent less time in the dwindling marshes. They moved seasonally between uplands and lowlands, staying for short times to do specific tasks (hide preparation, seed processing). Many of the upland sites were hunting camps, and roots and grasses were also collected.		image of artifacts in gallery, map showing where they lived, notable sites
	FP9.E01.fp04	focus panel	Focus panel text describes late Archaic people, where they lived, and how they lived.	At this time, corn appears in Utah, and people became settled farmers.	1000 BC-AD500 This time period was cool. Many people lived in lowland villages; there were surrounding scattered populations of high desert foragers. Villages were occupied for at least part of a year. Rock shelters were used long-term seasonally; caves were used for camping; temporary brush structures were used for storage. Later, the people built slab-lined pit houses on Cedar Mesa. Farming sites include upland dry farming and floodplain farming. The earliest samples of maize in Utah date to 200B.C. and AD400. The shift to farming was part of a pattern of staying in one place, an increase in food storage, and more permanent architecture. The atlatl was the weapon of choice. On the northern Colorado Plateau, the people were highly skilled weavers.		image of artifacts in gallery, map showing where they lived, notable sites

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	FP9.E01.fp05	focus panel	focus panel text describes Formative people, where they lived, and how they lived	Formative people began to live in large villages; they traded, and build large structures cooperatively.	In this period, corn farming became widespread, and pottery and bow and arrow technology appeared. The Fremont culture were farmers, hunters, and foragers, depending on where they lived. Although their lifestyles varied, they all made rod-and-bundle baskets, and distinctive moccasins and figurines, as well as polished stone balls and thin-walled plain gray pottery. Toward the end of this period, the Fremont built adobe and pit houses, and multi-room granaries and other storage structures. The Fremont complex began to disappear after AD1250, perhaps because the climate was too dry to grow corn. The Ancestral Puebloans (you might recognize them as "Anasazi"), lived in Utah at the same time as the Fremont, from AD500-AD1300. These people made black on white pottery, grew corn, hunted and gathered, and later in this period, settled in villages with pithouses. Some of the pit houses were large, and may have had community social uses. Later structures were built of jacal or adobe, and farming became complex, with terracing and irrigation in use. Still later, the people lived in stone houses. Their villages were laid out like those of Mexican cultures, suggesting contact with those people. At the end of this period, the people lived in large villages; the larger villages included monumental structures, plazas, and great kivas. This is the age of cliff dwellings like Canyon de Chelly. Around AD1200-1250, the people moved south from the Mesa Verde and Kayenta areas, due to a mix of push (warfare, climate variations that affected farming, collapses in trade systems) and pull (better farm lands, more rainfall) factors.		image of artifacts in gallery, map showing where they lived, notable sites, photos of large cliff houses and structures
	FP9.E01.gi01-gi05	graphic image	graphic image of map				
	FP9.E01.gc01-gc05	graphic caption	captions noting regions and time periods				
	FP9.E01.gi06-	graphic image	images depicting eras and artifacts				
	FP9.E01.gc06-gc15	graphic caption	captions for images				
FP.av01		av	Demonstration area AV				

LAND

1. Utah's landscape exhibits deep time. It reveals rock from every geologic time period.
2. Plate tectonics and erosion are major shapers of the landscape.
3. Studying rocks, life, soil, tectonics, and regimes tell us about the qualities of the three provinces of Utah.
4. Human interactions are speeding rates of change.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
LD1 Introduction			There are two introductory panels to introduce the Land Observatory. One is located at the top of the ramp as visitors enter from Life; it is a large rock slab with the name of the Observatory etched into the face and a relief map of Utah's provinces. The second introductory panel is for visitors entering from First Peoples and describes how Utah's landscapes are a 3D textbook of geology.				
LD1.E01.ip01	LD1.E01.ip01	Intro panel	Title, quote, intro text	Utah has three unique and extreme landscapes (physiographic regions); the landform in each are very different.	This exhibition explores the origin and evolution of Utah's three major physiographic regions: the Middle Rocky Mountains, the Colorado Plateau, and the Basin and Range. Middle Rocky Mountains are part of the Rocky Mountains and encompass the NE section of the Utah. The Colorado Plateau is found in the SE part of the state; these are the spectacular canyonlands. The Great Basin, a series of mountain ranges and valleys, forms the entire western half		
	LD1.E01.gi01	graphic image	map of Utah showing physiographic regions				
	LD1.E01.gc01	graphic captions	Captions for map				
LD1.E01.ip02	LD1.E01.ip02	Intro panel	Title, quote, intro text	Utah's landscapes are a living geology textbook. Almost any drive you take along Utah's highways is a drive through time	Whether you drive east or west, north or south, you will find Utah's geologic record exposed along the highway. College classes from all over the country come here to see for themselves the results of geologic processes like mountain building, erosion, uplift, and glaciation. Utah's landscapes record the presence of past life, from trilobites to dinosaurs to people in fossil quarries, archaeologic sites, and rock art localities. If you visit, remember to leave the sites as you found them for others to enjoy.	highway 50 rocks and fossils	
	LD1.E01.gi02	graphic image	Road map of Utah				
	LD1.E01.ic01	inset cases	Case in drive through time hold artifacts and rocks				
	LD1.E01.gi03-gi08	graphic images	Contextual images of artifact and rock origins				
	LD1.E01.gc03-gc08	graphic captions					
	LD1.E01.ar01-06	artifact label	Labels for rocks and fossils				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
LD1.E02 Utah Through Time			As visitors make their way down the first ramp exhibits show 7 periods in Utah's geologic Past with current "you are here" marker to facilitate the visitor's understanding of the map. The time periods are: 1. Pre-Cambrian (550 mya), 2. Late Cambrian (500 mya), 3. Late Pennsylvania (300mya), 4. Early Jurassic (195 mya), 5. Late Cretaceous (75 mya), 6. Early tertiary (60 mya) 7. Late tertiary (15 mya) 8. Quaternary (126 mya)				
	LD1.E02.sx01	special exhibit	Slate slab				
	LD1.E02.ar01	artifact label	artifact label for slate slab				
LD1.E02.gp01		graphic panel					
	LD1.E02.gi01	graphic image	Visitors see a map of the Western United States during the Pre-Cambrian era. "You are here" marks the current location of the museum on the map.	Utah has not always looked the way it does today. Its landscape has changed dramatically over time.			USGS relief maps-Provided by HG
	LD1.E02.gi02	graphic image	Visitors see a photo of what Utah would have looked like during the Pre-Cambrian.				Reefs off of Cancun Mexico Source: http://photos.mongabay.com/yucatan/PICT0011.html provided by HG
	LD1.E02.gc01	graphic caption	Graphic caption for map and photo		In the Pre-Cambrian era (550 mya) Utah was at the Northern edge of the continent. North America was rotated 90 degrees clockwise (i.e. the modern northern edge of Utah faced East). Utah was near the northern seashore, but consisted mainly of lowlands/coastal plain type environments.		
	LD1.E02.gi03	graphic image	Visitors see a map of the Western United States during the Late Cambrian era. "You are here" marks the current location of the museum on the map.				USGS relief maps-Provided by HG
	LD1.E02.gi04	graphic image	Visitors see a photo of what Utah would have looked like during the Late Cambrian.				www.rixane.com/fantastic-ocean-3d-screensaver provided by HG
	LD1.E02.gc02	graphic caption	Graphic caption describes the Late Cambrian.		In the Late Cambrian (500 mya) all of Utah is underwater (ocean). Eastern Utah was the shallowest zone.		
	LD1.E02.gi05	graphic image	Visitors see a map of the Western United States during the Late Pennsylvanian era. "You are here" marks the current location of the museum on the map.				USGS relief maps-Provided by HG
	LD1.E02.gi06	graphic image	Visitors see a contemporary photo of what Utah would have looked like during the Late Pennsylvanian.				Photo: Dead Sea, from http://www.terragalleria.com/middle-east/israel/dead-sea/picture.isra10329.html.

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	LD1.E02.gc03	graphic caption	Graphic caption for the Late Pennsylvanian.		During the Late Pennsylvania (300mya) a sea exists in Utah, the most extreme environment of which is the constricted Paradox basin of southeastern Utah. Tons of sediments deposited into basin, including massive amounts of evaporated salt. Shoreline deposits show evidence of dunes, and lots of ferns.		
	LD1.E02.gi07	graphic image	Visitors see a map of the Western United States during the Early Jurassic era. "You are here" marks the current location of the museum on the map.				USGS relief maps-Provided by HG
	LD1.E02.gi08	graphic image	Visitors see a contemporary photo of what Utah would have looked like during the Early Jurassic.				Early Jurassic: Sahara Desert, from www.scienceclarified.com/ landforms/Basins-t.
	LD1.E02.gc04	graphic caption	Visitors read a panel that describes the Early Jurassic.		Early: During the Early Jurassic (195 mya) a Large Sahara-like desert occupied Utah. Giant sand dunes dominated the state, along with scattered oases that supported the life in the desert. The sand in the dunes likely arrived from the Appalachian Mountains to the east.		
	LD1.E02.gi09	graphic image	Visitors see a map of the Western United States during the Late Cretaceous era. "You are here" marks the current location of the museum on the map.				USGS relief maps-Provided by HG
	LD1.E02.gi10	graphic image	Visitors see a contemporary photo of what Utah would have looked like during the Late Cretaceous.				3 Photos: Atlantic coastal plain from www.spikehampson.com/ voyage_plan.html and South Florida Everglades, www.igowildlifephotography.co m/ uploaded_image... and South Florida Everglades, www.beachdirectory.com/.../ evergladesaerial.gif
	LD1.E02.gc05	graphic caption	Graphic caption describes the Late Cretaceous.		During the Late Cretaceous (75 mya) an Ancestral Rocky Mountains was building in Western Utah, and eastern Utah was a broad coastal plain with abundant coal swamps on the western edge of an intercontinental seaway. A large portion of the eastern Utah was under the intercontinental seaway. It was much wetter and warmer during this time.		
	LD1.E02.gi11	graphic image	Map of the Western United States during the Early Tertiary era. "You are here" marks the current location of the museum on the map.				USGS relief maps-Provided by HG
	LD1.E02.gi12	graphic image	Visitors see a contemporary photo of what Utah would have looked like during the Early Tertiary.				
	LD1.E02.gc06	graphic caption	Graphic caption describes the Early Tertiary.		In the Early Tertiary (60 mya) sediments from the erosion of rising mountains to the west fill rivers. Large mountain valleys cover the west. Uinta Mtns uplift, large freshwater lakes (Flagstaff, Uinta, etc.) fill these mountain valleys. This era marks some of the warmest times in the Earth's history.		
	LD1.E02.gi13	graphic image	Map of the Western United States during the Late Tertiary era. "You are here" marks the current location of the museum on the map.				USGS relief maps-Provided by HG
	LD1.E02.gi14	graphic image	Visitors see a contemporary photo of what Utah would have looked like during the Late Tertiary.				

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	LD1.E02.gc07	graphic caption	Graphic caption describes the Late Tertiary.		In the Late Tertiary (15 mya) the Basin and Range province formed, North America began stretching to the west, because of the earlier formation of the Rocky Mountains. Volcanic activity emplaced mineral deposits throughout Utah due to hydrothermal processes. Volcanoes erupt through the surface in Utah. Also, the Colorado Plateau began to rise.		
	LD1.E02.gi15	graphic image	Visitors see a map of the Western United States during the Late Pleistocene era. "You are here" marks the current location of the museum on the map.				USGS relief maps-Provided by HG
	LD1.E02.gi16	graphic image	Visitors see a contemporary photo of what Utah would have looked like during the Late Pleistocene.				Photo: Cataract and Surprise glacier, Chugach Mountains, Alaska. From http://www.alaskaphotographics.com/cgibin/script.pl?op=viewpic&id=22688&oldop=http%3A%2F%2Fwww%2Ealaskaphotographics%2Ecom%2Fcgi%2Dbin%2Fscript%2Epl%3Fop%3Dsearch%3Bkeywords%3Dchugach%2520mountain%2520range
	LD1.E02.gc08	graphic caption	Graphic caption describes the Late Pleistocene.		In the Late Pleistocene ~18 ka the Land is basically like it is today. Modern major physiographic features are in place. Glaciated mountain regions, cold forests at low elevations, and forests more common across the state. Little Cottonwood Canyon glacier exits into Lake Bonneville. Wetter climate. Lakes more common than they are today.		
LD1.E03 Plate tectonics			In this exhibit area, visitors read text describing plate tectonics, and watch a video. The video program plays on a global projection surface to tell the story of earth's layers and plate tectonics. Visitors see images of movement of the continents through time—and into the future.				
LD1.E03.gr01		graphic rail	Plate tectonics				
	LD1.E03.ms01	mindset	Mindset panel describes the structure of the earth and plate tectonics.	The surface of the earth is made up of dynamic plates that converge, diverge and move sideways with respect to each other. Over time, these movements helped shape the landscape and gave rise to three diverse geographic provinces in Utah.	The ground that we walk on is actually floating on top of an ocean of magma. Continents collide, break apart, rotate, and migrate all over the world, because of convection cells in the Earth. This process has been going on for billions of years, and the continents have changed dramatically as well. Varying thicknesses of the earth's crust shift like arctic ice, sometimes sliding across one another to make mountains, or split apart making huge valleys. Plate tectonics causes earthquakes, volcanoes, mountains, and shapes the climate of the world through the creation of geographic features. Different plate tectonic forces were responsible for creating Utah's three physiographic regions and the climatic regimes seen in them.		diagram/cut away of earth showing structure
	LD1.E03.gc01	graphic caption	Graphic caption describes ocean crust conveyor belt	Convection cells move the continents	In the upper mantle, magma at different temperatures rises and sinks in a circular or ovular pathway. The hottest magma rises from near the core of the Earth then cools as it reaches the top of the Mantle, that is, near the crust. The cool magma becomes denser than the hotter magma from below and sinks. The circular movement of magma forms global scale conveyor belts that slowly drag the continental plates.		diagrams of crust conveyor belt
	LD1.E03.av01	av	32" diameter global projection				

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LD2 **Middle Rocky Mountains**			As visitors descend the second switchback, a large picture window provides a panoramic view of the Wasatch Mountains, signaling visitors' arrival in the Middle Rocky Mountain exhibits. Set right into the canted walls are exhibits about this region's rocks, minerals, fossils and plants with specimens from the Museum's collection.				
	LD2.si01	section intro	Section title and subhead introduces forces that formed the MRM	The MRM in Utah consists of mountain blocks that were uplifted by compressional forces in the Early Tertiary. Glaciers and streams have since eroded and shaped the landscape.	High mountains carved by streams and glaciers characterize the topography of the Middle Rocky Mountains province. The Utah portion of this province includes two major mountain ranges, the north-south-trending Wasatch and east-west-trending Uintas.		
	LD2.E01 Minerals and Rocks		Visitors see rock slabs which represent the process of Contact Metamorphosism: granite, marble, limestone, slate, shale, quartzite, and sandstone. The hottest point in the zone of contact is the skarn zone, where the greatest density of minerals are found. Visitors can touch these minerals as well as specimens from other source rocks and see if they can spot traces of the sources within the stone slabs.	The Middle Rocky Mountains are comprised of many different rocks. The rocks, in turn, are comprised of a variety of minerals.			
	LD2.E01.gi01	graphic image	background image for MRM				
	LD2.E01.qt01	quote	Quote related to the MRM on the east wall				
	LD2.E01.ms01	mindset panel	Mindset panel describes the formation of the MRM		The Middle Rocky Mountains arose as part of a mountain building event, the Laramide orogeny, about 70-40 million years ago. Most of the rocks in the Rocky Mountains were originally shale, siltstone, and sandstone, deposited in an ancient Paleozoic sea. Between 1.7 and 1.6 billion years ago, these sedimentary rocks were caught in a collision zone between sections of the Earth's crust called tectonic plates. These rocks were recrystallized into metamorphic rocks by enormous heat and pressure resulting from the collision. This process is called regional metamorphism . These recrystallized rocks were later uplifted, then eroded by glacial and stream activity.		
	LD2.E01.gi02	graphic image	diagram of contact metamorphism				
	LD2.E01.gp01	graphic panel	contains artifact labels				
	LD2.E01.ar01	group label	Specimen label- skarn zone touch minerals		Hot water plus magma helped many different minerals to form in the skarn zone. This area that is closest to the magma in the original rock houses minerals that are economically important, this is where Alta's mining was centered. The minerals found in the Alta skarn zone include: pyrite, bornite, galena, sphalerite, chalcopyrite, magnetite, silver, vesuvianite, green garnet, green diopside, muscovite, covellite, ludwigite, malachite, brochanite, chrysacola, hydroglossular, periclase, hematite, goethite, serpentine	Ten skarn zone touch samples will include a2825 Clintonite (var. xanthophyllite) a2858 Ludwigite and Serpentine	
	LD2.E01.ar02-ar04	artifact label	granite touch specimens			A2822 quartz, two others tbd	
	LD2.E01.ar05	artifact label	limestone touch specimens			specimen tbd	
	LD2.E01.ar06	artifact label	sandstone touch specimens			specimen tbd	
	LD2.E01.ar07	artifact label	shale touch specimens			specimen tbd	

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
LD2.E02 MRM Plants			This exhibit is a display of plants illustrating the relationship between surface geology, soil, and plants.				
	LD2.E02.sx05	special exhibit	Granite slab				
	LD2.E02.ar21	artifact label	Label for granite slab			Large granite slab	
	LD2.E02.pm01	photomural	MRM mountain meadow				MRM mountain meadow
	LD2.E02.ms01	mindset	Mindset panel	Elevation and soil drive plant diversity.	The geology and the geography of the MRM dictates what types of plants may grow there, and where the plants may grow. The plants here are adapted to different levels of moisture, sunlight, and soil composition. For instance, south facing slopes get much more sun than north facing slopes and have less time covered in snow. Soil composition is partly based on parent rock type; the rocks limestone and marble put lots of calcium in the soil which some plants cannot tolerate. Elevation is a critical factor for plants. Conifers and meadows are found in subalpine zones below the tree line. and cedars grow in forests in the foothills, along with grasses.		
LD2.E02.gr01-gr02		graphic rail	MRM Plants				
	LD2.E02.in01-in02	interactive	smell interactives (one per book)	on graphic panel			
	LD2.E02.ap01-02	activity prompt	activity prompt for smell interactive				
	LD2.E02.sx01-sx02	special exhibit	2 herbarium sheet flipbooks with 10 laminated plants in each flipbook		alpine/subalpine flipbook; montane/foothills flipbook	a0854, a0856, a1906, a1908, a1909, a1911, a1914, a1920, a1923, a1924, a2458, a2459, a2460, a2461, a2462-a2467	cover image of elevational life zones
	LD2.E02.sx03-sx04	graphic captions	for soil samples (1 for each flipbook)				
LD2.E02.gp01-gp20		graphic panels	MRM Plants flip book				
	LD2.E02.ar01-ar20	artifact captions	captions for herbarium sheet plants		fun fact, distribution, name, common name		map of where found, photo of plant in natural habitat
	LD2.E02.gc02	graphic caption					
LD2.E03 Glaciation			Visitors are introduced to glaciation through a display of touchable striated rock slab, placed in a contextual horizontal setting and beside a photomural of a U-shaped (glacially formed) canyon.				
	LD2.E03.sx01	special exhibit	Slab of sandstone				
	LD2.E03.ar01	artifact label	Artifact label for sandstone				
	LD2.E03.pm01	photo mural	Photo mural of a U-shaped canyon (possibly Little Cottonwood Canyon)		caption for photomural		Photograph of U-shaped Canyon

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	LD2.E03.ms01	mindset	Mindset panel introduces glaciation, and includes process diagrams.	Glaciers have played an important role in shaping the landscape we see in the MRM today. Cirques, aretes, horns, moraines, U-shaped canyons, and hanging valleys are all evidence of past glaciation.	During the last Ice Age, the climate was much colder and wetter. The increased snow fall caused glaciers to form and stream down the mountain-side, not just here in Utah but also throughout the entire Rocky Mountains. Glaciers are composed of snow that has been compacted into solid ice. The ice picks up rocks from the surrounding valley as gravity forces it to slide down, carving out the mountain valley. During the sliding process the rocks caught up in the moving ice scrape and erode underlying bedrock. Over hundreds and thousands of years the valley takes on a wide “U” shape, like that we see in Little Cottonwood Canyon. Many different landforms are created from this process.		
	LD2.E03.gc01	graphic caption	caption for timeline of glacial periods		By definition, we are still in an ice age. An ice age is defined as an interval of time when large areas of the surface of the earth are covered with ice sheets (large continental glaciers). Usually when people talk about the "Last Ice Age", they mean the last time glaciers advanced on the continent. This is sometimes called the "Last Glacial Maximum" and occurred about 18,000 years ago. We are currently in a warm interval or "interglacial" within an ice age. I think it's important to make these distinctions.		
	LD2.E03.gi01	graphic image	Process diagrams- how glaciers make a U-shaped canyon				
	LD2.E03.gc02	graphic caption	caption for U-shaped canyon diagrams				
	LD2.E03.gi02	graphic image	Glacial flow diagram and alpine glaciation features (u-shaped canyons, tarns, aretes, horns, cirques, col, hanging valley and a U-shaped Valley)				
	LD2.E03.gc03	graphic caption	diagram captions				
	LD2.E03.gi03	graphic image	timeline and images of glaciations				
	LD2.E03.gc04	graphic caption	diagram captions				
	LD2.E03.ar02	artifact label	label for glaciation rock slab			Glacial striated rock A2281	
LD2.E04 Fossils			Visitors learn about ancient environments by looking at fossilized organisms that once lived in Utah before the formation of the Middle Rocky Mountains. These are embedded within a limestone slab.				
	LD2.E04.ms01	mindset	Mindset panel explains fossils and types found in the Middle Rocky Mountains	Fossils in the MRM provide evidence of ancient oceans and other past environments that covered Utah long before the mountains were created.	The MRM record hundreds of millions of years of geologic time, and contain many different fossil organisms from all across geologic time. Most of the fossils are found in ocean deposits that formed here when an ocean intermittently covered Utah. Some of the fossils are displayed here. Vertebrate fossils are rare in the MRM. It may be surprising to find ancient "sea shells" in the foothills and mountains of the MRM. In fact, the mountains haven't been here all that long in geologic time.		
	LD2.E04.sx01	special exhibit	Limestone slab with marine fossils—horn corals, brachiopods, fossils from cephalopod gulch representing Ordovician, Triassic, and Cambrian Periods (Paleozoic).				
	LD2.E04.ar01	artifact label	caption for limestone fossil slab				

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	LD2.E04.fl01	family label	family label for marine fossil slabs	For most of the Paleozoic (hundreds of millions of years/before the Age of Dinosaurs), Utah was under water!	Can you see the shells that look like clams? They're actually brachiopods. They lived on the bottom of a warm shallow sea with clams, snails, sponges and corals. These oceans covered most of Utah more than 300 million years ago, leaving fossils of sea creatures on what are know mountain ranges. don't know how to work in this fun fact If you had been in Utah 500 million years ago, you would have been standing at the edge of the continent. More on brachiopods: live attached by stalk to sea floor/rocks look like bivalves but not related to them plane of symmetry runs through the middle of the shell		
LD2.E04.gr01		graphic rail	Viewshed to Wasatch				
LD3 Colorado Plateau			Ramping down to the Colorado Plateau, visitors catch sight of a centrally located cluster of exhibits and an image depicting the confluence of the Green and Colorado rivers. Hands-on exhibits and animation interpret the sedimentation that led to the Plateau's layer-cake geology and the uplifting and downcutting that carved its famed canyons. Nearby, a towering stratigraphic column juts up 20 feet into the space, spanning the Pre-Cambrian period to modern times, an iconic symbol of Earth's long history. A Jurassic-aged prosauropod specimen combines with other exhibits to further interpret the geological record and dating techniques. In an adjacent stylized setting, visitors find about the forces of weathering and erosion that led to the region's mesas, fins and hoodoos. Visitors manipulate a glass globe filled with sand to create dunes, and view live crustaceans that inhabit the region's potholes. The sequence concludes with exhibits interpreting the relationship between the region's soil and native plants and the volcanism that led to the formation of the Henry, La Sal, and Abajo Mountains.				
	LD3.si01	section intro	Title and subhead	The Colorado Plateau consists of rock layers deposited over millions of years. These layers were uplifted, then weathered and eroded to create canyons, hoodoos, and arches.			
	LD3.E01 Colorado Plateau/ Canyon Formation						
	LD3.E01.gi01	graphic image					diagram of Colorado Plateau formation and layers
	LD3.E01.pm01	photomural	Colorado Plateau photomural				
	LD3.E01.av01	av	CP soundscape				
LD3.E01.gr01		graphic rail	Plateau Formation				

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	LD3.E01.ms01	mindset	Mindset panel describes the formation of the Colorado Plateau.	Layers of sedimentary rocks form the Colorado Plateau; this "layer cake geology" has been sculpted by wind and water into the spectacular landscape we see today.	The Colorado Plateau records millions of years of Utah's history. The bottom of the plateau formed in the Paleozoic (actually, the region is floored by Precambrian-age metamorphic and igneous rocks), when oceans left layers of sediment that overtime became lithified into the rocks we see today. Additional layers accumulated in the Mesozoic, including thick layers of wind blown dune sand. One of the most geologically intriguing features of the Colorado Plateau is its remarkable stability. Relatively little faulting and folding has affected this high, thick crustal block within the last 600 million years, so those millions of years of earth's history are still in the order they were deposited, a geologic timeline for us to read. In contrast, the rocks of the MRM and BR have been tilted, faulted and folded such that the youngest rocks are not necessarily on top. Beginning about 20 million years ago, during the Miocene Epoch both the Basin and Range and Colorado Plateau regions were uplifted as much as 3 kilometers. As the land rose, the streams cut deep channels. The forces of erosion have exposed the Plateau's vivid rock layers.		aerial photos of Colorado Plateau; photos of Grand Canyon, Bryce Canyon, diagrams of formation, uplift, erosion
LD3.E01.gr02			Bioregions				
	LD3.E01.gc01	graphic captions	Captions for bioregions				photos of bioregions; map showing locations of bioregions
	LD3.E01.fp01	focus panels	Focus panel describes CP bioregions		Bioregions are natural assemblages of plants and animals with discernible but dynamic boundaries. Bioregions are defined by physiographic and climatic limits that define the natural communities of organisms. The Colorado Plateau encompasses a unique combination of diverse geologic substrates, landforms, and climatic gradients, so it has many bioregions. An important part of the bioregion concept is the inclusion of cultures; humans and their history are linked to the soil, plants, and animals around them.		
	LD3.E01.gi02	graphic image	Photo collage of Colorado Plateau bioregions				
	LD3.E01.gc02	graphic caption	captions for photos				
	LD3.E01.ar01	artifact label				Sample of cryptobiotic soil in enclosed dish	
LD3.E01.gr03			Erosion				
	LD3.E01.in01	interactive	Visitors will control water to create a diverse array of erosion patterns in a flat bed of sand that they smooth out and manipulate. The patterns will vary depending on how they distribute the sand and how quickly the water is released to flow through the sand.	The power and infinite potential of water as a force that moves and shapes the land.	Downcutting is a geological process that deepens the channel of a stream or valley by moving the sediment. Lateral erosion widens the stream or valley when downcutting approaches its base level. These two geological processes have shaped Utah's diverse and unique landscape.		

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	LD3.E01.ms02	mindset panel	Mindset panel describes erosion	Water is very good at moving sediment, and is one of the most powerful Earth shaping forces.	The water picks up sand and clay from the river channel , moves it further downstream, redepositing it in slower river waters, also lakes, ponds, playas, etc. or in the ocean. Either way, sediment from the upper reaches of the river travels downstream until the river cuts the channel down to sealevel. The movement of sediment, or rock particles is called erosion. Canyons form by weathering and erosion of sediment, or downcutting of the river channel through geologic formations.		
LD3.E01.gr04		graphic rail					
	LD3.E01.ap01	activity prompt	instructions for the erosion table	How would you sculpt the land? See how water shapes a sandy landscape…			
	LD3.E01.gi01	graphic image	Photo collage of eroded features of the Colorado Plateau				Photo of the confluence of the Green and Colorado Rivers, Gooseneck, river meanders
	LD3.E01.gi02	graphic image	Diagram showing downcutting				
	LD3.E01.gi03	graphic image	Diagram showing lateral erosion				
	LD3.E01.gc01-gc04	graphic caption	captions for photos				
LD3.E02 Index Fossils							
LD3.E02.ic01		inset case	Case with index fossils associated with geologic time periods, set into photomural of Colorado plateau.				
	LD3.E02.ar01	artifact label	Neogene			a3243, a3244, a3245	
	LD3.E02.ar02	artifact label	Paleogene			a3241, a3242	
	LD3.E02.ar03	artifact label	Cretaceous			a3240	
	LD3.E02.ar04	artifact label	Jurassic			a3239	
	LD3.E02.ar05	artifact label	Triassic			a3238	
	LD3.E02.ar06	artifact label	Permian			a3236, a3237	
	LD3.E02.ar07	artifact label	Pennsylvanian			tbd	
	LD3.E02.ar08	artifact label	Mississippian			a3235	
	LD3.E02.ar09	artifact label	Devonian			a3233, a3234	
	LD3.E02.ar10	artifact label	Silurian			a3230, a3231	
	LD3.E02.ar11	artifact label	Ordovician			a3228, a3229	
	LD3.E02.ar12	artifact label	Cambrian			a3227	
	LD3.E02.ms01	mindset	Mindset panel explains relative dating	Relative dating tells us which rock layer is older and which is younger; in general, the lower rocks are older, with younger rocks deposited on top of them.	Layers of sediment stack up with the oldest on the bottom and youngest on the top. Faulting and folding can turn them over and bend them, but originally, they are laid down in stacks. This simple concept called “Original Horizontality” is one of the most important in all of Geology. This fact helps geologists to determine if objects in layers are older or younger than objects in other layers, although they will not know how much younger or older. It allows anyone to know the relative ages of events in Earth history. Fundamental Principles of Relative Dating: 1. Superposition - oldest layer on bottom, youngest on top along with fossils within the layers 2. Original horizontality - sediments deposited in horizontal layers 3. Cross-cutting relationships - igneous intrusions or faults must be younger than the rock they intrude or displace" 4. Law of Cross-Cutting Relationships - An intrusion or fault that cuts through another rock is younger than the rock it cuts. [Sills vs buried lava flow? Must look for heat		

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					5. Principle of Inclusion -Inclusions are older than the rock that contains them. 6. Principle of Faunal Succession - Fossil organisms succeed one another in a definite and determinable order, so any time period can be recognized by its fossil content. General evolution pattern is from simple to complex organisms		
	LD3.E02.gi01	graphic image	biostratigraphy diagram				
	LD3.E02.gc01	graphic captions	Captions for biostratigraphy diagram	We use fossils to help us correlate rock layers in a region. If the same fossil occurs in both places, the rocks are of the same age.	Index fossils are easily identified, geographically widespread, and existed for a short period of geologic time. They are great time markers - if you find one, you know relatively, you need radiometric dating for "exact" dates "when" you are. Finding index fossils in different places lets you correlate one rock layer in one region to another in a different region. The process of dating rocks by their fossils is called Biostratigraphy, which means basically "The study of layered life". In this display, we've placed some important Utah index fossils.		diagram/illustration of biostratigraphy
LD3.E02.gr01		graphic rail	Prosauropod Fossil				
	LD3.E02.gi01	graphic image	Contextual image of the landscape and illustration of Prosauropod, to help visitors identify the specimen				
	LD3.E02.sx01	special exhibit	prosauropod specimen			Prosauropod specimen A1183	
	LD3.E02.ar09	artifact label	Label for prosauropod fossil		Prosauropods are the ancestors to the long necked giants found later in the Jurassic, but this type of dinosaur is only found during the early Jurassic. This animal roamed the Sahara-like desert of Utah 195 Ma. The fossil is in such an odd position, that it seems a sand dune collapsed, trapping the prosauropod inside until recently. Body fossils such as this are very rare in the desert sand deposits, making this find quite important. Additionally, it adds a sense of life to the mostly barren landscape of Utah 195 Mya.		
	LD3.E02.fl01	family label	Family label for prosauropod	This is the first prosauropod skeleton found in Utah.	This partial dinosaur skeleton was found recently by the Utah Museum of Natural History in the Comb Ridge area of southeastern Utah between Bluff and Blanding. What can we learn from it? The bones are articulated, which means the body was buried whole, with skin and muscle holding the bones together. Also the skeleton hasn't moved much since it was buried. Scientists think a sand dune collapsed on the dinosaur, burying it in place. Can you see the back bones, the hand, and the foot?		
LD3.E03 Colorado Plateau Stratigraphy			An abstracted stratigraphic wall of the Colorado Plateau shows the colorful layers and different rock types.		A column of rock layers demonstrates the stone layers and sequences that are found in the Colorado Plateau. In the diagram, there is an emphasis on Navajo sandstone which places it at the level of the tabletop and alligns it with the aeolian landscape, pothole, crossbedded stone sample and prosauropod, which can all be found in sandstone.		
	LD3.E03.sx01	special exhibit	Stratigraphy Wall				
LD3.E03.gr01		graphic rail	Stratigraphy				
	LD3.E03.ar-	artifact labels				artifact labels for each level of the strat column- tbd	
	LD3.E03.gi01	graphic image	Biostrat diagram (explains column)				diagram of strat column with layer groupings, layer cake formation explanation and photos of Utah examples.

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	LD3.E03.ms01	mindset panel	Mindset panel describes the layers of the Colorado Plateau	The Colorado Plateau is a "lithic layercake."	Throughout the Paleozoic Era the Colorado Plateau region was periodically inundated by tropical seas. Thick layers of sediment were deposited in these seas that became the limestone, sandstone, siltstone, and shale of the CP. Over 300 million years passed as layer upon layer of sediment accumulated. Then, in the Age of Dinosaurs, huge accumulations of dune sand was deposited and later hardened to form sweeping arcs of cross-bedded sandstone. Eruptions from volcanic mountain ranges to the west buried vast regions beneath ashy debris.		
LD3.E04 Weathering and Erosion			This exhibit area is a stylized setting evoking eroded rock formations and exposed stratigraphy. A Sand dune formation interactive shows that dune formation is a depositional process.				
LD3.E04.gr01		graphic rail	Weathering and erosion				
	LD3.E04.ms01	mindset	Mindset panel explains the relationship of weathering and erosion	Weathering and erosion are major shapers of the landscape and are an important part of the rock cycle. Weathering is the deconstruction of rocks, erosion is the movement of rock particles.	Weathering happens through physical interaction such as rain hitting rocks, freeze-thaw action, or from rock particles slamming into one another. Weathering breaks up rocks into particles; erosion is the movement of these weathered rock particles. Unlike earthquakes and volcanoes, these shapers of the land work slowly and gradually, but they also produce dramatic results.		
LD3.E04.gr02		graphic rail	Sand Dune Interactive				
	LD3.E04.in01	interactive- Erosion Table	Sand dune formation interactive- (Aeolian landscape with Utah-specific context.)				
	LD3.E04.ap01	activity prompt	Instructions for the use of the sand dune interactive	Use your blower to shape the landscape			
LD3.E04.gr03		graphic rail	Potholes				
	LD3.E04.sx01	special exhibit	Pothole aquarium exhibits set into table top.			Triops live display	
	LD3.E04.fp01	focus panel	Focus panel describes potholes and pothole organisms	In the deserts of Southern Utah, vernal or ephemeral pools occur that remain dry for much of the year. When they are filled with rain water, the dormant life forms that inhabit them spring to life.	Potholes are common in Southern Utah where they form in bedrock, most typically sandstone. They form through weathering and erosion. Potholes are unique ecosystems. Many potholes have endemic fauna and flora. Potholes are hard living environments. They often dry up, they may freeze and they have rapid changes in water temperature and pH. The animals and plants that can live in potholes have found a unique biological niche. They can lie dormant for 4 years, then when brought to life by rain, live an entire life cycle in just 20 hours!		photos, diagrams or illustrations of pothole creatures; photo of dry pothole and filled pothole
	LD3.E04.ar01	artifact label	Label for pothole organisms		tadpole shrimp Triops sp. Well adapted to life in the desert, these crustaceans live in temporary rainpools which form in low lying areas during the summer monsoons. Hatching from eggs which have lain dormant in the soil, they mature quickly feeding on detritus washed into the pool, mate, and deposit their eggs before the pool dries up.		
LD3.E04.gr04		graphic rail					

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	LD3.E04.fl01	family label	Family label at pothole window	Tadpole shrimp spring to life when it rains.	Triops, or tadpole shrimp, have adapted to life in potholes. Their eggs stay in dry potholes for many years. When the pool fills with water, some of the eggs hatch. It takes less than a day for the shrimp to grow from egg to adult! They take advantage of every moment when the pothole is water-filled.		
	LD3.E04.ar02	artifact label	Label for crossbedded sandstone		The angled pattern seen on the side of this sandstone is evidence of windblown sand dunes. In which case the foresets ("angles") are the preserved remnants of the leeward side of the dune.		
LD3.E05 CP Plants			Plant diversity of the CP				
LD3.E05.gr01		graphic rail	CP Plants				
	LD3.E05.ms01	mindset	Mindset panel describes the CP plants and their relationship with the land	The Plateau, with its range of soils and elevation, is marked by great ecological diversity.	On the semi-arid Colorado Plateau elevation is an important factor in determining what assemblages of species or biotic communities occur in a given location. At higher elevation, it's colder and rainier. The Plateau is marked by great ecological diversity. Climate, elevation, and soil combine to create many micro-zones that support an amazing range of plants and animals. Six of the seven North American life zones are represented on the Plateau (only subtropical is absent), a rare biological occurrence.		
	LD3.E05.in01-in03	interactive	Interactive of plant scents	on panel			
	LD3.E05.ap01	activity prompt	prompt for scent interactive				
	LD3.E05.sx03-sx06	special exhibit	soil samples for each				
LD3.E05.gp01-gp30			CP Plants flip book				
	LD3.E05.sx01-sx03	special exhibit	3 herbarium flip books with 10 plants/ea.	on panel		A1890-1905	
	LD3.E05.ar01-ar30	artifact label	artifact label for specimens				
LD4 Basin and Range							
	LD4.si01	section title	Title and subhead	The Basin and Range consists of a series of north-south trending mountains isolated by elongate flat basins. This topography is a result of the “stretching” of the western US region that began about 30 mya and continues today.	The name comes from the wide basins stretching between mountain ranges from central Utah through western Nevada.		
	LD4.E01.gi01	graphic image	Graphic imagefor Basin and Range				
	LD4.E01.pm01	photomural	Photomural of the Basin and Range		caption for photomural		
LD4.E01 Rock Cycle			Visitors see a large diagram of the rock cycle illustrated with rock specimens.				
	LD4.E01.ms01	mindset	Mindset panel describes rock cycle	Rocks are recycled over time; they may return to the mantle layer, be broken down into sediments and redeposited, combined with organic matter to form soil, or transformed into other kinds of rocks.	Everything in the Earth gets reused and recycled, including the rocks. The rock cycle is not one circle but a set of interconnected subcycles and transformations. There are three main rock types: igneous, metamorphic, and sedimentary. Igneous rocks form from crystallized magma. Metamorphic rocks form when any of the three rock types gets altered by heat and pressure. New minerals and rock structures occur in this process. Sedimentary rocks form from the weathering and erosion of any of the three rock types.		
	LD4.E01.gi02	graphic image	Graphic image of the rock cycle				

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	LD4.E01gc01-06	graphic captions	Captions describe the processes: heat and pressure, weathering, transportation, and deposition, cementation and compaction that cause the rock cycle.		Each segment of the rock cycle is typified by a series of processes that are unique to that portion. Heat and pressure Volcanic rocks are always melted, through subduction below another plate and at rift zones, and hot spots. Metamorphic rocks are always altered by pressure and/or temperature, but hardly ever fully melted. Different metamorphic rocks form by altering the temperature and pressure of the same original rock. Uplift Some of the same plate tectonic processes that form metamorphic rocks are responsible for starting the sedimentary cycle. Mountains form from the uplift of rocks during collision from another plate. When a region is uplifted, gravity intensifies erosive processes. Weathering The uplifted rocks start the sedimentary cycle because of weathering and gravity. The exposed rocks are broken apart by physical and chemical weathering processes, the gravity see above pulls them toward sea level.		
	LD4.E01.sx01	special exhibit	Sixteen rock touch samples mounted on graphic of rock cycle			conglomerate, sandstone, siltstone, claystone, coal, limestone, basalt, peridotite, rhyolite, granite, porphyry, marble, quartzite, gneiss, schist, metamorphosed basalt	
	LD4.E01.gi03	graphic image	Photographs connected to rock cycle samples	diagram of rock cycle; images of weathering and erosion, deposition, burial and heating placed in the appropriate positions in the graphic diagram of the rock cycle.			
	LD4.E01.ar01	artifact caption	Label for conglomerate		This type of sedimentary rock forms near the source, usually mountains, of the original rock. It consists of large chunks of rock, some rounded some not, as well as sand or or mud to cement to pebble to boulder sized chunks together.		
	LD4.E01.ar02	artifact caption	Label for sandstone		Further down river systems, the large chunks from conglomerates become broken apart to a sandstone. The term sand refers to the size of the mineral grains in this type of sedimentary rock. As one gets further down the river (or the longer it's been reworked by waves, etc.), the coarse sand becomes medium grained and then fine grained.		
	LD4.E01.ar03	artifact caption	Label for siltstone		Siltstone is made when sand grains get worn down more to silt size. When taken between your front teeth, silt will be gritty, but not rocky like sand.		
	LD4.E01.ar04	artifact caption	Label for claystone		Claystone, or mudstone, is the finest material in this group of sedimentary rocks. When taken between your front teeth you will not feel any grit with a pure clay stone. Special clay minerals form most of this rock type. Clay minerals are not quartz or feldspar, but unique to themselves.		
	LD4.E01.ar05	artifact caption	Label for coal		Plants pile up in low lying areas, underwater, oxygen absent., with very little input of sediment. The thickness of a coal layer is 10-30 times less the original thickness of the plants.		

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	LD4.E01.ar06	artifact caption	Label for limestone		Limestone takes a variety of forms (eg. stalactites, tufa, coquinas, oolites, micrites, crystalline, travertine, coral reefs, etc. etc.) and forms in a variety of ways. Limestone can be precipitated directly from water (chemical) or from organisms secreted it in their shells (biochemical) which rain down on the ocean/lake floor after the organism dies. The can also be a combination of both. Limestone is an important component of the earth's surface.		
	LD4.E01.ar07	artifact caption	Label for basalt		Mid-ocean ridges are the areas in the middle of oceans where new crust is being formed. The new crust comes straight from the Mantle of the Earth and is pure basalt. This igneous rock is made mostly of iron, with little quartz actually, basalt is primarily silica (basalt is about 45-52% silica) - as are all rocks), it just contains less than granite (>65% silica), etc.) . It occurs in hot spots like Hawaii also continental hot spots like the Snake River plain-Yellowstone.		
	LD4.E01.ar08	artifact caption	Label for peridotite		Peridotite is what composes most of the upper mantle. Gabbro is the intrusive equivalent of basalt if that is what is meant by "crystallized" . The green mineral is olivine.		
	LD4.E01.ar09	artifact caption	Label for rhyolite		Rhyolite has the same chemical make up as granite, it is just exploded from a volcano and the magma cools quickly. Quartz (also feldspar and plagioclase) is the dominant mineral.		
	LD4.E01.ar10	artifact caption	Label for granite		Granite is a magma that contains a very large percentage of quartz Silica. This magma cools very slowly in the Earth's crust, allowing time for large crystals to grow.		
	LD4.E01.ar11	artifact caption	Label for porphyry		Porphyry igneous rocks refer to any type of igneous rock where large crystals are surrounded by fine grained matrix. This occurs when the lava begins cooling slowly, giving time for the first crystals to grow, but then is erupted and the remainder of the lava cools quickly.		
	LD4.E01.ar12	artifact caption	Label for marble		recrystallizing limestone		
	LD4.E01.ar13	artifact caption	Label for quartzite		A sandstone gets heated and compressed, the edges of the sand grains melt together. This type of metamorphism is "Low-grade."		
	LD4.E01.ar14	artifact caption	Label for gneiss		Gneiss is formed from granite can also be other rock types that is taken to great temperature and pressure, enough to force all of the light colored together and the dark colored minerals together. The minerals align in response to the pressure .		
	LD4.E01.ar15	artifact caption	Label for schist		Schist is a general term for a metamorphic rock that is shiny due to the alignment of mica and other minerals caused by intense heat and pressure. It usually contains other minerals such as chlorite, talc, horneblende, quartz, and garnet. All schist is formed from mudstone or siltstone, but depending on the depth the rock is taken to, temperature and pressure changes creates different types of schist.		
	LD4.E01.ar16	artifact caption	Label for metamorphosed basalt		Amphibolite can form from the metamorphism of dolerites *(intrusive* ig rx), "dirty" marls, dolomites, etc. The primarily mineral is amphibole, sometimes tremolite or actinolite. Feldpar, pyroxene, chlorite, epidote and garnet can be present.		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGES	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
LD4.E03 Wasatch Fault/ Front			This exhibit area informs the visitor about the Wasatch front and fault. Visitors learn about faults through the manipulation of models and by enjoying the earthquake interactive.				
	LD4.E03.ms01	mindset	Mindset panel describes Wasatch Fault, associated dangers	You're in earthquake country! The Wasatch fault, the most significant fault in Utah, runs below the site of the museum.	A fault is a break in the earth's crust along which blocks of earth slip past each other. This slipping is the earth's way of adjusting to the buildup of strain within its crust. Movement can be horizontal, vertical, or both. The Wasatch fault is called a normal fault, a term that means that the slip is mostly vertical and the block that overhangs the fault plane (the valley block) has slipped down relative to the block that lies beneath the fault plane (the mountain block -i.e. Wasatch Range)). We know there have been many large earthquakes on the Wasatch Fault in the past. In many places, like the mouth of Little Cottonwood/Bells Canyon, there are fault scarps. Scarps (steep slope breaks) are also visible around Salt Lake City. The Wasatch Fault is essentially the boundary between the Basin and Range province to the west and the Middle Rocky Mountains to the east. The Wasatch Fault is just one of the many faults around the world.		
	LD4.E03.gi01	graphic images	images of scarps, triangular facets				
	LD4.E03.gi02	graphic image	Intermountain Wasatch Belt map				
	LD4.E03.gi03	graphic image	World earthquake map				
	LD4.E03.gc01	graphic caption	Caption for earthquake map		Most of the world's earthquakes and active faults occur in narrow belts that outline a mosaic pattern on the earth's surface, much like the patchwork surface of a soccer ball. These zones define the edges of large crustal plates. The plates ARE the earth's surface and part of the interior in different directions. Earthquakes occur as these plates slide by, bump into, plunge beneath, or spread apart from each other. Not all earthquakes and faults occur at plate margins, though. The Intermountain seismic belt (ISB), in which the Wasatch fault is located, is one example.		Map of globe showing recent earthquakes, faults, and plates; location of Wasatch Fault called out; map of intermountain west showing faults
	LD4.E03.in01	interactive	jump on seismometer			seismometer, jump pad, screen	
	LD4.E03.av01	av	av screen for seismometer				
	LD4.E03.gi04	graphic image	image on floor indicates to visitors they should jump and see results.				
	LD4.E03.ap01	activity prompt	prompt for seismometer	Jump on the circle and see the mini quake you made!	The seismometer picks up the vibration your jump made. Similar recording devices chart the energy released in earthquake waves.		
	LD4.E03.ar01	artifact label	Label for boulder with scarp				
LD4.E03.ic01		inset case	holds seismograph			seismograph	
Seismograph/ earthquake map	LD4.E03.sx01		Real-time seismograph with 3 remote stations. Remote stations capture the activity from: 1)Marysvale, UT 2) Yellowstone National Park 3) Hansel Valley Utah				

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	LD4.E03.fp01	focus panel	Focus panel describes earthquake monitoring and recording.	Seismographs detect the energy waves generated by earthquakes.	Networks of seismographs help us locate and monitor earthquake activity. When an earthquake happens, the location in the Earth's crust is determined by the triangulation method. Working back from when a seismograph records the earthquake, and comparing seismographs at different locations, we can roughly locate the earthquake. Each year, tens of thousands of small earthquakes occur throughout the United States. These quakes don't cause damage, and they earth provide a wealth of information that enables seismologists and engineers to better assess the distribution, frequency, and severity of seismic hazards throughout the country. Seismologists and engineers use this information to assess public safely and seismic design criteria, as well as basic research. The readout here is compiling date from 3 regional seismographs. Improved Seismic Monitoring - Improved Decision-Making: Assessing the Value of Reduced Uncertainty (2006) Board on Earth Sciences and Resources http://books.nap.edu/openbook.php?record_id=11327&page=77		
	LD4.E03.ar01-04	artifact captions	IDs describing seismographs above.		This readout compiles data from 3 seismographs located in different parts of the West. As the earthquake sends out waves they arrive at different times to the various seismograph stations. A central computer calculates and compares those times, circles are drawn according to the arrival times and the intersection of the circles marks the spot of the earthquake.		
LD4.E03.tt01		table top	Earthquake				
	LD4.E03.in02	interactive	Earthquake interactive- a step on shake platform. Visitors select one of the local earthquakes, and experience the magnitude of the quake. A monitor displays the seismographic read out for that earthquake.	Pick your quake and rattle and roll	23 mi. NW of Brigham City Utah 9/6/2008 mag. 3.1 near Magna, UT 5/34/06 2.3 Wells UT/NV border 2/21/2008 mag. 6.0 Herriman Utah 1992 4.3 mag. 16 miles SE of Salina UT 1/29/89 mag. 5.4 SF 4/18/1906 7.9 Loma Prieta 10/17/89 mag. 6.9 or Northridge 1/17/94 mag. 6.7		
	LD4.E03.ap01	activity prompt	for earthquake interactive		touch epicenter to experience the quake		map showing earthquake locations
	LD4.E03.gi01	graphic images	fault diagrams				
	LD4.E03.gc01	graphic caption	text describing fault types	There are three types of faults: Normal, strike-slip and reverse faults.	Normal faults are high angle faults where the hanging wall slides down relative to the footwall. The hanging wall is the block that lies above the fault plane. The footwall lies below the fault plane. The hanging wall is *never* below the footwall They are named that because this was the kind of fault that 18th century English coal miners Normally found within the mines. A reverse fault is where the hanging wall moves up relative to the footwall. A Strike-slip fault is when fault blocks slide past one another laterally.		fault diagrams
	LD4.E03.gi02	graphic images	earthquake damage photos				
	LD4.E03.gc02	graphic caption	captions for earthquake damage images				photos of earthquake damage to match quakes in interactive, also historical (alaska, san francisco)
LD4.E04 Human Interactions			Visitors look at a display of objects and graphics that tells the story of the interactions of people and Utah's landscapes. Human activities like mining, grazing, and development are rapidly changing the				
LD4.E04.tt01		tabletop	Human Interactions				

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	LD4.E04.av01	av	This digital talkback station gives visitors a chance to type in their responses to a prompt on the monitor, take a photo, and contribute to an ongoing blog about their connection to the land and sustainability.				
	LD4.E04.ap02	activity prompt	Prompt encourages visitors to record their connections to sustainability related to Utah				
	LD4.E04.ms01	mindset	Mindset panel about mining, grazing, climate change and development and its effects on the land.	Because of its diverse geologic history, Utah's landscape is rich with resources. Resource acquisition and use has a significant impact on the land.	Utah's grand geologic history has produced many resources useful to humans, such as those minerals found underground. Utah also has a climate and ecosystem ameniable to grazing. And Utah's rising population has caused expansion into rural areas. All of these changes require destroying altering the original landscape in order to take advantage of the resources. Over one hundred years of resources utilization has left areas of Utah in dire need of conservation in order to maintain a semblance of its original legacy. Humans are changing the landscape at rates that are orders of magnitude above the natural processes the formed it.		
	LD4.E04.rc01	rail case	Mining			mined minerals	
	LD4.E04.ar01	artifact label	Label about mining and the formation of the Bingham Canyon stock.	tbd	Utah's mineral resources are often associated with igneous activity during the Tertiary. Hot, molten rock intruded the country rock, causing adjacent rocks to be metamorphosed and hot fluids to run through veins and cavities. Precious metals and minerals are formed in this fashion. Bingham canyon has one of the richest deposits of minerals on earth.		
	LD4.E04.gi01-gi05	graphic images-	A series of before and after images including maps and photos reveal changes in land use and transformation of the landscape and geoantiquitieis due to grazing, mining, development, and climate change.				
	LD4.E04.gc01-gc05	graphic captions	Graphic captions accompany before and after photographs. Topic is a futures component: human interactions can either exacerbate or mitigate effects of global warming—as indicated in Eric and Becca's work on changes in climate that change the ecosystem.	Humans are causing the climatically sensitive taxa to shift their living ranges higher.	Global warming is causing the global temperature to rise. At the end of the Pleistocene, rising temperature caused organisms adapted to the cold to live on mountains where temperatures still were cooler, leaving the mountain valleys. The rising temperatures due to human induced green house gases are causing the same effect. Researchers are the Utah Museum of Natural History are showing that plants and animals sensitive to temperature and rainfall are actually living higher on the mountain to stay within their preferred cooler climates, as compared to 80 years ago.		
	LD4.E04.sp01	story panel	story about mining from multiple viewpoints				photo of speakers
	LD4.E04.sp02	story panel	story about grazing from multiple viewpoints				photo of speakers
	LD4.E04.rc02	inset case	Grazing			chains used for grazing	
	LD4.E04.ar02	artifact label	artifact label that explains how chains are used				
	LD4.E04.sp03	story panel	story about climate change				photo of speakers, Daybreak
	LD4.E04.gc02	graphic captions					
	LD4.E04.sp04	story panel	story about development				photo of speakers
	LD4.E04.sp05	story panel	story about geoantiquities				

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	LD4.E04.rc03	inset case	Development			Sand and gravel	
	LD4.E04.ar03	artifact label	label for sand and gravels		Sands and gravel is not just a pile of dirt! These deposits contain information about Utah's recent geologic history. Many of the landforms are being destroyed to build highways and buildings. What is the value of these geoantiquities? (scientific, educational, aesthetic, historical values)		
LD4.E06 B & R Formation			Visitors see graphics, read texts and manipulate interactive model to gain an understanding of the B&R formation.				
	LD4.E06.ms01	mindset	Mindset panel describes the formation of the Basin and Range	The Basin and Range formed when the earth's crust and mantle stretched - over 100%! Los Angeles would have been a suburb of Salt Lake City before the expansion.	During the late Cretaceous and early Tertiary the Rocky Mountains were pushed up by the Pacific plate sliding to the east under North America. However, about 20 million years ago the plate changed directions and started moving toward the northwest. The change in direction of the Pacific plate, along with the friction created by the movement of the plate under North America, caused the previously compressed area to begin spreading out, and created a series of faults. The valleys seen throughout western Utah and Nevada are the areas of land being dropped by the normal faults. The mountain ranges are the areas not being dropped.		aerial view of Basin and Range; map/diagram of Basin and Range; diagrams of formation
	LD4.E06.gi01	graphic image	aerial view of Basin and Range; map/diagram of Basin and Range; diagrams of formation				
LD4.E06.tt01		table top	Expansion				
	LD4.E06.in01	interactive	Mountain and valley interactive- This interactive demonstrates the formation of the Utah mountains and valleys by modeling the changes in the terrain that resulted from the separation of tectonic plates.		The interactive is built into a counter and protected by an acrylic cover. A lever protrudes from between simulated rock layers in the counter. • The visible part of the interactive is comprised of parallel angled “blocks” that separate as the lever is pulled to the left. As the expansion occurs the “secondary blocks” descend between the “primary blocks” that remain level as they move. • A concealed scissor mechanism simultaneously replicates this action across the interactive. • A hydraulic or electromechanical device resets the interactive to the compressed configuration after it is expanded and the operator releases the handle. • A system of tracks, block carriages, block support posts and a scissor apparatus is illustrated in the drawings as a conceptual basis for the mechanical operation.		
	LD4.E06.ap01	activity prompt	Activity prompt encourages visitors to raise the lever that results in the rock layers expanding.				
LD4.E07 House Range							
LD4.E07.tt01		table top	Utah's Cambrian				
	LD4.E07.rc01	rail case	Rail case holds trilobites and soft-bodied creatures from the House Range			A0978-990	
	LD4.E07.ar01	artifact label	Label for trilobites				
	LD4.E07.ar02	artifact label	Label for soft-bodied animals				images of creatures in life

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	LD4.E07.fp01	focus panel	Focus panel about the House Range and Utah's cambrian fossils.	Utah contains some of the most spectacular Cambrian fossils in the world	Very few places in the world preserve fossil organisms without hard shells. Utah is one of those places. The Spence Shale, of the House Range, is one of the best examples of these special fossil deposits where rare organisms such as soft worms are preserved. In addition to this, the House Range contains an amazing array of Trilobites and other fantastically preserved animals. These organisms were likely preserved in deeper ocean with very little oxygen, which prevented rapid decay and allowed burial and fossilization. Exposures of these fossil beds within the Basin and Range are some of the best places to find these animals in the world.		
LD4.E07.gr01		graphic rail	LD_PW overlook				
	LD4.E07.gi01	graphic image	geologic map with sites and time frames of PW scenes				
	LD4.E07.gc01	graphic caption	captions call out time periods on map				
LD4.E08 Island Biogeography			Illustration of elevation and latitude and the biodiversity among the gradient (see our Wasatch installation). Relic refuge=high places remained a refuge for plants and animals as the ice age ended. Incipient speciation; mountain ranges provide isolated habitats, which is the foundation for speciation. The isolation was creased via global warming at end of last ice age. Continued global warming due to human interactions has changed modern geographic/elevation range of animals.				
	LD4.E08.ms01	mindset	Mindset panel explains island biogeography and how it affects Utah	Sometimes populations become isolated when their preferred habitats become isolated, as on distinct ocean islands, or islands of mountains separated by desert.	Island Biogeography is a term that describes the isolation of organisms because their preferred habitats are isolated. Like islands in the ocean, mountain ranges can isolate organisms adapted to certain climatic conditions. The areas in between the mountain ranges are not suitable for the organisms to survive and are equivalent to the ocean between islands. We see this in the Great Basin, where desert expanses separate mountain ranges. Once populations are isolated, they may diverge,, ultimately evolving into different species. There are 15 mountain ranges exhibiting Island Biogeography in Utah.		diagram of island biogeography; map showing mountain ranges in Utah that exhibit Island Biogeography, or a Sat photo showing the B&R mountains and valleys.
	LD4.E08.av01	av	animated film depicts biogeography		Visitors watch a short animation that shows how 'sky islands' form and may result in separation of populations of organisms		
LD4.E09 B & R Plants, Soil, Parent Rock, Cryptobiotic Soil			Display of plants illustrating the relationship between surface geology, soil, and plants. Plants are displayed according to the elevation at which they grow.				

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	LD4.E09.ms01	mindset panel	Mindset panel describes elevation and plant communities.	Because elevation in the Basin and Range varies thousands of feet, multiple plant communities live here.	Three major plant communities grow in the Great Basin and Columbia Plateau: sagebrush, salt desert shrub, and pinyon-juniper woodlands. Temperature and moisture dictate where each is found. Salt desert shrub usually grows in low, dry elevations, whereas sagebrush requires surroundings with greater moisture levels and sandy, slightly alkaline soils. Pinyon-juniper woodlands occur at the base of mountains, while forests of pine, spruce, fir, and aspen blanket the high peaks. The sagebrush community, which consists of a mixed mosaic of shrubs, perennial grasses, and forbs, is the most common. These plant communities are home to more than 200 bird, 70 mammal, and 20 amphibian and reptile species.		photo/diagram of different plants at different elevations; photos of different plant communities
LD4.E09.gr01-gr05		graphic rails	Basin and Range plants				
	LD4.E09.gp01-50	graphic panels	10 graphic panels on each graphic rail				
	LD4.E09.gi01-gi05	graphic images	images of each elevations with key plants and animals highlighted				
	LD4.E09.gc01-gc05	graphic caption	captions for elevation images				
	LD4.E09.gi06-gi11	graphic image	1 soil profile (on rail adjacent to plant flip book)				soil and parent rock samples
	LD4.E09.gc06-gc11	graphic caption	caption for soil profile			cryptobiotic soil A2051	
	LD4.E09.in01-in05	interactive	Plant scent activity				
	LD4.E09.ap01-ap05	activity prompt	for plant scent activity				
	LD4.E09.sx01-sx05	special exhibit	Basin and Range plant flipbook	5 plant booklets w. with 10 pages each.			
	LD4.E09.sx06-sx11	special exhibit	Soil samples for each plant book				
	LD4.E09.ar01-ar50	artifact labels	artifact labels for herbarium samples				
	LD4.E09.gc11-15	graphic captions	captions for plant context photos, whole plant photos				
LD4.E10 Homestead Cave							
LD4.E10.tt01		table top	Table top with magnifiers lets visitors examine the evidence from Homestead Cave, and see how it holds a record of changing climate. Visitors see a sediment core from Homestead Cave with an associated timeline and temperature chart.			soil core, a2361-a2365	
	LD4.E10.ms01	mindset	Mindset panel describes how Homestead Cave records past fauna and climates	Eight feet of sediment in Homestead cave preserves a record of natural resources and changes in the land. This evidence of past climate change was collected and left by the animals that used the cave over thousands of years.	Homestead Cave is a shallow (~50 ft deep) cave that contains ~8 ft of sediment preserving a record of the animals that used the cave over the last 11,000 years. Plants that are present were either blown in by the wind or brought in by animals. The cave located on the NW side of the Great Salt Lake above one of the ancient Bonneville Shorelines (the Provo shoreline). Humans discovered the cave 5000 years ago, but it seems they did not use it very much. Luckily, the cave was utilized by lots of animals, especially owls and pack rats, and the skeletal remains of vertebrates, along with the seeds, pollen, and plant materials they gathered and ate, can be used to see changes in climate through time.		photo of Homestead Cave

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	LD4.E10.gi01	graphic image	Label for sediment core showing climate shift and timeline graphic				
	LD4.E10.ap01	activity prompt	Prompt encourages people to use magnifiers to see layers of the core				
	LD4.E10.gi02	graphic image	climate shift and timeline graphic				
	LD4.E10.gi03	graphic image	Illustrations show the deposition in the cave.	18 distinct time slices are captured in the debris of the cave.	Deposition did not occur at an even pace, but instead experienced episodes of hiatus creating a stratigraphy that allows scientists to divide the cave deposit into 18 distinct time slices. Almost all of the vertebrate remains found in the Homestead Cave were deposited within owl pellets. After examining the numbers of kangaroo rat, pocket mouse, and hackberry nutletts, scientists were able to find evidence of climate change in the past 11,000 years, from a cooler wetter climate to the drier climate we know today.		Schematic illustration of Homestead Cave section, photo of Homestead Cave, key map of Homestead Cave, owl image
	LD4.E10.fp01	focus panel	Focus panel ties k-rat specimens to the matrix example				
LD4.E10.rc01		rail case					
	LD4.E10.ar02	artifact label	Label for first Kangaroo rat skull and skin		Kangaroo rat and pocket mouse remains Rodent remains such as two species of kangaroo rat (Dipodomys microps and ordii) and two species of pocket mouse (Peromyscus parvus and longimembris) are valuable food sources for raptors like the owl. Kangaroo rats are the most abundant component of the vertebrate remains in the Homestead Cave assemblage. Pocket mice are also abundant.	A2364	
	LD4.E10.ar01	artifact label	Label for plant specimens				
	LD4.E10.gi04		Image of shadscale and sagebrush habitat				
	LD4.E10.gc03	graphic caption	Caption for habitat photo				
LD4.E10.rc02		rail case					
	LD4.E10.ar04	artifact label	Label for second Kangaroo rat skull and skin		Kangaroo rat and pocket mouse remains Rodent remains such as two species of kangaroo rat (Dipodomys microps and ordii) and two species of pocket mouse (Peromyscus parvus and longimembris) are valuable food sources for raptors like the owl. Kangaroo rats are the most abundant component of the vertebrate remains in the Homestead Cave assemblage. Pocket mice are also abundant.	A2364	
	LD4.E10.ar03	artifact label	Label for plant specimen				
	LD4.E10.gi05		Image of sagebrush habitat				
	LD4.E10.gc04	graphic caption	Caption for habitat photo				
LD4.E10.rc03		rail case					
	LD4.E10.ar05	artifact label	artifact label for owl and owl pellets		Owls eat their food whole, digesting the meat from small mammals while leaving their bones. They then regurgitate all of the bones and fur of their prey into convenient packages that are finely preserved in Homestead cave. By tracking the types of animals found in the pellets, changes in faunal composition can be seen.	A2361, 2362, owl tbd	
LD4.E10.rc04-rc07							

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	LD4.E10.ar06	artifact label	Artifact label for wood rat fecal pellets		Wood rat midden and pellets Wood rats and pack rats (Neotoma spp.) both create middens, which are large nests of gathered sticks, grass, bones, and almost anything else they can find within their foraging range. They like to build their middens in crevasses and caves and were active in a portion of the Homestead cave. In turn, raptors eat the rats, and left their remains within the cave.	A2263	
	LD4.E10.ar07	artifact label	Artifact label for Hackberry nutlets		Hackberry plant Hackberry (Celtis reticulata) is a small bush that provides a fruit with a large nutlett. It provides food for a large number of vertebrates including small birds and rodents. The nutletts are extremely well preserved in the sediment record and also provide a valuable record of changes in plant abundance through the Homestead Cave deposit.	A2365	
	LD4.E10.ar08	artifact label	Fish vertebrates, yellow bellied marmot, vole-Microtis and perhaps skeletal elements from shorebirds-			specimens tbd	

LIFE

Explore the structure, function and evolution of life from genes through regional ecosystems.
1. To fully understand the properties of life, we need to study it at different physical scales.
2. Utah's diverse geography has given rise to rich biotas whose species interact with each other and the physical world.
3. Life's diversity is the result of evolution reshuffling the same "biobytes."

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LF1 Introduction			Entering from sky, visitors will see an animated light display of examples of different scales of life, from single cells to ecosystems. These slide projections include examples of the key Utah critters, and introduce visitors to the idea of scales of life, and to the Utah critters they will see throughout the observatory.				
	LF1.E01.ip01	introductory text	Title, quote/question, text	All living things are related; these genetic relationships can be charted on a tree of life. In this exhibit, you will meet plant, micro-organisms, and animals that live in Utah, and see them at different scales of life, where they have different stories to tell.	Life on Earth is diverse - from bacteria that live in deep sea vents to sagebrush in the Great Basin, to the migratory birds that fly over Great Salt Lake every year. Estimates vary, but there are more than 1.6 million known species of organisms. Life is also related - all living things share a common ancestor, and DNA. And life exists at different scales, from single-celled creatures invisible to the naked eye to towering redwoods hundreds of feet high. In this gallery we will explore these scales of life, and you will meet some of Utah's bacteria, plants, and animals.		
	LF1.E01.av01	av	Gobo projections on entry wall show a sequence of five images of a Utahn pronghorn or pinon jay in five scales of life-- from cellular structure to ecosystem. There are two different images that cycle in the projections.				pronghorn, pinon jay
	LF1.E01.gi01-gi09	graphic images					key plants and animal images- 1 plant and 1 animal per scale, only one per ecosystem.
	LF1.E01.ip02	introductory text	Title, quote/question, text	The diversity of life plays out at the ecosystem level, as groups of organisms interact. We need to preserve this diversity to maintain the healthy ecosystems we all depend on.	An ecosystem is an area and all the micro-organisms, plants, and animals that live and interact there, as well as non-living elements (like soil or rocks). At this scale of life, populations of different living things interact in different ways. Energy enters ecosystems, and flows through them. The ecosystem is the broadest scale of life depicted in this gallery. You will see 4 of Utah's ecosystems, and some of the other scales of life as you explore this gallery.		
	LF1.E01.gi10	graphic images	Parade of Life illustrations				
LF2 DNA, Amino Acids and Proteins			Visitors walk around and under a sculptural element depicting an unraveling DNA double helix.				
	LF2.si01	section intro		All life has DNA; DNA stores the instructions for building and reproducing organisms.	At this scale of life, we're deep inside cells, at the level of DNA, amino acids, and proteins. DNA is the underlying basis of inheritance. When DNA is copied errors, or mutations, can occur. You will see how DNA tells the cell how to construct proteins. We'll use the protein keratin as an example to show how important proteins are to us and other lifeforms.		
LF2.E01 DNA							
	LF2.E01.sx01	special exhibit	DNA/mRNA sculpture descending to the wall interactive				

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	LF2.E01.ms01	mindset	Mindset text describes the role and components of DNA., with diagram of DNA; written as captions for the DNA sculpture.	DNA, or deoxyribonucleic acid, stores hereditary information in a code.	DNA, or deoxyribonucleic acid, stores hereditary information in a code made up of four chemical bases: adenine (A), guanine (G), cytosine (C), and thymine (T). The order, or sequence, of these bases determines the information available for building and maintaining an organism. DNA bases pair up with each other, A with T and C with G, to form units called base pairs. Each base is also attached to a sugar molecule and a phosphate molecule. Together, a base, sugar, and phosphate are called a nucleotide. Nucleotides are arranged in two long strands that form a spiral called a double helix. The structure of the double helix is somewhat like a ladder, with the base pairs forming the ladder's rungs and the sugar and phosphate molecules forming the vertical sidepieces of the ladder.		diagrams of DNA, protein synthesis
	LF2.E01.gi01	graphic image	DNA replication diagram		An important property of DNA is that it can replicate, or make copies of itself. Each strand of DNA in the double helix can serve as a pattern for duplicating the sequence of bases. This is critical when cells divide because each new cell needs to have an exact copy of the DNA present in the old cell. Mutations, or changes in the DNA code, happen if errors occur in copying DNA.		diagram of DNA replication
LF2.E02 Building Proteins			Visitors help assemble the keratin amino acid sequence by matching messenger RNA puzzle pieces to the unraveling DNA strand past a strand of messenger RNA on an unraveled DNA helix, and see a keratin molecule strand being assembled. They play the keratin sequence game, following a "recipe book" to insert different amino acids at critical positions in the sequence, and see how readily proteins change.				
	LF2.E02.gp01	graphic panel					
	LF2.E02.ms01	mindset	Mindset text explains protein synthesis and the roles of DNA and mRNA	The information in DNA is translated to make proteins, a key building block of cells. Proteins change readily, resulting in physical changes in an organism.	The process of making proteins is very precise. First, the DNA molecule unzips. One strand is the template for a strand of mRNA. (RNA is a nucleotide, like DNA, with a slightly different chemical structure). Then, the strand of mRNA goes outside the cell nucleus to the ribosomes. A ribosome is a complex of RNA and proteins where protein assembly takes place. The mRNA code sequence is matched to a complementary tRNA (transfer RNA) molecule. Each tRNA is linked to an amino acid, and as the mRNA is read off, the amino acids on each tRNA are joined together through peptide bonds, forming an amino acid chain. This chain is the basis of a protein.		diagram of protein assembly

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	LF2.E02.in01	interactive	Protein synthesis game: Visitors match the mRNA puzzle pieces to the base pairs on the DNA strand	Visitors understand that DNA stores information that is translated into proteins.	•Visitors complete an amino acid chain, acting as transfer RNA to pair up an amino acid to the correct 3 base sequence (codon) on a strand of DNA. • Using a color-coded key, visitors pick from a bin of amino acid puzzle pieces. They match the 3 amino acids in sequence; when the chain is completed, it lights up. The lit chain extends to the Keratin Tree game. • Visitors are encouraged to detach the puzzle pieces and return to the bin.		
	LF2.E02.ap01	activity prompt	Prompt for protein synthesis game				
	LF2.E02.in02	interactive-Keratin sequence game	Visitors see rows of letters representing the amino acids in part of the sequence of a keratin protein for 14 different animals: rhizobium, amanita, mormon cricket, harvester ant, pronghorn, humans, mountain lion, pika (or kangaroo rat) desert tortoise, pinon jay, spruce (or pine) yucca and Utah bunchgrass. Next to this set of sequences is a tree with graphics of the 14 animals, and screens at the end points and at the branching points. As visitors look across the rows they notice that most of the letters are the same and match in neat vertical columns. At least three of the columns show that there is sometimes a variation in this pattern. Visitors push a button to select one of 3 highlighted column positions on the keratin sequences. Letters appear on the screens at the end points to match the amino acid letters at the chosen position.	Visitors understand that mutations are inherited, and that genetic variation is one basis for building a tree of life.	Visitors pull a lever to select one of 3 highlighted positions on the keratin sequences. The 3 positions are noted by skill level (easy, medium, hard). In the easy position, most of the nodes have been "solved;" in the medium version no nodes are solved, but there is feedback at each node (lights up at correct selection); in the hard version, there is no feedback until all correct node selections have been made. • Once the position is selected, the end point amino acid letters switch to match it, and the first node (goat sheep) blinks, a cue to begin there. Visitors are asked to pick the amino acid present in the common ancestor (at the node). • Visitors touch a screen at the node to change the letter, stopping to indicate their choice. If they are correct, the portion of the tree to the right of the node and the end animals light up, and the next node on the tree blinks. • Working sequentially, visitors pick the amino acids at each node until the entire tree lights up.		
	LF2.E02.ap02	activity prompt	Prompt for keratin synthesis				
	LF2.E02.fp01	focus panel	Focus panel text explains sequencing		Comparing proteins from different species gives us clues to their evolutionary relationships. If we find the same amino acid sequences in the same protein of different species, it means they inherited it from a common ancestor. Comparing the amino acid sequences gives us an idea of overall similarity, and allows us to pinpoint particular areas that are different. In proteins that serve the same function in dissimilar species small differences in the amino acid sequence will often not affect overall functioning of the protein molecule, but they can indicate evolutionary distance.		diagram/ illustration of sequencing
	LF2.E02.gi01	graphic image	images of keratin sequence animals		captions for animals		
	LF2.E02.gi02	graphic image	Process diagrams help break down the complex process of sequencing of keratin.				
LF2.E03 Keratin Investigation			Visitors discover that the protein that makes up our hair and nails, keratin, is shared with many other mammals. They studysamples of hair,and other examples of keratin under a microscope, and touch keratin specimens. A case holds examples of keratin.				
	LF2.E03.gi01-gi03	graphic images	Photos of keratin close-ups				
LF2.E03.gr01		graphic rail	Keratin Investigation				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	LF2.E03.sx01	special exhibit-keratin touch specimens	Table top with touch keratin specimens ideally same as microscope specimens; should be Utah key critters.				
	LF2.E03.ar01-ar03	artifact label	Label for keratin touch specimens			elephant skin, fur, feathers	
	LF2.E03.ap01	activity prompt	Encourages visitors to touch the keratin specimens				
	LF2.E03.sx02	special exhibit-microscope	microscope with attached monitor enables visitors to zoom into samples of keratin.			prepared slides of keratin samples including hair, animal hair/ fur, claws, beaks, and skin	
	LF2.E03.ap02	activity prompt	Encourages visitors to look at their hair and nails and keratin samples under the microscope				
	LF2.E03.ms01	mindset	Mindset text explains keratin's importance and where it's found	Keratin is a key structural protein that you have in your hair, skin and nails; other animals have it too, in claws, horns, and feathers.	Keratin is an extremely strong protein which is a major component in skin, and things that grow out of skin, such as hair, nails, hooves, horns, and feathers. The amino acids which combine to form keratin have several unique properties, and depending on the amounts of the various amino acids present, keratin can be inflexible and hard, like hooves, or soft, like skin. Most of your keratin is actually dead; hair, skin, and nails are all formed from dead cells which the body sheds as new cells push up from underneath.		photos of keratin items, diagrams of hair structure
	LF2.E03.ca01	case	Keratin specimen holds hooves, horn sheaths, feathers, turtle shells, fur, silk, rhino horn, lizard or snake skin and pronghorn antlers, dinosaur skin and claw impressions.			39 specimens (side A-18, side B-21) rhino horn a1048, whale a1049 hoofed mammals a1055, Mountain sheep horn a1269, Bison skull a1270, Hoof a1435, Mountain goat hornsa1441 Long tailed weasel a1420, a1421,W Spotted skunk a1422 N American Porcupine a1050, N American beaver a1062, N Flying squirrel a1423, hoary bat a1424 pangolin a1419 birds a1046, Horn bill skull a1047, Bird of paradise a1051, Peacock feather a1054, Raptor a1057 Fossil bird with feathers a1061, Mountain bluebird a1141, Stellars jay a1426, W Crow a1427, Evening Grosbeak a1428, Bohemian waxing a1429, Thrasher a1430 American Avocet 1431, Kestrel Hawk a1432, Ring necked pheasant a1442, Ostrich foot a1060, Great Basin rattlesnake a1052, S Desert Horned lizard a1053, Hadrosaur skin a1056, Turtle shell a1433, Snake Skin shed a1434	

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	LF2.E03.ms02	mindset	Mindset panel describes the variety of keratins.	Keratin is a versatile protein found in our nails and hair, and in horns, scales, and feathers.	Keratins are tough, fibrous proteins found in vertebrates. They form the hard outer structures of birds, reptiles, and mammals (think claws and scales). Look at the specimens in this case - each has keratin structures. Keratin can take many forms, as you can see, from the baleen in whales that filters microorganisms from sea water to the feathers and beaks of birds, porcupine quills and pangolin scales. Alpha keratins are softer and include fur, hair and wool; beta keratins are harder and include horns and scales.		
	LF2.E03.ar01-36	artifact labels	Labels for keratin specimens				
	LF2.E03.gp01	graphic panel					
	LF2.E03.ar37	artifact labels				a1436 rabbit	
	LF2.E03.gp02	graphic panel					
	LF2.E03.ar38-ar39	artifact labels				a1440 mountain goat fur, a1439 Sheepskin	
	LF2.E03.gp03	graphic panel					
	LF2.E03.ar40-ar41	artifact labels				a1437 Bobcat pelt, a1438 Coyote pelt	
LF2.E04 What Keratin Does			At graphic panels with table top displays, visitors see 3 of the key Utah critters, and learn what keratin does through specific, intriguing stories (like pronghorn hollow hair). Visitors can pull out drawers at each critter to see specimens and graphics of all the forms of keratins in that critter (i.e. pronghorn antler, hoof, nose, skin).				
	LF2.E04.ms01	mindset	Mindset text describes structural proteins and their importance	Proteins are important molecules for all organisms and have many functions. Structural proteins are vital components of vertebrate bodies.	Structural proteins are fibrous proteins (with long string shapes as opposed to globular shapes). Keratins are the probably the most familiar fibrous proteins; they form the protective covering of all land vertebrates: skin, fur, hair, wool, claws, nails, hooves, horns, scales, beaks and feathers. Equally widespread, if less visible, are the actin and myosin proteins of muscle tissue. Another group of fibrous structural proteins are the silks and insect fibers. In addition, there are the collagens of tendons and hides, which form connective ligaments within the body and give extra support to the skin where needed.		photos of different keratin structures w. corresponding micrograph of keratin structure
	LF2.E04.ar01-	artifact labels	Labels for keratin examples				
LF2.E04.gr01		graphic rail	What Keratin Does				
	LF2.E04.sx01	specimen display-Keratin drawers	Specimen display in drawers			pinon jay and other bird feathers, pronghorn skin/hair sample, mountain lion claws and pawprint, gopher tortoise shell and isolated scutes. Additional keratin items from key critters to be selected; each will have color coded body diagram to indicate parts shown.	each specimen will have color-coded body diagram to indicate parts shown
	LF2.E04.gp01-gp03	graphic panel	contains artifact labels, focus panels and captions				
	LF2.E04.ar01	artifact label					

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	LF2.E04.fp01	focus panel	Focus panel text explains bird feather structural colors, illustrated by the pinon jay.	The blue color of a pinon jay comes from light scattering off the structure of the feather.	Bird feather colors can come from pigments (colored substances) or by structural color (light refracting off the structure of the bird's feathers). Some birds, like the pinon jay, have both structural colors and pigment colors. In feathers, blues and greens, and the shiny iridescent colors, are structural colors. Tiny air pockets in the barbs of feathers can scatter incoming light, resulting in a specific, non-iridescent color. Blue colors in feathers are almost always produced in this manner. What's the keratin connection? Bird feathers are made of keratin, so it's the keratin structure that makes the pinon jay blue.		photo of jay feather, wavelength diagram, diagram of feather
	LF2.E04.gi01	graphic image	photo of closeup of jay feather				
	LF2.E04.gc01	graphic caption			If you find the feather of a Blue Jay or Steller's Jay you can see for yourself how this works. First, observe the feather in normal lighting conditions and you will see the expected blue color. Next, try back-lighting the feather. When light is transmitted through the feather it will look brown. The blues are lost because the light is no longer being reflected back and the brown shows up because of the melanin in the feathers. (Cornell bird lab).		images of feather lit from front and back
	LF2.E04.fp02	focus panel	Focus panel text explains the structure of turtle shells, and how the gopher tortoise's shell helps it survive in the desert.	Keratin forms the hard scutes on the surface of desert tortoise shells.	Turtle shells are made of bone, covered by a layer of scutes, made from hard (beta) keratin. The scutes grow, laying down rings more or less annually, so you can estimate a turtle's age from the number of rings on the scutes. The shell helps protect desert tortoises from predators, and the outer keratin scutes are waterproof (for those occasional desert storms).		
	LF2.E04.gi02	graphic image	photomicrograph of scutes				diagram of shell and scutes, photomicrograph of scutes, image of tortoise in desert
	LF2.E04.fp03	focus panel	Secondary text explains mountain lion whiskers, and how they're used in hunting.	Whiskers help mountain lions feel their way, and detect and capture prey.	Mountain lion whiskers are long, thick stiff hairs. All mammal hair (even ours) is made of keratin. Keratin is a colorless protein that gives strength and stiffness to the hair. Mountain lions have whiskers, or vibrissae, on their lips, cheeks, chins, eyebrows, and forelegs that give them information about their environment. The whiskers are deeply embedded in the skin and connected to nerve endings that transmit information to the brain, so a cat can feel its way as it moves. They "read" air currents and the locations of obstacles and items around them, like grass and branches, in order to stalk almost silently. When capturing prey, the whiskers around the face all point forward like a net, to detect exactly where the prey is and where it might go. For a large prey, like deer, the whiskers tell the mountain lion where to bite the deer's neck to bring it down.		
	LF2.E04.gi03	graphic image	photomicrograph of whiskers				photomicrograph of whiskers, mountain lion hunting; diagram of hair structure
LF3 Cells							
	LF3.si01	section intro		Cells are the basic structural unit of life.	You are now at the cell organizational layer of life. You will see different kinds of cells, take them apart to learn about their parts, and see what cells can do. You have an estimated 100 trillion cells in your body! Your cells have many different shapes and functions. Did you know that some organisms have only one cell?		
LF3.E01 What are Cells			At this hands-on "cell workshop" visitors add parts to giant, diagrammatic cell frameworks to make animal or plant cells. As they correctly insert one of the cell organelle puzzle pieces, visitors receive feedback about the function of that part.				
	LF3.E01.gi01-gi03	graphic images	Close-ups of animal and plant cell images				

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	LF3.E01.in01	Interactive - build a plant cell	Visitors understand that plant and animal cells have many similar elements, but key differences.		Visitors are invited to help build a cell. They select parts from the plant and animal cell bins, and try to insert them into the openings in the 2 cells. The animal parts and cell are "squishier" and the plant parts and cell more rigid. When a part is inserted in the right opening, the visitor hears feedback (now the cell can make more proteins!). Once all the cell components are inserted, the whole cell lights up, and visitors hit a reset so that the cell part pieces eject into a bin below.		annotated photomicrographs matching viewable cell types.
	LF3.E01.ap01-	activity prompt	Prompts for build a plant cell	Help us put the cells together.	Can you put the right parts in the plant and animal cells?		
	LF3.E01.in02	Interactive - build an animal cell					
	LF3.E01.ap02	activity prompt	Prompts for build an animal cell	Help us put the cells together.	Can you put the right parts in the plant and animal cells?		
LF3.E01.gr01		graphic rail	What Are Cells				
	LF3.E01.ms01	mindset	Mindset text defines cells, explains the differences between plant and animal cells.	Cells are the basic functional unit of life. Plants, animals, and prokaryotes have different kinds of cells	All living things are composed of one or more cells. There are two main types of cells: prokaryotic and eukaryotic. Prokaryotic cells don't have a true nucleus and they tend to be smaller than eukaryotic cells. Bacteria and archaea have prokaryotic cells. Eukaryotic cells have a true nucleus, and have a more organized cytoplasm. Within eukaryotes, there are two main types of cells: plant and animal. They are similar, except plant cells have a rigid cell wall, which animal cells lack. Animal cells have lysosomes and centrioles, which plant cells lack.		diagrams and photos of plant and animal cells, prokaryote cells and organisms
	LF3.E01.gc01-03	graphic caption	Captions for 3 cell types diagrams/photos				
LF3.E02 What Cells Can Do			Visitors see cells under the microscope, then watch the What Cells Can Do AV to see cells in action- dividing, making and using energy, photosynthesizing and communicating. Graphics and table top displays with microscopes explain how different cells in 4 of the key critters work.				
LF3.E02.gr01		graphic rail	What Cells Can Do				
	LF3.E02.ms01	mindset	Mindset text explains cell functions and activities	Cells are alive and need energy. Cells move, grow, reproduce, make energy, and communicate	A cell has to carry out basic functions: molecule transport, reproduction, and energy conversion. Molecule transport The cell must be able to obtain nutrients and other molecules to survive. Reproduction Simply being able to sustain itself is not enough. Cells must be able to produce new generations. Energy conversion Cells have to carry out tens of thousands of chemical reactions, all of which need energy. Cells have developed highly efficient systems to make energy. Plant cells derive their energy from photosynthesis and animal cells rely on aerobic respiration to fulfill their energy needs.		
	LF3.E02.gi01-gi03	graphic image	Close-up of cell function images				cell function images- mitosis, meiosis, respiration, etc.

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	LF3.E02.gc01-gc03	graphic caption	Graphic captions mitosis and meiosis	One of the things cells do is reproduce themselves.	Eukaryote cells can reproduce in two ways, mitosis and meiosis. In mitosis, the resulting daughter cell is an identical clone of the original cell. Mitosis is mostly used by body cells. Meiosis, however, is a form of sexual reproduction and only occurs in gametes (reproductive cells). The resulting daughter cells have different genetic information than their parent cells. suggest details as captions for diagram Mitosis Cell division begins with interphase, when the cell replicates all of its genomic and cytoplasmic material and prepares for division. After preparation is complete, the cell enters the 4-phased mitosis. In mitosis, the cell sequentially goes through prophase, metaphase, anaphase, and telophase. Immediately after the completion of telophase, cytokenesis is initiated to end cell division by literally separating the cell in two. Meiosis Meiosis starts with cells that have two sets of chromosomes from their parents. In meiosis the cell eventually forms four germ cells, each with half the chromosomes.		diagrams of mitosis and meiosis
	LF3.E02.sx01	special exhibit	Microscope with attached monitor			8 prepared slides of cells	
	LF3.E02.av01	av- What cells can do	Av shows mitosis and meiosis, cell communication, respiration and movement				
	LF3.E02.ap01	activity prompt	standard prompt encourages visitors to use microscope				
	LF3.E02.ar-	artifact labels	Labels for cells				
	LF3.E02.fp01	focus panel	Focus panel explains nitrogen fixing in Rhizobium	Bacteria transform nitrogen from the air so it can be used by plants.	All living organisms need nitrogen to make proteins, nucleic acids, and other compounds. The earth's atmosphere is almost 80% nitrogen, but living things can't use this form of nitrogen until it has been "fixed" (combined with hydrogen), to ammonia. Green plants, the base of most food chains, use this supply of fixed nitrogen to make proteins. But plants can't "fix" nitrogen, so where do they get their supply? Rhizobium is the best known species of a group of bacteria that symbiotically fix nitrogen. These bacteria enter the roots of leguminous plants, causing the plant to form lumps or nodules. Inside the nodules, the bacteria fix nitrogen, which in turn goes into the plant through the roots.		diagram of nitrogen fixing, photo of plant root nodules, photo of Rhizobium
	LF3.E02.fp02	focus panel	Secondary text explains cancer, and how cancer cells are different than normal cells.	Cancer is a term used for diseases in which abnormal cells divide without control and are able to invade other tissues.	Cancer is a class of diseases in which a group of cells grow uncontrollably, invade adjacent cells, and sometimes spread to other locations in the body. Cancer cells are different from normal cells in several ways. Cancer cells don't obey signals from other neighboring cells, and they don't become specialized, but stay immature. Nearly all cancers are caused by abnormalities in the genetic material of the transformed cells. As you have seen, the genetic material (DNA and RNA) controls how the cell reproduces and makes proteins, so if this material is damaged, the control of cell growth and reproduction may be affected.		diagram of cancer cells

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	LF3.E02.fp03	focus panel	Secondary text explains mountain lion rod and cone cells.	For predators such as mountain lions, vision is an extremely important sense.	The vision of the Mountain Lion is one of the animal's most important adaptations for hunting. Mountain lions hunt in the evening and at night - how do they see their prey? The animal's eyes are quite large, and the retina contains more rods than cones, lending to the cat's excellent night vision. Although Mountain Lions cannot see in complete darkness, they can discern details in much lower light than humans. Rods and cones are specialized eye cells (we have them too). The retina is the back part of the eye that contains the cells that respond to light. These specialized cells are called photoreceptors. There are 2 types of photoreceptors in the retina: rods and cones. The rods are most sensitive to light and dark changes, shape and movement and contain only one type of light-sensitive pigment. Rods are not good for color vision. The cones are not as sensitive to light as the rods. However, cones are most sensitive to one of three different colors (green, red or blue).		eye diagram, image of magnified rods and cones, image of mountain lion eye
	LF3.E02.qt01-03	quotes/questions	Quotes/questions on back panel				
LF3.E03 Economy of Life			The Economy of Life exhibits tell the story of photosynthesis, the energy driver of most life on Earth. Visitors feel the heat of the sun, life's ultimate energy source, and see living plants and cyanobacteria.	Plants use photosynthesis to capture the sun's energy for use in ecosystems. Plant cells "bank" energy in the form of sugar.			
LF3.E03.gr01		graphic rail	Economy of Life				
	LF3.E03.sx01	special exhibit	Visitors see a large glass tank with living plants and algae (Elodea, Volvox, and a water lily), fueled by the heliostat. They watch as oxygen bubbles form on the Elodea leaves, indicating photosynthesis. Using a magnifier, they view the Volvox colonies swimming.				
	LF3.E03.ar01	artifact label	Label for Elodea				id photos for plants
	LF3.E03.ar02	artifact label	Label for Volvox				
	LF3.E03.ar03	artifact label	Label for water lily				
	LF3.E03.ap01	activity prompt	prompt encourages visitors to use magnifier				
	LF3.E03.fl01	family label	Family label for Volvox	Can you see the glowing spheres in the tank?	Each of those balls is a colony - a bunch of cells that live and work together. The cells swim together. They have eyespots, more developed near the "front" of the sphere, helping the colony to swim towards light.		volvox illustration and diagram
	LF3.E03.ms01	mindset	Mindset text describes photosynthesis and its critical role in ecosystems.	In photosynthesis, the beginning of energy's flow through life, plants capture the sun's energy in the form of sugars.	Plants and animals need energy to live, to grow, and to make more of themselves. The major source of energy for life on Earth is the sun, but we can't just absorb that energy and use it, it has to be converted into a form that we can use. Photosynthesis is the process that converts light energy into chemical energy. Living plants and some bacteria are able to use the energy from sunlight to produce sugar, which cellular respiration converts into ATP, the "fuel" used by all living things. This conversion process requires chlorophyll, the green pigment in plants, carbon dioxide and water, and produces sugar and oxygen. This process is arguably the most important biochemical pathway, since nearly all life on Earth either directly or indirectly depends on it.		photosynthesis diagram
LF4 Organisms							

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	LF4.si01	section intro			You are at the organismal level of life's organization, where we are going to look at multicellular forms of life, whole plants and animals making their way in the world. Organisms need to find food, grow and reproduce. Their cells are specialized, and organized into tissues and organs that have different functions.		
	LF4.E01.ca02	case- Organisms	Case holds plants, vertebrates and invertebrates demonstrating size ranges and limits;variation; and growth patterns.			side A: 20 specimens heron and hummingbird, shrew and whale, multituberculate and mastodon teeth, seed array, egg array, turtle shells, insects, shells	
	LF4.E01.ms01	mindset panel	Mindset panel describes diversity, variation, scale	There are millions of species on earth, most are not yet described. This diversity has great variation in size, shape and scale.	There may be as many as 30 million different living species on Earth. Science has described about 1.75 million species. As you can see from the specimens in this case, there is a large variety among different species. This variety can be physically obvious (different sizes, shapes, and colors) or obvious only if you look at the organism's genes. This variety results in organisms being adapted to particular places they live and particular ways of making a living.		diagram showing humans compared to whales, redwoods, etc.
	LF4.E01.gi01	graphic image	growth pie chart with captions				
	LF4.E01.fp01	focus panel	Focus panel discusses scale	The sizes of organisms vary widely, from tiny shrews to giant redwoods.	A variety of influences place an upper limit to the size of organisms. One is the strength of biological materials. Sequoia redwood trees, some of which exceed 90 metres (300 feet), are apparently near the upper limit of height for an organism. The Italian astronomer Galileo calculated in 1638 that a tree taller than roughly 90 metres would buckle under its own weight when displaced slightly from the vertical (for example, by a breeze). Because of the buoyancy of water, large animals such as whales are not presented with such stability problems.		
	LF4.E01.gi02	graphic caption	caption for number of species pie chart				
	LF4.E01.ar01	artifact label	Label for shrew and whale			Shrew a3170, Whale a3169	
	LF4.E01.ar02	artifact label	Label for heron and hummingbird			tbd	
	LF4.E01.ar03	artifact label	Label for multituberculate and mastodon			Multituberculate a3194, Mastadon a3195	
	LF4.E01.ar04	artifact label	Group label for seed array			tbd	
	LF4.E01.ar05	artifact label	Group label for turtles			Turtle shells a3183-a3188	
	LF4.E01.ar06	artifact label	Group label for plant specimens, oak slice			tbd	
	LF4.E01.ar07	artifact label	Group label for egg array			tbd	
	LF4.E01.ar08	artifact label	Group label for insects			tbd	
	LF4.E01.ms02	mindset panel	Mindset panel discusses growth	Growth is a permanent, irreversible change in the size of an organism.	There are different types of growth. Some organisms have limited growth; they reach a certain size and stop growing. Others have unlimited growth; they continue to grow throughout their lifetimes. Some plants and animals grow rapidly, others slowly. In general, the larger the plant or animal, the more slowly it grows. You grew from a single cell - imagine how complex that development is. Multicellular organisms have carefully regulated growth in order to become functional adults.	side B: 10 specimens	
	LF4.E01.fp02	focus panel	Focus panel explains allometric growth and how the wolf skulls demonstrate it		In allometric growth, different parts of the organism grow at different rates; this produces changes in size and form in the body. You can see the different skull proportions in these wolves - the younger wolves have shorter snouts and the back of their skulls is relatively large. Humans grow allometrically, too. Think of how large a baby's head is relative to its body, and how short it's legs are. As you grow, the rest of your body "catches up" to your head.		wolf pup and young wolf, human baby adult line drawing

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	LF4.E01.fp03	focus panel	Focus panel explains isometric growth, and how shells demonstrate it		In isometric growth, the organs grow at the same rate as the rest of the body; there is no change in body shape and form. If you look at these shells, you can see that they have the same proportions, whether they are large or small. The chambers of the Nautilus are a good example - look closely and you'll see that each chamber is the same shape, but a different size.		
	LF4.E01.fp04	focus panel	Focus panel explains metamorphosis in insects (partial and complete) and frogs		Metamorphosis is a biological process by which an animal physically develops after birth or hatching, involving a conspicuous and relatively abrupt change in the animal's form or structure through cell growth and differentiation. Metamorphosis is usually accompanied by a change of habitat or behaviour (think of tadpoles swimming in water vs. frogs hopping on land). Most insects go through complete metamorphosis, with 4 very different stages. Others have incomplete metamorphosis, with 3 stages that look similar.		frog metamorphosis diagram, insect metamorphism diagrams
	LF4.E01.fp05	focus panel	Focus panel explains growth in plants		Plants grow throughout their lifetimes - which can be as short as a season and as long as thousands of years. Annual plants sprout, flower and die in one year. Perennials, especially small flowering plants, grow and bloom over the spring and summer and then die back every autumn and winter, then return in the spring from their root-stock rather than seeding themselves as an annual plant does. Perennials tend to be larger than annuals; annual plants "invest" in producing seeds, whereas perennials may produce fewer, larger seeds less often, and "invest" more in growth.		
	LF4.E01.gi02	graphic image	frog metamorphosis diagram				
	LF4.E01.gi03	graphic image	complete insect metamorphosis diagram (beetle)				
	LF4.E01.gi02	graphic image	incomplete insect metamorphosis diagram (dragonfly)				
	LF4.E01.ar08	artifact label	Group label for wolf skulls and taxidermy			Wolf skull series a3176, 13177, a3178, a3179, a3180, Wolf taxidermy a3175	id photos
	LF4.E01.ar09	artifact label	Group label for shells			Natilus a3199, Murex Pecten a3201, Melongena corona a3202	
	LF4.E01.ar10	artifact label	Label for frog			specimens tbd	
	LF4.E01.ar11	artifact label	Label for dragonfly			specimens tbd	
	LF4.E01.ar12	artifact label	Label for beetle			specimens tbd	
	LF4.E01.ar13	artifact label	Label for oak slice			specimens tbd	
	LF4.E01.ar14	artifact label	Group label for plants			specimens tbd	
LF4.E01 Problem of Size			This exhibit introduces visitors to the challenge of being multicellular through interactives, text and viewing live animals. Visitors compare animals with internal and external skeletons, and see live tarantulas.				
LF4.E01.gr01		graphic rail	Problem of Size				
	LF4.E01.ms01	mindset	Mindset text describes the problems of being large and multicellular (growth, food, oxygen, transport, waste disposal)	Being large poses similar problems for plants and animals - they need to find ways to support themselves and to transport food, oxygen, and wastes.	Imagine a single-celled organism the size of you - how could it feed itself and move around? It would be hard to absorb all the food and oxygen needed. A single-celled organism could never grow as tall as a redwood. Large multicellular organisms need to get energy, get rid of waste, and reproduce themselves. But the larger you are, the more complicated it can become. Take the redwood - it has to get water up 200 or 300 feet. And like large animals, the redwood has to support itself. The evolution of trunks and sturdy internal skeletons allowed plants and animals to become large. Insect size is limited by their endoskeleton.		illustration/ diagram of largest/ smallest plants, mammals, insects, compare to humans
	LF4.E01.sx01	special exhibit	Live tarantulas and past molts, ideally showing growth; with small arthropod to compare.				
	LF4.E01.ar01	artifact labels	Label for tarantula		include comparison to smallest insect		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	LF4.E01.fp01	focus panel	Focus panel text compares size limits of endoskeletons and exoskeletons.	Skeletons have to be strong enough for support, yet still allow animals to move.	The exoskeleton limits the possible size of the insect. The immense bulk that would be required in an exoskeleton strong enough to support an insect as large as a human being would pose insurmountable mechanical problems. This is certainly one reason why arthropods, as varied and successful a group as they are, have never even approached the size of most vertebrates. Further, rigid exoskeletons impose difficulties in overall growth, such as the periodic molting and deposition of a new covering that are necessary to permit increases in size. While not as drastic, endoskeletons also impose limits on size. Horses must have thicker bones than antelope, and elephants must have thicker bones than horses. The structural support and muscular mass required for large animals imposes constraints on size. It should come as no surprise that the largest vertebrates, the whales, are aquatic. The buoyancy of the water in which they live provides much of the support their great weight requires.	tarantula molts	illustration/ diagram of spider crab exoskeleton and largest mammal skeleton
LF4.E01.rc01		rail case	Rail case with lupine and pine cones			lupine sheet; large and small pine cones	
	LF4.E01.fp02	focus panel	Focus panel text compares lupine and pine size (with laminated lupine plant and pine cones, bark, pine image)	Plants grow continuously, yet some are much taller than others - why?	Why can't a lupine grow as tall as a pine tree? Setting aside their genetic differences, lupine don't have the thick trunk a pine tree has. The multilayered trunk of a pine tree provides support, and a way to get water to the top of the tree. The outside layer of the tree is dead bark which provides protection from the environment. The inner bark layer is composed of live tissue that transports food downward. Between the bark and wood is the cambium layer which is responsible for increases in tree diameter (by creating annual rings) and responds to injury by producing callus tissue. The annual rings of wood are composed of large pores that carry water up to the leaves. Scientist used to think that older, taller trees' growth rates slows so much that they are essentially not growing. Recent studies, however, imply that the tree isn't growing because the top leaves and branches aren't getting enough water.		lupine and pine diagram/illustration; bark diagram
LF4.E02 Reproduction and Development			Visitors see some of the "key critters" as eggs, juveniles and immature forms and adults and learn how they reproduce and develop.				
	LF4.E02.gi01-gi03	graphic image					Images of Reproduction and Development
LF4.E02.gr03		graphic rail	Reproduction and Development				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	LF4.E02.ms01	mindset	Mindset text explains reproduction and development.	Reproduction is a way to reshuffle information between generations.	Organisms produce offsprings similar to themselves through reproduction. Most multicellular plants and animals reproduce sexually. The different genetic contributions of two parents come together, forming a new genetic identity in the offspring. There is potential for a lot of genetic variability in this process, as different combinations of genetic contributions occur. This variability is what underlies evolution. A multicellular organism starts off as a single, fertilized egg or ovule. This single cell develops into a vastly complicated multicellular organism, with structures, such as limbs, and functions, such as respiration, all able to work correctly in relation to each other.		
	LF4.E02.fp01	focus panel	Focus panel text contrasts asexual and sexual reproduction.	There are two main means of reproduction: asexual and sexual.	In asexual reproduction, an individual can reproduce without involvement with another individual of that species. The division of a bacterial Rhizobium cell into two daughter cells is an example of asexual reproduction. Asexual reproduction is not, however, limited to single-celled organisms. Most plants have the ability to reproduce asexually. Sexual reproduction requires the involvement of two individuals, typically one of each sex. Gopher tortoises reproduce in this way, with males doing battle for females.		diagrams, photos of asexual reproduction in Rhizobium; photo of gopher tortoises fighting for mates
	LF4.E02.fp02	focus panel	Focus panel text explains growth.		Organisms grow by increasing in size and complexity. Growth is the increase in size and mass during the development of an organism over a period of time. Growth occurs as cells divide through mitosis, then increase in size, and differentiate to perform specific functions, for example red blood cells in mammals and root cells in plants. All organisms grow, although the rate of growth varies over a lifetime. Typically, growth in an organism follows an S-shaped curve, in which growth is at first slow, then fast, then, towards the end of life, non-existent.		
LF4.E02.rc01-rc05		rail cases	five rail cases with eggs			5 specimens groups of eggs-a1262, 1263, 1264, 1265, 1266	
	LF4.E02.gi01	graphic image	Growth chart compares insect, human, and shell				
	LF4.E02.gc01	graphic captions	Captions for growth comparison diagrams.				
	LF4.E02.in01	pollination interactive	Visitors find that pollinators and the flowers they pollinate have co-evolved.		Visitors see 2 dials - one with flowers and one with pollinators. They turn the pollinator dial to match the pollinator to the flower and find that some flowers are pollinated by bats, others by wasps, and others by butterflies. When they make a correct match, a graphic congratulates them, and points out the co-evolved features of the plant and pollinator.		
	LF4.E02.ap01	activity prompt	Prompts for pollination game				
LF4.E03 Feeding and Fueling			Visitors will see skulls and jaws of different animals and learn how they feed. They can play the jaws game to see how different jaws work.				
LF4.E03.gr02		graphic rail	Feeding and Fueling				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	LF4.E03.ms01	mindset	Mindset text explains energy flow and feeding.	All organisms need energy, and have evolved different methods of feeding to fuel themselves.	Animals and plants need energy to move, grow, and reproduce. Plants make their own energy through photosynthesis. Animals can't make their own energy; they have to eat plants, or other animals. Carnivores like the mountain lion are meat-eating animals. There are two main types of meat-eaters: predators and scavengers. Predators actively hunt, kill and eat animals. Scavengers don't hunt or kill. They simply eat any animals that are already dead. Herbivores like the pronghorn or gopher tortoise eat plants. Humans, like other omnivores are adapted to eat both plants and animals.		
	LF4.E03.gi01-gi04	graphic images					Feeding and Fueling images
	LF4.E03.in01	interactive- Jaw movement	Visitors understand that animals have evolved different shapes and configurations of jaws and teeth for different diets.		Visitors see a set of skulls; the skulls are flat, but dimensional, and lifesize; they include key Utah critters like pronghorn, mountain lion, desert tortoise. Graphics of the animal are adjacent to the skulls. Visitors manipulate the skulls and jaws to see how the animal chews.		
	LF4.E03.ap01	activity prompt	Prompt for jaw interactive	Move the jaws to see how different animals chew. Which are the planteaters, meateaters and omnivores?	Meat eaters have slicing teeth and jaws that move up and down to cut effectively. Omnivores eat meat and plants; they have some sharp teeth and some grinding teeth. Their jaws move up and down and side to side. Plant eaters usually don't have sharp canine teeth. Their jaws move side to side to grind tough plants.		
	LF4.E03.fp01	focus panel	Focus panel text describes how saprophytic fungi feed (w. Amanita model).		Amanita, a large, red mushroom with white spots, is the quintessential toadstool. Like other mushrooms, it is a saprophyte. This means that they feed on the dead remains of plants or animals, or on the waste materials (such as dung) of other living things. These fungi help to get rid of organic waste. They are often found in woodlands, where the floor is covered with massive amounts of dead plant material such as fallen leaves, twigs and logs. The digestion of such waste material is very important. Without this, the waste would pile up higher and higher into a permanent rubbish heap. Decomposers like Amanita are important recyclers of nutrients and energy, returning it to the soil where it can be reused by plants.		photo of fungus on a log, diagram of fungus eating
	LF4.E03.qt01-03	quotes/questions	Quotes/questions on back wall				
LF7 Tree of Life							
	LF7.E01.ms01	mindset	mindset explains the tree of life	All living things are related; these genetic relationships can be charted on a tree of life.	Life on Earth is diverse. There are more than 1.6 million known species of life, from bacteria that thrive in Great Salt Lake, to sagebrush in the Great Basin, to the pelicans that nest on Gunnison Island. All this diversity is related, sharing a common ancestor, and DNA. This tree shows 3 major domains of life: bacteria, archaea, and eukaryotes. You (and other animals with backbones) are a eukaryote. Bacteria are single-celled microscopic organisms. The archaea are also single-celled microbes, but analysis of their RNA shows them to be very different from bacteria, and in fact more closely related to eukaryotes. You might know archaea as "extremophiles" - they live in extreme conditions like sulphur springs and deep sea vents. Highlighted on this tree are some of Utah's bacteria, archaea, and eukaryotes.		tree of life showing diversity of major groups over time
	LF7.E01.gc01-	graphic caption	Graphic captions call out common features of major groups		archaea features tk plants - chlorophyll, a green pigment that captures light from the sun, enabling plants to make energy in the form of sugar (photosynthesis) animals - multicellular, no cell wall vertebrates - jaws		images featured: DNA, jaws, 4 limbs, chlorophyll

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	LF7.E01.gc01	graphic captions	for endpoint organisms		brief captions for Utah-specific taxa	highlight animals include: nitrogen fixing bacterium Rhizobium,mycorrhizal fungus Amanita muscaria, Anabrus Mormon cricket, harvester ants, pronghorn Antilocapra, mountain lion Felis concolor, human Homo, pinon jay, desert tortoise Gopherus agassizii, stickleback fish, spruce or pine, lupine, yucca, bunchgrass Elymus elymoides	
	LF7.E01.gc02	graphic captions	Caption for animal tree				animal tree
	LF7.E01.gc03	graphic captions	Caption for plant tree				plant tree
LF5 Populations							
	LF5.si01	section intro		groups of similar individuals who tend to mate with each other in a limited geographic area. A population might be a field of flowers, or a pod of whales.	You are now at the level of populations in the scales of life. Populations are groups of organisms of one species in the same area. They interact with other populations of the same and different species, and they can become new species, under the right conditions. You will see species of stickleback fish and a population of harvester ants. Can you spot the different age groups of ants in the population?		
	LF5.gi01-gi05	graphic image					Images of Populations
LF5.E01 What is a Population?			Visitors view a colony of harvester ants to understand the concept of a population. They observe different age and size classes of ants, and watch as they cooperate in foraging. They also see a tank of stickleback fish, and observe variation within a species.				
	LF5.E01.ms01	mindset	Mindset text explains the concept of a population.	Populations are members of a species in a given area; they vary, move, and sometimes become different enough to form a new species.	A population is a group of individuals living in the same area that interbreed. Populations are dynamic. Populations interact with other populations. They compete for resources and space. They eat each other. Populations vary in size over time and space. Populations may move to find resources or places to mate and raise young. Populations form communities, which in turn form ecosystems.		
LF5.E01.gr01		graphic rail	Adaptation and Population				
	LF5.E01.sx01	special exhibit	Stickleback fish live display				
	LF5.E01.fp01	focus panel	Focus panel describes variation in stickleback fish.	Three-spined stickleback fish are used by scientists at the University to study evolution and development.	The threespine stickleback evolved since the end of the last Ice Age, which occurred 15,000 years ago. When the giant glaciers melted, they created thousands of lakes and streams in North America, Europe, and Asia. These waters were colonized by the sticklebacks marine ancestors, which adapted to life in fresh water. The spiny fish, which are one- to six-inches long, were remarkably successful in adapting to various niches in their new habitats. The isolated pockets of sticklebacks have created thousands of evolutionary experiments. By studying the genetic variation among various species, it should be possible to discover how evolution generates new species adapted to life in different environments		photos of male and female fish; map showing distribution of sticklebacks in North America
	LF5.E01.ar01	artifact label					
LF5.E01.gr02		graphic rail	Growth				
	LF5.E01.sx02	special exhibit	Visitors see a colony of live seed harvester ants, and note the different stages of growth and development of different individuals.				
	LF5.E01.ar02	artifact label	Label for harvester ants			harvester ants	

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	LF5.E01.ar03	artifact label	Label for fossil ant in amber			fosslized ant in amber	
	LF5.E01.fp01	focus panel	Focus panel text explains the age/caste structure of the harvester ant colony.	Harvester ants live together in colonies of different ages and castes.	In nature, Pogonomyrmex harvester ants live in colonies with as many as 10,000 to 12,000 members, with each colony started by a single mother queen. Although workers and queens are all female, they differ considerably both anatomically and physiologically. Queens are much bigger, with an abdomen packed with ovaries. Queens also have wings at the beginning of their life, which allow them to fly off and mate. Once mated, they settle down, lose their wings, and produce working daughters who will tend broods. In early spring, the queens produce new queens and males. The males' only job is to mate, after which they die. Workers perform a variety of tasks, such as foraging, nest construction, and care of the brood. Larvae hatch from eggs and develop through several stages (instars). Larvae are white and legless, shaped like a crookneck squash with a small distinct head. They make cocoons to pupate.		photos/ illustrations of different ages and castes of harvester ants
	LF5.E01.ca03	case- Populations	Visitors see a cased display of corvids, lupines, and pinon, with phylogenies; the other side of the case houses specimens showing diversity and variability within populations of chipmunks, ground squirrels, yarrow, and evening primrose.			20 specimens	
	LF5.E01.ms01	mindset panel	Mindset panel explains populations, variation and selection.		You may think evolution means change over time - to population biologists, it means a change in the gene frequency of a population. A change in gene frequency may interact may change how an organism looks (its phenotype), or may just be seen in the genes (genotype). A number of natural phenomena can act to change gene frequencies. Organisms moving into or out of a population (migration) can cause gene frequencies to change. Random fluctuations can also cause changes, particularly in small populations. Natural selection is particularly important in causing changes in gene frequencies. In natural selection, aspects of the environment favor certain genes, so organisms with them survive and reproduce.		
	LF5.E01.fp01	focus panel	Focus panel explains phenotypic variation and how the yarrow and chipmunk demonstrate it.		A metapopulation consists of a group of spatially separated populations of the same species which interact at some level. In this case you'll see a metapopulation of chipmunks; they look different but they are all members of the same species and can interbreed. The pelage or fur color of these specimens reflects clinal change (or “a gradual change in a character or feature across the distribution range of a species or population, usually correlated with an environmental or geographic transition.”) We see phenotypic variation also in Utah yarrow plants - the higher they grow, the smaller they are, though it's the same species of plant. Their varied phenotypes are the result of the same genotype interacting with different		
	LF5.E01.gi01	graphic images	map showing locations of chipmunks;				

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	LF5.E01.fp02	focus panel	Focus panel explains genotypic variation and how the ground squirrel and evening primrose demonstrate it.		Maguire primrose (Primula maguirei) lives only in a small area in northern Utah (U.S.A.). Although these neighboring primrose look alike, scientists have found that the populations of primrose can be very different genetically. The populations flower at different times, so they don't interbreed, and genetic differences persist. Uinta ground squirrels live in the Western U.S. - the center of their range is the Yellowstone hotspot. Scientists studied living squirrels and museum specimens (including ones from this museum) and found that ground squirrel populations were separated by a major volcano flow millions of years ago. These populations, kept apart on mountain "islands" became genetically distinct.		
	LF5.E01.gi02-gi04	graphic images	Photos of habitats correlate with map				
	LF5.E01.gi05	graphic images	map showing locations of ground squirrels				
	LF5.E01.gi06	graphic image	gene frequency pie charts				
	LF5.E01.ar01	group label	Group label for yarrow			specimens tbd	
	LF5.E01.ar02	group label	Group label for evening primrose			a3196, a3197	
	LF5.E01.ar03	group label	Group label for chipmunks			a2819, a2820, a2821	
	LF5.E01.ar04	group label	Group label for Uinta ground squirrels			a3181, a3182	
	LF5.E01.ms02	mindset panel	Mindset panel explains speciation and diversity in lineages.	New species arise when lineages split.	When populations become distinct enough, or separated by space or behavior such that they cannot interbreed, they become distinct species. This occurs when gene flow between the populations is very low or nonexistent, for instance when separated by a physical barrier. But speciation can occur sympatrically, as well, when the populations are not physically separate. Hybridization is a form of sympatric speciation. Frogs and corvids demonstrate allopatric speciation, where a physical barrier led to speciation. Speciation is a lineage-splitting event that produces two or more separate species. We plot these lineages on evolutionary trees; the branching points represent speciation events.		corvid tree, lupine tree, pinon tree,
	LF5.E01.gi07	graphic image	Corvid tree with captions		Note: tree captions should address form of speciation that occurred in that group, also overall trees		
	LF5.E01.gi08	graphic image	Pinon tree with captions				
Phylogenies	LF5.E01.ar05	group label	Group label for corvids			a2783-a2793, a2818	
	LF5.E01.ar06	group label	Group label for lupines			27 scanned images	
	LF5.E01.ar07	group label	Group label for pine specimens			12 scanned images	
LF5.E02 What Populations Do							
	LF5.E02.si01	section intro	Visitors see some of the key Utah critters, and learn what populations do. They interact with a tabletop to see how populations are dynamic over space and time.				
	LF5.E02.ms01	mindset	Mindset panel describes what populations do, relates to map	Populations behave and interact in time and space, and populations evolve into new species; we can see this happening in Utah.	Populations adapt, migrate, or die as environments change. Populations occupy ranges, and sometimes move long distances over the year. Some ranges are small (if populations are only found in 1 region, they are endemic), others are very large. Populations meet populations of their species and other species. Some of these interactions involve competing for resources, or space, or mates. Populations vary - a chipmunk from one part of Utah may not look exactly like a chipmunk from another part of Utah.		
LF5.E02.gr01		graphic rail	Populations				
	LF5.E02.rc01-rc04	rail case	Four cases hold specimens of flickers, pines, mammals (tbd) and insects (tbd) hat are lit up with visitor interaction.			flicker, pine, mammal and insect specimens tbd	

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	LF5.E02.av01	av- Populations	Visitors select a graphic on the interactive tabletop of the species they want to follow and at what scale. Once selected, the rail case holding the specimen lights up and an av program is triggered. The projection shows how populations of that plant or animal have changed over time - some separate into 2 species, while other populations can still interbreed.	Individuals interact and react to a dynamic environment on small to large time and spatial scales, resulting in changes to population gene frequencies. Individuals within a population are subject to a number of pressures that can drive changes in populations over time and across space. Mechanisms of change can vary The changes that occur are shifts in the frequency of traits.	The program has 3 levels: today/local spatial scale; recent past/regional scale; and Holocene/continental scale. Visitors start at the today scale and then use a time slider to choose one of the other times. At each time scale, a projected map changes to match that scale (local/regional/continental). There is also an option to select the future. Visitors must do the local scale first. At each scale they see animation sequences that illustrate mechanisms that operate at that scale to affect the frequency of a gene in a population.		
	LF5.E02.ap01	activity prompt	Prompt encourages visitors to interact with the map.				
	LF5.E02.gi01-gi04	graphic images	Maps show context and distribution of each of the four game species				
	LF5.E02.ar01-ar04	extended artifact label	Artifact labels tell unique features of each species.				
LF5.E02.gr02		graphic rail	What Populations Do				
	LF5.E02.fp03	focus panel	Secondary text explains competition in Utah bunchgrass.	Species may compete for resources, sometimes resulting in one species adapting or dying out.	In the Great Basin of the western United States of America, the invasive annual grass Bromus tectorum has extensively replaced native shrub and bunchgrass communities, but the native bunchgrass Elymus elymoides has been reported to suppress Bromus. Scientists studied the two grasses in Curlew Valley, Northern Utah. At this site, they found that the native bunchgrass did suppress Bromus. This relationship might be explained by competition between the two grasses involving a different resource or occurring in a different season. Efficient autumn soil moisture use by Elymus may help suppress Bromus. In competition plots, Artemisia (sagebrush) grown with Bromus were stunted relative to those grown with Elymus, despite equivalent above-ground biomass of the two grasses. Elymus physiology and function appear to play an important role in determining the composition of communities in Curlew Valley, by maintaining zones free of Bromus where Artemisia can grow. Overlapping resource use in three Great Basin species: implications for community invisibility and vegetation dynamics BOOTH Mary S. (1) ; CALDWELL Martyn M. (2) STARK John M		photo of Curlew Valley, Bromus, Elymus
	LF5.E02.fp04	focus panel	Focus panel text explains coevolution and symbiosis in doves, lice and bacteria.	Coevolution is the process in which two species affect each other's evolution.	Chewing lice are ectoparasites that live on the skin and feathers of birds and mammals. Hair is made of keratin, which is a tough, fibrous structural protein and difficult to digest. Some chewing lice have symbiotic bacteria. Researchers here at the University are studying these organisms to determine if the bacteria are helping digest the keratin, or contributing in some other way to the louse's nutrition, perhaps by supplying amino acids not found in keratin. http://darwin.biology.utah.edu/PubsHTML/PDF-Files/88.pdf	specimens tbd	micrograph of lice, bacteria; close up image of lice on feather
	LF5.E02.qt01-03	quotes/questions	Quotes/questions on back wall				
LF5.E03 Hominin Evolution			Visitors can touch cast fossils (provided by owner) at the Hominin Evolution exhibit, and see their spots on the human evolution tree. They will learn the latest theories on human origins and about the University's breakthrough research in this area.	Like all other living and extinct species, we humans evolved from other species.			

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	LF5.E03.ms01	mindset panel	Mindset text explains the bushiness of human evolution and adaptive radiation.	The pattern of human evolution is a bush with many branches; we just happen to be the branch that survived. Human beings are part of nature, and respond to the same evolutionary processes and forces as other primates.	Today we humans are the only human species, but earlier in our evolution, there might have been several different hominids living at the same time. This is because human evolution is characterized by adaptive radiation - a key evolutionary change causing rapid speciation. The first of these involved bipedal apelike creatures. Being bipedal allowed them to move better on the ground, while still being able to move in trees. A second adaptive radiation followed the development of tool use. This evolutionary pattern created the bushy tree of human evolution that you see here. This tree is based on physical characteristics like tooth shape and brain size.		
	LF5.E03.sp01	story panel	From Kristen Hawkes				images tbd
	LF5.E03.fp01	focus panel	Focus panel discusses behavioral evidence for hominin evolution		It's fascinating to imagine our early relatives - how did they look and behave? Did they hunt? Fight? How did they communicate? Anthropologists look at the behavior, cognitive capacity and life history of our closest living relatives, the chimps, for clues. Humans have different life histories from other primates (we live longer and have children later), but there are similarities. Looking at the primate tree helps scientists reconstruct the life history of early humans.		
	LF5.E03.gi01	graphic image	Primate tree				
	LF5.E03.gi02	graphic image	Photos of chimp cognitive research				
	LF5.E03.gp01-gp18	graphic panels	Key for each skull and Reconstructions of each hominid				
	LF5.E03.ar01-	expanded artifact labels	Artifact label for each skull				
	LF5.E03.gi03	graphic image	Map of all finds				
	LF5.E03.qt01	quote/question	Quotes/questions on west wall				
LF5.E04							
	LF5.E04.gr01	graphic rail	rail overlooking Life to Land				
	LF5.E04.ms01	mindset	Mindset text explains biogeography and how it relates to continental drift.		Biogeography is the study of the distribution of organisms in space and time. Looking at patterns of distribution, we ask how did the organisms get there. One pattern that needed to be explained is disjunct distributions of clearly related species (or even the same species) are found in different areas, for instance marsupials are found in Australia and South America. Ratite birds (Ostrich, Emu&Cassowary, Rhea) are found in Africa, Australia and South America, respectively.A lfred Wegener, a German polar meteorologist, proposed the theory of continental drift in 1912, after noticing that there were similar glacial deposits in the southern continents, which had a rational distribution if these continents were once joined. The theory also helped explain the distribution of fossils, living plant and animal species and the occurrence of matching rock types in continents that were once contiguous.		
	LF5.E04.gc01	graphic caption	Caption for continental drift maps (showing marsupial and ratite distribution)				
LF6 Ecosystems			Visitors see Utah's ecosystems (hot desert, cold desert, montane forest and alpine) through dioramas, audio, and timelapse videography. They encounter the key plants and animals, this time at ecosystem scale and how they interact with other living things.				
	LF6.si01	section intro		Utah's living systems vary according to elevation and latitude. The diversity of elevation and landscape leads to an amazing diversity of ecosystems over a relatively small geographic scale.	You are now at the level of ecosystems in the organization of life. Populations live and interact in ecosystems. Natural ecosystems are made up of non-living factors (air, water, rocks, energy) and living factors (plants, animals, and microorganisms). Energy flows through ecosystems, from plant producers to consumers to decomposers. Here you will see recreations of 4 of Utah's ecosystems, and discover the players in each.		

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LF6.E01 Hot Desert-Mojave			Visitors see a diorama representing the Beaverdam Wash area of southwest Utah, and learn how the extremes of heat and water availability affect the animals and plants that live in deserts. Visitors see up close the interdependencies of this ecosystem (cryptobiotic soils, plant and insect pollination) and appreciate its fragile nature. Use of lighting and scrims show night time inhabitants vs. daytime inhabitants, as well as sunset/ sunrise.				
	LF6.E01.ms01	mindset	Mindset text describes the hot desert (elevation, rainfall, climate) and its inhabitants.	Desert animals and plants have functional and behavioral adaptations to high heat and low water availability.	Deserts are dry, receiving less than 10 inches of rain/year. Utah has 2 deserts: the hot Mojave and the cold Great Basin desert. In the Mojave, summer air temperatures can reach as high as 115 degrees, and the ground can be 140 degrees. In Utah, the hot desert occurs at elevations between 2500 and 3500 feet. You might think that animal and plant life in the desert would be sparse, yet life thrives in the desert. Plants and animals adapt to allow them to live in these extreme conditions.		
	LF6.E01.gi01	graphic image	ecosystem location map				
LF6.E01.gr01		graphic rail	Hot Desert				
	LF6.E01.gi02	graphic image	Illustration of diorama at night/desert at night		image captions		
	LF6.E01.fp01	focus panel	Focus panel text explains yucca pollination.	Yucca are only pollinated by yucca moths.	Most plants have several pollinators. One-to-one matches between plant and pollinator species are rare. Utah is home to a case of tight coevolution in pollination systems: the yucca and yucca moth. Yucca are pollinated only by yucca moths, and 70% of yucca moth species visit flowers of only one yucca species. A female moth has special mouth parts (tentacles) for collecting pollen. She balls up the pollen and stores it under her head. The pollen is sticky and clings as she flies between yucca plants. She reaches a fresh flower and actively packs the pollen on the stigma, pollinating the yucca. Then, she moves to the flower base and lays her eggs in the yucca ovary. Finally, she climbs up to the anthers and collects pollen, ready to repeat the process in a new flower.		photo of yucca moth in yucca flower
	LF6.E01.sp01	story panel	Story panel from botanist - Mitch?				
	LF6.E01.gc02	graphic captions	Caption text explains plant adaptations		Desert plants use different strategies to "beat the heat." Cholla cactus uses CAM photosynthesis; in this variation of photosynthesis, the small holes on leaves are closed during the day to prevent evaporation. This precludes photosynthesis since CO_2 can't get into the plant. When the tiny pores open at night, the plant stores CO_2 for photosynthesis the following day. Many desert plants can store water. Called succulents, these plants store water in their fleshy leaves, stems or roots. Another strategy desert plants use is called drought dormancy. This strategy allows plants to survive periods of drought by conserving water through reduced metabolism. During this process (also called idling metabolism) the plant slows its metabolism down by recycling CO_2 and using stored water, just enough to keep the plant alive. Waxy or oily coatings that many plants have on their leaves and stems is another way that plants retain water. Creosote and jojoba are two examples of this. These waxes and oils, which are shiny, also reflect light and reduce the temperature of the leaves.		CAM photosynthesis diagram, succulent photos, photos of desert plants w. waxy coatings

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	LF6.E01.fp02	focus panel	Focus panel text explains cryptobiotic soil	Soil crusts are important members of desert ecosystems and contribute to the well-being of other plants by stabilizing sand and dirt, promoting moisture retention, and fixing atmospheric nitrogen.	Cryptobiotic soils, or biological soil crusts are formed by living organisms and their by-products. They creating a crust of soil particles bound together by organic materials. In arid regions, these living soil crusts are dominated by cyanobacteria, but also include lichens, mosses, green algae, microfungi. Because of their thin, fibrous nature, cryptobiotic soils are extremely fragile systems. A single footprint or tire track is sufficient to disrupt the soil crust and damage the organisms. While some species within the soil crust system may regrow within a few years of a disturbance, the damage to slow-growing species may require more than a century before the delicate soil returns to its former productivity.		cryptobiotic soil photo, cryptobiotic soil diagram w. components identified, photo of damaged cryptobiotic soil
	LF6.E01.gc03	graphic captions	Caption text explains animal adaptations		Like desert plants, desert animals have strategies to survive in the dry heat. Many desert birds are active during cool early morning and evening hours, resting in the shade during the day. Some lizards, including collared, zebra-tailed and leopard lizards, have long legs and toes that lift their body high off the ground and reduces the amount of heat they absorb. Sidewinders stay cool by moving sideways. This sideways movement results in only two short portions of their bodies touching the scorching sand at any one time. A variety of desert animals, including rodents, kit foxes and tarantulas, escape the high temperatures by burrowing below the surface of the ground. When the temperatures drop at night, they come out to hunt. Desert tortoises retreat to long, underground burrows they've dug to escape the summer heat. (hot and cold desert info largely from Utah's Desert Dwellers, Utah Div. of Wildlife Resources, by Diana Vos)		photo of sidewinder, rodent and tarantula burrows, desert bird in shade
LF6.E01.id01		id label	id graphic panel has photo/illustration of featured inhabitants, plus captions about each				photo illustration of featured inhabitants; ecosystem overlay
	LF6.E01.sx01	special exhibit-Mojave Ecosystem	Diorama: refer to diorama specifications		Nearground: biologic soil crust (cryptobiotic soil), cholla cactus w. cactus wren and nest (and woodrat in burrow), Joshua tree (background model), creosote bushes, soil cross section showing kangaroo rat burrow (cutaway), soil cutaway showing cholla cactus (shallow) and yucca (deep) roots; gopher tortoise eating prickly pear cactus; banana yucca w. yucca moth (resting on plant/ hanging out near flower); annual lupine; desert moss; raven w. pecked juvenile gopher tortoise shell; coyote stalking antelope ground squirrel; pallid bat under rock eating scorpion; tarantula hawk dragging tarantula backwards into burrow.		
	LF6.E01.pm01	background photomural	Photomural of Beaverdam Wash showing Joshua tree, creosote bush		caption for photomural		
	LF6.E01.av01	av- Nature's Sounds-Audioscape	In this quiet desert ecosystem, you need to listen hard to pick up the subtle noises.		The hot desert ecosystem is represented by a night scene of the Mojave Desert at Beaverdam Wash in Southwest Utah. The background sounds here might include wind across the soil and in leaves of Joshua tree or creosote bush. The foreground sounds of coyote yipping, owl calls, raven calls, coyote brushing against a creosote bush, rodents chewing or scurrying punctuate the stillness.		
	LF6.E01.sx02	special exhibit-Magnifier for Cryptobiotic Soil	Biologic Soil Crust		standard prompt	cryptobiotic soil sample a0042	
	LF6.E01.sx03	special exhibit-Magnifier for lac inset	Creosote Lac Insect		standard prompt	creosote lac insect tbd	

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LF6.E02 Cold Desert			Visitors see a diorama representing a valley/foothill gradient in the Bonneville Basin. They learn about the plant and animal species that live here.				
	LF6.E02.ms01	mindset	Mindset text describes the cold desert (elevation, rainfall, temperature) and its inhabitants.	Plants and animals have adapted to the extremes of hot and cold in the cold desert. New, incoming species can displace desert species and disrupt ecosystems.	The temperature ranges in cold desert biomes are extreme. The Great Basin area is one of the few deserts on the planet where the temperature often falls below freezing. It is cold enough in the Great Basin desert to snow in the winter. The Great Basin Desert in Utah has long periods of cold weather and somewhat higher precipitation than other deserts (10-20 inches). Summers are long, with hot days and cool nights. Animals tend to seek the shade of desert plants during hot summer days.		
	LF6.E02.gi01	graphic image	map of ecosystem location				
LF6.E02.gr01		graphic rail	Cold Desert				
	LF6.E02.gi02	graphic image	Graphic images of the cold desert in day and night, and the four seasons		image captions		
	LF6.E02.fp01	focus panel	Focus panel text explains invasive cheat grass and potential biological soil crust control.	Invasive plant species can take over from native plants;biological soil crusts may make it difficult for some invasives to take root.	Open, arid spaces in Utah's cold deserts are usually covered by a biological soil crust or biocrust, a highly specialized community of cyanobacteria, mosses, and lichen. This soil crust creates a micro-topography of minibumps, with microsites suitable for the seeds of native plants to germinate. The larger seeds of cheat grass have difficulty germinating on this surface; without drill-like awns, their seeds can't penetrate the dense biological soil crust.		images of cheatgrass, cryptobiotic soil
	LF6.E02.gc02	graphic captions	Caption text explains plant adaptations.		The name ‘pickleweed’ comes from the pickle-like appearance of its stem segments and its salty taste. Those "pickles" are fleshy parts of the stem where the plant stores dilute water. Pickleweed leaves are waxy on the outside, which keeps water from evaporating from the plant. Shadscale has several strategies for life in the cold desert. Tolerance to drought is achieved through partial shedding of leaves; this reduces water loss during severe moisture stress (a boon for the chisel-toothed kangaroo rat, whose diet is primarily shadscale leaves). The plant deposits excess salt on its leaves, which has the added benefit of increasing the reflectivity of the leaves, so less of the sun's heat is absorbed.		images of pickleweed and shadscale

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	LF6.E02.gc03	graphic captions	Caption text explains piñon and juniper encroachment.		Pinyon and juniper woodlands have expanded 10 to 30% in the past 30 years and now occupy nearly 20 million hectares of sagebrush shrub steppe in the Great Basin Region and Colorado Plateau. Under natural conditions western juniper remains in balance with sagebrush, grasses, wild flowers and sedges in the Great Basin. Historically, individual trees were found clinging to rocky ridges where they were spared by periodic wildfire. However, decades of livestock grazing, fire suppression and other factors have created conditions that scientists believe have contributed to the rapid and unnatural spread of western juniper down from the hilltops and across sagebrush basins. The introduction of these trees upsets ecosystem relationships, and may increase erosion and runoff, as well as the chance of catastrophic fire, as shrub layers disappear.		maps or aerial photos showing pinon juniper distribution in 1950 and 2000
	LF6.E02.fp02	focus panel	Focus panel text explains sage brush as a keystone species.	Sagebrush is a keystone species in the Great Basin	In the Great Basin, sagebrush provides food and cover for many plant-eating animals, including sage grouse and pygmy rabbit. Utah might have lost as many as 1 million acres of sagebrush. The chief threat to sagebrush is invading cheatgrass; cheatgrass is prone to catastrophic fires. The expansion of pinyon-juniper woodlands into sagebrush habitat and other human impacts, such as overgrazing by livestock are also major sources of concern. Loss of sagebrush impacts the species that depend on it. It is estimated that Greater Sage-Grouse occupy only 41.4 percent, and Gunnison Sage-Grouse occupy only 30.7 percent, of the habitat they once did (Beck et al. in press).		images of sagebrush and species that depend on it; map or aerial photo showing extent of sagebrush in Utah in 1930? And today
	LF6.E02.sp01	story panel	Story panel from birder who visits the cold desert				
LF6.E02.id01		id label	Graphic id panel has photo/illustration of featured inhabitants, plus captions about each				photo/illustration of featured inhabitants, diagram of ecosystem interactions (foodweb)
	LF6.E02.sx01	special exhibit- Cold Desert Ecosystem	Diorama: refer to diorama specifications		Close-up/magnified shadscale leaves, soil cutaway/section showing harvester ant nest and spadefoot toad burrow; Mormon cricket feeding on saltbush or sagebrush, short horned lizard eating ants, sagebrush and broomrape, greater sage grouse, pygmy rabbit hiding under sagebrush, pinon jay distributing seeds, Paiute ground squirrel, paint brush, dyers woad, broad-tailed hummingbird (visiting paintbrush), pronghorn (stepping into scene), iodine bush, greasewood, two-needled pinon (background) w. nuts and cones in foreground, invasive plants (cheatgrass and Russian thistle), Utah juniper (background) and other characteristic plants and animals associated with the cold desert community.	UMNH models/ existing taxidermy: spadefoot toad A0054,	

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	LF6.E02.pm01	photomural	Background photomural of Cedar Valley or Fish Springs showing big sagebrush, two-needle piñon, Utah juniper, greater sage-grouse, pronghorn.		photomural caption		
	LF6.E02.av01	av- Audioscape			The cold desert ecosystem, represented by the Great Basin at Cedar Valley or Fish Springs, is also relatively quiet. The background noises are like those of the hot desert, with sagebrush, pinon, and juniper instead of creosote bush. Visitors might hear the chirp of Mormon crickets, the movement of shorthorned lizards, the call of a spadefoot toad, the cry of pinon jays, the display of a male sage-grouse, the sound of pronghorn hooves, the scurrying and chewing of a chisel-toothed kangaroo rat, and the hopping of a pygmy rabbit. A sudden thunderstorm disturbs the stillness.		
	LF6.E02.sx02	special exhibit	Magnifier for microfungi		standard prompt	prepared slide of microfungi	
LF6.E02.fl01		family label	Family label about Mormon cricket	Can you see the Mormon cricket?	Technically, it's a katydid, not a cricket. In the Great Basin, this big bug eats sagebrush and saltbush. Mormon crickets migrate up to 50 miles a year! On this trek, they may eat food crops like alfalfa and vegetables.		
LF6.E03 Montane Forest			Visitors see a diorama representing a forested canyon on the Wasatch Front and learn about the interconnections of the plants and animals.				
	LF6.E03.ms01	mindset	Mindset text describes the mountain forest (elevation, rainfall, climate) and its inhabitants.	Changes in elevation and moisture affect the plants and animals that live on mountain slopes.	Utah's montane forests are found at elevations of 6000 to 9000 feet. Trees prefer northern and eastern aspects. The mountains have more rainfall than the warmer plains and foothills below; about 20 to 25 inches of rain and snow fall each year. This helps many shrubs, vines, and berries to grow in the understory of taller trees. Often the understory is very grassy with smaller trees, such as Gambel's oak, and shrubs growing in the open areas. Wildlife that makes their homes here include Steller's jays, boreal toad, Western garter snake, and elk.		
	LF6.E03.gi01	graphic image	ecosystem location map				map of Utah showing montane forest areas
LF6.E03.gr01		graphic rail	Montane Forest				
	LF6.E03.gi02	graphic image	Graphic images of montane forest in day and night, and the four seasons				
	LF6.E03.fp01	focus panel	Focus panel text explains trees/woodpeckers/boring insect interactions.	Woodpeckers help protect trees by eating boring insects.	Woodpeckers drum on trees to claim territory and attract a mate. They drill into trees to search for food and hollow out a nesting or roosting cavity. Woodpeckers use their chisel-like bills and strong neck and head muscles to chip away bark and wood to uncover insects. Their extremely long, barbed tongues (some species are able to extend their tongue two inches beyond the bill tip) can spear insects hidden deep in small holes. Scientists have estimated that one black-backed woodpecker may eat 13,500 beetle larvae annually. In some areas, woodpeckers are thought to be able to eat enough larvae to prevent outbreaks of insects that damage and kill trees. In addition, while the birds feed, they remove bark and expose the remaining insects to the elements.		woodpecker on tree photo, photos of woodpecker eating boring beetles/larvae

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	LF6.E03.gc02	graphic captions	Caption text explains plant adaptations.		Some plants have adaptations to reduce damage from planteaters, and even to repel them. Plants use of chemical or mechanical defenses, such as toxins that kill herbivores or reduce plant digestibility (also called antibiosis). Plant toxins are organic compounds that are often by-products of the plant's metabolic activities. Gamble oak shoots contain tannic acids, which inhibit herbivore digestion by binding to consumed plant proteins and making them more difficult for animals to digest, and by interfering with protein absorption and digestive enzymes. If sheep or cattle eat enough of the shoots, they become ill. Producing toxins helps the young Gambel oak escape being eaten and survive to become a tree.		Gambel oak, Gambel oak shoots
	LF6.E03.gc02	graphic captions	Caption text explains mule deer seasonal energetics and movement patterns.		Mule deer are selective feeders, and rarely concentrate on any single species. Feeding habits vary with the changing seasons, and many researchers believe that mule deer have the ability to pick and choose the plants with the highest nutritional value during each season of the year. From late spring to early fall, mule deer quickly gain weight and build up fat reserves by feeding heavily on succulent leaves of the plentiful forbs and grasses. In late fall, they feed primarily on the current year's growth of leaves and stems of brush species. During the winter and early spring when there is little ground forage available, mule deer are on a starvation diet of branches. This dry, woody vegetation is difficult to digest and lacks enough nutritional value to maintain body condition. During these periods of inadequate nutrition, mule deer use stored body fat to survive. Mule deer living in areas of high snowfall, like Utah's mountains, or in areas with drastically changing climates, like Utah's deserts, will make seasonal migrations between winter and summer ranges. Generally, mule deer summer at high elevations and winter at low elevations, following the snow line. During heavy winters, migrating deer will often move into cities and towns in their search for food. Often this causes problems as the deer eat ornamental shrubs and fruit trees in an attempt to survive. (from http://wildlife.utah.gov/publications/pdf/muledeer.pdf)		photo of mule deer in montane forest, photo of mule deer on U of U campus
	LF6.E03.fp02	focus panel	Focus panel text explains boreal toad threats (chytrid fungus, link to keratin).	Utah's boreal toads are declining; one factor may be chytrid fungus.	The population of boreal toads has declined dramatically over the past 25 years. The decline has been attributed to several possible causes. These include: increased UV radiation, acidification of water, water borne toxins, heavy metal contamination, habitat disturbance, and most recently a pathogenic chytrid fungus called batrachochytrium dendrobatidis. The Utah Wildlife Action Plan recognizes this latest threat and recommends researching the causes of the boreal toad decline in the state as well as restoring and protecting habitat. The Chytrid fungus only attacks the parts of a frog's skin that have keratin in them. Most of frog skin doesn't have keratin - they need to have breathable skin to absorb oxygen from the air. Frogs only have keratin in the parts of their body that get exposed to wear and tear - such as their hands and feet, and the places where their legs rub against their bodies. An infected toad may die, but not until after it's hopped around, spreading the fungal spores. Once a pond has become infected with Chytrid fungus, the fungus may stay in the water forever		photo of healthy boreal toad, photo of chytrid fungus on boreal toad.
	LF6.E03.sp01	story panel	Story from Eric or Becca				

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LF6.E03.id01		graphic id label	Graphic id panel has photo/illustration of featured inhabitants, plus captions about each				photo illustration of featured inhabitants, diagram of ecosystem interactions (foodweb)
	LF6.E03.sx01	special exhibit-Montane Ecosystem	Diorama: refer to diorama specifications		Red squirrel on decomposing log w. shelf fungus holding cone, soil cutaway showing lupine roots, Rocky Mountain maples (background) with seeds in foreground and in the air, Gambel Oak (background), curl-leaf mountain mahogany (background), Mountain alder (background), Sub-alpine fir log with spruce budworm, Engelmann spruce with bark beetle and three-toed woodpecker eating the beetles, wild flowers in a clearing/more open sunny spot; less mature trees, aspen with fungus, lupine, oak and maple galls, Western garter snake eating a boreal toad under a log, Steller's jay, elk, mule deer skull or antler, mountain lion crouching (elevated), Uinta chipmunk in grass and other characteristic plants (including fungi and leaves w/galls) and badger and pocket gopher.	UMNH models: boreal toad A0065 Western garter snake A0066, a0069 mule dee, a0070 mountain lion, a3198 elk	
	LF6.E03.pm01	photomural	Background photomural of steep canyon on Wasatch front showing Gambel oak, Rocky Mountain Maple, aspen, curlleaf mountain mahogany, sub-alpine fir, Engelmann spruce		photomural caption		
	LF6.E03.av01	av- Audioscape			The montane forest ecosystem is represented by a community on the Wasatch front. Visitors hear the wind in oak, maple, fir, spruce, alder, and aspen trees. Leaves rustle and crunch as mountain lion or elk go by. Visitors hear the call of a boreal toad, the cry of a Steller's jay, the slither of a Western garter snake over the ground, the chewing as a red squirrel eats, Uinta ground squirrel chirping "song," the calls and pecking of a three-toed woodpecker, and the scolding of a red squirrel.		
	LF6.E03.sx02	special exhibit	Magnifier for fungi		standard activity prompt	prepared slide of fungi	
	LF6.E03.qt01	quotes/questions	Quote/question on back wall				
LF6.E04 Subalpine-alpine			Visitors see a diorama representing a rock outcrop and associated tundra at the edge of the treeline and learn about the interconnections of the plants and animals, and how they are adapted to life at extremes of elevation and low temperatures.				
	LF6.E04.ms01	mindset	Mindset text describes the alpine ecosystem and its inhabitants	On mountain tops, there is nowhere to run - species adapted to life here are vulnerable to climate change and invading species.	Between 9,500 and 11,500 feet above sea level lies the Subalpine Life Zone. This is the most humid life zone, since it is covered with snow six to nine months each year. Rain and snowfall can be 30 to 60 inches a year. That leaves only about two months for tree seedlings to sprout and flowering plants to produce flowers and seeds. The major plant community in this zone is the Englemann spruce and subalpine fir forest. Shade from the forest and cool temperatures help keep snow on the ground until late spring. Trees, and other plants growing here, tend to be smaller than those growing in the zones below. Growing closer to the ground helps protect them from the harsh winds. The highest life zone in Utah is the arctic-alpine tundra. Above timberline, this life zone ranges from 11,500 feet to more than 12,000 feet in elevation. This is the wettest and windiest life zone. (from http://www.wildlife.utah.gov/projectwild/magazine/life_zones.pdf; note, from the species list, this seemed like it was more subalpine than alpine)		
	LF6.E04.gi01	graphic image	ecosystem location map		captions for images		
LF6.E04.gr01		graphic rail	Alpine				
	LF6.E04.gi02	graphic image	Graphic images of Alpine region in day and night, and the four seasons				

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	LF6.E04.fp01	focus panel	Focus panel text explains threats from climate change.	Humans are speeding up the rate of global climate change; mountaintop ecosystems are particularly vulnerable.	Over the past 150 years, humans have increased the “natural” rate and quantity of greenhouse gasses cycling from the Earth into the atmosphere. Increased greenhouse gases cause air and ocean temperatures to increase, and alter atmospheric pressure, air and water circulation, and the transport of heat and precipitation between low and high latitudes. This, in turn, changes the Earth’s historic climate patterns, leading to extreme weather that is difficult to predict. Increased temperature has been documented in Utah - 0.69 degrees between 1940 and 1996. Among other impacts, climate change is expected to induce accelerated extinction. General climate models predict that as temperatures increase, vegetation will shift upslope and mountainous wilderness will lose the highest and coolest climatic zones at the top of climate zones shift upward, the habitat on top of the peaks becomes smaller and smaller, putting more spatial and genetic pressure on species populations there. Where will the alpine species go?		
	LF6.E04.gc02	graphic captions	Caption text explains plant adaptations.		Plants in the Alpine ecosystem have adaptations to extreme cold and harsh winds. Small plants often grow in thick little clusters. Among these “cushion-type” plants is the alpine forget-me-not, which grows close to the ground. The fierce winds stunt and deform trees into what is called Krumholtz formation (from German: krumm, "crooked, bent, twisted"; and Holz, "wood", also Knieholz "knee timber"). The wind off dries and kills branches on the windward side, giving trees a flaglike appearance. Intense winter cold, combined with permafrost, dwarfs these trees as it does every other plant. Alpine plants are perennials, slow growing, and long lived. The seeds of alpine plants must be viable for more many seasons in case conditions are not favorable for seed germination the year of production.		photo of alpine forget me not, photo of Krumholtz spruce, and normal spruce at lower elevations
	LF6.E04.gc03	graphic captions	Caption text explains animal adaptations.		Alpine animals need to survive cold harsh winters. Some, like the marmot, hibernate. The marmot spends the winter in its burrow, the entrance sealed, in a state of torpor (reduced body functions). Marmots emerge when the temperature at night gets warm enough. The pika has a unique adaptation. It sets grass during the warmer months and builds haystacks under sheltering rock so it has dried grass to eat in the winter months. If you are a brown animal, how do you hide in winter when the world is white? Animals like the snowshoe hare and the ptarmigan solve this problem by shedding their summer brown fur or feathers, and growing a coat of winter white.		photo of marmot ideally in burrow, photo of pika and haystack, photo of winter and summer ptarmigan and snowshoe hare
	LF6.E04.fp02	focus panel	Focus panel discusses Whitlow grass.		Draba globosa, or Whitlow grass, is a member of the mustard family that grows at elevations above 2,743 m (9,000 feet) in western Wyoming, central Colorado, southwestern Montana, south central Idaho, and northwestern Utah. It grows in low, matlike clusters, and has yellow-white flowers. It lives in groups of 2-4 plants, growing on limestone and granitic soils. Draba globosa was first collected near Alta in the Wasatch Range in Utah in 1879. Draba globosa is a perennial species that reproduces by seed. Draba reproduces by apomixis, producing seeds without fertilization. Draba produces large numbers of seeds, yet there are relatively few adults, and they are long-lived, suggesting that seedling establishmet in difficult. Like other alpine plants, Draba is threatened by global climate change. Warming could affect alpine areas, causing tree lines to rise by roughly 350 feet for every degree Fahrenheit of warming.		photos of Draba
	LF6.E04.sp01	story panel	Story panel from climber discussing alpine habitat				

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LF6.E04.id01		graphic id	Graphic id panel has photo/ illustration of featured inhabitants, plus captions about each.				photo/ illustration of featured inhabitants, diagram of ecosystem interactions (foodweb)
	LF6.E04.sx01	special exhibit- Alpine Ecosystem	Diorama: refer to diorama specifications		Group of around 10 Magdalena Alpine butterflies flying over rockslide, marmot, Clark's nutcracker feeding on pine seeds, Rufous hummingbirds visiting a penstemon, 2 white-tailed ptarmigans foraging, snowshoe hare (in brown pelage), bighorn sheep skull, pika w. hay pile, dwarf shrew eating spiders in talus rock formation, spiders, diptera, Whitlow "grass," sedge, bristlecone pine in Krumholtz formation and pine cones, Engelmann spruce (background), Mat willow (background), moss campion (tundra), bristlecone, lichen, diptera tbd, spiders tbd in talus.		
	LF6.E04.pm01	photomural	Photomural of a rock outcrop and associated tundra at the edge of the treeline showing lichen, bristlecone pine, Engelmann spruce, mat willow, limber pine		photomural caption		
	LF6.E04.av01	av- Audioscape			The alpine ecosystem background should sound very windy. Strong harsh winds rattle in dwarfed pine and spruce, and whistle through sedge and Whitlow "grass." Visitors hear the cry of a golden eagle, a marmot alarm call, the rustle and chewing of a white-tailed ptarmigan as it looks for food, the sound of bighorn sheep hooves, pikas squeaking, and the occasional rattle of a rock fall.		
	LF6.E04.sx02	special exhibit	Magnifier for lichens		standard prompt	lichen specimen tbd	
	LF6.E04.qt01	quotes/questions	Quote/question on back wall				
LF6.E05 Human Interactions			Visitors wander through a series of story stations, where they meet individuals who are working to improve our interactions and relationships with the natural world. Inspired by the words of these scientists, activists, conservation biologists, educators, and writers, visitors add their own thoughts to a digital "talkback" station.				
	LF6.E05.ms01	mindset	Mindset panel reviews human interactions/leave no trace	Be mindful of your impact on the planet.	As we humans increase in number, and occupy more of the planet, and use more of its resources, we impact natural ecosystems. It's possible to minimize your own impact, at home and when you are in the outdoors. Do you travel lightly on the land, with minimal disturbance to the plants and animals that live there? Some of Utah's ecosytems are threatened by development and climate change, including wetlands and the cold desert. It will take cooperation and planning, and perhaps a change in our behavior and attitude, to save them.		
	LF6.E05.sp01	story panel	Story panel about conservation (aquaculture and fisheries or bee extinction)		Note: story panels should include multiple viewpoints		
	LF6.E05.sp02	story panel	Story panel about climate change				
	LF6.E05.sp03	story panel	Story panel about fire ecology				
	LF6.E05.sp04	story panel	Story panel about invasive species (cheatgrass or zebra mussel)				
	LF6.E05.av01	av	Visitors wander through a grove of sound stations, listening to different people as they discuss their relationship to the natural world. Themed around "Leave No Trace," these voice recordings will inspire visitors to examine their own thoughts and feelings about nature and conservation. These individuals might include a ski resort owner, environmental activist, policy maker, poet or artist, and a biologist. Visitors hear differing points of view on nature, human interactions with the natural world, and sustainability. The speakers represent a diversity of Utahns.				

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	LF6.E05.in02	interactive - talkback	Visitors are invited to "talk to us" and offered a menu that includes: join a blog-based discussion on sustainability and human interactions hosted by the UMNH website; view the population clock or respond to a "what do you think?" question about issues or "what do you do?" question about sustainability tips.				
	LF6.E05.ap01	activity prompt	Prompt for talkback				
LF7 Naturalist Lab							
	LF7.pm01	graphic panel					
	LF7.pm02	graphic panel					
	LF7.pm03	graphic panel					
	LF7.pm04	graphic panel					
	LF7.gc01	graphic captions	Captions for field and lab notebook pages				
	LF7.qt01-03	quote/question	quotes/questions on wall to Naturalist's Lab				

NATIVE VOICES

Traditions persist and culture endures for Utah's distinctive five nations: Shoshone, Goshute, Paiute, Navajo, and Ute.

1. Native Americans are not merely a shadow of the past, but are living, breathing cultural groups whose distinct histories, traditions, tragedies, and triumphs inform their present and future in both tribal and mainstream life.
2. What is means to be Native in the twenty-first century.
3. Utah is home to five tribes with distinct histories, geographies, traditions, tragedies, and triumphs that inform the present and future in both tribal and mainstream life.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
NV1.E01 Introduction			A wide entry opens the way to the gallery and is flanked on one side by an exhibit case arrayed with objects from across the North American continent and on the other by a series of large-scale photographs depicting Native people, both young and old. Focused sound elements feature voices of Native people greeting visitors in native languages and in English. At the end of the “welcome wall” as one turns into the outer circle of the gallery, a map of Native territories and language groups in North America reinforces the diversity among Native Americans and locates Utah as part of the Great Basin region.				
	NV1.E01.gi01-10	title wall w/ graphic image	A photographic mural composed of 12 large–scale photographs; 6 of adults and elders, 6 of children; to be produced by Kenny Blackbird in local communities.	Both old and new generations are the keepers and creators of history and tradition.			
	NV1.E01.av01	av	Motion- triggered audio offering greeting in different Native languages				
	NV1.E01.ip01	intro panel	This exhibit provides a broad continent-wide context for the Native Voices exhibit experience. The space illustrates the vast numbers of diverse indigenous people across North America (including Utah) and the wide variety of language groups, material cultures, and traditional dwellings that have been created over time.	For millennia hundreds of distinctive Native bands, tribes, and nations lived across North America many of which survive as intact political communities today. Language and custom connected broadly dispersed groups, while trading and raiding brought others together in both peace and conflict.	Hundreds of distinctive Native communities exist across the North American Continent. These and many more have been here for millennia. During pre-Columbian times, separate indigenous societies existed in a context of sovereignty and traditional culture. In the region that now encompasses the state of Utah, this continuum persisted well beyond the early days of a post-Columbian America. Language, homeland and material culture are among the features that distinguish each cultural group. Among many indigenous peoples, the cardinal direction east holds particular importance. East is the direction that symbolizes new beginnings, with the rising of the sun each day. The NV gallery has been designed at the eastern edge of the new building. Likewise visitors will be encouraged to circulate in a clockwise direction, toward the east, as they move into the space, much as one would in any number of Utah's indigenous households and gathering places, whether tipi, hogan, brush wikiup, or dance arena.		
	NV1.E01.gp01	graphic panel	A map of native territories in what is now North America reflect diminished land ownership, and language and cultural dispersal. The layers of information reinforce the breadth, diversity, and long history of Native language and culture while helping visitors to locate themselves in Utah and the surrounding region.				

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NV1.E01.gc01		graphic caption		155 native languages are spoken by approximately a half million native speakers in the US today. More than 115 are already extinct, with children actively learning fewer than 20 of the 155 languages still spoken.	Language and cultural groupings are concentrated in different geographic areas, but have migrated and been forced to move over time. At the time of the first European contact there were 280 Native American languages spoken in current US territory; 155 of these are still spoken today. There are 51 language families within the continental US, and 58 in all of North America.		
NV1.E01.ca01			Exhibit case with objects from across the north American Continent organized in geographic groupings of major culture areas: Arctic (baskets, harpoons, seal skin objects), Northwest (masks, rattles), California (baskets, horse dance sticks), Plateau (beadwork bandolier and other objects), Great Basin (baskets), Southwest (Earl Denet Katsina, Pueblo pots), Great Plains (beadwork objects), Prairie (beadwork objects), Woodland (beadwork and quillwork), Southeast (ribbon work).			Northwest Coast: Bella Coola 2435 Kwakuitl 2438, Haida 0944, Eskimo 0769, Makah 0787, Salish 0745, Tlingit 0790, 0958. California: Mission 0800, Maida 0949, Hupa 0748, 0798, Yakima 0751, Northwest California 0760, Pomo 0786 Achomawi 0957,Yokut 0797 Great Basin: Panamint 0952, Shoshone 0353, Goshute 0355, Paiute 0749, Ute 2437, Moapa 0795 Southwest: Hopi 2374-2378, 0158, 0946, 3154, 0774, 0801, New Casa Grandes 2439, Zuni 0744, 0811, 0812, 0818, 0819, Zia 0776, Santa Clara 0772, 0773, Santo Domingo a0815 San Juan 0778, Havasupai 0788 Tohono O'Odham 0791, 0802, 0803, 0804, Pima 0792, Navajo 0805, 0806, 0807, 0808, Santa Domingo 0810, 0814, 0824, Isleta 0817, Pima 0950 Apache 0960, Yaqui 0942 Plains: Cheyenne 0956, Arapaho a3132 Sioux 0766, Plains 0941, Assiniboine 0767, Apache 0746, Crow 0747, 0762, 0771, 0821, 0823, Osage 0752, Blackfoot 0763, Nez perce 0947 Northeast: Chippewa 0750, Iroquois 0754, 0759, 0953 Cree a0758, 0954, Potawatomie 0761, Mohawk 0768, Eastern Woodlands 0770, Ojibwa 0789	
	NV1.E01.ct01	case title	National Tribes Case				

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	NV1.E01.ar01-ar07	artifact labels	seven group labels correlate to objects and identify seven geographic groupings: NW coast, California, Plateau, Great Basin, Southwest, Plains, NE	Native people typically rely on the materials available in surrounding environments and through trade to make things used in everyday life or for special occasions.	These objects reflect the lifestyles, cultures and beliefs of the people who made and use them. Readily available materials--porcupine quills in the Northeast and Great Lakes regions, buffalo hide on the Great Plains, colored clay in the Southwest, willow in the Great Basin, and whale baleen in the Arctic--typically comprise the basis for form and design of traditional arts. For hundreds of years, new materials, motifs, and forms have been incorporated into tribal arts through trade, intermarriage, and commerce. Shells and shell ornaments have made their way into the North American heartland since prehistoric times, through trade. Glass beads from Europe were used as currency between the earliest Euro-American traders and Eastern Indian tribes and were soon dispersed across the continent through extensive intertribal trade systems. "Hair pipes," long cylindrical beads used on Plains breast plates have their origins among east coast tribes and were originally made of shell as hair ornaments.		
					An entrepreneurial New Jersey man began to manufacture this form on a lathe, using cow bone, and soon these beads became ubiquitous throughout the Plains and into the Great Basin. Buttons obtained from Russian traders are as traditional as the imagery they are used to create. Today's powwow regalia incorporates mirrors, ribbons, beads from around the world, and feathers of all kinds. While materials and patterns evolve over time, the cultural and spiritual basis of many traditional objects remain unchanged. Katsina dolls, given to young Hopi girls are believed to embody virtues and characteristics that will be passed on to them.		
NV2 We Remember							
	NV2.si01	section intro	Utah Indians share personal and tribal histories in a sequence that begins with ancient roots in the land, addresses outside influences and conflicts with non-Indians in their territory, and reflect on state and federal Indian policies.		Generational memory, as opposed to textbook histories of Native Americans in Utah, has been passed down through oral tradition and preserved through material culture. Family histories and stories carry cultural practices and traditions and serve as portals to sometimes painful and defining tribal moments--when entire communities were wiped out, people were relocated from homelands and tribes forced to leave behind their traditions and beliefs.		
NV2.E01 We've Always Been Here							
	NV2.E01.pm01	photomural	Photograph of ancient antelope corral at Ibapah (photo to be taken by Kenny Blackbird)				
	NV2.E01.gc01	graphic caption					

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	NV2.E01.ms01	mindset	Aboriginal culture and sovereignty during pre-Columbian times	The Shoshone, Paiute, Goshute, Navajo and Ute people's homelands extend across the Great Basin and into the Rocky Mountains.	Prior to contact the indigenous people of the area now known as Utah lived in small extended-family groups that traveled broadly in the Great Basin, Colorado Plateau, and beyond following a seasonal round of resources. Identity and band affiliation was tied to extended family, home territory, and lifestyle. With relations on both the eastern and western flanks of the Rocky Mountains, the many bands of Utes engaged in broad exchange and affiliation with Plains peoples. Likewise, Shoshone bands extended north into what is now Wyoming and west into what is now Nevada, so Plains, Plateau, and Basin influences can be seen in their material culture. Tied linguistically to both Shoshone and Ute, Goshute and Paiute people were tied more closely to the Great Basin and remained in this expansive territory except when moved forcibly by Ute raiders. Navajo country extended along the southern edge of Utah and deep into Arizona as is does today, and as today, Navajo communities were organized according to their clan system.		
	NV2.E01.fp01	focus panel	Description of language groupings among Native people in the Great Basin.	Language is the primary conduit for transmission of tradition and culture.	Language is the primary conduit for transmission of tradition and culture. Among the native people of Utah and surrounding regions, shared linguistic roots of four of the five major tribes may relate to other forms of shared cultural tradition The languages spoken by native people of Utah and the surrounding region fall into two language families: Uto-Aztecan and Athabaskan. On the Numic branch of the Uto-Aztecan language family tree, are Ute, Paiute, and Shoshone. So, while each of these languages (as well as Goshute, which is a dialect of Shoshone) are distinct, there are deep linguistic connections among them. Native speakers are able to understand components of these related languages. Navajo is a language of the Athabaskan language family tree and falls within the Apachean language branch of the tree. Thus, there is no linguistic connection between the numic speakers of the region (Ute, Paiute, Shoshone, Goshute), and the Navajo. Likewise, family and clan structure and tribal origin stories are very different between the Navajo and the other "Utah" tribes.		graphic of a language tree structure to illustrate groupings
	NV2.E01.sp01	story panel	It is important for Navajos to know who they are and what clan they come from.	In the Navajo way, a person introduces themselves based on both their maternal and paternal clan. Navajo children are "born to" the mother's clan and take her clan name and are "born for" the father's clan. This way, no matter where they are in time or space, Navajo people know precisely who they are and where they come from. The clan that never ends is the maternal clan, the male side changes through marriage.	From first world to fourth world. Origin of Navajo and explanation of clan system, both of which connect them inextricably to the land. Changing Woman is the daughter of Mother Earth and Father Sky and the spiritual mother of all Navajos. She gave birth to twins Monster Slayer and Born of Water. They killed all the monsters on earth. When it was safe Changing Woman and her husband the Sun traveled to earth and Changing Woman created the four original clans of humans by rubbing the skin of her breast, back and under both arms. The Four clans are Towering Clan, Mud Clan, One Who Walks Around Clan and Bitter Water Clan. Navajo society is matrilineal so the first clan for all Navajos is the mothers' clan The Navajo or Dine' have an oral tradition of passing on their beliefs from generation to generation.		
					The Navajos consider their homeland within four sacred mountains which are Mt. Blanca to the East, Mt. Taylor to the South, San Francisco Peaks o the West and Mt. Hesperus to the North. Present Navajo land is in New Mexico, Arizona and Utah.		

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	NV2.E01.sp02	story panel	Goshute story	The Goshute remember a different landscape before white contact.	Story 2: Goshute: Genevieve Fields has stories that have been passed down through her family describing a very different Great Basin landscape before contact, in which tall grasses rather than sagebrush covered the land. There is still the remnant of an antelope corral from the long-ago antelope drives. Goshutes saw the last buffalo in the 1920's.		
	NV2.E01.sp03	story panel	Shoshone story		Story 3: Patti and Helen Timbimboo tell of the last Shoshone rabbit hunt in 1928.		
	NV2.E01.gi02	Photograph-	Shoshone Chief Sagwitch's wife wearing a rabbit skin robe				http://www.koffordbooks.com/pretty/released/sagwitch/stereo2.jpg
	NV2.E01.gc03	graphic caption					
	NV2.E01.ic01	inset case	rabbit robe for a child-commission from Brenda (Paiute)			a03122	
	NV2.E01.ar01	artifact label		Weaving is a tradition shared by Paiute, Shoshone and Goshute people.	It is a Paiute piece, so it's id label will need to address the broader use of this weaving technique among Shoshone, Paiute, and Goshute people. We have additional images of rabbit-skin-wearing folks in our archives.		
NV2.E02 Contact							
	NV2.E02.pm01	photomural	Historic image of Ute men on horseback (Rights obtained, b/w print in hand)				
	NV2.E02.gc01	graphic caption					
	NV2.E02.ms01	mindset	Displacement of Native peoples began with the arrival of Fur trappers in the Great Basin region from 1824 to about 1840. Mormon settlers arrived in 1847.	As elsewhere in North America, changing federal Indian policies that emerged over time resulted in conflicts across Indian Country. These policies removed, relocated, dislocated and displaced Native people from their homelands and disrupted traditional lifeways.	By the 1600s, the nomadic Utes and the southerly-situated Navajos came into contact with Spanish traders and their envoys. Combined with trade of Plains and Pueblo goods, Spanish horses and other goods expanded the raiding and trading capacity of Utes (or Yutas as they were known by New Mexicans) in Utah and Colorado and brought silversmithing to the Navajo. By the early 1800s, Utah's other indigenous people began to see the impacts of conquest from the east. Surely and steadily the flow of trappers, traders, explorers, miners and settlers flowing westward reached the western slope of the Rockies and altered the lives of the indigenous people of this region forever. As Mormon and non-Mormon settlement expanded across the region, the broader influences of Federal Indian policies impacted indigenous life in Utah. Ultimately, removal from tribal lands, dislocation from and destruction of natural resources, unhappy alliances and forced cohabitation among tribes was the norm. Like other native nations across the continent, the past one hundred-fifty years of Indian policy have shaped the economic, political, and psychic reality of Utah's tribes. Forrest Cuch refers to this as "intergenerational grief," a phenomena in which the suffering of one's ancestors—when not acknowledged beyond one's own community, when denied in official histories, ignored in school texts, or redefined in popular culture—continues to cause suffering among each new generation. For example, when a Ute child sits in school and hears the stories of his family dismissed or disparaged, his entire identity is challenged, his ability to learn stifled, and his self-esteem trampled. Cuch explains, "If native people had a written language earlier, history books might have incorporated the viewpoints of the indigenous peoples" (American Indians of Utah).		

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	NV2.E02.fp01	focus panel	The Ute are known for being powerful and fierce horsemen.		As early as the 1600s, Utes encountered Spanish explorers and their Indian envoys who brought with them horses from Spain. For an already highly mobile people, the acquisition of the horse was an expansive, almost magical gift. Mounted horsemen can be seen in early rock art in Ute territory. It made it possible to carry more belongings, to hunt greater numbers of buffalo, and to connect with tribes from greater distances. Horses became the most prized possession of the Ute people and they had great herds of horses used for hunting, raiding, transporting supplies, and as a status symbol. Utes have long been expert, fearless horsemen who can ride in the rugged mountains and high valleys where others dismount and lead their horses. The Utes became known as fierce and powerful horsemen whose mountainous homeland provided abundant resources and a position from which to defend an enormous territory. Their economic stature grew as they raided Paiute and Goshute communities for slaves to trade with the Spanish, followed by a period of lucrative fur trading.		Rock art image at Ute reservation by Kenny Blackbird.
	NV2.E02.fp02	focus panel	Mormon arrival and religious conversion	With the arrival of Mormon settlers in 1847, a complex and often contradictory relationship began to develop with Native people inhabiting the land. Land was taken from Native Americans to make way for the building of religious communities simultaneous to Mormons seeking to convert these same people.	The arrival of Mormons in the Desert Territory in 1847 added a new and pervasive layer of outside influence and increased pressure, particularly for those tribes living in the northern parts of the region. The church's approach to the native population was inconsistent and erratic. As settlers attempted to take Indian lands, resistance could alternately lead to a command from church leader Brigham Young that his army "crush them," or to no retaliation at all—indeed to sharing of food in some cases. Young has been famously quoted as saying "it's cheaper to feed 'em than fight 'em" (qtd. Ward, Geoffery C., The West, 159). This confusing and conflicting approach was based in large part on the church's belief that indigenous people were in fact the lost tribes of Israel, or the "Laminites." Thus, in the midst of decades of conflict and deadly battles, a patina of paternalism overlaid many Mormon/Indian relations—a situation that continues in various guises today.		
	NV2.E02.sp01	story panel	The Blackhawk War and Ute removal recounted by Roland McCook.	Ute story	In 1861, President Lincoln set aside land in the Uintah Valley of Utah, where Brigham Young had procured land and expected all of "his red children" to settle. In 1863, in the face of poverty and failed farming experiments, Tumpanawach, Pah Vant, Parianuche, and Yampariccka Utes met in Central Utah where Black Hawk led a series of raids known as the Black Hawk War of Utah--the last guerilla campaign against removal.		
	NV2.E02.sp02	story panel	Lora Thom recounts the Mountain Meadow Massacre and its repercussions.	Paiute story	Paiute communities often had contentious and contradictory association with Mormon settlers, including the events that led up to and followed the Mountain Meadows Massacre.		

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	NV2.E02.sp03	story panel	Leland Pubigee recounts the Bear River Massacre.	Shoshone story	Among the Northwestern Band of Shoshone, the historical moment that continues to define tribal consciousness is the Bear River Massacre. With the deaths of over 300 tribal members and loss of their Bear River Valley, the Northwestern Band faced a new way of life with the oversight of their Mormon neighbors, and the successors to their land. The Northwestern Band now includes 456 enrolled members, many of whom are active members of the Mormon Church. As Patti Timbimboo Madsen, Cultural Resources Manager for the tribe relates, “The people who became the Northwestern Band of Shoshone had to adapt to the changes or die…"It's easier to take a group away from their environment--it makes them dependent." (consultation notes, 2006)		
	NV2.E02.gi01	graphic image	Photograph of Bear River Massacre Site/Northwestern Band Cemetery by Kenny Blackbird.				
	NV2.E02.gc02	graphic caption					
	NV2.E02.sp04	story panel	Story of telling of the Long Walk- impact on 2nd generation	Navajo story	The Long Walk In 1863, under the direction of the US Army, Kit Carson rounded up the Navajo people for a forced removal to Bosque Redondo, or Fort Sumner (Hwééldi to the Navajo). His approach was a scorched earth policy—livestock were killed and home and field burned as the people were driven on foot for 300 miles. At least 200 died along way. Between 8,000 and 9,000 people were settled on a 40 miles (104 km_) square area, with a peak population of 9,022 by the spring of 1865. Some Navajo escaped the treacherous journey, hiding with White Mesa Utes and San Juan Paiute people on and around Douglas Mesa.		
	NV2.E02.gi02	graphic image	The Long Walk, public domain historic images available from SI anthropology collections.				
	NV2.E02.gc03	graphic caption					
NV2.E02.ic01		inset case				Navajo saddle blankets a2311, Ute saddle a0409	
	NV2.E02.ar01	artifact label	saddle blanket--see below. Artifact label will reference the trade blanket along with information about the saddle style.		Women wove coarse saddle blankets with no pattern so they could sell them quickly. Later the quality of saddle blankets would improve dramatically and weavers would incorporating twill patterns.		
	NV2.E02.ar02	artifact label	Ute saddle		In the 1600s horses came to the Utes via trade through their compatriots (although it's never entirely clear whether there was direct contact with Spanish conquistadors as well, this early). Then, by 1776, the Dominguez-Escalante expedition passed through Ute territory, so this does make sense as a contact story.		
NV2.E03 Assimilation							
	NV2.E03.pm01	photo mural	Boarding School- kids lining up				
	NV2.E03.gc01	graphic caption					
	NV2.E03.ms01	mindset		Assimilation to lifeways, traditions and relationships to the land that differed from native perpectives and traditions took many forms.			

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	NV2.E03.fp01	focus panel	focus on boarding schools	Boarding schools have a huge impact on Native languages and take children away from their homes and families for extended periods of time.	The government sought to have Navajos assimilated into white society. Children were taken from their homes and sent to boarding schools. They had to wear white society attire, have their hair cut and not speak their native language. Boarding schools continued into the mid 1900s. Today there are schools on the reservation run by the Bureau of Indian Affairs that include some boarding schools (Teec Nos Pos and Aneth) due to the great distances to travel.		
	NV2.E03.sp01	story panel	Many did not want to go to boarding schools.	Navajo story	Navajo: Stephanie Holly's mother went to Phoenix Indian School though she did not want to go. She went in her Indian clothes but was made to change into non-Indian clothes and wear her hair during the school year. Often children were separated from their families for four years because they could not afford to pay for transport home in the summers. Other boarding schools where Indians were sent include Brigham City, Headway, Oregon and Sherman Institute in California. The boarding school arrangement was part of the Bosque Redondo treaty signed on June 1st 1868.		
	NV2.E03.gi01	graphic image	historic image of boarding school				Brigham Indian School (source: American West Center)
	NV2.E03.gc02	graphic caption			Today there are schools on the reservation that include some boarding schools due to the great distances to travel. Teaching Navajo language in schools is left mostly up to families.		
	NV2.E03.sp02	story panel	Many attended boarding schools fearful of what would happen if they didn't.	Shoshone story	Shoshone: Patty Timbimboo said that when white people approached their homes when she was a child adults would tell her "Run and hide. They'll kill you or steal you."		
	NV2.E03.fp02	focus panel	focus on religious assimilation-		During the years of the Bear River Massacre, conflicts in the region continued, treaties were signed and Mormons settled in the Shoshone's last mountain valley. The Mormon's took a paternalistic stance toward the displaced Indians, however, providing food, lessons in farming, and the doctrine of the church. Many Mormons believed that religious affiliation would help assimilate the Shoshone overall and encourage them to help build a religious community. By 1880, the settlement at Washakie, Utah was well established. (adapted from UMNH materials)		
	NV2.E03.sp03	story panel	Experiences of religious assimilation had many different long term results and lasting impact.	Goshute story	Source material for stories related to the Goshute experience of religious assimilation: Genevieve Fields (Indian Advisory Committee Member) Christine Steele (former Indian Advisory Committee Member and collaborator on Utah's First Nations) Julie Yupe Evonne Evening Chrissandra Murphy Jeanine Hooper Mel Steele Edwin Clover Melissa Oppenheim Also, Kenny may have recorded a pertinent interview for this story.		

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	NV2.E03.fp03	focus panel	focus on property/ ownership assimilation		The Ute Indians lived on the plains and in the mountains of an area covering about 150,000 square miles, what we now know as the Great Basin and Colorado Plateau This land included hunting grounds, places of spiritual importance, and the territories of the seven Ute bands. The Utes lived off the land and hunted the many animals in the area, which provided them material for clothing and homes. They lived in tipis and made their homes across the area of what is now Colorado, Wyoming and Utah. When white settlers and homesteaders arrived, they brought with them very different ideas about the land and what they saw as their right to own, cultivate and use natural resources. They saw the wilderness as something to be conquered rather than respected for its life sustaining resources. The settlers, explorers, miners and traders wanted the Ute people to become herders and farmers. The Ute people believed if they stayed in one place they would starve. This was a fundamental difference between Native Americans and non-natives, and the cause of great clash.		
	NV2.E03.sp04	story panel	White Mesa loss of land, has led to a loss of culture--contacts Jeanette Badback and Gwen Cantsee	White Mesa Ute	Biggest issues for White Mesa: losing culture. Jeanette, who has taught Ute language, notes that kids have lost their identity. They're looking for something that fits…to be something they're not. Hip hop music, gangsters, graffiti, but no drug problem…yet. It's that old thing of trying to fit in that everyone goes through. For the middle-aged generation now at White Mesa, they went off to boarding school, tried so hard to fit into Anglo culture and language that they didn't use their language—now many of them have passed away because of alcoholism, and many can't teach traditions to their kids because they let them slip away. It's the grandparents who still retain traditions and language.		Request photos from Jeanette or Gwen--yearbooks ca. 1970s.
	NV2.E03.gi02	graphic image	photo of encampment of Northern Shoshone from Washakie, 1906. (UMNH Collection)	Mormon arrival created new communities			
	NV2.E03.gc03	graphic caption					
NV2.E04	**Reorganization and Termination**						
	NV2.E04.pm01	photo mural	tbd				
	NV2.E04.gc01	graphic caption	tbd				

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	NV2.E04.ms01	mindset	Termination was the governments response to the perceived request of more freedom by Native Americans. After having grown dependent on government policies, the Indian community protested this resolution claiming that the US government had forced them to become dependent on the government for subsistence. Without this subsistence many Indians suffered deprivation and the accompanying misery generated by the termination policy. The termination policy also resulted in the termination of more than fifty tribal governments when the federal government no longer recognized the nation status of their tribes.	The US Governments attempt to "reorganize" Indian life and culture resulted in mass dislocation and ultimately, isolation.	Termination is the period of time spanning about twenty years, when the policies and subsidies instituted by the Bureau of Indian Affairs in an effort to assimilate Native Americans, were revoked. The period of the 1930s through the 1960s marked the end of failed attempts by the government to assimilate Native Americans. Through the Indian Reorganization Act of 1934, tribes were urged to move toward self-governance. The act "symbolized a new relation between the Indians and the Indian Office which the Commissioner hoped would evolve. In lieu of administrative absolutism there would be developed between government officials and Indians a partnership in the determination of many policies. Instead of the superintendents or Washington officials deciding everything, there would be an area for local self-government. If the Indian councils proved capable and faithful to their trust, they would be delegated additional power by the Secretary.		
					A short 15 years later, in 1953, Termination acts were administered on a tribe by tribe basis, in order to assimilate Indian people into mainstream society. Most included the end of federal recognition and all the federal aid that came along with being federally recognized tribes. Subsidies were terminated and people were left to fend for themselves. "A total of 109 tribes and bands, totaling over 11,000 Indians or 3% of the total Indian population, across the country were terminated during this time and lost their status as "recognized" and sovereign dependent nations.[3] The termination of these tribes extinguished traditional rights to land, hunting, and fishing as well as disbanded the tribe as a whole and incorporated them as official American citizens."--Wiki		
					"For Native Americans who favored certain aspects of termination programming, the movement was optimistically envisioned as a catalyst for enhanced Indian autonomy and control over tribal resources and increased liberation from the heavy hand of federal paternalism. Government proponents of termination likewise viewed the policy as aimed toward Indian "freedom," but their view of self-determination was predicated on the ultimate goal of privatizing Indian resources through the wholesale liquidation of the reservation system, the Bureau of Indian Affairs, and the very concept of tribalism itself. As so often has been the case in federal Indian relations, the two sides largely talked past one another, and little common ground could be found."--Law and History Review.		
	NV2.E04.qt01	quote	laws and policies from an Indian perspective	There were many different approaches to fixing the Indian problem	Two perspectives on how the Indian "problem" was dealt with by the government.		
	NV2.E04.qt02	quote					

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	NV2.E04.fp01	focus	Focus on laws and policies		tbd- This should outline the trust relationship between the federal government and Indian tribes, which has been a highly dynamic platform upon which multiple approaches have been played out over time. I'll look for a good reference to help guide this. (BM)		
	NV2.E04.sp01	story panel	Story 1: Travis Parishant	Paiute story	In the late 19th century, the Paiute Bands in southern Utah coalesced into five Bands: the Shivwits Band, Indian Peaks Band, Kanosh Band. Koosharem Band and Cedar Band. Reservations were established between 1903 and 1929 for all but the Cedar Band whom the federal government overlooked. In 1954, the Bands were terminated from federal recognition, with the exception of the Cedar Band who received no federal assistance and consequently suffered de facto termination. The Tribe became ineligible for any federal assistance for 26 years.		
	NV2.E04.sp02	story panel	Story 2: Roland McCook, Donna Land Moldanado	Both sides of the story…	Ute Partition and Termination Act of 1954 terminated the Federal supervision and Trust over the mixed blood Uintas of Utah. It was amended in 1956, 1962, and again in 1975. This act has led to ongoing litigation that continues today. The Act defined full-bloods as those tribal members possessing one- half degree of Ute Indian blood and a total of Indian blood in excess of one-half a degree, and defined mixed-bloods as those members who did not possess sufficient Ute or Indian blood to fall within the definition of full-bloods and those full-bloods who chose to be designated as mixed-bloods...The Act provided that after distribution, mixed-bloods could dispose of their interests in the assets they received subject to the approval of the Secretary for a period of years, and thereafter without federal supervision. The United States actually ended its supervision over the affairs of the mixed-blood Utes and terminated its trust relationship with them on August 24, 1961.		
	NV2.E04.sp03	story panel	Story 3: Navajo Code Talkers	The 2nd World War and Indians	Makes more sense to place this story here--the war effort and the goal of overcoming enemy propaganda about Indian/government relations was one of the issues that spurred on the Reorganization Act		Navajo Code Talker Photograph
	NV2.E04.gi01	graphic image					
	NV2.E04.gc02	graphic caption					
	NV2.E04.ic03	inset case				Paiute vest a2372	
	NV2.E04.ar01	artifact label		This vest was made for the local Indian agent at Shivwitz, whom this band of Paiutes deemed to be fair, thus the nickname no cheet'em.	Description of Shivwitz vest with "No Cheet'em" embroidered on it.		
NV2.E04.tt01		table top	Termination flipbook table				
	NV2.E04.sx01	special exhibit	Flipbook with primary source documents related to the termination period.		This will include treaties, legal briefs, policy papers, and photographs that we will collect from various archives.		
	NV2.E04.ar01-	artifact labels	identifies primary source materials			a3125- documents tbd	
	NV2.E04.ap01	activity prompt	encourages visitors to look through flipbook				
NV2.E05 Living in Cities							

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	NV2.E05.pm01	photomural	Relocated Native Americans in an industrial work setting in the city		Refer to archives at the Denver Public Library for Navajo image.		UMNH collection
	NV2.E05.gc06	grapphic caption					
	NV2.E05.qt01	quote-tbd					
	NV2.E05.ms01	mindset		Today, many Native Americans live in cities both by choice and because they, or their families were removed or relocated from their tribal lands.	In the last half of the 20th Century, a government program that was little known at the time and is largely forgotten today created the largest movement of Indians in American history. The final scope and meaning of this massive social experiment is still impacting native peoples today." In 1950, the average Native American on a reservation earned $950. The average black person earned $2,000, and the average white person earned almost $4,000 — over four times more than Indians. So, in 1952, the federal government initiated the Urban Indian Relocation Program. It was designed to entice reservation dwellers to seven major urban cities where the jobs supposedly were plentiful." Native cultures and lifeways that had been geographically and culturally distinct until this point, were brought together in urban settings by Native people faced with the challenges of an unfamiliar environment and looking for ways to identify. Relocatees were supposed to receive temporary housing, counseling and guidance in finding a job, permanent housing, community and social resources. The new migrants also were given money to tide them over on a sliding scale based on the number of children in the family. A man, his wife and four children got $80 a week for four weeks. That's what they were promised. Some found that the promises were not kept. Not every relocatee found a job, and those that did were generally at the lower end of the economic ladder. Others succumbed to alcohol and those who were accustomed to drinking in public on their home reservations got into trouble with the law when they drank on city streets. Many more were simply homesick so far away from their families and familiar landscapes.		
					Still more decided to return to their reservation. But over the years, it's estimated that as many as 750,000 Native Americans migrated to the cities between 1950 and 1980. Some came through the Relocation Program. Others came on their own. The juxtaposition of intertribal Indians within city centers led to new alliances and a new era of activism and AIM was born.		
	NV2.E05.fp01	focus panel		Salt Lake City was a relocation center in the 1950s and 1960s.	Navajo and Hopi men were among the first people relocated when the BIA recruited them for agricultural and railroad work. Soon after, job placement and relocation offices were created in cities across the country, including Salt Lake City. The government saw relocation as the policy fairest to Native Americans that would encourage them to live without federal supervision and have more control over the quality and direction of their own lives. For most, the relocation experience was traumatic and disorienting. For the first time, people encountered elevators, telephones, and structured work environments. For those without education, the choices of livelihood were limited.		

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					Those who were successful were mostly young people with some college education. The BIA relocation program originally provided transportation, job placement, subsistence funds until the first paycheck, and counseling. In 1956 Public Law 959 added vocational training to the program. Participants, mostly between the ages of eighteen and thirty-five, received two years of benefits for either on-the-job experience or vocational classes. Typically, Indians working in factories on the reservation received apprenticeship provisions, and relocated individuals received vocational training and for those who qualified, counseling services. The BIA relocation program was controversial. Some believed that industrial jobs freed Indians from BIA control, exposed them to improved education, and provided a means to end Indian poverty. Others believed that the program forced Indians to leave reservations without improving living conditions or access to comprehensive job training.		
					One distinct result of relocation was that the disadvantages Native Americans faced vs. other minority groups became much more visible in urban settings, rather than rural outskirts.		
	NV2.E05.sp01	story panel	Relocation story that speaks to the diversity of Indian people in SLC	Salt Lake City is home to urban Indians from across the US--as many as 70 tribes are represented in Utah's Indian population.	Conversations with folks via Indian Walk-in Center, Gayle Russell, Dina Ned, Nola Lodge		
	NV2.E05.sp02	story panel	Relocation story that speaks to the choice of moving from the reservation to the city.	Navajo story	There are a lot of urban Native Americans, and those raised off the res; those who live and work in cities and want to learn and get degrees and jobs and come back to help their people…but most don't... (Stephanie Holly, interview, 4/13/06)		
	NV2.E05.sp03	story panel	Activism in urban settings (AIM) or to the city for college then back to the rez.		Conversation Donna Land Moldanado; or Anthony Shirlet--left the rez for college and has remained in the city) or Larry Cesspooch at IAIA, then back to the Rez.		
	NV2.E05.ic01	inset case			Contemporary Navajo folk art combines traditions with contemporary life.	folk art tbd	
	NV2.E05.ar01	artifact label					
	NV2.E05.gi01-gi05	graphic image	relocation posters and advertisements (American West Center as resource)				
	NV2.E05.gc01-gc05	graphic captions					
NV3 Being Indian Today							

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	NV3.si01	section intro	This concluding exhibit speaks to the efforts of Indians during the last quarter century to reverse the pressure of assimilation by reestablishing viable, separate sovereignties in Indian country. This section also looks at what it means to be a Native American today and how traditions persists and change over time. How does tradition get successfully passed on? Native people speak to these themes in first-hand story panels that address issues such as healthcare, preserving native languages, being a teenager on a reservation today, being a teacher on a reservation and of students in a city school, living in the city and participating in traditional dance and music performance, generational differences, etc.	Native people's lives integrate traditional lifeways and contemporary culture.	Photography by Native Americans and first-person accounts document these revitalization efforts, interpret contemporary issues and describe moments of healing and celebration among Native Peoples. Unlike the entry sequence this area is comprised of portraits and narratives that collectively paint a picture of contemporary Indian life, tradition, celebration and (struggle for) sovereignty.		
	NV3.E01.sp01	story panel	Old songs are lost-they have not been recorded or written down.	Goshute story	Loss of traditions and language-the pine nut dance is no longer held on a yearly basis. Genevieve Fields heard them when she was young but does not have a way to find them again.		
	NV3.E01.sp02	story panel	Someone to speak to the uniqueness of language and describe how languages define the identity of a people.				
	NV3.E01.sp03	story panel	A speaker to describe the inter-relatedness of language, perhaps a dual-language speaker who can tell the story of how she/ he came to know both.				
	NV3.E01.sp04	story panel	An elder who is one of the few fluent speakers of a language, describing their fear about the loss of language.				
	NV3.E01.sp05	story panel	A young person who lives in the city, and attends school where a program to teach native language has been recently introduced. Why is it important to them to learn their language?				
	NV3.E01.sp06	story panel	An archivist/ anthropologist who works at the Center at the U of U recording and translating stories.				
	NV3.E01.sp07	story panel	A scientist involved with research related to the elderly and access to adequate healthcare.				
	NV3.E01.sp08	story panel	A Goshute teenager from Ibapah describes their everyday life.	"We don't still live in tipis, cuz we never did live in Tipis." The teens at Ibapah created an entire presentation about life as a Goshute Indian.			
	NV3.E01.sp09	story panel	Skull Valley Goshute addresses concerns about nuclear waste				
	NV3.E01.sp10	story panel	Ibapah Goshute describes how troops changed names into shorter versions.				
	NV3.E01.sp11	story panel	Shoshone voice describes their participation in ceremonial dance. (Great to have a photo of them in typical clothes and dress for dance)				
	NV3.E01.sp12	story panel	Tribal chairperson				

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	NV3.E01.sp13	story panel	Northern Ute participant in contemporary Bear Dance				
	NV3.E01.sp14	story panel	Paiute participant in contemporary Restoration Dance				
	NV3.E01.sp15	story panel	Shoshone handgame gathering at Fort Hall or Brigham				
	NV3.E01.sp16	story panel	Shoshone- contemporary issue of Diabetes				
	NV3.E01.sp17	story panel	Shoshone- Mae Perry has been involved in revitalization efforts.				
	NV3.E01.sp18	story panel	Horserace in August- Navajo				
	NV3.E01.sp19	story panel	Skull Valley- Nuclear Waste Story				
	NV3.E01.sp20	story panel	Additional stories collected by Kenny Blackbird, to be transcribed.				
	NV3.E01.sp21	story panel	Image of White Mesa Bear Dance by Steve Trimble				
	NV3.E01.sp22-30	story panel	tbd				
	NV3.E01.ic01	inset case				Mary Black Basket a0168	
	NV3.E01.ar01	artifact label	Mary Black's basket entitled "Lifeways" depicts images related to Mary's life on the Navajo reservation.	Against all odds, basketry traditions continued on Douglas Mesa into the 21st century. Each basket created has a story, and Mary says, "If we stop making the baskets, we lose the stories."	Mary Holiday Black's family has lived for generations on Douglas Mesa in Monument Valley. Those who hid in the canyons and mountains to avoid the Long Walk settled on Douglas Mesa, Allen Canyon, and Paiute Canyon where interaction between friendly Utes and Paiutes let to marriage ties, and sharing of skills and knowledge that continues today. At Douglas Mesa, where her family continued to create ceremonial baskets for their medicine men, Black follows in the footsteps of a long succession of Navajo basketmakers, carrying their skills from antiquity forward.		
	NV3.E01.qt01	quote	quote makes transition from stories to next section		Possibilities: "There are certain advantages the Indians have. We have a place, a sense of belonging." David Box, Ute or "Some of the things Indian people feel are not written in books, they are written in their hearts." Edie Box, Ute		

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	NV3.E01.fp01	focus	Languages spoken in the Great Basin region can be broken down into three geographic regions.	Native languages are endangered in the US, making the preservation and recording of these languages and the people who speak them, particularly important.	The Numic language family can be broken down into Western, Central and Southern parts. The Westernmost wedge in Nevada-Oregon, bordering on California, consists of the California language Mono-Paviotso; its cogeners in the Basin & into Oregon & Idaho is N. Paiute-Bannock (so, that's Western Numic). Some of it is north of the Basin above the Snake River Valley & into West-Central Oregon. Central Numic; it has the California language: Tumpisa-Panamint + the Basin chain of Nevada dialects including: Shoshoni-Gosiute, plus the break-away Comanche (the latter now in Oklahoma, after having ranged the Southern Plains since the 1700s as powerful equestrian nomadic raiders). Shoshoni itself (C. Numic) reaches into N. Idaho (Lemhi) & Wyoming (Wind River Reservation). At one time it could be found as far north Saskatchewan, Canada. They also occupied the Yellowstone Park area. Southern Numic: California has Chemehuevi (now sharing the Colorado River Reservation with Mohave, a Yuman Language). Eastward in the G. Basin-Colorado Plateau: Southern Paiute-Ute, the latter (Ute) is found on reservations near the 4-corners region in Colorado, plus the "Uintah Basin" at Ft. Duchesne (near the town of Roosevelt, in northeast Utah)		
NV3.E01.tt01		table top	Language Interactive				
	NV3.E01.av01	av	language based interactive av that offers visitors the chance to learn and repeat words in different Native languages.		Visitors type a word or select from a dictionary-like list of words, push the translate button and see the word projected on the monitor in several different Native languages while a native speaker pronounces the word out loud. Visitors can see and hear similarities and differences among languages and try to repeat the new word. A simpler variation of this could be a flash card-based game.	Reference: Dr.s Mixco and DiPaolo at the U are currently working on a talking dictionary of the Shoshone language.	
	NV3.E01.ap01	activity prompt					
NV3.E01.tt02		table top	Talk Back				
	NV3.E01.sx01	special exhibit	Feedback notebook prompts visitors to respond				
	NV3.E01.ap02	activity prompt	Visitors are encouraged to write a response to a prompt of "Who are you?" Or "Where are you from?"				
NV4 Homeland Photomural			Homeland images that share the same horizon line and objects will be inset into cases of each of the Utah's tribes. Objects highlighted at cutouts in case: Ute rasp, Shoshone bustle, Goshute seed jar, Paiute basketry hat, Navajo water carrier				

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	NV4.E01.qt01-qt05	quotes	5 Quotes reflect people's relationship to their homeland		Interviews conducted by UMNH in 2006 may serve as source materials for these quotes. Becky Menlove is a resource.		
	NV4.E01.pm01-05	photo mural	5 photomurals reflect the landscape of different native homelands				
	NV4.E01.gc01-05	graphic captions	identify different native homelands				
NV5 Utah's Tribes							
	NV5.si01	section intro	The five tribes prominent in Utah today are featured in this section.	Native American culture has persevered in the Great Basin.			
NV5.E01 Ute							
NV5.E01.ca02							
	NV5.E01.ar01	artifact labels	case highlight object	Ute-Bear Dance rasp		Ute- Bear Dance rasp- a0462, White Mesa Ute (within the Ute case)-flute,	
	NV5.E01.ms01	mindset	Ute (all bands)		For hundreds of years before Europeans arrived Ute home land was the Eastern Great Basin and Western Rocky Mountains. Today the Ute people lived on three reservations in Utah and Colorado. The Southern Ute tribe have their headquarters in Ignacio, Colorado; the Northern Ute tribe is one the Uintah and Ouray Reservation with their headquarters in Duchesne, Utah; and the Ute Mountain Ute have their headquarters in Towaoc, Colorado. The Uintah and Ouray reservation consist of the Uintah, Umcompahgre and White River Bands. The White Mesa Utes who reside in southeastern Utah belong to the Ute Mountain Ute tribe. When the Spanish came into contact with the Utes they called them Yutas from which the state of Utah got its name.		
	NV5.E01.fp01	focus panel	traditional Ute ways of life relied on their environment.		Before white contact Utes hunted big and small game and gathered wild foods moving from place to place with the seasons. Shelers were ramadas with pole frames covered with tule or juniper bark. Northern groups also used skin tipis to protect from the cold. Utes were experts in tanning hides and made beautiful clothing, footgear and carrying bags. Soft strips of rabbit skin were woven into warm robes. In higher elevations pine nuts were gathered in conical baskets, then parched and winnowed in fan shaped baskets. Among other important food sources that utilized baskets were berries, seeds, roots and in some other areas fish traps. Ute Mountain Ute people wore fiber shirts and sandals. Globular shaped water jugs were woven and pitched on the inside to make them water tight. Baskets were made for many purposes including gathering, winnowing, parching, carrying and storing water.		
	NV5.E01.gl	group label/ artifact labels	artifacts connected to focus panel and the use of environment			Water bottles a0411, a2773,	
	NV5.E01.ar-	artifact labels				Baskets- bowls, lidded, large carrying- a0414,	
	NV5.E01.ar-	artifact labels				a0415	

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	NV5.E01.ar-	artifact labels				a0413	
	NV5.E01.ar	group label/ artifact labels				White Mesa baskets tbd (2 of them)	
	NV5.E01.fp02	focus panel	trade and raids sustained the Ute people and provided them with beads and horses- both vitally important.		In the 1750s fur trappers and then traders appeared. The Utes traded furs for food, wool blankets and trinkets. By the mid 1850s glass pony beads were brought form Europe as trade items for the Indians. Beads replaced shells and teeth for decoration. The Utes became expert bead workers decorating clothes, moccasins, horse blankets, cradleboards and beaded blankets. Utes first acquired horses through trading with the Navajo and Comanche, not directly from the Spanish. Saddle blankets were also acquired from the Navajo and through trading and raiding with the Ute's neighbors.		
	NV5.E01.ar	extended artifact label	objects related to horse culture of the Ute that they traded for		Richly painted parfleches were made of finely tanned leather from bison, elk or later cattle. These served as storage for clothing, utensils and tools.	saddle a0410,	
	NV5.E01.ar	artifact label				gloves a0461,	
	NV5.E01.ar	artifact label				painted hide of encampment a0459,	
	NV5.E01.ar	artifact label				parfleche bag a0408	
	NV5.E01.fp03	focus panel	Glass Beads		By 1870 the smaller seed beads were available. The Utes became expert bead workers decorating clothes, moccasins, horse blankets, cradleboards with intricate designs Beaded blanket strips were sewn to wool and hide blankets that were worn over the shoulder. The high back cradleboard was unique and often highly decorated with intricate bead patterns. Small beaded bags and pouches were popular to carry small items, ration tickets or in some cases strike a light. Larger bags like dance bags would attach to the waist and carry special items such as tobacco or sage. People carried their pipes in tanned hide bags embellished with beads.		
	NV5.E01.gl	group label/ artifact label	objects related to the use of beads that the Ute traded for.			Bags and Pouches a0434-a0438, a0440-a0442, a0444-a0453,	
	NV5.E01ar	artifact label				Awl case a0460,	
	NV5.E01ar	artifact label				Pipe Bag a0420,	
	NV5.E01ar	artifact label				Belts a0430, a0431,	
	NV5.E01ar	artifact label				Blanket strips a0428,	
	NV5.E01ar	artifact label				Cradleboard a0416	
	NV5.E01ar	artifact label				Cradleboard a0417	
	NV5.E01.fp04	focus panel	objects related to childrearing/passing on traditional knowledge		Before Europeans arrived Ute children learned from their parents and grandparents. Tradition was past from generation to generation so the stories, survival skills, and knowledge of the natural world would be past on. Ute people felt they were the stewards of the land and not the owners.		

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	NV5.E01ar	artifact label				Doll Cradle a0418;	
	NV5.E01ar	artifact label				Umbilical Fetish Bag a0439,	
	NV5.E01ar	artifact label				Child's dress a0455,	
	NV5.E01ar	artifact label				Turtle amulets a2764, a2765, a2766	
	NV5.E01.gl	group label/ artifact labels				Child's moccasins a0424; a0427; Doll moccasins a0425, Moccasins a0426	
	NV5.E01.ar10	extended artifact label	Settled life		As Settlers, explorers, miners and traders moved in they wanted the Ute people to become herders and farmers. The Ute people believed if they stayed in one place they would starve. Despite these uneasy alliances, Ute people stood behind America's symbols and have continued to fight in American wars.	Am. Flag headband a0429; Am. Flag watch fob a0458	
	NV5.E01.sp01	story panel	story that relates to the Bear Dance--we may want to focus on White Mesa (Ute Mountain) Bear Dance, also--we have a great photo by Steve Trimble identified OR, we can send Kenny to the spring Bear dance at Northern Ute.				
	NV5.E01ar	artifact label	connects to story panel related to Bear Dance			Moccasins a0421,	
	NV5.E01ar	artifact label	connects to story panel related to Bear Dance			Hat bands a0432,	
	NV5.E01ar	artifact label	connects to story panel related to Bear Dance			Arm bands a0463,	
	NV5.E01ar	artifact label	connects to story panel related to Bear Dance			Hand game a0457,	
	NV5.E01ar	artifact label	connects to story panel related to Bear Dance			Vest a2769,	
	NV5.E01ar	artifact label	connects to story panel related to Bear Dance			Medallion a2775,	
	NV5.E01ar	artifact label	connects to story panel related to Bear Dance			Bag a0433	
	NV5.E01.fp05	focus panel	Contemporary crafts by Fabian Jenks	Traditional arts are still important today.	Contemporary crafts today follow traditions but incorporate innovation and inspiration from may sources. Artists' work is highly valued by both Indians and non-Indians. Beaded and leather pieces continue to be produced for powwows and celebrations that renew traditions, stories and culture.		
	NV5.E01ar	artifact label	Contemporary crafts by Fabian Jenks			a0419;	
	NV5.E01ar	artifact label	Contemporary crafts by Fabian Jenks			a0443;	
	NV5.E01ar	artifact label	Contemporary crafts by Fabian Jenks			a2767;	
	NV5.E01ar	artifact label	Contemporary crafts by Fabian Jenks			a0454;	
	NV5.E01ar	artifact label	Contemporary crafts by Fabian Jenks			a2768	

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NV5.E01.tt01		activity table	Ute interactive table				
	NV5.E01.sx01	special exhibit	touch object display			raw materials used to make flutes, reed and tools	
	NV5.E01.ar	artifact label	label for materials and touch object provided by UMNH				
	NV5.E01.sp02	story panel	Text introduces visitors to Nino Reyes and the story and tradition of his craft				
	NV5.E01.gi01-gi04	graphic images	Images reflect the process of making the object- from raw materials to detailed handiwork-				
	NV5.E01.gc01-gc04	graphic captions					
NV5.E02 NW Band Shoshone So-so-goi							
NV5.E02.ca03		case				45 total objects	
	NV5.E02.ar-	artifact labels	case highlight object	Shoshone-bustle		Shoshone-bustle a1257 show center only	
	NV5.E02.ms01	mindset	Shoshone		The Northwestern Band of Shoshone is of seven original bands of Shoshone people. Unlike many of their relations they didn't acquire horses, and thus were known as So-so-goi, those who travel by foot. The historical moment that continues to define the tribal consciousness of the Northwestern Band is the Bear River Massacre. With the deaths of over 300 tribal members and loss of their Bear River Valley, the Northwestern Band faced a new way of life with the oversight of their Mormon neighbors and the successors to their land. The Northwestern Band now includes 456 enrolled members, many of whom are active members of the Mormon Church. As Patti Timbimboo Madsen, Cultural Resources Manager for the tribe relates, “The people who became the Northwestern Band of Shoshone had to adapt to change or die.”		
	NV5.E02.gl	group label/ artifact labels				Floral moccasins a0343; Children's moccasins a0348; Blue moccasins a0350	
	NV5.E02.ar-	artifact labels				Basket a3131	
	NV5.E02.sp01	story panel			It is a new generation’s responsibility to pass along history and traditions just as the ancestors did. Artist Rios Pacheco creates one-of-a-kind clothing for powwow dancing that is rich with historical meaning. As a teacher and purveyor of beadworking and traditional arts, he keeps stories and long-established techniques in play. Each component of this ensemble combines to tell the story of the Northwestern Band. (In notes, states that this story will be recorded by Kathy Kankainen)		
	NV5.E02.gl	group label/ artifact labels	connected to story panel			Rios Pacheco Dance Regalia a1248-1261	

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	NV5.E02.ar-	artifact labels				Woven water bottle a0368;	
	NV5.E02.ar-	artifact labels				water container a3130	
	NV5.E02.fp01	focus panel			In 1875, the first permanent home for the Northwestern Band was located near Corinne, Utah. The people were forced to give up a nomadic lifestyle and replace it with farming. The Shoshone were ultimately expelled by the military from this settlement. Some moved to Fort Hall in Idaho, while others returned to their traditional homeland in Cache Valley.		
	NV5.E02.gl	group label/ artifact labels				Tassel moccasins a0349; Beaded bag a0361; Beaded bag a2238; Beaded bag a2239; Beaded bag a2241; Fort Hall Bag/Pouch a0359; Fort Hall Bag/Pouch a0360;	
	NV5.E02.ar	artifact label			Educational programs bring families and children together to rediscover and reclaim traditional activities and stories.	Cradle a0391;	
	NV5.E02.ar	artifact label				Coyote Steals Fire: A Shoshone Tale (Children's story book) a2250;	
	NV5.E02.ar	artifact label				Children's moccasins a0345	
	NV5.E02.ar	artifact label				Children's moccasins a0347;	
	NV5.E02.fp02	focus panel			In 1863, following the Bear River Massacre, the Treaty of Box Elder was signed to agree that “friendly and amicable relations be re-established” and that “a firm and perpetual peace shall be henceforth maintained between the said bands and the United States.” After the signing of the Box Elder agreement, government officials attempted to get all of the Northwestern Shoshone to move to the newly founded Fort Hall Indian Reservation in Idaho. After several years of receiving their government annuities at Corinne, Utah, near the mouth of the Bear River, some Shoshone Indians bands finally gave up their homelands in Utah and settled at Fort Hall, where their descendants live today.		
	NV5.E02.ar	artifact label				Beaded Eagle belt buckle a0371;	
	NV5.E02.ar	artifact label				Band a2230; Leg bands a2232;	
	NV5.E02.ar	artifact label				Arm bands a2237;	
	NV5.E02.ar	artifact label				Purse a2236;	
	NV5.E02.ar	artifact label				Cradle a0341;	
	NV5.E02.ar	artifact label				Shoshone Bannock moccasins a0346;	
	NV5.E02.ar	artifact label				Blue/Rust moccasins a0352;	

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	NV5.E02.ar	artifact label				Loom beaded necklace a2247	
	NV5.E02.ar	artifact label				Winnowing tray a3172	
	NV5.E02.ar	artifact label				Tray a3171	
	NV5.E02.ar	artifact label				Bowl a3173	
	NV5.E02.ar	artifact label				Lidded basket a3174	
	NV5.E02.ar	artifact label				Gauntlet gloves a0369	
	NV5.E02.gi01	graphic image	Image of Bear River Massacre gravesite				
	NV5.E02.gc01	graphic caption					
	NV5.E02.gi02	graphic image	Powwow dancers in regalia				
	NV5.E02.gc02	graphic caption					
	NV5.E02.ar01	artifact label	Storytelling, dance, and handgames offer social events at which this sharing occurs.			Handgame sticks a2255;	
	NV5.E02.ar01	artifact label				Beaded bag a2234;	
	NV5.E02.ar01	artifact label				Beaded bag a2235;	
	NV5.E02.ar01	artifact label				Blanket strip a0396	
	NV5.E02.gi03	graphic image	A handgame gathering, acquired from NW Band of Shoshone Tribe.				
	NV5.E02.gc03	graphic caption					
	NV5.E02.gi04	graphic image					
	NV5.E02.gc04	graphic caption					
	NV5.E02.gi05	graphic image	Photograph of Bear River, new photos by Kenny for this.				
	NV5.E02.gc05	graphic caption					
	NV.E02.gi06	graphic image	Photograph of Fort Hall Powwow, source to be identified				
	NV5.E02.gc06	graphic caption					
NV5.E02.tt01		activity table	Shoshone interactive table				
	NV5.E02.sx01	special exhibit	touch object display			leather cord, shell, hair pipes for touching	
	NV5.E02.ar	artifact label	label for hair pipe choker touch object provided by UMNH and raw materials				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E02.sp01	story panel	Text introduces visitors to Rios Pacheco, his work, and how he learned the traditional craft		There are a number of Northwestern Shoshone artists, like Rios Pacheco, who are known for their beautifully crafted beadwork from jewelry to dance regalia. In beadwork classes, artists learn the craft and learn more about language, genealogy, stories and oral history of their people.		
	NV5.E02.gi07-gi10	graphic image	Images reflect the process of making the object- from raw materials to detailed handiwork-				
	NV5.E02.gi11	graphic image	photos of Rios Pacheco at work				
	NV5.E02.gc07-gc11	graphic captions					
NV5.E03 Goshute- Newe			Goshute: Skull Valley Band and Confederated Tribes of Goshute at Ibapah				
NV5.E03.ca04		case					
	NV3.E03.ar01	artifact labels	case highlight object	Goshute-seed jar		Goshute-seed jar a3129	
	NV5.E03.ms01	mindset		For Goshutes today, education of their children and preservation of their language remain top priorities. (reference boy's and girl's cradles in association with this message)	There are two Goshute Tribes residing in Utah on reserved land: the Confederated Tribes of Goshute (409 members) whose land is located on the Utah/Nevada border and the Skull Valley Band of Goshute (127 members) whose reservation is located in Skull Valley Utah. Many Goshutes today have family ties within both tribes and more broadly among their Shoshonean relations.		
					From UMNH exhibit text: We are the remnants of small nomadic bands of Shoshonean-speaking peoples of Western Utah and Nevada. The white man has called our homeland a desolate, empty, and barren desert. We knew it as a sea of sagebrush with mountain islands that provided us with plants, animals and water. We followed the seasons gathering seeds, berries, roots, and insects. We lived in small family groups that came together for communal rabbit drives, antelope hunts, ceremonies and socializing. When our springs, creeks and valleys were taken by settlers, we starved. We were reduced to begging and raiding settlements. Years of conflict. Despite many attempts to relocate our people to other lands, we have remained in our homeland. Set aside by executive order in 1914, the Ibapah reservation- Aveenbah, meaning milky water- lies between the Deep Creek Mountains of Western Utah and Antelope Mountains of Eastern Nevada.		
					Today, we are struggling for economic development, the education of our children, and the preservation of our language and culture.		
	NV5.E03.gl01	group label/ artifact label		Cradleboards created for girls and boys differ in design. Girls have a zig zag while boys have straight lines in the design and shade of the boards. Pouches and bags were sometimes used to carry smudgings.		cradle a0096; Cradle a0097; Cradle a0374;	
	NV5.E03.ar01	artifact label				Doll cradle a0335;	
	NV5.E03.ar01	artifact label				Purse a0101;	

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	NV5.E03.ar01	artifact label				Moccasins a2249;	
	NV5.E03.ar01	artifact label				Water vessel with grass stopper a0093	
	NV5.E03.gi01	graphic image	new Ibapah baby in cradle image by Kenny Blackbird				
	NV5.E03.gc01	graphic caption		Traditions still inform contemporary Goshute people and their lifeways.			
	NV5.E03.fp01	focus panel		Goshute food gathering and production is based on a desert lifestyle	Historically, the Confederated Tribes of Goshute knew their environment intimately and were masters of the seasonal round. They gathered plants for both food and medicinal purposes. While their home territory is among the most desolate in the broad expanses of the West Desert, their food gathering led them to fertile marshlands, the foothills and highlands of the Deep Creek Mountains, and the shores of the Great Salt Lake. This subsistence lifestyle was flexible and mobile and resulted in a wonderful array of basket types designed for gathering and storing food and water.		
	NV5.E03.ar	artifact label				Chokecherry basket a0090;	
	NV5.E03.ar	artifact label				Water bottle a0092	
	NV5.E03.ar	artifact label				Seed jar a3129	
	NV5.E03.ar	artifact label				Nesting baskets a3128	
	NV5.E03.gi02	graphic image	Historic photograph of Goshute women and baskets (UMNH collection)				
	NV5.E03.gc02	graphic caption					
	NV5.E03.gi03	graphic image	Photograph of plants/plant expert at Ibapah (Kenny Blackbird to photograph)				
	NV5.E03.gc03	graphic caption					
	NV5.E03.fp02	focus panel	In 1995, Ethnobotanists Elaine York and Paul Cox visited with members of the Goshute Tribe and with their guidance, documented important specimens at the Reservation.	Pine nuts are very important to the Goshute historically and today.	The taste and smell of pine nut mush is especially nostalgic, and tribal members gather the seeds of the pinon in good seasons. The harvest is good every three years and the best place to collect is where there has been rain. The nuts are cooked and then shelled using a rock. Pine nut dances are done before the harvest.		
	NV5.E03.ar	artifact label				Winnowing basket a0095	
						Treasure basket a0089	
	NV5.E03.ar	artifact label				Pinenut bowl a0088	
	NV5.E03.ar	artifact label				Pinon and chockecherry vouchers tbd	
	NV5.E03.gi04	graphic image	Photograph of pine nut winnowing from Baskets of the Great Basin w/ permission.				
	NV5.E03.gc04	graphic caption					

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	NV5.E03.ar	artifact label	relationships between farmers and ranchers		Surrounded by farmers and ranchers who took up residence around Goshute lands, Goshute artisans at Ibapah and Skull Valley created sturdy work gloves embellished with beadwork for the home market and to sell to their neighbors. The most ornate gloves were usually made to sell.	Gauntlet gloves a0102	
	NV5.E03.ar	artifact label				Gauntlet gloves a0104	
	NV5.E03.fp03	Focus panel	making a living	Today the Goshute are faced with the difficulty of finding sustainable economic development.	The Skull Valley reservation is approximately 18,000 acres surrounded by waste repositories, the Deseret Chemical Depot, Dugway Proving Grounds, and a bombing range. For more than ten years the community at Skull Valley has been deeply divided over the prospect of a nuclear waste repository on their tribal lands. While some of the tribe stood behind the initiative to collaborate with Private Fuel Storage to bring high level nuclear waste to Utah--in order to bring jobs, education and training, housing and improved infrastructure for the future—other members of the tribe have fought long and hard to halt these plans. Whether or not a nuclear waste site would have been a sustainable choice, the process was an important reminder of the sovereign status of Indian tribes. With only about 30 tribal members living at Skull Valley, it is clear that most tribal members must make a living elsewhere. Laine Thom lives far from Skull Valley, but has taken along his extraordinary beadworking skills--learned from his mother and grandmother and influenced by all his relations.		
	NV5.E03.gl	group label/ artifact labels	Contemporary beadwork			Laine Thom beaded dance bag a0103; Floral Bag/Pouch a0356; a0358 Geometric bag a0357, Beaded knife sheath a0342;	
	NV5.E03.ar	artifact label				Quilled moccasins a0354,	
	NV5.E03.gi05	graphic image	Photographs of Margene Bullcreek and Leon Bear at Skull Valley signpost (existing source--will seek permission)				
	NV5.E03.gc05	graphic caption					
	NV5.E03.ar	artifact label				Dolls a0099, a0100, a0098	
	NV5.E03.fp04	Focus panel	Relationships between and among Utah's tribes have had lasting influences.	influences of other groups on Goshute artists Laine Thom and Shoshone Linda Harrelson	There have always been relationships among the many tribes and bands of Shoshone people of the Intermountain West through collaborative hunting, social gatherings, and intertribal marriages. Such visits brought opportunities for trade, gift giving, and the exchange of ideas and technologies.		
	NV5.E03.ar	artifact label				Moccasins with beaded soles a0344;	
	NV5.E03.ar	artifact label				Beaded doll a0337;	
	NV5.E03.ar	artifact label				Doll Cradle a2248;	
	NV5.E03.ar	artifact label				Beaded choker a0372,	
	NV5.E03.sp05	story panel			In 2007, a pilot program to bring solar energy to Skull Valley was organized with an eye to alternative solutions to the economic progress needed in this remote community.		
	NV5.E03.gi06	graphic image	Photos and words from “People of the Dust”				www.youtube.com/watch?v=3IjbPkr5VzI

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NV5.E03.tt01		activity table	Goshute nteractive table				
	NV5.E03.sx01	special exhibit	touch object display				trade cloth, beads, and examples of other influences
	NV5.E03.ar	artifact label	label for Laine Thom touch object provided by UMNH and raw materials				
	NV5.E03.sp06	story panel	Text introduces visitors to Laine Thom the story and process of his craft and the history and tradition of beadwork	The beadwork of the Thom family has been inspired by different Native styles and traditions over the years.	Laine Thom comes from a family known for generations for their exquisite beadwork. His mother, Ardis Brown, his grandmother Vida Bear, and his great-grandmother; Daisy Baker, were well respected-artists whose work was appreciated by both community members and art collectors. Thom is well known for his fine beading and also for his documentation of beadwork styles, techniques, and traditions in the Rocky Mountains. (UMNH text)		
	NV5.E03.gi05-gi08	graphic image	Images reflect the process of making the object- from raw materials to detailed handiwork-		Laine Thom uses many different designs to develop the unique patterns and shading that characterize his work.		
	NV5.E03.gi09	graphic image	photos of Laine Thom and his family				
	NV5.E03.gc05-gc09	graphic captions					
NV5.E04 Nuwuvi Southern Paiute "The People"			Title Panel				
NV5.E04.ca05		case					
	NV5.E04.ar	artifact labels	case highlight object	Paiute-basketry hat		Paiute basketry hat- a0918	
	NV5.E04.ms01	mindset		The Paiute Indian Tribe of Utah, which was created by an act of Congress in 1980 is actually a confederation of five Paiute Bands that were independent for generations. The Paiute tribe was terminated in 1954 by the federal government and reinstated in 1980. Today, the constituent bands that make up the PITU are the Shivwits Band, Indian Peaks Band, Kanosh Band, Koosharem Band, and Cedar Band.	Southern Paiute territory once stretched from Death Valley to Monument Valley and included the five bands now recognized as the PITU as well as the Kiabab, Moapa, Las Vegas, and San Juan Paiutes. Each of these communities knew the land and it plants and other resources making it possible to live in the varied and arid lands that were their expansive land base. Small mobile communities of 100-150 individuals was traditionally the norm, and today, while the five bands of PITU collaborate in many ways, each band retains autonomy and communities remain small. Powwow provides the Paiute Indian Tribe of Utah with a rich way to celebrate life and heritage and the restoration of the federal trust relationship with the five Bands. Traditional lands of the Southern Paiute Nation stretched from Death Valley to Monument Valley. As skilled botanists who knew the land, its plants, and its resources, we were known for our ability to survive in harsh climates. We lived in family communities, as we do today. The Paiute Nation includes the Paiute Nation of Utah, Kaibab Paiutes, Moapa Paiutes, Las Vegas Paiutes, San Juan Paiutes, and the Chemehuevi. Now, Paiute tribal populations are small, with 100-900 members. Our language is part of the Numic language family which includes Gread Basi tribes and Comanche. History has not always been kind to the southern Paiute. Encroachment of Euro-American settlers into the area brought destruction of our culture, health, religion, economy and title to our homelands. Despite ill-conceived attempts to "help the Indian tribes," we still remain close to our ancestral lands. We have survived acculturation, relocation, and termination and we retain our distinct identity as a tribe. (UMNH exhibit text)		

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	NV5.E04.fp01	focus panel	Basket making skills passed from generation to generation	Unique Southern Paiute basket-making skills were passed down from generation to generation for centuries.	The Southern Paiute developed a broad range of basketry types directly related to food gathering, preparation and storage to accommodate a wide range of wild foods collected. Twined seed beaters freed seeds from their stalks and conical burden baskets carried heavy loads. Winnowing trays, with seeds tossed skyward, separated hulls from seeds and nuts, and precious seeds were kept from year to year in tightly twined containers. They included both coiling and twining techniques.		
	NV5.E04.ar-	artifact label				Beaded Dance Bag a0926	
	NV5.E04.ar	artifact label				Matching moccasins (Shivwitz) a2368,	
	NV5.E04.ar-	artifact label				gloves (Shivwitz) a2369, a2370	
	NV5.E04.ar-	artifact label				Shivwitz vest a2371	
	NV5.E04.gi04	graphic image	Photograph of San Juan Paiute Basketmaker, 1936				
	NV5.E04.gc04	graphic caption					
	NV5.E04.ar-	artifact label				Square basket a0907	
	NV5.E04.ar-	artifact label				Gathering basket 0914	
	NV5.E04.ar-	artifact label				Twined storage basket a0931	
	NV5.E04.ar-	artifact label				Coiled bowl a0933	
	NV5.E04.ar-	artifact label				Coiled trays- a0927	
	NV5.E04.ar-	artifact label				Shivwitz bowl a0916	
	NV5.E04.gl	group label				Seed bottles a0911, a0912, Twined seed baskets- a0929, Seed beater a0913,	
	NV5.E04.gl	group label				Winnowing trays- a0934, a0935, a0910, a0915,	
	NV5.E04.gl	group label			Both Southern Paiutes and their relations in the high deserts of Western Nevada and Oregon created twined basketry hats to protect themselves from the desert sun and made pitched vessels to carry and store water.	Coiled bottle a0930, Water bottle- a0909, Shivwitz water bottle a0917, Twined water bottle a0932	
	NV5.E04.gi03	graphic image	Photograph of Kiabab women wearing hats, 1870s				
	NV5.E04.gc03	graphic captions					
	NV5.E04.ar06	extended artifact label			Finely coiled basketry trays have a long tradition among the San Juan Southern Paiute adding beauty and function to their daily lives and providing goods for trade and sale. Into the 1980s a small cadre of San Juan Southern Paiute weavers began creating remarkably fine baskets with complicated and colorful designs to serve the global collecting market.	San Juan Southern Paiute basketry tray a0908	
	NV5.E04.gi05	graphic image	Eleanor Tom, 2001, in hand				
	NV5.E04.gc05	graphic caption					

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	NV5.E04.ar07	extended artifact label	Eleanor Tom, Cedar Band		Earnestine Lehi, Indian Peaks Band, learned to make cradles from her mother using willow for the frame and sunshade, sinew to bind them, and buckskin for the cover. In 2000, members of all five bands of the Paiute Tribe of Utah gathered to share information and learn from her. One of her students, Eleanor Tom, of the Cedar Band, has gone on to teach others in her community.	Paiute Cradles- a0920	
	NV5.E04.ar-	artifact label				Paiute Cradles a0936	
	NV5.E04.ar-	artifact label				Paiute Doll Cradle a0921,	
	NV5.E04.ar-	artifact label				Doll and cradle a1023	
	NV5.E04.fp02	focus panel			Depending on the season, Paiute clothing was traditionally made of woven buck brush (the inner bark of the cliff rose), beautifully tanned hides, or rabbit skins cut into strips and twined into warm robes. Each type of clothing required local resources for materials and a wide range of skills for production. Paiute beadwork incorporates designs that resemble arrows, arrowheads, and floral patterns. Northern Paiutes add beadwork to basket forms and bottles as well as to clothing and regalia.		
	NV5.E04.ar-	artifact label				Beaded moccasins- a0924,	
	NV5.E04.ar-	artifact label				Baby moccasins a2252,	
	NV5.E04.ar-	artifact label				beaded water bottle- a0922,	
	NV5.E04.ar-	artifact label				beaded baskets a2253, a2254,	
	NV5.E04.ar-	artifact label				Barkskirt being made a3127	
	NV5.E04.gi01	graphic image	Photograph of Kiabab Basket Maker, 1870s				
	NV5.E04.gc01	graphic caption					
	NV5.E04.gi02	graphic image	Photograph of Cedar Band Paiute woman splitting willow, 1936 Contemporary Shivwits community (Kenny Blackbird photo)				
	NV5.E04.gc02	graphic captions					
	NV5.E04.fl01	family label	Bring attention to beaded water bottle in exhibit	Waterbottles, both plain and fancy, are important for people who live in arid country. Do you carry a water bottle? What does it look like?			
NV5.E04.tt01		activity table	Paiute interactive table				
	NV5.E04.sx01	special exhibit	touch object display			samples of whole, peeled, and split willow; cloth, canvas, colored yarn	
	NV5.E04.ar-	artifact labels	label for Eleanor Thom's cradleboardt touch object provided by UMNH and raw materials.				

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	NV5.E04.sp01	story panel	Text introduces visitors to Eleanor Tom and the story and process of her craft		traditions of cradleboards and traditional ways of crafting distinct cradleboards for boys and girls.		
	NV5.E04.gi01-gi03	graphic image	Images reflect the process of making the object- from raw materials to detailed handiwork-				
	NV5.E04.gi04	graphic image	photos of Eleanor Tom and colleagues at work on cradle project.				
	NV5.E04.gc01-gc04	graphic captions					
NV5.E05 Navajo Dineh							
NV5.E05.ca06		case					
	NV5.E05.ar02	artifact labels	case highlight object	Navajo-pitched water carrier		Navajo-water carrier a0153	
	NV5.E05.ms01	mindset	Clans and language define the Navajo people	The story and history of the Navajo nation is one of tenacity, adaptability and endurance.	The Navajo or Dine' have a long-standing oral tradition rooted in the clan system, Navajo language, the land, and core beliefs to pass on traditional knowledge from generation to generation. Changing Woman is the daughter of Mother Earth and Father Sky and the spiritual mother of all Navajos. She gave birth to twins Monster Slayer and Born of Water. They killed all the monsters on earth. When it was safe, Changing Woman and her husband the Sun traveled to earth and Changing Woman created the four original clans of humans. The Navajo homeland sits within four sacred mountains, which are Mt. Blanca to the East, Mt. Taylor to the South, San Francisco Peaks o the West and Mt. Hesperus to the North. Present Navajo land is in New Mexico, Arizona and Utah. When the Spanish first entered this land in the 1600s they brought horses, goats and sheep. Neighboring Pueblo people learned to shear, scared, spin and dye wool and to weave, and the Navajos likely learned weaving from them. However, oral history and tradition teaches that Spider Woman taught the Navajo how to weave. Navajos also acquired horses and sheep at this time, which remain important today. The Spanish sheep are Churro--well-suited to life in the desert. The long straight wool contains little grease and can be spun and woven without being washed. Weaving brought a new dress style to the Navajo, the biil: two rectangular pieces joined at the shoulders. Navajos used natural dyes and Indigo blue that was brought up from Mexico. The most prized thread was from Spanish cloth or bayeta which the Navajo unraveled and respun for their weavings.		
	NV5.E05.gi01		A photo of Monument Valley w/Navajo Mt. in the back is a fitting photo here.				
	NV5.E05.gc01		caption for image				
	NV5.E05.fp01	focus panel	The Navajo people's successful adaptation to other cultures over time has enabled them to survive and thrive.	Navajo culture tells a story of their encounters and adaptations with neighboring cultures like the Pueblo Indians and white homesteaders.			
	NV5.E05.ar	artifact labels				Child's wearing blanket a0173,	
	NV5.E05.ar	artifact labels				Navajo dress a2304 and sash a3126 (shown together)	
	NV5.E05.ar	artifact labels				Weaver and loom a0163,	

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	NV5.E05.ar	artifact labels				wedge weave sample a 0162	
	NV5.E05.ar	artifact labels				wedding basket a2308,	
	NV5.E05.ar	artifact labels				Doll a2303	
	NV5.E05.fp02	focus panel	Objects made for kids	Navajo adore and dote on their children.	Navajo adore and dote on their children. After a child is born wood is chosen from a juniper or cedar tree. A gift of the Holy People, the two back boards for the cradleboard represent mother earth and father sky. A wide piece of cedar is bent at the head representing the rainbow and providing shade and safety for the baby. Traditionally, the umbilical cord is buried near the home, to connect the baby to home and mother earth.		
	NV5.E05.ar0	artifact labels				blanket a0196,	
	NV5.E05.ar0	artifact labels				baby moccasins a2367	
	NV5.E05.ar0	artifact labels				cradleboards a0149	
	NV5.E05.ar0	artifact labels				cradleboards a0151	
	NV5.E05.gi02	graphic image	We have many contemporary and historic photos of Navajo kids				
	NV5.E05.gc02	graphic caption					
	NV5.E05.ar	group label, artifact labels	Silver work	Since the advent of silverwork in Navajo country, this art form has become	Before the Long Walk a Navajo Medicine man named Old Smith had a Mexican friend who taught him to make iron ornaments for bridles. When Old Smith returned from Ft. Sumner he went back to his Mexican friend to learn how to forge and hammer silver. Old Smith also taught his four sons. Several great turquoise mines produced beautiful stones. Jewelry making has flourished with many great and highly skilled artists	Necklace a0183, Bracelet a0184, Coral necklace a0180, Squash Blossom Necklace a0179, Silver Bead necklace a0190, Silver and Turquoise cross necklace a0192, Silver cornstalk necklace a3137, a0194, Silver bracelets a0186, a0187, a0188, Ketoh a0178, Belts a0181,a0182	
	NV5.E05.ar	artifact labels				Canteen a0177	
	NV5.E05.ar	artifact labels				Silver bridle (head stall) a0176	
	NV5.E05 gi03	graphic image	Photograph of Navajo silversmith (in hand)				
	NV5.E05.gc03	graphic caption					
	NV5.E05.sp01	story panel	story that relates to The Long Walk	This can be drawn from the recently produced film about the Long Walk by KUED.	The incarceration of thousands of Navajos from 1863 to 1868 at Ft. Sumner (the Long Walk) was devastating for Navajos. It is still a profound and a sad event that affects Navajos today. The Treaty of 1868 promised Navajos the provisions to help begin again. These were hard years of reconstruction. It took 15 months for sheep to arrive. Women wove coarse saddle blankets with no pattern to sell fast. Later the quality of saddle blankets would improve dramatically incorporating twill patterns.		historic photos available.
	NV5.E05.ar	artifact labels	connect to story- should be alongside			Saddle blanket a2310,	
	NV5.E05.ar	artifact labels	connect to story- should be alongside			Moccasins a0160	
	NV5.E05 gi03	graphic image	photograph of Navajo women in tiered and velvet skirts reflecting outside influences.				

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	NV5.E05.gc04	graphic caption		New clothing style adopted at Bosque Redondo (Fort Sumner	Velveteen shirts, worn by Navajo men for special occasions, emerged during the late 1800s. At this time, women also began to wear cut-and-sewn blouses of cotton, and later velveteen, influenced by the four-year incarceration at Fort Sumner, an influx of traders into the region, and bitter experience as slaves in New Mexico. As today, men's shirts, often embellished with silver buttons and other accoutrements, were worn with trousers. Women's blouses continue to be paired with long tiered cotton or velveteen skirts.		
	NV5.E05.fp03	focus panel	objects reflecting the end of some traditional ways	While Navajos are known for many traditional and contemporary arts that enjoy international renown, some of their material culture ended with the changes brought on by western expansion.	When the railroad came in 1881 it brought an end to handmade equipment. Navajos previously wove baskets for storage, gathering and cooking. The Navajo cooking pot and pitched water bottle were staples in the desert. In the 1700s Navajos were creating pottery with black or black and red designs on buff. For cooking they made bullet-bottom pots sometimes with a fillet decoration on the rim. Now they had access to metal pots and pans and other containers. Traders also appeared and set up trading posts throughout the reservation trading wool, rugs and jewelry with the Navajos for food and other necessities.		
	NV5.E05.ar	group label	prominent objects related to traditional Navajo past and lifeways				
	NV5.E05.ar	artifact label	cooking vessels			pitched water bottles a0152, a0154 Cooking pots a0155, a0157, a2309,	
	NV5.E05.ar	artifact label				Pictorial rug of Navajo life a2305,	
	NV5.E05.ar	artifact label				Dolls a0171, a0165,	
	NV5.E05.ar	artifact label				Horse Story Basket a2307	
	NV5.E05.ar	group label	Classic Navajo rugs		With the advent of traders came the demand for handwoven rugs to be sold to people in the east. Commercial yarn was also available in many colors. Traders had their weavers follow patterns that were often more oriental and very fine with complicated geometric designs. Rugs are named more for the region they came from. Pictorial rugs, yei, storm pattern and sand painting rugs do have some interpretation.		
	NV5.E05.ar	artifact label				Wide Ruins rug a0175	
	NV5.E05.ar	artifact label				Marilyn Scott Rug a3121	
	NV5.E05.gi04	graphic image	image of Navajo family seated in front of a huge loom, early 1900s. (UMNH collection)				
	NV5.E05.gc04	graphic caption					

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E05.fp04	focus panel	Contemporary baskets/emergent artform	Early traditional basket forms had a rebirth in the late 20th century.	Ceremonial basket weaving nearly died out as there were so many restrictions and taboos for women who wove them. For ceremonial use Navajos often bought these baskets from the Utes and Paiutes. The baskets used in ceremonies are given to the medicine man. When there is illness or disorder specific ceremonies, prayers and songs are used to heal. Baskets have seen a revival in the late 20th century with many original and varied designs being produced including story baskets that relate stories and traditions in the Navajo culture. The process for basket weaving remains the same as does the process and set up for loom weaving which has also seen innovation from weavers who create from their own view of Navajo myth and tradition. Navajos believe they must have harmony and balance or hozho in their art as well as in their every day life.		
	NV5.E05.ar	artifact labels	Ceremonial basket weaving nearly died out as there were many restrictions and taboos for women who wove them. For ceremonial use Navajos often bought these baskets from the Utes and Paiutes.			Beacon baskets (set of three) a2301a-c	
	NV5.E05.ar	artifact labels				a2308	
	NV5.E05.fp05	focus panel	sacred art	Sand paintings are created with colored sand during sacred ceremonies in hogans and then erased. Imagery found in sand paintings depicting yeis are found in rugs, paintings, baskets and framed sand paintings.	Traditional Navajo beliefs do not separate religion from daily life. The relationship of all living things and the land must stay in balance, which requires prayer at specific locations and at ceremonies. Ceremonies are performed in hogans--the traditional six-sided family dwelling. Most ceremonies are for healing illness or disorders and are performed by a medicine man using ceremonial baskets, sandpaintings, local herbs and minerals. The sandpaintings are elaborate and intricate and are made directly on the hogan's dirt floor. After the ceremony, the painting is erased. While some of the figures--yei bi chais produced in sandpaintings--have been reproduced in framed sandpaintings, baskets, and rugs which are made for a thriving art market.		
	NV5.E05.ar	group label/ artifact label	Sand paintings were originally done with colored sand during sacred ceremonies in hogans and then erased. Today these sand painting designs depicting yeis are found in rugs, paintings, baskets and framed sand paintings.				
	NV5.E05.ar	artifact label				yei bi chai dolls (8) a0169	
	NV5.E05.ar	artifact label				yei rug a3120	
	NV5.E05.ar	artifact label				Sandpainting rug a 0172	
	NV5.E05.ar	artifact label				Framed sandpainting a0148	
NV5.E05.tt01		activity table	Navajo interactive table				
	NV5.E05.sx01	special exhibit		natural materials are used and combined with computer generated images to create contemporary patterns		natural dyes, sumac	
	NV5.E05.ar		label for touchable basket start provided by UMNH and raw materials				
	NV5.E05.sp02	story panel	Text introduces visitors to Joanne Johnson, a working basketmaker who describes the history and tradition of the craft.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	NV5.E05.gi01	graphic images	Images reflect the process of making the object- from raw materials to detailed handiwork-				
	NV5.E05.gc01		tbd				
	NV5.E05.gc04						
NV5.E06.av01		av	Generational memory av production contains firsthand accounts, historic images, and interviews addressing the themes of the outer circle exhibits.	Generational Memory is preserved by those who tell, listen and repeat the stories of their lives.			
NV6 Center- Storytelling Circle			This area is a recessed storytelling area surrounded by tiered seating and large vertical scrims displaying contemporary imagery. Here, visitors listen to an audio program featuring stories of origin and connections to the land.				
NV6.E01.av01-av04		av	A storytelling audio loop is comprised of a series of traditional tales told in native languages by regional storytellers. An English translation is visible on monitors in the storytelling circle to visitors sitting within the circle. Audio is synched with the Generational memory av so only one is playing at a time.		Storytellers may include: Helen Timbimboo (Shoshone) Maude Moon (Goshute, deceased), etc. from the collections of the University of Utah.		
	NV6.E01.ap01-ap04	activity prompt	activity prompts associated with each caption reader		encourages visitors to listen to the stories		
NV6.E01.tt01		table top					
	NV6.E01.ms01	mindset	Stories will need to be carefully screened so that they are appropriate to play in the current season. Most traditional stories can only be told in winter. We need to honor this.	Stories sustain people and traditions and provide entertainment.	The history of Native people begins with stories and their stories of origin, often called creation stories. These stories are part of an oral tradition that predates European contact and extends back for countless generations. Creation and origin stories tell of how the world was made and how groups of people came into being. They explain how animals, humans, and the natural world were created, and offer instructions and lessons for living. Many of these stories are humorous and are traditionally told in the winter season when people spend time indoors and are looking to be entertained. Among many groups in the West, powerful trickster characters, such as Coyote and Raven, have mystical powers that helped create and order the universe. These tricksters teach lessons through their own mistakes and sometimes take on human characteristics to show how greed or deceit can be dangerous.		
	NV6.E01.gp01-05	photo mural	5 scrims with photomurals of storytellers in action- both contemporary and historic. These should represent the five groups of Utah.				
	NV6.E01.gc01-05	graphic captions					
	NV6.E01.fl01	family label		Storytelling is an activity for all ages, and is a way that Native Americans have kept their culture and traditions going for so long.	What stories does your family tell? When are they told?		
NV.av01		av	Demonstration area AV				

SKY

Observing our sky, day or night, helps us appreciate our connections to weather and climate over time.

1. Weather and other celestial phenomena impact earth's systems in a variety of ways. Behavior, adaptation, and culture have all been influenced by astronomical and atmospheric events.

2. While weather is in large part a global phenomenon, Utahns experience four seasons and Utah communities experience weather caused by particularities of elevation, topography, and aspect.

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
SK1 Introduction			Visitors see a glowing rainbow of light projected across a scrim panel. They find that this rainbow is actually reflected from a projection of the sun.				
	SK1.E01.ip01	intro panel	title, grabber, text block	Weather is important to our daily lives; we try to predict it, and wonder how climates will change over time.	People have always been fascinated with the sky - whether a night sky dazzling with stars, or the bright blue sky of a Utah summer day. What we think of as sky is just one of the layers of the earth's atmosphere. Weather takes place In the 6-mile-thick layer closest to earth. "Weather" refers to the state of the atmosphere with regard to temperature, cloudiness, rainfall, wind, and other meteorological conditions. In this exhibition, you'll see the surface of the sun, watch weather from the weather station on the terrace, and see how Native peoples view the night skies.		
	SK2.E01.sx01	special exhibit	Spectral Projection	Rainbow image of solar spectrum			
SK2 Helioscope			Visitors see a real-time image of the sun projected on the table top and spectral projection on a moveable exhibit panel.				
SK2.E02.tt01		tabletop					
	SK2.E02.sx01	special exhibit	Solar Image	Helioscope and heliostat projection			
	SK2.E02.fp01	focus panel	Focus panel explains the heliostat and the helioscope.	You're looking at a real-time projected image of the sun's surface; if you're lucky, you'll see evidence of solar activity.	A heliostat is a light channelling system that uses mirrors to project sunlight into a building. The heliostat tracks the sun's movement, so that the image of the sun can be transferred to the helioscope. The helioscope projects the image of the sun's surface onto this table. Look for dark spots and flares, evidence of solar activity. Solar activity create the weather than can disrupt satellites in space and technology on earth. Sunspots and flares are caused by magnetic storms on the Sun's surface.		photos of sun's surface showing sunspots, storms, flares
	SK2.E02.gi01	graphic image	photos of sunspots and flares for comparison				
	SK2.E02.gc01	graphic caption	graphic caption				
SK3 Utah's Dynamic Climate			Visitors see a chart of climate change over time, and images of Utah weather. They can look at feeds from local weather stations, and post their extreme weather story along the wall's talkback surface.				
	SK3.E01.gp01	graphic panel					
	SK3.E01.ms01	mindset panel	Mindset panel discusses climate change in Utah	Human activities are changing the chemistry of the atmosphere, which will lead to changes in weather and climate.	Utah's climate has changed over the past 100 years, and may change more in the next century. Different models offer different predictions. One group predicts that by 2100 temperatures in Utah could increase by 3-4°F in spring and fall (with a range of 1-6°F), and by 5-6°F in winter and summer (with a range of 2-10°F). A warmer climate could result in less winter snowfall, more winter rain, and faster, earlier spring snowmelt. A panel of 8 Utah scientists agreed recently that * Warming is real and there is "very high confidence" human activities are to blame. * Utah can expect to warm faster than other parts of the world, resulting in fewer frost days, longer growing seasons and more heat waves. * If the trend continues, there will be a decline in the state's snowpack and a threat of severe and prolonged droughts. http://yosemite.epa.gov/OAR/globalwarming.nsf/UniqueKeyLookup/SHSU5BWJ38/$File/ut_impct.pdf http://www.met.utah.edu/news/global_warming_2007		

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	SK3.E01.gi01	graphic image	Timeline chart of highs and lows (temperature, snowfall, rain)				timeline of climate change and recent Utah weather
	SK3.E01.gc01	graphic caption	Captions for chart				
SK3.E01.gr01		graphic rail	Utah's Dynamic Weather				
	SK3.E01.in01	interactive - talkback	Talkback station invites visitors to remember where they were and what they were doing on an extreme weather day. Their recollections will be written on disks and added to the weather wall.				
	SK3.E01.ap01	activity prompt	Prompt for talkback				
	SK3.E01.gp03	graphic panel					
	SK3.E01.fp01	focus panels	Weather extremes				
	SK3.E01.gi02-06	graphic image	Photos of weather extremes				
	SK3.E01.gc02-06	graphic caption	Captions for images of weather extremes				
	SK3.E01.ic01	inset case	Inset case w/extreme weather object- fulgurite			fulgurite	
	SK3.E01.ar01	artifact label	Artifact label for fulgurite		Tubular shape of glassy rock created when lightning strikes and fuses dry, sandy soil. Tubes can be up to a couple of cm in diameter and meters long. Their color depends on the composition of the sand they formed in, ranging from black and tan to green or translucent white. Local info. here		
	SK3.E01.fp02	focus panel	Focus panel explains lake effect	The Great Salt Lake acts as a heat reservoir, and intensifies winter storms.	"Lake effect" storms happen in fall or spring when a cold air mass moves in over the warmer Great Salt Lake. The rising warm air from the lake hits the cold air mass above, leading to heavy rain or snow. Wind lifts salt crystals from the lake or nearby salt flats; they become the nuclei for large rain drops or snow flakes. In a lake effect storm, it's possible to get 2 feet of snow in Salt Lake City.		diagram of lake effect, photo of dramatic snowfalls
	SK3.E01.gi07	graphic image	lake effect diagram				
	SK3.E01.gc07	graphic caption	Caption for lake effect diagram				
	SK3.E01.gi08	graphic image	Image of greatest snow on earth				
	SK3.E01.gc08	graphic caption	Caption for "greatest snow on earth" images				
	SK3.E01.gi09	graphic image	Snowflake formation graphic images				
	SK3.E01.gc09	graphic caption	Caption for snowflake formation				
	SK3.E01.av02	AV	Snowflake film (existing)				
	SK3.E01.in02	interactive	Plastinated snow crystals and magnifier			6 slides of snowflakes	
	SK3.E01.ap02	activity prompt	Prompt for snow crystal viewing				
	SK3.E01.qt01	quote	Quote about observing or predicting weather; about importance of weather to people				
SK3.E01.gp02		graphic panel					
	SK3.E01.fp03	focus panel	Focus panel discusses weather prediction and Utah and Salt Lake City weather.	Weather is changeable and difficult to predict- everyone has a weather story.	We make a lot o decisions based on the weather forecast. You can probably predict that a February day here would be cold and maybe snowy, while a day in August would be hot and dry. But how about predicting tomorrow's weather? Meteorologists rely on computers to bring together information from weather satellites and local weather stations and make predictions. Weather forecasts have become more accurate largely due to weather satellites and computing power.		
	SK3.E01.av01	av	A split screen monitor displays feeds from weather instruments on the roof and locally, including two operated by RT/K and one (solar operated) at Range Creek. The screen also shows time lapse photography of Utah Weather systems.				

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	SK3.E01.fl01	family label	Family label about weather and what to wear	Do you put on different clothes on rain days and sunny days?	How do you decide what to wear (besides your favorite color). Clothes help keep us cool on hot days, warm on cold days, and dry on rainy days. Pick the right outfits for the kids to wear!		illustration of kids w. weather visible through window and choice of outfits
	SK3.E01.gi10	graphic image	Dress magnetic silouette with weather-appropriate clothing.				
SK4 Astronomy			Visitors see a giant photomural image of the night sky, and see how western and native star charts differ.				
	SK4.E01.pm01	photomural	Photomural of night sky enhanced to show as many elements of the solar system as possible				
	SK4.E01.ms01	mindset panel	Mindset panel describes astronomy, our solar system, the universe.		Astronomy is the science of celestial objects, like stars, asteroids, comets and planets, and phenomena. If you like to watch the night skies, you can be an astronomer. Amateur astronomers have made major contributions to astronomy, especially in finding new comets. What's up there? Using a regular telescope, you'll see parts of our solar system (the planets, moons, dust, and asteroids that orbit the Sun). Astronomers use an array of scopes that detect different wavelengths of light to see farther out in the universe.		
SK4.E01.ic01		inset case	Inset case w. moon rock, asteroids			Moon rock and asteroids A3143, a3144, a3145	
	SK4.E01.ar01	artifact label	artifact label for moon rock and aseroids				
	SK4.E01.gi01	graphic image	Star map w. constellations				
	SK4.E01.gc01	graphic caption	Caption for star map				
	SK4.E01.gi02	graphic image	Native star chart w/ constellations				
	SK4.E01.gc02	graphic caption	Caption for native star chart				
SK4.E01.ic02		inset case	Inset case w/native representations of celestial objects			Moon mask A0397, Sun mask A0334	
	SK4.E01.ar02	artifact labels	artifact label for moon mask and sun mask				
	SK4.E01.sp01	story panel	Story from Cosmic Serpent educator Robert Johnson				
	SK4.E01.gi03	graphic image	Photo of native star party on Navajo res				
	SK4.E01.gc03	graphic captions	Caption for star party photo				
	SK4.E01.sp02	story panel	Paiute story				
	SK4.E01.gi04	graphic image	Anasazi rock art star ceiling image				star ceiling photo
	SK4.E01.gc04	graphic captions	Caption for rock art				
	SK4.E01.qt01	quote	Quote about observing stars, astronomies				
SK5 Terrace			Visitors go outside onto the terrace to look at weather rolling in. They see solar panels and wind turbines, and learn how the museum building is saving and reusing energy. They play the sky interactive game and look at the sky through telescopes, becoming better observers of the world around them. They'll also see some of the weather equipment on the museum roof and learn what it records.				
SK5.E01 Measuring Weather/Sustainable Energy							
SK5.E01.gr01		graphic rail	Measuring weather				
	SK5.E01.fp01	focus panel	Focus panel describes measuring weather	Temperature, wind speed, wind direction, humidity, and atmospheric pressure are all indicators of weather.	What we perceive as the day's weather is actually a combination of factors. These are measured at weather stations on the earth's surface using instruments like thermometers and barometers. There is an array of these sensor on the museum roof, so the museum is a weather station.		
	SK5.E01.ar01	artifact label	Label for temperature and humidity sensor and radiation shield		Thermometers measure air temperature.		photo of equipment
	SK5.E01.ar02	artifact label	Label for pressure sensor		A barometer measures air pressure. The weight of the air above an object exerts a force per unit area upon that object and this force is called pressure. Variations in pressure lead to winds.		photo of equipment

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
SK5.E01.gr02		graphic rail	Measuring weather				
	SK5.E01.ar03	artifact label	Label for solar radiation sensor				diagram of equipment
	SK5.E01.ar04	artifact label	Label for rain gauge				photo of equipment
	SK5.E01.ar05	artifact label	Label for snow measurer				photo of equipment
SK5.E01.gr03		graphic rail	Measuring weather				
	SK5.E01.ar06	artifact label	Label for wind monitor		Anemometers measure wind speed and direction.		photo of equipment
	SK5.E01.ar07	artifact label	Label for wind turbine		pending turbine info To make enough electricity to serve lots of people, power companies build "wind farms" with dozens of huge wind turbines. Wind farms are built in flat, open areas where the wind blows at least 14 miles per hour; they can be onshore or offshore. This is a residentiar turbine; it could power_____		
SK5.E01.gr04		graphic rail	Renewable Energy				
	SK5.E01.fp02	focus panel	Focus panel explains renewable energy.		Renewable energy is energy generated from natural resources—such as sunlight, wind, rain, tides and geothermal heat—naturally replenished (unlike coal and gas which are finite resources). Wind power is one of the fastest growing renewable energy sources. Turbines like this one convert the wind's kinetic energy into electricity. Photovoltaic cells convert the sun's energy to electricity. The museum building has arrays of similar panels on the roof, so the building helps generate energy to power lights and exhibits.		
	SK5.E01.ar08	artifact label	Label for solar panel		pending solar panel info		
	SK5.E01.ar09	artifact label	Label for green roof				diagram of roof, close-up photo of plants
SK5.E01.gr05		graphic rail	Sun Angle				
	SK5.E01.gi01	graphic image	Diagram of sun angles				
	SK5.E01.gc01	graphic caption	Caption for sun angle diagram				
SK5.E01.gr06		graphic rail	Inversions				
	SK5.E01.fp03	focus panel	Focus panel explains inversion	The topography of Salt Lake Valley can magnify air pollution.	On windless winter days, warm air above sometimes traps colder air down in the valley, causing a temperature inversion. Usually, the higher elevation you are, the colder the air, but this is the opposite. When that happens, city smog has nowhere to go. Standing on a hillside looking down into the valley, the inversion can look like a blanket of white. Much of that blanket is harmless ice crystals, especially in the morning, forming a thick fog. But when the fog wears off, explains University of Utah Meteorology Professor John Horel, the blanket turns into a “hideous, brown” color. Although the brown stew is an eyesore, the pollutants that more frequently lead to respiratory problems are the smaller, less visible particulate matter in the air. The skies, however, make no distinction, pressing all types of pollution down into the populated valley. http://www.acfnewsource.org/science/olympic_air.html		
	SK5.E01.gi01	graphic image	diagram of inversion; photos of clear and inversion days (ideally from museum looking out)				
	SK5.E01.gc01	graphic caption	caption for inversion diagrams				
SK5.E02 Observing Weather							
SK5.E02.gr01		graphic rail	Panoramic viewshed with sunset positions				
	SK5.E02.gi02	graphic image	Sunset calendar				images of sunsets at different times of the year from museum site

AREA	CODE	COMPONENT	DESCRIPTION	MESSAGE	CONTENT	OWNER PROVIDED ARTIFACTS/ SPECIMENS	GRAPHICS
	SK5.E02.gc02	graphic caption	Caption for sunset photos				
	SK5.E02.gp01	graphic panel	graphic panel for cloud types		A cloud consists of water particles or ice crystals floating in the atmosphere. There are 10 different types of clouds. Spin the wheel to find a match for the clouds in the sky. Stratus clouds are spread out, dull clouds usually found at ground level. Stratus clouds are so close to the ground they are identified as fog. Cumulonimbus clouds are piled up high like scoops of dark ice cream. These clouds usually bring rain showers. Cumulus clouds look like giant heads of cauliflower because they are white and fluffy. Dark, flat nimbostratus clouds often produce rain or snow. Stratocumulus clouds are spread out heaps of dense cover that rise higher in the atmosphere. Altocumulus and altostratus are middle-altitude clouds. Even though the word alto means "height" in Latin, these are not the highest clouds. Altocumulus clouds look fleecy and have dark, shadowed sides. Altostratus clouds are flat and make the sun look as if it is being seen through a misty glass. Clouds forming in high altitudes are called cirrus, cirrostratus, and cirrocumulus. It is so cold in the upper atmosphere that high altitude clouds contain ice crystals instead of water particles. Cirrocumulus clouds look like upside down waves rolling across the sky. High, thin cirrostratus clouds look much like stratus clouds, but cirrostratus clouds contain ice crystals and are much higher. Cirrus clouds form when the wind blows these ice crystals into wispy streaks that look like thin horse tails. verbatim from ASU's website http://chainreaction.asu.edu/weather/digin/clouds.htm		photos of different clouds
SK5.E02.sx01		special exhibit	North star direction diagram embedded in floor; viewscope to North Star				
	SK5.E02.sp01	story panel	Story for North Star				

UTAH MUSEUM OF NATURAL HISTORY

EXHIBIT SPECIFICATIONS

100% FINAL DESIGN DOCUMENTS
PREPARED BY RALPH APPELBAUM ASSOCIATES
SUBMITTED APRIL 2, 2009

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(Provided by Owner)

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RAA Project No. 0275
University of Utah Project No. 0872-9630
Division of Facilities Construction Management Project No. 02243750

SECTION 01050 — APPLICABLE STANDARDS

PART 1 – GENERAL

1.01 DESCRIPTION

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

B. Work Included:

1. In the Contract Documents reference is made to codes and standards which establish qualities and types of workmanship and materials and which establish methods for testing and reporting on the pertinent characteristics.
2. Where materials or workmanship are required by these Contract Documents to meet or exceed the specifically named code or standard, it is the Exhibit Fabricator's responsibility to provide materials and workmanship that meet or exceed the specifically named code or standard.
3. It is also the Exhibit Contractor's responsibility, when so required by the Contract Documents or requested by the Exhibit Designer, to deliver to the Exhibit Designer all required proof that the materials or workmanship, or both, meet or exceed the requirements of the specifically named code or standard. Such proof shall be in the form requested by the Exhibit Designer.

B. Related work: Specific naming of codes or standards occurs on the Drawings and in other Sections of these Specifications.

1.02 QUALITY ASSURANCE

A. Rejection of non-complying items: the Exhibit Designer reserves the right to reject items incorporated into the work that fail to meet the specified minimum requirements. The Exhibit Designer further reserves the right to accept non-complying items subject to an adjustment in the contract amount as approved by the Exhibit Designer and the Exhibit Contractor without prejudice to other recourse the Exhibit Designer may take.

B. Applicable standards listed in these specifications include, but are not necessarily limited to, standards and requirements promulgated by all pertinent government agencies having jurisdiction.

END OF SECTION

SECTION 01110 — SUMMARY OF WORK

PART 1- GENERAL

1 .1 RELATED DOCUMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

1 .2 SUMMARY

A. The work of this contract consists of the general construction and installation of exhibits for the Utah Museum of Natural History comprising 37,500 square feet of permanent exhibits that explore topics ranging from Utah!s ancient ecosystems and Utah's first peoples to cutting-edge science in the areas of biogeography and genetics. These permanent exhibitions are organized in a series of eight thematic exhibit galleries located within which are three embedded Learning Labs. These galleries include Utah Sky, Native Voices, Life (with an adjacent Naturalist!s Lab), The Land, First Peoples (with an adjacent Dry Cave Lab), Great Salt Lake, Past Worlds (with an adjacent Earth Lab), and Utah Futures. On the main floor, a discovery room titled Our Backyard, severs a younger audience. The Canyon, a grand space at the heart of the building, offers views into collections core of the building and provides a general orientation to the museums public programs.

1 .3 CONTRACTS

A. Project will be constructed under multiple Prime Contracts.

B. Multiple contracts are separate contracts, representing significant construction activities, between the DFCM and separate contractors. See Division 1 Section “Project Coordination” for a description of work and responsibilities included under each separate contract. Each contract is performed concurrently and coordinated closely with construction activities performed on Project under other contracts. Contracts for this Project include the following:

1. General Construction Contract, designated as the “General Contractor” or “GC”. This contract includes the base building and related site work and Interior Fit out.
2. Exhibit Fabrication and Installation designated from here on as the “Exhibit Contractor” or “XC”. This contract includes all fabricated graphics, casework, exhibit furnishings, environments, scenic work, interactives, etc.
3. Exhibit AV Systems Integration Contractor. This contract includes all exhibit-related audio visual systems, controls, playback and display equipment.
4. Media Producer(s). These contracts include the production of all media including interactive media, log form film media and other software for exhibits.
5. Mountmaking and Installation Contractor(s). This work includes the provision of dinosaur casts and fossil mounts and the creation of custom mounts for all objects (artifacts and specimens) owned by the museum and their installation within the exhibits.

1 .4 LOCATION

A. The site for the new museum is located at 301 Wakara Way, Salt Lake City, Utah.

1 .5 EXHIBIT FABRICATOR'S USE OF PREMISES

A. Prior to the scheduled Dust free date, Exhibit Contractor may obtain E lot parking passes from the U of U and shuttle to the project site. The freight elevator will be in use by the Building General Contractor and use thereof would need to be coordinated as well as contribution toward monthly elevator cost. After the scheduled Dust Free date, Exhibit Contractor could set up offices in the parking lot on site. The Building General Contractor would transition the freight elevator use agreement to the Exhibit Contractor.

B. The project site will be closed to the public during construction.

C. Exhibit Fabricator shall at all times conduct his operations to ensure the least inconvenience to the public.

D. Confine storage of materials to within staging areas defined by the Owner.

E. Hauling Restrictions: Comply with all State of Utah load restrictions in the hauling of materials. Load restrictions on all roads are identical to the state load restrictions with such additional regulations as may be imposed by the Owner. Information regarding rules and regulations for vehicular traffic on roads may be obtained from DFCM. A special permit will not relieve Exhibit Fabricator of liability for damage that may result from moving of equipment.

1 .6 FIELD VERIFICATION

A. Field verify all new and existing dimensions affecting the work of this contract before ordering products.

1 .7 PERMITS, FEES AND NOTICES

A. The Exhibit Fabricator shall obtain and pay for all permits, licenses and certificates required by the State of Utah!s Laws for the proper execution and completion of their work. The Exhibit Fabricator shall furnish proof of payment for all such permits, licenses and certificates, or proof that no permits, licenses and certificates are required. This proof must be furnished prior to the second request for payment.

B. The Exhibit Fabricator shall give all notices and comply with all applicable codes, laws, ordinances, regulations, rules and orders of any public authority bearing on the performance of the work. If the Exhibit Fabricator observes that any of the Contract Documents is at variance therewith in any respect, it shall promptly notify the Owner in writing. Any necessary modifications will be made by the Owner. If the Exhibit Fabricator performs any work knowing it be contrary to such applicable laws, ordinances, regulations, rules or orders, and without such written notice to the contracting officer, it assumes full responsibility therefore and shall bear all costs attributable thereto.

C. The Exhibit Fabricator shall obtain and pay for permits required for temporary traffic lane closings, no parking zones, and sidewalk closings as required by the City of Salt Lake City and the State of Utah. The street closings, no parking designations, and sidewalk closings are required from the commencement of construction through construction completion. The Exhibit Fabricator shall furnish proof of payment for all such permits.

PART 2 – MEASUREMENT AND PAYMENT

A. Payment will be based upon an approved schedule of values. No payments for work complete will be made until Exhibit Fabricator provides proof of payment for material and performance bonds.

END OF SECTION 01110

SECTION 01305 — PROJECT COORDINATION

PART 1-GENERAL

1.01 RELATED DOCUMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

1.02 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Coordination and Survey Drawings.
4. Administrative and supervisory personnel.

B. Related Sections: The following Sections contain requirements that related to this Section:

1. Division 1 Section “Summary of Work” for a description of the division of Work among Separate contracts and responsibility for coordination activities not in this Section.
2. Division1 Section “Project Schedule” for preparing and submitting the Contractor!s Construction Schedule.
3. Division 1 Section “Project Closeout” for coordinating Contract closeout.

1.03 COORDINATION

A. Project Coordinator shall be responsible for coordination between the General Construction Contract and the Exhibit Construction Contract.

1. The Exhibit Contractor shall assign a Project Coordinator.
2. The Project Coordinator is responsible for for coordination of Exhibit Contract Work and the Work of General Construction.
3. The Exhibit Contractor shall appoint a qualified Exhibit Project Manager to act as a single point of contact and coordinate all aspects of the Exhibit Contract Work with the GC!s Project Coordinator and other prime contractors.

1.04 EXHIBIT PROJECT COORDINATOR

A. Exhibit Project Coordinator: Project Coordinator shall be experienced in administration and supervision of building construction, including exhibit construction work.

1. Coordination activities of Project Coordinator include, but are not limited to, the following:

a. Provide overall coordination of the Work.
b. Coordinate shared access to work spaces.
c. Coordinate product selections for compatibility; Provide coordination and support for Base Building LEED submittals.

d. Provide overall coordination of temporary facilities and controls.
e. Coordinate, schedule, and approve interruptions of permanent and temporary utilities, including those necessary to make connections for temporary services.
f. Coordinate construction and operations of the Work with work performed by each contract.
g. Prepare Coordination Drawings to coordinate work by more than one contract.
h. Coordinate sequencing and scheduling of the Work. Include the following:
   i) Initial Coordination Meeting: At earliest possible date, arrange and conduct a meeting with separate contractors and the Owner and Exhibit Designers for sequencing and coordinating the Work; negotiate reasonable adjustments to schedules.
   ii) Prepare a combined Contractor!s Construction Schedule for entire Project. Base schedule on Preliminary Construction Schedule. Secure time commitments for performing critical construction activities from separate contractors. Show activities of each contract on a separate sheet. Prepare a simplified summary of sheet indicating combined construction activities of contracts.
   iii) Distribute copies of schedules to the Owner, and separate contractors.
i. Provide quality-assurance and quality-control services.
j. Coordinate sequence of activities to accommodate tests and inspections, and coordinate schedule of tests and inspections.
k. Provide information necessary to adjust, move, or relocate existing utility structures affected by construction.
l. Locate existing permanent benchmarks, control points, and similar reference points, and establish permanent benchmarks on Project site.
m. Provide field surveys of in-progress construction and site work and final property survey.
n. Provide progress cleaning of common areas and coordinate progress cleaning of areas or pieces of equipment where more than one contractor has worked.
o. Coordinate cutting and patching.
p. Coordinate protection of the Work.
q. Coordinate firestopping.
r. Coordinate preparation of Project Record Documents if information from more than one contractor is to be integrated with information from other contractors to form one combined record.
s. Collect Record Specification Sections from other contractors, collate Sections into numeric order, and submit complete set.
t. Coordinate preparation of operation and maintenance manuals if information from more than one contractor is to be integrated with information from other contractors to form one combined record.

2. Responsibilities of Project Coordinator for temporary facilities and controls include, but are not limited to, the following:
   a. Provide common-use field office for use by all personnel engaged in construction activities.
   b. Provide telephone service for common-use facilities.

1.05 EXHIBIT PROJECT MANAGER

1. The Exhibit Project Manager must have a experience coordinating exhibit fabrication and installation with a general contractor on a project of similar scale and type. Coordination responsibilities of the Exhibit Project Manager include the following:

   a. Provide overall coordination of the Exhibit Contract Work with the Project Coordinator and all other Prime Contractors.
   b. Attend all Project Coordination Mtgs, Quality Control Inspections, Pre-Installation Mtgs and Project Closeout Mtgs. See Division 1 – Project Meetings.

c. Coordinate product selections for compatibility.
d. Prepare and submit all Shop Drawings, RFIs and Submittals.
e. Coordinate and schedule use of permanent and temporary utilities, including those necessary to make connections for temporary services as required for the Exhibit Contract Work.
f. Review Coordination Drawings and coordinate work with the General Contractor. Prepare a Site Survey verifying all conditions in the field and prepare Shop Drawings.
g. Coordinate sequencing and scheduling of the Work described in the Exhibit Contract Documents. Include the following:
    i) Initial Coordination Meeting: at earliest possible date, arrange and conduct a meeting with separate contractors for sequencing and coordinating the Work; negotiate reasonable adjustments to schedules.
    ii) Prepare an Exhibit Fabrication and Installation Schedule (Exhibit Schedule) and coordinate its incorporation within the Overall Construction Schedule with the work of other prime contractors.
    iii) Base the Exhibit Schedule on Preliminary Construction Schedule.
    iv) Secure time commitments for performing critical fabrication and installation activities.
    v) Indicate and include construction milestones including turnover conditions for exhibit installation and AV systems installation, mount making and object installation.
h. Provide quality-assurance and quality control services specified.
i. Coordinate sequence of activities to accommodate tests and inspections, and coordinate schedule of tests and inspections.
j. Locate existing permanent benchmarks, control points, and similar reference points, and establish new permanent benchmarks on Project site.
k. Provide a field survey of all dimensions and conditions on the site as-built in preparation for exhibit shop drawings.
l. Coordinate protection of the work.
m. Coordinate preparation of project record documents and provide to Project Coordinator.
n. Collect Record Specification Sections and provide to Project Coordinator for inclusion in the master document.
o. Coordinate preparation of operation and maintenance manuals and provide to Project Coordinator for inclusion in the master document.

2. Responsibilities of Exhibit Project Manager for temporary facilities and controls include, but are not limited to, the following:

a. Share and maintain common-use field office and office equipment for use by all personnel engaged in construction activities.

1.06 CONTRACTS, GENERAL

A. Extent of Contract: Unless the Contract Documents contain a more specific description of the work, the names and terminology on drawings and in specification sections determine which contract includes that specific element of the project.

1. Unless otherwise indicated, work for each contract shall be complete systems and assemblies, including products, components, accessories, and installation required by the Exhibit Contract Documents.
2. Local custom and trade-union jurisdictional settlements do not control the scope for the Work of each contract. When a potential jurisdictional dispute or similar interruption of work is first identified or threatened, affected contractors shall negotiate a reasonable settlement to avoid or minimized interruption and delays.

3. Trenches needed for the work of each contract shall be provided by the General Construction Contract.
4. Cutting and patching needed for the work of each contract shall be provided by the General Construction Contract.
5. Firestopping needed for the work of each contract shall be provided by the General Construction Contract.
6. Within five working days after preliminary horizontal bar-chart-type construction schedule submittal has been received from Project Coordinator, the Exhibit Project Manager shall submit a matching preliminary horizontal bar-chart schedule showing construction operations sequenced and coordinated with overall construction.

B. Substitutions: Each contractor shall cooperate with other contractors involved to coordinate approved substitutions with remainder of the Work.

C. Temporary Facilities and Controls: In addition to specific responsibilities for temporary facilities and controls indicated in this Section and in Division 1 Section “Temporary Facilities and Controls,” each contractor is responsible for the following:

1. Installation, operation, maintenance, and removal of each temporary facility usually considered as its own normal construction activity, and costs and use charges associated with each facility.
2. Plug-in electric power cords and extension cords, supplementary plug-in task lighting, and special lighting necessary exclusively for its own activities.
3. Its own field office, complete with necessary furniture, utilities, and telephone service.
4. Its own storage and fabrication sheds.
5. Temporary enclosures for its own construction activities.
6. Waste disposal facilities, including collection and legal disposal of its own hazardous, dangerous, unsanitary, or other harmful waste materials.
7. Progress cleaning of it!s own areas on a daily basis.
8. Secure lockup of its own tools, materials, and equipment.
9. Construction aids and miscellaneous services and facilities necessary exclusively for its own construction activities.

D. Temporary heating, cooling, and ventilation: The General Construction Contract is responsible for temporary heating, cooling, and ventilation, including utility-use charges.

E. Use Charges: Divide cost of providing and using common-use temporary services and facilities, including use charges, among the General Construction Contract and the Exhibit Contract. The Contract Sum of each contract shall include cost of providing and using temporary services and facilities, including use charges.

F. Use Charges: Comply with the following:

1. Sewer Service: Include the cost for sewer service use by all parties engaged in construction activities at Project site in the General Construction Contract.
2. Water Service: Include the cost for water service, whether metered or otherwise, for water used by all entities engaged in construction activities at Project site in the General Construction Contract.
3. Electric Power Service: Include the cost for electric power service, whether metered or otherwise, for electricity used by all entities engaged in construction activities at Project site in the General Construction Contract.

A. Coordination: Each contractor shall coordinate its construction operations with those of other contractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections, which depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in the sequence needed to obtain the best results, especially when the installation of one part of the work depends on the installation of other components, before or after its own installation.
2. Coordinate installation of different components with other contractors to ensure maximum accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.

1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities and activities of other contractors to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor!s Construction Schedule.
2. Preparation of the Schedule of Values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Pre-installation conferences.
7. Project closeout activities.

D. Conservation: Coordinate construction activities to ensure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work.

1.07 SUBMITTALS

A. Coordination of Prime Contractors. Each Prime Contractor shall notify in writing any occurrence where their work may interfere with the work of other Prime Contractors. Conflicts that become apparent during coordination meetings shall be brought to the attention of the affected Prime Contractors and conflicts shall be resolved prior to commencement of by any Prime Contractor of the effected work. The Exhibit Contractor shall arrange a meeting with the Prime Contractors to discuss any and all areas of conflict, resolve the conflicts, prepare any necessary coordination drawings, and submit the drawings to the Owner, Designer and other Prime Contractors for review.

B. Site Survey and Exhibit Coordination Drawings: The Exhibit Project Manager shall conduct his own site survey, verifying dimensions and conditions of the site as-built and document any coordination issues with other Prime Contractors. This work shall be done and submitted to the Designer as a submittal, prior to the commencement of shop drawings and fabrication of

exhibits. The site survey may utilize the drawings prepared by the General Contactor or the Designer but these drawings in no way constitute a substitute for field verification of as-built dimensions. The site survey should be scaled dimensioned drawing(s) 1/8”=1!-0” scale drawings (30” x 42” sheet size) that indicate;

1. Any special or typical conditions requiring coordination of the Exhibit Contract Work with the Work of other prime contractors.
2. Required installation sequences.
3. Any variance with Contract Documents in dimensions or conditions as-built.
4. Any proposed changes to the Exhibit Contract Documents to rectify errors or omissions, or to account for variances.

The Site Survey and Exhibit Coordination Drawings must be completed and all issues resolved in conference with the Owner and the Exhibit Designer prior to the commencement of any Work by the Exhibit Contractor.

C. Staff Names: Within 15 days of starting construction operations, submit a list of principal staff assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers including home and office telephone numbers. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.

1. Post copies of list in Project meeting room, in temporary field office, and by each temporary telephone.

1.08 TURNOVER CONDITIONS

A. During turnover of exhibit space from General Contractor to Exhibit Fabricator, it is the responsibility of the GC to establish and achieve turnover dates for dust controlled and dust free environments on the construction schedule.

The following milestones must be established in the construction schedule for coordination of work between the Exhibit Fabricator, General Contractor (GC), AV Systems Integrator and museum staff and contractors who will be installing specimens and artifacts.

1. Dust Controlled Environment

This environment is established when the General Contractor!s scope of work in all exhibit spaces is substantially complete. These spaces are broom cleaned & turned over to the Exhibit Contractor free and clear of all gang boxes, obstructions, construction materials, trash and debris. General access to the exhibit areas by non- Exhibit Contractors are to be limited and tightly controlled. Clear and unobstructed access paths for Exhibit Contractors to and from loading docks & exhibit areas are required and are coordinated with the General Contractor.

If a "phased installation" is required, the General Contractor is to provide temporary barriers to divide work areas and to ensure adequate isolation of exhibit areas. “Adequate isolation" can be defined as a framed plywood barrier (or other mutually agreed upon device or material) to inhibit dust infiltration and insure security against theft or vandalism, if required."

The Exhibit Contractor will commence delivery of exhibit cases and components; the AV Systems Integrator will phase in delivery and installation of AV equipment and components, the Mount making Contractor will phase in delivery and installation of large-scale artifacts and specimens.

Construction Turnover Conditions (at Dust Controlled) indicates:

a. All wall, floor, ceiling construction finishes are completed.

b. Windows and doors are installed.

c. The space is water-tight.

d. Normal or temporary power and preliminary grounding systems are completed and emergency power and integration of all systems are in progress.

e. All GC (or sub GC) responsible lighting is complete.

f. HVAC systems will have start up completed and are operational with clean filters and are distributing continuous conditioned air within 5 degrees F of an agreed upon set point.

g. Sprinkler system piping is completed, but the system will not be active.

h. All conduit paths are completed with anti-short bushings installed on the conduit ends.

i. All sharp edges on the cable trays and ladders will be covered or filled.

j. Drag lines are installed in all conduit paths.

k. Final adjustments (e.g. lighting systems, electrical hardwiring of exhibits, etc.) are a comeback operation.

2. Dust Free Environment

A Dust Free Environment is established when all Contractors work in all exhibit spaces is completed to the point of zero dust generation from remaining work. All of the building!s systems are performing as they will under normal operating conditions.

The Exhibit Contractor will deliver and install exhibit elements (e.g. graphics, photos, facsimiles, etc.). The AV Systems Integrator will integrate, install, balance and test all AV equipment and systems components. The Media Producers will install and test all media software. The Exhibit Lighting Designer will aim and balance the exhibit lighting and the Mount making Contractor will deliver and install mounts and small scale and/or sensitive/valuable artifacts and specimens.

Construction Turnover Conditions (at Dust Free) indicates:

a. HVAC systems will be fully commissioned and operational and approved by the Architect and the Owner.

b. Clean filters and are distributing continuous conditioned air as described in the conservation standards – Section 01811 Air Management.

c. Permanent power is provided.

END OF SECTION 01305

SECTION 0131 – PROJECT MEETINGS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

B. Schedule meetings and conferences throughout progress of Work; each session scheduled, administered, and presided by entity indicated. Requirements for meetings and conferences include:

1. Prepare an agenda for each conference and meeting.

2. Distribute written notice to participants seven days in advance of scheduled date.

3. Make physical arrangements.

4. Record minutes and attendees; include significant proceedings and decisions.

5. Reproduce and distribute copies of minutes within three days after each meeting.

6. Distribute one copy of minutes to each participant and to entities affected by decisions made at meeting

7. Distribute one copy of minutes each to Exhibit Designer, Architect and Owner.

8. Maintain in field office one copy of agenda and minutes for each conference and meeting.

C. Representatives attending meetings shall be qualified and authorized to act on behalf of entity each represents.

1. Exhibit Designer and Professional Consultants may attend meetings to ascertain that Work is consistent with the Exhibit Contract Documents.

2. Architect may also be present at meetings and may propose agenda items.

D. The Exhibit Contractor is responsible for all costs associated with travel to and from Coordination Meetings.

1.02 PRE-CONSTRUCTION CONFERENCES

1. Schedule pre-construction conferences no later than seven days prior to commencement of Work. Convene at Project site. The Exhibit Contractor presides over meeting and is responsible for minutes

B. Attendees:

1. Exhibit Project Coordinator.
2. Exhibit Project Manger.
3. Representatives of all Prime Contractors.

4. Owner!s Construction Manager.
5. Owner!s Representatives
6. Exhibit Designer.
7. Architect.
8. Professional Consultants.
9. Others as appropriate.

C. Minimum Agenda:

1. Administrative and Procedural Issues:

   a. Designation of key personnel.
   b. Review and clarify responsibilities of parties to contract.
   c. Communications procedures.
   d. Review of proposed Contractors, materials, equipment, and products.
   e. Application for payment procedures; schedule of values, proposal requests, change orders.
   f. Critical work sequencing; long lead-time items.
   g. Submittal and construction progress schedules.
   h. Submittal requirements; complete, correct, and timely submittals; scheduled dates.
   i. Procedures for submitting product data, shop drawings, samples, and other submittals.
   j. Product options and substitutions procedures.
   k. Procedures for requests for interpretations (RFI), minor changes, field decisions, construction change directives, proposal requests, change orders, and filing claims.
   l. Procedures for testing and inspection, including timely notification
   m. Responsibilities and limitations of authority of geotechnical engineer and testing laboratories; distribution of reports.
   n. Procedures for maintaining Project Record Documents.
   o. Schedule for progress meetings.
   p. Issue notice to proceed.

2. Review of Exhibit Plan and all Exhibit Contract Documents.

3. Review of Owner Furnished Reference and Source Materials including:
   a) original art work for reproduction.
   b) artifacts and objects.

5. On-Site inspection & measurement of artifacts
   a) meet with museum conservation and mount making staff
   b) discuss artifact mount making procedures
   c) verification of artifact dimensions and weights.

6. Exhibit Contractor familiarization with the project site and project office.

   a) site walk and survey

1.03 PROGRESS MEETINGS

1. Schedule periodic meetings as necessary by progress of Work; day, location, and time to be determined. Convene at Project site a minimum of one monthly Project Coordination Meeting prior to installation (the rest being conducted by teleconference). The Exhibit Contractor presides over meeting and is responsible for minutes.

B. Attendees:

1. Exhibit Project Coordinator.
2. Exhibit Project Manger.
3. Representatives of all Prime Contractors (as appropriate to agenda).
4. Owner!s Construction Manager.
5. Owner!s Representatives
6. Exhibit Designer.
7. Architect.
8. Professional Consultants.
9. Others as appropriate.
10. Others as appropriate to agenda.

C. Minimum Agenda:

1. Approval of minutes of previous meeting.

2. Work Progress Since Previous Meeting:
   a. Current activities.
   b. Critical activities.
   c. Deviations from schedule.

3. Field observations, problems, conflicts, and decisions.

4. Deficiencies:
   a. Identification of items.
   b. Status of correction.

5. Requests for Interpretations (RFIs):
   a. Status of clarification.
   b. Status of proposal requests.

6. Changes and Modifications:
   a. Status of change orders.
   b. Pending changes.
   c. Pending claims and disputes.
   d. Clarification decisions of Owner or Exhibit Designer.

7. Problems and conflicts that impede planned progress.

8. Construction Progress and Submittal Schedules:
   a. Off-site fabrication and delivery schedules..
   b. Effect of proposed changes on construction progress schedule and coordination.
   c. Submittal schedules, status of submittals, and effect on construction progress schedule.
   d. Corrective measures to regain projected schedule.

9. Planned progress during succeeding Work period.

10. Adequacy of work forces.

11. Coordination between elements of Work.

12. Maintenance of Project Record Documents.

13. Other business relating to progress of Work.

D. Meeting Minutes:

1. Include column to indicate who is required to take action and date action is to be completed. Each of these items requiring action will be carried in subsequent minutes of meeting as "old business" until noted as "resolved."

2. As minimum, separate into following categories:
   a. Old business.
   b. New business.
   c. Work progress.
   d. Deficiencies.
   e. RFIs.
   f. Proposed changes.
   g. Schedules.
   h. Submittals.
   i. Other business, including events to be accomplished by next meeting.

1.04 OFF-SITE PROGRESS MEETINGS AND QUALITY CONTROL REVIEWS

A. Schedule Off-Site Meetings and Quality Control Reviews at the Exhibit Contractor!s facility in coordination with regular progress meetings. These meeting shall occur when it is necessary to review mock-ups and prototypes prior to completion of work for each section. The Exhibit Contractor presides over meeting and is responsible for minutes.

B. Attendees:

1. Exhibit Project Coordinator.
2. Exhibit Project Manger.
3. Owner!s Construction Manager.
3. Owner!s Representatives
4. Exhibit Designer.
5. Professional Consultants.
6. Others as appropriate.

C. Minimum Agenda:

1. All items in regular Progress Meetings as noted above.

2. Review of Work completed to date.

3. Determination of conflicts and impediments to progress of the Work.

4. Resolution of impediments.

D. Meeting Minutes:

1. Record observations, recommendations and directives offered by the attendees.

1.05 PRE-INSTALLATION CONFERENCES

A. Schedule pre-installation conferences required in individual Specification sections. Convene at Project site prior to commencing Work of the section.

B. Attendees:

1. Exhibit Project Coordinator.
2. Exhibit Project Manger.
3. Owner!s Construction Manager.
3. Owner!s Representatives
4. Exhibit Designer.
5. Professional Consultants.
6. Local Subcontractors (installer, applicator, or erector).
7. Material or equipment supplier.
8. Manufacturers! representative.
9. Others directly affecting, or affected by the work.
10. Testing agency (if necessary).

C. Minimum Agenda:

1. Access to work and conditions of proper installation.

2. Site mobilization and utilization:

a. Use of premises; office and storage areas ; Owner!s requirements.
b. Temporary utilities and services
c. Waste management plan and procedures.
d. Conditions of installation, such as substrates, existing and surrounding conditions, and environmental conditions.

3. Conditions detrimental to installation.

4. Preparation procedures, including protection of adjacent work.

5. Verify installers! receipt and understanding of installation instructions.

6. Review submittals, installation procedures, and sequence.

7. Review coordination with other work.

8. Evaluate delivery schedule and Construction Progress Schedule.

9. Observe sample installation.

10. Required protection procedures.

1.06 CLOSEOUT CONFERENCE

A. Schedule Project Closeout conference with sufficient time to prepare for requesting Final Completion.

B. Attendees:

1. Exhibit Project Coordinator.
2. Exhibit Project Manger.
3. Owner!s Construction Manager.
4. Owner!s Representatives (museum staff, facilities operations and security personnel, etc)
5. Exhibit Designer.
6. Others as appropriate.

C. Minimum Agenda:

1. Start-up of facilities and systems.

2. Operations and Training and Exhibit Maintenance Manuals.

3. Testing, adjusting, and balancing.

4. System demonstration and observation.

5. Operations and Training and maintenance instructions for the museum!s personnel.

6. Exhibit Contractor!s inspection of work.

7. Exhibit Contractor!s preparation of an initial "punch list."

8. Procedure to request Exhibit Designer inspection to determine date of substantial completion.

9. Completion time for correcting deficiencies.

10. Inspections by authorities having jurisdiction.

11. Certificate of occupancy and transfer of insurance responsibilities.

12. Partial release of retainage.

13. Preparation for final inspection.

1. Closeout submittals
   a. Project Record Documents.
   b. Operating and maintenance documents.
   c. Operating and maintenance materials.
   d. Warranties and bonds.
   e. Affidavits.

2. Final application for payment.

3. Final cleaning.

4. Exhibit Contractor!s demobilization of site.

5. Maintenance.

END OF SECTION 01312

SECTION 01323 — PROJECT SCHEDULE

PART 1 – GENERAL

1 .1 RELATED DOCUMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

1 .2 DESCRIPTION

A. Summary: The work of this section consists of project schedule requirements including preparation of a project schedule, schedule updates, schedule revisions and time impact analysis. The project schedule shall be based upon the Critical Path Method (CPM) for planning, scheduling and reporting progress of the Work.

B. Purpose: The purpose of the project schedule is to ensure adequate planning, coordination, scheduling, and reporting during execution of the work by the Exhibit Contractor. The project schedule will assist the Exhibit Contractor, General Contractor!s Project Coordinator and Owner in monitoring the progress of the work, evaluating proposed changes and potential impacts to overall schedule.

1 .3 SUBMITTALS:

A. As specified in Section 01330

B. Project Schedule: Within 5 calendar days after Notice to Proceed, submit one electronic copy (pdf) and 3 paper copies of the proposed project schedule, and accompanying CPM Schedule Reports to the Owner.

C. Project Schedule Updates: Submit estimates of the completion time required for each scheduled activity. The submittal shall include 3 paper copies and one electronic copy of the previous month!s Schedule Update indicating actual activity start and/or complete dates, revised (current) remaining durations, and percent complete information. The Exhibit Contractor shall also indicate in writing those activities the Exhibit Contractor plans to work on during the following update month, any anticipated conditions which may delay the work, or any additional information necessary to support the above.

D. Project Schedule Revisions and Time Impact Analysis: Submit one electronic copy and two paper copies of a Time Impact Analysis. Each analysis shall demonstrate how the Exhibit Contractor proposes to incorporate a modification, change, delay, or Exhibit Contractor request into the project schedule.

1 .4 PRELIMINARY REQUIREMENTS

A. Meeting: The Exhibit Contractor shall meet with the Owner on the day of the preconstruction conference to conduct a joint review of the project schedule requirements of the contract to assure the Owner of the Exhibit Contractor's and subcontractors' understanding of the requirements of this section.

B. Exhibit Contractor's Schedule Representative: Before or at the preconstruction conference, designate in writing and provide the qualifications of an authorized representative in the Exhibit Contractor's organization who shall be responsible for coordinating with the Exhibit Designer and Owner during the preparation and maintenance of the project schedule.

1 .5 PROJECT SCHEDULE

A. Schedule Development:

1. The late finish date shown on the schedule shall be the same date as the last day of the contract period.

2. The Exhibit Contractor shall carefully plan the durations between scheduled activities so as not to effect the completion of the work. The Exhibit Contractor's project schedule shall consist of procurement activities (including mobilization, submittal, and the fabrication and delivery of key and long-lead procurement items) and construction activities.

3. The Exhibit Contractor's project schedule shall consist of, but not be limited to, the following for each activity:

a. Identify each and every activity number with numerical designations (maximum 5-digit). Numbering of activities shall be in increments of 10 digits.

b. Concise description of the work represented by the activity (maximum 48 characters). Avoid the use of non-standard abbreviations. The work related to each activity shall be limited to one work trade.

c. Activity duration in whole working days with a maximum duration of 15 work days each, unless otherwise approved by the Owner, except for non-construction activities including mobilization, shop drawing and sample submittals, fabrication of materials, delivery of materials and equipment.

d. Identify if activity is a "critical path! activity.

4. In developing the project schedule, ensure that work of all sub contractors at all tiers, as well as the prime work, is included and coordinated in the project schedule.

5. The project schedule as developed shall show the sequence and interdependence of activities required for complete performance of the work. Ensure all work sequences are logical and the project schedule shows a coordinated plan of the work.

6. Proposed duration assigned to each activity shall be the Exhibit Contractor's best estimate of time required to complete the activity considering the scope and resources planned for the activity.

7. Resource loading of each activity shall list all personnel by labor category and equipment type and capacity proposed to complete the activity in the duration shown.

8. Consider seasonal weather conditions in planning and scheduling all work influenced by high or low ambient temperatures, wind and/or precipitation to ensure completion of all work within the contract time. Show anticipated weather conditions on project calendar.

B. Joint Review, Revision, and Acceptance:

1. Within seven calendar days of receipt of the Exhibit Contractor's proposed project schedule, the Exhibit Designer, the Owner and Exhibit Contractor shall meet for joint review, correction, or adjustment of the proposed project schedule. Any areas which, in the opinion of the Owner or the Exhibit Designer, conflict with timely completion of the project shall be subject to revision by the Exhibit Contractor.

2. In the event the Exhibit Contractor fails to define any element of work, activity, or logic, and the Owner review does not detect this omission or error, such omission or error, when discovered by the Exhibit Contractor, the Exhibit Designer or Owner, shall be corrected by the Exhibit Contractor at the next monthly project schedule update and shall not affect the contract time.

3. Within seven calendar days after the joint review between the Exhibit Contractor, the Project Coordinator and Owner, the Exhibit Contractor shall revise and resubmit the project schedule in accordance with agreements reached during the joint review.

4. Upon acceptance of the project schedule by the Owner, the project schedule will be used to evaluate the Exhibit Contractor's monthly applications for payment based upon information developed at the monthly project schedule update meeting.

1 .6 PROJECT SCHEDULE UPDATES

A. General: Update the project schedule on a monthly basis throughout the entire contract time and until project substantial completion.

B. Procedure: The Exhibit Contractor shall meet with the Owner and Exhibit Designer each month at a project schedule update meeting to review actual progress made through the status date of the project schedule update, including dates activities were started and/or completed and the percentage of work completed on each activity started and/or completed. In case of disagreements at the schedule update meeting concerning actual progress to date, the Owner's determination shall govern.

1 .7 PROJECT SCHEDULE REVISIONS

A. Required Revisions: If, as a result of the monthly schedule update, it appears the project schedule no longer represents the actual prosecution and progress of the work, the Owner will request, and the Exhibit Contractor shall submit, a revision to the project schedule. The Exhibit Contractor may also request reasonable revisions to the project schedule in the event the Exhibit Contractor's planning for the work is revised. If the Exhibit Contractor desires to make changes in the project schedule, the Exhibit Contractor shall notify the Owner in writing, stating the reason for the proposed revision. Accepted revisions will be incorporated into the project schedule at the next monthly schedule update.

B. Procedure: If revision to the project schedule is contemplated, the Exhibit Contractor or Owner shall so advise the other in writing at least seven calendar days prior to the next schedule update meeting, describing the revision and setting forth the reasons therefore. Government-requested revisions to the project schedule will be presented in writing to the Exhibit Contractor, who shall respond in writing within seven calendar days.

1 .8 TIME IMPACT ANALYSIS FOR CONTRACT MODIFICATIONS, CHANGES, DELAYS, AND EXHIBIT CONTRACTOR REQUESTS

A. Requirements: When contract modifications or changes are initiated, delays are experienced, or the Exhibit Contractor desires to revise the project schedule, the Exhibit Contractor shall submit as part of the proposal for modified work to the Owner a written time impact analysis illustrating the influence of each modification, change, delay, or Exhibit Contractor request on the contract time.

B. Time Extensions: Activity delays shall not automatically mean that an extension of the contract time is warranted or due the Exhibit Contractor. It is possible that a modification, change, or delay will not affect existing critical path activities or cause non-critical activities to become critical. A modification, change, or delay may result in only absorbing a part of the available total float that may exist within an activity chain of the project schedule, thereby not causing any effect on the contract time. Time extensions will be granted in accordance with the terms of the contract.

C. Float: Float is not for the exclusive use or benefit of either the Owner or the Exhibit Contractor. Extension of the contract time will be granted only to the extent the equitable time adjustments to the activity or activities affected by the modification, change, or delay exceeds the total (positive or zero) float of a critical path activity and extends the contract completion date.

D. Procedure: Each time impact analysis shall be submitted within the time period stated in a request for proposal, or the time period designated under the clauses entitled Changes or Default. In cases where the Exhibit Contractor does not submit a written request for extension of time and a time impact analysis within the designated time, it is mutually agreed that the particular modification, change, delay, or Exhibit Contractor request does not require an extension of the contract time. Upon acceptance, the time impact analysis shall be incorporated into the project schedule at the next monthly schedule update.

END OF SECTION 01323

SECTION 01330 — SUBMITTALS

PART 1 - GENERAL

1 .1 RELATED DOCUMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

1 .2 DESCRIPTION

A. The work of this section consists of submittal requirements before and during construction.

1 .3 RELATED REQUIREMENTS

Section 01770 Project Closeout

1 .4 SUBMITTAL AND APPROVAL PROCEDURES

A. All submittals shall be transmitted using the form provided at the end of this section. No action will be taken on a submittal item unless accompanied by the transmittal form. No verbal communication or other documented form of communication shall serve as a substitution for required submittals and the required forms and transmittals.

B. As specified in the individual sections, forward submittals to Exhibit Designer at least 45 days before need for a final approval. Exhibit Designer and Consultants require 14 days (exclusive of shipping time) for review and notation of each submittals. Assume that each submittal will require repeat submittals and incorporate enough time in the schedule to accommodate at least 3 rounds of submission and review for each submittal required.

C. Unless a different number is specified, submit one original and two copies of each shop drawing, three copies of manufacturer's catalog sheets (cut sheets), three specimens of each sample, and three copies of all other submittals requested.

D. All submittals must be provided as full size hardcopies, not delivered electronically.

1. Site Survey and Exhibit Coordination Drawings: Include the following information with each copy of survey drawings:

a. Date.

b. Date of revisions (when applicable).

c. Exhibit Contractor's certification that coordination drawing has been checked for accuracy by filed measurement of existing conditions and for compliance with contract documents.

d. Details of fabrication, coordination, assembly and erection including connections and engagement to contiguous work.

e. Any special or typical conditions requiring coordination of the Exhibit Contractor!s Work with the Work of other Prime Contractors.

f. Note required installation sequences.

g. Note any variances with Exhibit Contract Documents in dimensions or conditions as-built.

e. Note any proposed changes to the Exhibit Contract Documents to rectify errors or omissions, or to account for variances.

f. The term "by others" shall not be used. All work to be performed by others shall be identified by Exhibit Contractor or subcontractor name, discipline, or trade.

2. Shop Drawings: Include the following information with each copy of shop drawings:

a. Date.

b. Date of revisions (when applicable).

c. Exhibit Contractor's certification that shop drawing has been checked for compliance with contract documents.

d. Details of fabrication, assembly and erection including connections and engagement to contiguous work.

e. Materials used (including all hardware and fasteners)

f. All required dimensions.

f. The term "by others" shall not be used. All work to be performed by others shall be identified by Exhibit Contractor or subcontractor name, discipline, or trade.

2. Samples: Samples shall be large enough to illustrate clearly the functional characteristics and full range of color, texture, pattern and workmanship.

3. Manufacturers' Catalog Sheets: Submit only pertinent pages; mark each copy of standard printed data to identify specific products proposed for use.

4. Manufacturer's Installation Instructions: When contract documents require compliance with manufacturer's printed instructions, provide one complete set of instructions for Owner and keep another complete set of instructions at the project site until substantial completion for their records.

E. Owner reserves the right to require submittals in addition to those called for in individual sections.

F. Approved Equals:

1. For each item proposed as an "approved equal," submit supporting data, including:

a. Drawings and samples as appropriate.

b. Comparison of the characteristics of the proposed item with that specified.

c. Changes required in other elements of the work because of the substitution.

d. Name, address, and telephone number of vendor.

e. Manufacturer's literature regarding installation, operation, and maintenance, including schematics for electrical and hydraulic systems, lubrication requirements, and parts lists. Describe availability of maintenance service, and state source of replacement materials.

2. A request for approval constitutes a representation that Exhibit Contractor:

a. Has investigated the proposed item and determined that it is equal or superior in all respects to that specified.

b. Will provide the same warranties for the proposed item as for the item specified.

c. Has determined that the proposed item is compatible with interfacing items.

d. Will coordinate the installation of an approved item and make all changes required in other elements of the work because of the substitution.

e. Waives all claims for additional expenses that may be incurred as a result of the substitution.

3. Construction Materials: The Exhibit Contractor is encouraged to submit for approval products made out of recycled or environmentally responsible material. Every effort will be made by the National Park Service to approve these materials.

F. Coordinate all submittals and review them for legibility, accuracy, completeness, and compliance with contract requirements. Forward submittals that are related to, or affect one another, as a package to facilitate coordinated review. Each transmittal shall contain only data specific to that individual submittal. Delays resulting from the return of submittals without processing, are not the responsibility of the Exhibit Designer. Submittals will be returned without processing if:

1. They have not been reviewed and stamped by the Exhibit Contractor and Owner for coordination of work and for conformance with the Contract Documents prior to submission to the Exhibit Designer.

2. They are not initialed or signed by the authorized person.

3. They are not dated.

4. It becomes evident that they are incomplete or have not been properly reviewed.

G. Submittal Identification:

4. Owner will provide a project identification stamp which shall be applied by the Exhibit Contractor. Identification shall include the park name-package number, project title, contract number, and transmittal number.

5. All sets of shop drawings, manufacturer's catalog sheets, samples, and other documents submitted to the Owner must have the identification information stamped on the submittal.

6. Identification information shall be applied to the bottom right margin on each page. Identification information on samples shall be applied to the most readily visible area on the sample or on tags attached to sample.

H. Submittal Numbering:

7. Number each submittal consecutively.

8. For re-submittals use the original submittal number, plus a letter suffix beginning with A.

9. Additional re-submittals of the same item shall contain the original number with the next consecutive letter.

I. Designer's Review:

10. Submittals will be returned disapproved without technical review if identification information is missing, not filled in, or if placed on the back of the submittal; an incorrect number or format of submittals is provided; the transmittal form is incorrectly filled out; submittals are not coordinated; or submittals do not show evidence of Exhibit Contractor's approval.

11. Any work done or orders for materials or services placed before approval shall be at the Exhibit Contractor's own risk.

12. After reviewing submittals, the Designer will return one copy of form and one copy of applicable (marked up) submittal sheets to the Exhibit Contractor and One Copy to the Owner. Shop drawing review notations will be returned on the reproducible original shop drawing. All other submitted items will be retained. The Exhibit Contractor is responsible for producing additional copies for his/her own use.

13. The returned submittal will be marked in one of three ways as defined below:

a. APPROVED: Acceptable with no corrections.

b. APPROVED WITH NOTATIONS: Minor corrections or clarifications required. All comments are clear and no further review is required. The Exhibit Contractor shall address all review comments when proceeding with the work.

c. DISAPPROVED - RESUBMIT: Rejected as not in accordance with the contract or as requiring major corrections or clarifications. The Designer will identify the reasons for disapproval. The Exhibit Contractor shall revise and resubmit with changes clearly identified.

d. RECEIVED – NO ACTION REQUIRED: Contents of submittal were in appropriate or were sent in error: Not subject to review and record.

e. NOT SUBJECT TO REVIEW: Informational submittal. No copies will be returned. Copy will be kept as record. No review of submittal will be conducted.

1.4 USE OF ELECTRONIC CAD FILES OF PROJECT DRAWINGS

A. Electronic CAD Files of Design Drawings: May only be used to expedite production of Shop Drawings for this Project. Use for other project or purpose not allowed. Contact Exhibit Designer directly for CAD Files.

B. Electronic CAD Files of Design Drawings: Will be distributed only under following conditions:

1. Source information used to generate electronic CAD files was not prepared by Exhibit Designer and Exhibit Designer is not responsible for accuracy of information contained in files.

2. Use of files is solely at receiver!s risk. Exhibit Designer does not warrant accuracy of files. Receiving files in electronic form does not relieve receiver of responsibilities for measurements, dimensions and quantities set forth in the Exhibit Contract Documents. In event of ambiguity, discrepancy or conflict between information on electronic media and that in Contract Documents, notify Exhibit Designer of discrepancy and use information in hard copy Drawings and Specifications.

3. CAD Files: Do not necessarily represent latest Contract Documents, existing conditions, and as-built conditions. Receiver: Responsible to determine and comply with these conditions. Receiver: Responsible for incorporating addenda and modifications, Change Orders and Exhibit Designer!s Supplemental Instructions.

4. User: Responsible for removing information not normally provided on Shop Drawings and any references to Contract Documents. Shop Drawings submitted with information associated with other trades or with references to Contract Documents will not be reviewed and immediately returned.

5. Files: Vectorworks files transmitted by electronic storage device (CD). There is no guarantee of integrity of data or completeness and form of translation. Receiver shall not hold Exhibit Designer responsible for data or file clean-up required to make files usable, nor for error or malfunction in translation, interpretation or use of this electronic information.

6. Receiver understands that even though Exhibit Designer has computer virus scanning software to detect presence of computer viruses, there is no guarantee that computer viruses are not present in files or in electronic media. Receiver: Not hold Architect nor Exhibit Designer responsible for such viruses or their consequences, and shall hold Architect and Exhibit Designer harmless against costs, losses or damage caused by presence of computer virus in files or media.

END OF SECTION 01330

SECTION 01350 — LEED REQUIREMENTS

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

1.2 SUMMARY

A. This Section includes general requirements and procedures for compliance with certain U.S. Green Building Council's (USGBC) LEED prerequisites and credits needed for the Project to obtain LEED Certified certification.

1. Other LEED prerequisites and credits needed to obtain LEED certification are dependent on material selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests.

2. Additional LEED prerequisites and credits needed to obtain the indicated LEED certification are dependent on the Exhibit Designer!s and Architect's design and other aspects of the Project that are not part of the Work of the Contract.

B. Related Sections include the following:

1. Divisions"1 through 16 Sections for LEED requirements specific to the Work of each of those Sections. These requirements may or may not include reference to LEED.

1.3 DEFINITIONS

A. LEED: Leadership in Energy & Environmental Design.

B. Regionally Manufactured Materials: Materials that are manufactured within a radius of 500 miles (800 km) from the Project location. Manufacturing refers to the final assembly of components into the building product that is installed at the Project site.

C. Regionally Extracted, Harvested, or Recovered Materials: Materials that are extracted, harvested, or recovered and manufactured within a radius of 500 miles (800 km) from the Project site.

D. Recycled Content: The percentage by weight of constituents that have been recovered or otherwise diverted from the solid waste stream, either during the manufacturing process (pre-consumer), or after consumer use (post-consumer).

1. Spills and scraps from the original manufacturing process that are combined with other constituents after a minimal amount of reprocessing for use in further production of the same product are not recycled materials.

2. Discarded materials from one manufacturing process that are used as constituents in another manufacturing process are pre-consumer recycled materials.

1.4 SUBMITTALS

A. General: Submit additional LEED submittal requirements included in other sections of the Specifications.

B. LEED submittals are in addition to other submittals. If submitted item is identical to that submitted to comply with other requirements, submit duplicate copies as a separate submittal to verify compliance with indicated LEED requirements.

C. Project Materials Cost Data: Provide statement indicating total cost for building materials used for Project. Include statement indicating total cost of mechanical and electrical components.

D. LEED Action Plans: Provide preliminary submittals within 14 days of date established for commencement of the Work indicating how the following requirements will be met.

1. Credit MR"2.1 (and 2.2, if applicable): Waste management plan complying with Division"1 Section "Construction Waste Management."

2. Credit MR"4.1 (and 4.1 if applicable): List of proposed materials with recycled content.

a. Indicate cost, post-consumer recycled content, and pre-consumer recycled content for each product having recycled content.

3. Credit MR"5.1 (and 5.2 if applicable): List of proposed regionally manufactured materials"and regionally extracted, harvested, or recovered materials.

a. Identify each regionally manufactured material, its source, and cost.
b. Identify each regionally extracted, harvested or recovered material, its source, and cost.

4. Credit EQ"3.1: Construction indoor air quality management plan.

E. LEED Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with LEED action plans for the following:

1. Credit MR"2.1"and 2.2: Waste reduction progress reports complying with Division"1 Section "Construction Waste Management."

2. Credit MR"4.1"and 4.2: Recycled content.

3. Credit MR"5.1"and 5.2: Regionally manufactured materials"and regionally extracted, harvested, or recovered materials.

F. LEED Documentation Submittals:

1. Credit WE 3.1: Product Data for plumbing fixtures indicating water consumption.

2. Prerequisite EA"3.0: Product Data for new HVAC equipment indicating absence of CFC refrigerants.""Phase-out plan to replace CFC refrigerants in HVAC&R systems with CFC-free refrigerants within the Construction Period.

3. Credit EA"4.0: Product Data for new HVAC equipment indicating absence of HCFC refrigerants,"and for clean-agent fire-extinguishing systems indicating absence of HCFC and Halon.

4. Credit MR"2.1"and 2.2: Comply with Division"1 Section "Construction Waste Management."

5. Credit MR"4.1"and 4.2: Product Data and certification letter indicating percentages by weight of post-consumer and pre-consumer recycled content for products having recycled content. Include statement indicating costs for each product having recycled content.

6. Credit MR"5.1"and 5.2: Product Data indicating location of material manufacturer for regionally manufactured materials.

   a. Include statement indicating cost and distance from manufacturer to Project for each regionally manufactured material.
   b. Include statement indicating cost and distance from point of extraction, harvest, or recovery to Project for each raw material used in regionally manufactured materials.

7. Credit EQ"1.0: Product Data and Shop Drawings for carbon dioxide monitoring system.

8. Credit EQ"3.1:

   a. Construction indoor air quality management plan.
   b. Product Data for temporary filtration media.
   c. Product Data for filtration media used during occupancy.
   d. Construction Documentation: Six photographs at three different occasions during construction along with a brief description of the SMACNA approach employed, documenting implementation of the IAQ management measures, such as protection of ducts and on-site stored or installed absorptive materials.

9. Credit EQ"3.2:

   a. Signed statement describing the building air flush-out procedures including the dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.
   b. Product Data for filtration media used during flush-out and during occupancy.
   c. Report from testing and inspecting agency indicating results of IAQ testing and documentation showing conformance with IAQ testing procedures and requirements.

10. Credit EQ"4.1: Product Data for adhesives and sealants used on the interior of the building indicating VOC content of each product used. Indicate VOC content in g/L calculated according to 40"CFR"59, Subpart D (EPA method 24).

11. Credit EQ"4.2: Product Data for paints and coatings used on the interior of the building indicating chemical composition and VOC content of each product used. Indicate VOC content in g/L calculated according to 40"CFR"59, Subpart D (EPA method 24).

12. Credit EQ"4.3: Product Data for carpet products indicating VOC content of each product used.

13. Credit EQ"4.4: Product Data for composite wood and agrifiber products indicating that products contain no urea-formaldehyde resin.

    a. Include statement indicating adhesives and binders used for each product.

14. Credit EQ"6.2: Product Data and Shop Drawings for sensors and control system used to provide individual airflow and temperature controls for minimum 50 percent of non-perimeter, regularly occupied space.

15. Credit EQ"7: Product Data and Shop Drawings for sensors and control system used to monitor and control room temperature and humidity.

PART 2 PRODUCTS

2.1 RECYCLED CONTENT OF MATERIALS

A. Credit MR"4.1: Provide building materials with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of five percent of the cost of materials used for the Project.

B. Credits MR"4.1"and MR"4.2: Provide building materials with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 10 percent of the cost of materials used for the Project.

    1. The cost of post-consumer recycled content of an item shall be determined by dividing the weight of post-consumer recycled content in the item by the total weight of the item and multiplying by the cost of the item.

    2. The cost of post consumer recycled content plus one-half of pre-consumer recycled content of an item shall be determined by dividing the weight of post-consumer recycled content plus one-half of pre-consumer recycled content in the item by the total weight of the item and multiplying by the cost of the item.

    3. Do not include mechanical and electrical components in the calculation.

    4. Recycled content of materials shall be defined according to the Federal Trade Commission's "Guide for the Use of Environmental Marketing Claims," 16"CFR 260.7"(e).

2.2 REGIONAL MATERIALS

A. Credit MR"5.1: Provide 20 percent of building materials (by cost) that are regionally manufactured materials.

B. Credit MR"5.2: Of the regionally manufactured materials required by Paragraph "Credit MR"5.1" above, provide at least 50 percent (by cost) that are regionally extracted, harvested, or recovered materials.

2.3 LOW-EMITTING MATERIALS

A. Credit EQ"4.1: For interior applications use adhesives and sealants that comply with the following limits for VOC content when calculated according to 40"CFR"59, Subpart D (EPA method 24):

1. Wood Glues: 30 g/L.
2. Metal to Metal Adhesives: 30 g/L.
3. Adhesives for Porous Materials (Except Wood): 50 g/L.
4. Subfloor Adhesives: 50 g/L.
5. Plastic Foam Adhesives: 50 g/L.
6. Carpet Adhesives: 50 g/L.
7. Carpet Pad Adhesives: 50 g/L.
8. VCT and Asphalt Tile Adhesives: 50 g/L.
9. Cove Base Adhesives: 50 g/L.
10. Gypsum Board and Panel Adhesives: 50 g/L.
11. Rubber Floor Adhesives: 60 g/L.
12. Ceramic Tile Adhesives: 65 g/L.
13. Multipurpose Construction Adhesives: 70 g/L.
14. Fiberglass Adhesives: 80 g/L.
15. Structural Glazing Adhesives: 100 g/L.
16. Wood Flooring Adhesive: 100 g/L.
17. Contact Adhesive: 250 g/L.
18. Plastic Cement Welding Compounds: 350 g/L.
19. ABS Welding Compounds: 400 g/L.
20. CPVC Welding Compounds: 490 g/L.
21. PVC Welding Compounds: 510 g/L.
22. Adhesive Primer for Plastic: 650 g/L.
23. Sealants: 250 g/L.

24. Sealant Primers for Nonporous Substrates: 250 g/L.

25. Sealant Primers for Porous Substrates: 775 g/L.

B. Credit EQ"4.2: For interior applications use paints and coatings that comply with the following limits for VOC content when calculated according to 40"CFR"59, Subpart D (EPA method 24) and the following chemical restrictions:

1. Flat Paints and Coatings: VOC not more than 50 g/L.

2. Non-Flat Paints and Coatings: VOC not more than 150 g/L.

3. Anti-Corrosive Coatings: VOC not more than 250 g/L.

4. Varnishes and Sanding Sealers: VOC not more than 350 g/L.

5. Stains: VOC not more than 250 g/L.

6. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).

7. Restricted Components: Paints and coatings shall not contain any of the following:

a. Acrolein.
b. Acrylonitrile.
c. Antimony.
d. Benzene.
e. Butyl benzyl phthalate.
f. Cadmium.
g. Di (2-ethylhexyl) phthalate.
h. Di-n-butyl phthalate.
i. Di-n-octyl phthalate.
j. 1,2-dichlorobenzene.
k. Diethyl phthalate.
l. Dimethyl phthalate.
m. Ethylbenzene.
n. Formaldehyde.
o. Hexavalent chromium.
p. Isophorone.
q. Lead.
r. Mercury.
s. Methyl ethyl ketone.
t. Methyl isobutyl ketone.
u. Methylene chloride.
v. Naphthalene.
w. Toluene (methylbenzene).
x. 1,1,1-trichloroethane.
y. Vinyl chloride.

C. Credit EQ"4.4: Do not use composite wood and agrifiber products that contain urea-formaldehyde resin.

PART 3 EXECUTION

3.1 REFRIGERANT AND CLEAN-AGENT FIRE-EXTINGUISHING-AGENT REMOVAL

A. Prerequisite EA"3.0: Remove CFC-based refrigerants from existing HVAC and refrigeration equipment indicated to remain and replace with refrigerants that are not CFC based. Replace or adjust existing equipment to accommodate new refrigerant as described in Division"15 Sections.

B. Credit EA"4.0: Remove HCFC-based refrigerants from existing HVAC and refrigeration equipment indicated to remain and replace with refrigerants that are not HCFC based. Replace or adjust equipment to accommodate new refrigerant.""Remove clean-agent fire-extinguishing agents that contain HCFCs or halons, and replace with agent that does not contain HCFCs or halons.

1. Refer to Division"15 for additional requirements.

3.2 CONSTRUCTION WASTE MANAGEMENT

A. Credit MR"2.1"and 2.2: Comply with Division"1 Section "Construction Waste Management."

3.3 CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT

A. Credit EQ"3.1: Comply with SMACNA IAQ Guideline for Occupied Buildings under Construction.

1. If Owner authorizes the use of permanent heating, cooling, and ventilating systems during construction period as specified in Division 1 Section "Temporary Facilities and Controls," install filter media having a MERV"8 according to ASHRAE"52.2 at each return-air inlet for the air-handling system used during construction.

B. Credit EQ"3.2:

1. Conduct a two-week building air flush-out after construction ends with new air filters and 100 percent outdoor air. Replace air filters after building air flush-out. Replacement air filters shall have a MERV"13 according to ASHRAE"52.2.

END OF SECTION 013520

PART 1 - GENERAL

1 .1 The following abbreviations, which may be used in the construction specifications, refer to the organizations and specifications of the organizations listed below:

AA	Aluminum Association 900 19th Street, NW, Suite 300 Washington, D.C. 20006-2168
AABC	Associated Air Balance Council 1518 K Street, NW, Suite 503 Washington, D.C. 20005
AAMA	American Architectural Manufacturers Association 1827 Walden Office Square, Suite 104 Schaumberg, Illinois 60173-4268
AAN	see ANLA
AASHTO	American Association of State Highway and Transportation Officials 444 North Capitol Street, NW, Suite 249 Washington, D.C. 20001
ABMA	American Boiler Manufacturers Association 950 N. Glebe Road, Suite 160 Arlington, Virginia 22203-1824
ACI	American Concrete Institute P.O. Box 9094 Farmington Hills, Michigan 48333-9094
ACPA	American Concrete Pipe Association 222 West Las Colinas Boulevard, Suite 641 Irving, Texas 75039-5423
ADC	Air Diffusion Council 11 South LaSalle Street, Suite 1400 Chicago, Illinois 60603
AFPA	American Forest and Paper Association 1111 19th Street, NW, Suite 800 Washington, D.C. 20036
AGA	American Gas Association 1515 Wilson Boulevard Arlington, Virginia 22209
AHA	American Hardboard Association 1210 W. Northwest Highway Palatine, Illinois 60067-1897
AHAM	Association of Home Appliance Manufacturers 20 N. Wacker Drive, Suite 1500 Chicago, Illinois 60606
AI	Asphalt Institute Research Park Drive P.O. Box 14052

Lexington, Kentucky 40512-4052

AISC American Institute of Steel Construction
1 East Wacker Drive, Suite 3100
Chicago, Illinois 60601-2001

AISI American Iron and Steel Institute
1101 17th Street, NW
Washington, D.C. 20036-4700

AITC American Institute of Timber Construction
7012 S. Revere Parkway, Suite 140
Englewood, Colorado 80112

ALSC American Lumber Standards Committee
P.O. Box 210
Germantown, Maryland 20875

AMCA Air Movement and Control Association International, Inc.
30 W. University Drive
Arlington Heights, Illinois 60004-1893

ANLA American Nursery and Landscape Association
1250 I Street, NW, Suite 500
Washington, D.C. 20005

ANSI American National Standards Institute
11 West 42nd Street, 13th Floor
New York, New York 10036

APA American Plywood Association (See EWA)

APWA American Public Works Association
106 West 11th Street, Suite 1800
Kansas City, Missouri 64105-1806

ARI Air-Conditioning and Refrigeration Institute
4301 Fairfax Drive, Suite 425
Arlington, Virginia 22203

ARMA Asphalt Roofing Manufacturers Association
Center Park, 4041 Powder Mill Road, Suite 404
Calverton, Maryland 20705

ASC Adhesive and Sealant Council
1627 K Street, NW, Suite 1000
Washington, D.C. 20006-1707

ASHRAE American Society of Heating, Refrigerating, and Air-Conditioning Engineers
1791 Tullie Circle, NE
Atlanta, Georgia 30329-2305

ASLA American Society of Landscape Architects
4401 Connecticut Avenue, NW
Fifth Floor
Washington, D.C. 20008-2369

ASME American Society of Mechanical Engineers
345 East 47th Street
New York, New York 10017

ASPE American Society of Plumbing Engineers
3617 Thousand Oaks Boulevard, Suite 210
Westlake, California 91362-3649

ASSE American Society of Sanitary Engineering
28901 Clemens Road, Suite 100

	Westlake, Ohio 44145
ASTM	American Society for Testing and Materials 100 Barr Harbor Drive West Conshohocken, Pennsylvania 19428-2959
AWI	Architectural Woodwork Institute 1952 Isaac Newton Square Reston, Virginia 20190
AWPA	American Wood-Preservers' Association 3246 Fall Creek Highway, Suite 1900 Granbury, Texas 76049-7979
AWPI	American Wood Preservers Institute 1945 Old Gallows Road, Suite 550 Vienna, Virginia 22182
AWS	American Welding Society, Inc. 550 NW LeJeune Road Miami, Florida 33126
AWWA	American Water Works Association 6666 W. Quincy Avenue Denver, Colorado 80235
BHMA	Builders Hardware Manufacturers Association, Inc. 355 Lexington Avenue, 17th Floor New York, New York 10017-6603
BIA	Brick Institute of America 11490 Commerce Park Drive Reston, Virginia 22091-1525
BOCA	Building Officials Code Administrators 4051 W. Flossmoor Road Country Club Hills, Illinois 60478-5795
CBM	Certified Ballast Manufacturers 1422 Euclid Avenue, Suite 402 Cleveland, Ohio 44115-2851
CDA	Copper Development Association, Inc. 260 Madison Avenue, 16th Floor New York, New York 10016-2401
CE	Corps of Engineers 20 Massachusetts Avenue, NW Washington, D.C. 20314
CID	Commercial Item Description See contract clauses
CISPI	Cast Iron Soil Pipe Institute 5959 Shallowford Road, Suite 419 Chattanooga, Tennessee 37421
CLFMI	Chain Link Fence Manufacturers Institute 9891 Broken Land Parkway, Suite 300 Columbia, Maryland 21046
CRA	California Redwood Association 405 Enfrente Drive, Suite 200 Novato, California 94949
CRI	Carpet and Rug Institute 310 S. Holiday Avenue

Dalton, Georgia 30722-2048

CRSI	Concrete Reinforcing Steel Institute 933 N. Plum Grove Road Schaumburg, Illinois 60173-4758
CS	Commercial Standard of NBS (U.S. Department of Commerce) Government Printing Office Washington, D.C. 20402
CSSB	Cedar Shingle and Shake Bureau 515 116th Avenue, NE, Suite 275 Bellevue, Washington 98004-5294
DHI	Door and Hardware Institute 14170 Newbrook Drive Chantilly, Virginia 22021-2223
EPA	Environmental Protection Agency 401 M Street, SW Washington, D.C. 20460
EWA	APA- The Engineered Wood Association P.O. Box 11700 Tacoma, Washington 98411-0700
FHA	Federal Housing Administration (U.S. Department of Housing and Urban Development) 451 7th Street, SW Washington, D.C. 20410
FHVA	Fine Hardwood Veneer Association 260 S. First Street, Suite 2 Zionsville, Indiana 46077
FM	Factory Mutual System 1151 Boston-Providence Turnpike P.O. Box 9102 Norwood, Massachusetts 02062-9102
FS	Federal Specifications See contract clauses
GA	Gypsum Association 810 First Street, NE, Suite 510 Washington, D.C. 20002
GANA	Glass Association of North America 3310 SW Harrison Street Topeka, Kansas 66611-2279
HI	Hydronics Institute 35 Russo Place P.O. Box 218 Berkeley Heights, New Jersey 07922
HMA	Hardwood Manufacturers Association 400 Penn Center Boulevard, Suite 530 Pittsburgh, Pennsylvania 15235-5605
HPMA	Hardwood Plywood Manufacturers Association P.O. Box 2789 Reston, Virginia 22090-2789
IA	Irrigation Association 1911 N. Fort Myer Drive, Suite 1009

	Arlington, Virginia 22209-1630
IBC	International Building Code, 2000 Edition
ICBO	International Conference of Building Officials 5360 S. Workman Mill Road Whittier, California 90601
ICEA	Insulated Cable Engineers Association, Inc. P.O. Box 440 South Yarmouth, Massachusetts 02664
IEEE	The Institute of Electrical and Electronics Engineers 345 E. 47th Street New York, New York 10017-2394
IES	Illuminating Engineering Society of North America 120 Wall Street, 17th Floor New York, New York 10005-4001
IGCC	See ITS
ILIA	Indiana Limestone Institute of America, Inc. Stone City Bank Building, Suite 400 Bedford, Indiana 47421
ITS	Internek Testing Services 3393 Route 11 P.O. Box 2040 Cortland, New York 13045-7902
KCMA	Kitchen Cabinet Manufacturers Association 1899 Preston White Drive Reston, Virginia 22091-4326
LIA	Lead Industries Association, Inc. 295 Madison Avenue New York, New York 10017
MBMA	Metal Building Manufacturer!s Association c/o Thomas Associates, Inc. 1300 Sumner Avenue Cleveland, Ohio 44115-2851
MFMA	Maple Flooring Manufacturers Association 60 Revere Drive, Suite 500 Northbrook, Illinois 60062
MIA	Marble Institute of America 30 Eden Alley, Suite 201 Columbus, Ohio 43215
MIMA	Mineral Insulation Manufacturers Association 1420 King Street Alexandria, Virginia 22314
MLSFA	Metal Lath/Steel Framing Association - A Division of NAAMM 8 South Michigan Avenue, Suite 1000 Chicago, Illinois 60603
MS	Military Standardization Documents See contract clauses
MSHA	Mine Safety and Health Administration 4015 Wilson Boulevard, Room 601 Arlington, Virginia 22203
MSS	Manufacturers Standardization Society of the Valve and Fittings Industry

127 Park Street, NE
Vienna, Virginia 22180-4602

NAAMM The National Association of Architectural Metal Manufacturers
8 South Michigan Avenue, Suite 1000
Chicago, Illinois 60603

NACE National Association of Corrosion Engineers
1440 South Creek Drive
P.O. Box 218340
Houston, Texas 77218-8340

NAIMA North American Insulation Manufacturers Association
44 Canal Center Plaza, Suite 310
Alexandria, Virginia 22314

NAPA National Asphalt Pavement Association
NAPA Building
5100 Forbes Boulevard
Lanham, Maryland 20706-4413

NAPCA National Association of Pipe Coating Applicators
8th Floor, Commercial National Bank Building
333 Texas Street, Suite 800
Shreveport, Louisiana 71101-3673

NBS National Bureau of Standards
(U.S. Department of Commerce)(See NIST)

NCMA National Concrete Masonry Association
2302 Horse Pen Road
Herndon, Virginia 20171-3499

NEC National Electrical Code (by NFPA)

NECA National Electrical Contractors Association
3 Bethesda Metro Center, Suite 1100
Bethesda, Maryland 20814

NELM Northeastern Lumber Manufacturers' Association
272 Tuttle Road
P.O. Box 87A
Cumberland Center, Maine 04021-0687

NEII National Elevator Industry, Inc.
185 Bridge Plaza North, Suite 310
Fort Lee, New Jersey 07024

NEMA National Electrical Manufacturers Association
1300 N. 17th Street, Suite 1847
Rosslyn, Virginia 22209

NFPA National Fire Protection Association
1 Batterymarch Park
P.O. Box 9101
Quincy, Massachusetts 02269-9101

NHLA National Hardwood Lumber Association
P.O. Box 34518
Memphis, Tennessee 38184-0518

NHPMA Northern Hardwood and Pine Manufacturers Association, Inc.,
c/o Northern Softwood Lumber Bureau
Box 217
Dear River, Minnesota 56636

NIOSH	National Institute for Occupational Safety and Health NIOSH Building 1, Room 3007 1600 Clifton Road, NE Atlanta, Georgia 30333
NIST	National Institute of Standards and Technology (US Department of Commerce) Building 101, #A1134 Route I-270 and Quince Orchard Road Gaithersburg, Maryland 20899 Send requests for publications to: Superintendent of Documents Government Printing Office Washington, D.C. 20402
NOFMA	National Oak Flooring Manufacturers Association P.O. Box 3009 Memphis, Tennessee 38173-0009
NPA	National Particleboard Association 18928 Premiere Court Gaithersburg, Maryland 20879-1569
NRCA	National Roofing Contractors Association O'Hare International Center 10255 W. Higgins Road, Suite 600 Rosemont, Illinois 60018-5607
NSF	NSF International (Formerly National Sanitation Foundation) 3475 Plymouth Road P.O. Box 130140 Ann Arbor, Michigan 48113-0140
NTMA	The National Terrazzo and Mosaic Association 3166 Des Plaines Avenue, Suite 121 Des Plaines, Illinois 60018
NWWDA	National Wood Window and Door Association 1400 East Touhy Avenue, Suite G-54 Des Plaines, Illinois 60018
OSHA	Occupational Safety and Health Administration U.S. Department of Labor 200 Constitution Avenue, NW Washington, D.C. 20210
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, Illinois 60077-1083
PCI	Precast/Prestressed Concrete Institute 175 W. Jackson Boulevard Chicago, Illinois 60604
PDI	Plumbing and Drainage Institute 45 Briston Drive, Suite 101 South Euston, Massachusetts 02375
PEI	Porcelain Enamel Institute, Inc. 4004 Hillsboro Pike, Suite 224-B Nashville, Tennessee 37215

PI	Perlite Institute, Inc. 88 New Dorp Plaza Staten Island, New York 10306
PS	Product Standard of NBS (U.S. Department of Commerce) Government Printing Office Washington, D.C. 20402
RFCI	Resilient Floor Covering Institute 966 Hungerford Drive, Suite 12-B Rockville, Maryland 20850-1714
RIS	Redwood Inspection Service (Grading Rules) 405 Enfrente Drive, Suite 200 Novato, California 94949
RMMI	Rocky Mountain Masonry Institute 1780 South Bellaire Street, No. 602 Denver, Colorado 80222
SCMA	Southern Cypress Manufacturers Association 400 Penn Center Blvd., Suite 530 Pittsburgh, Pennsylvania 15235
SDI	Steel Deck Institute P.O. Box 25 Fox River Grove, Illinois 60021
SDI	Steel Door Institute 30200 Detroit Road Cleveland, Ohio 44145-1967
SFPA	Southern Forest Products Association P.O. Box 52468 New Orleans, Louisiana 70152
SGCC	See ITS
SIGMA	Sealed Insulating Glass Manufacturers Association 401 N. Michigan Avenue Chicago, Illinois 60611-4267
SJI	Steel Joist Institute 3127 10th Avenue, North Ext. Myrtle Beach, South Carolina 29577-6760
SMACNA	Sheet Metal and Air-Conditioning Contractors' National Association, Inc. 4201 Lafayette Center Drive P.O. Box 221230 Chantilly, Virginia 20151-1209
SPIB	Southern Pine Inspection Bureau (Grading Rules) 4709 Scenic Highway Pensacola, Florida 32504-9094
SSPC	Steel Structures Painting Council 40 24th Street, 6th Floor Pittsburgh, Pennsylvania 15222-4643
SWI	Steel Window Institute c/o Thomas Associates, Inc. 1300 Sumner Avenue Cleveland, Ohio 44115-2851
TCA	Tile Council of America 100 Clemson Research Boulevard

	Anderson, South Carolina 29625
TIMA	Thermal Insulation Manufacturers Association (See NAIMA)
TPI	Truss Plate Institute 583 D'Onofrio Drive, Suite 200 Madison, Wisconsin 53719
UBC	Uniform Building Code (by ICBO)
UL	Underwriters Laboratories, Inc. 333 Pfingsten Road Northbrook, Illinois 60062
USDA	U.S. Department of Agriculture 14th Street and Independence Avenue, SW Washington, D.C. 20250
WCLB	West Coast Lumber Inspection Bureau (Grading Rules) P.O. Box 23145 Portland, Oregon 97281-3145
WIC	Woodwork Institute of California P.O. Box 980247 West Sacramento, California 95798-0247
WMMPA	Wood Moulding and Millwork Producers Association 507 First Street Woodland, California 95695
WRI	Wire Reinforcement Institute, Inc. 203 Loudoun Street, SW Leesburg, Virginia 20175-2718
WSFI	Wood and Synthetic Flooring Institute (See MFMA)
WWPA	Western Wood Products Association (Grading Rules) Yeon Building 522 SW 5th Avenue Portland, Oregon 97204-2122
WWPA	Woven Wire Products Association 2515 Nordica Avenue Chicago, Illinois 60635
WWPI	Western Wood Preservers Institute 7017 NE Highway 99 #108 Vancouver, Washington 98665

END OF SECTION 01420

SECTION 015000 -- CONSTRUCTION FACILITIES & TEMPORARY CONTROLS

PART 1 GENERAL

1.1 GENERAL REQUIREMENT

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the construction facilities and temporary controls as shown on the drawings and specified herein, including but not limited to, the following:

1. Construction signs.
2. Hoists, stairs, and ladders.
3. Rodent control.
4. Temporary elevator.
5. Construction fence.
6. Field office.
7. Fire protection.
8. Temporary utilities.
9. Temporary toilets.
10. Temporary site access.
11. Security.
12. Water and snow control.
13. Environmental controls.

1.3 RELATED SECTIONS

A. Materials and Equipment - Section 016000.

PART 2 PRODUCTS

2.1 GENERAL

A. Arrange for and provide temporary facilities and controls as specified herein and as required for the proper and expeditious prosecution of the work. Pay all costs, except as otherwise specified, until final acceptance of the work unless the Owner makes arrangements for the use of completed portions of the work after substantial completion.

B. Make all temporary connections to utilities and services in locations acceptable to the local authorities having jurisdiction thereof; furnish all necessary labor and materials, and make all installations in a manner subject to the acceptance of such authorities; maintain such connections; remove the temporary installation and connections when no longer required; restore the services and sources of supply to proper operating condition.

C. Unless otherwise noted, pay all costs for temporary electrical power, temporary water, and temporary heating; provide metering as necessary.

2.2 PROJECT IDENTIFICATION

A. No signs or advertisements will be allowed to be displayed on the premises without the approval of the Architect.

B. One construction sign on the site shall be provided by the Exhibit Contractor and shall be subject to the approval of the Owner. Text and lettering shall be provided for at a later date.

C. Erect the construction sign on the site where directed by the Owner approximately 4 ft. x 8 ft. in size, of 3/4 in. plywood with suitable frame, moldings, and supports. Use Douglas Fir Overlaid Plywood, Grade B-B high density, exterior, good two sides, complying with PS-1. The sign shall be primed and given two coats of approved white paint. Lettering shall be black of an type, size, and lay-out as directed by the Owner. Sign shall contain the name of the building, Owner, Designer, Contractor, and such other reasonable information as the Designer or Owner may require.

2.3 MATERIAL HOIST

A. Provide a material hoist as required for use by all trades. Provide all necessary guards, signals, safety devices, and so on, required for safe operations, and suitable runways from the hoists to each floor level and roof. The construction and operation of the material hoist shall comply with all applicable requirements of ANSI A10.5, the ACG Manual of Accident Prevention in Construction and to all applicable state and municipal codes. Prohibit the use of the material hoist for transporting personnel.

2.4 RODENT CONTROL

A. Institute an effective program of rodent control for the entire site within the construction limits. Cooperate with local authorities and provide the regular services of an experienced exterminator who shall visit the site at least once a month for the entire construction period. Provide marked metal containers for all edible rubbish and enforce their use by all employees. Containers shall be emptied and the contents removed from the site as often as required to maintain an adequate rodent control program. If the program of rodent control used is not effective, take whatever steps are necessary to rid the project of rodents, and such action shall not be the basis of a claim for additional compensation or damages.

2.5 TEMPORARY CONSTRUCTION OPENINGS

A. Provide openings in slabs, walls, and partitions where required for moving in large pieces of equipment of all types. Close and/or restore all openings and finish them after the equipment is in place. Structural modification, if required, shall be subject to review by the Architect and Exhibit Designer.

2.6 TEMPORARY ELEVATOR

A. Provide a temporary elevator for necessary service during construction operations after the hoistway enclosures are completed and electrical power is available; use temporary machines, or at the Exhibit Contractor's option, use permanent machines, if they are available in due time for the required services.

B. The temporary elevator shall include temporary wood cars with suitable gates, including temporary hoistway doors, all designed in accordance with the local and state safety requirements.

C. The temporary services shall include qualified operating and maintenance personnel to perform the work in connection with the temporary operations.

D. Upon completion of temporary use, all work or damaged permanent parts are to be replaced and all equipment placed in first-class condition equal to new.

2.7 TEMPORARY FENCE

A. If not already provided by the General Contractor, provide and maintain an 8 foot high temporary fence to enclose the area at the job site and to guard and close effectively the designated area. Provide gates at locations where required for access to the enclosed area. Gates shall be cross-braced, hung on heavy strap hinges, and shall have hasps and padlocks. Paint the fence with two coats of an approved paint.

B. Remove the fence upon completion of the work or at such time before final completion as directed by the Owner.

2.8 TEMPORARY FIELD OFFICES

A. Provide and maintain a field office at the job site. The office shall be complete with light, heat, air conditioning, toilet facilities, electric water cooler, plan racks, four-drawer metal file with lock, shelves for samples, tables, chairs, and janitor service. When it becomes possible to establish an office in the building, office accommodation of approximately the same size as those in the field offices, including the services above, shall be provided and maintained until the issuance of a certificate of substantial completion. Temporary offices shall be removed when no longer required. Provide a telephone, computer with E-mail service and a fax line with machine and pay all charges for installation and calls, including long distance calls.

2.9 FIRE PROTECTION

A. Provide and maintain adequate fire protection, ready for instant use, distributed around the project.

B. Make arrangements for periodical inspection by municipal fire protection authorities and insurance underwriters inspections. Cooperate with said authorities and promptly carry out their recommendations.

C. Open fire will not be permitted within the building enclosure or on the project site.

2.10 TEMPORARY HEAT AND VENTILATION

A. Provide temporary heat as required during construction to protect the work from freezing or frost damage, and as necessary to ensure suitable working conditions for the construction operations of all trades. In areas of the building where work is being

conducted, the temperature shall be maintained as specified in the various sections of the Specifications, but not less than 45 degrees Fahrenheit. Under no circumstances shall the temperature be allowed to reach a level that will cause damage to any portion of the work that may be subject to damage by low temperatures.

B. Until the building, or any major portion thereof, is enclosed, temporary heating shall be by smokeless portable unit heaters of type listed by Underwriter's Laboratories, Factory Mutual, and the Fire Marshall. Pay for fuel, maintenance, and attendants required in connection with the portable unit heaters. Interior or exterior surfaces damaged by the use of these space heaters shall be replaced by new materials or be refinished.

C. The building shall be considered enclosed when it has reached the stage when exterior walls have been erected, the roof substantially completed, exterior openings closed up either by the permanently glazed windows and doors, or by adequate temporary closing, and the building is ready for interior masonry and plastering operations.

D. After the building, or any major portion thereof, has been enclosed, the permanent heating system as specified below may be used for temporary heat.

E. When the permanent heating system, or a suitable portion thereof, is in operating condition, the system may be used for temporary heating, provided that the Exhibit Contractor assumes full responsibility for the entire heating system, and pays all costs for fuel, operation, maintenance, and restoration of the system.

F. Provide adequate ventilation as required to keep the temperature of the building within 10 degrees Fahrenheit of the ambient outdoor temperature when such ambient temperature exceeds 70 degrees Fahrenheit, and to prevent accumulation of excess moisture or to prevent excess thermal movement in the building.

G. When the permanent air circulation system, or a suitable portion thereof, is in operating condition, it may be used without refrigeration or chilling, provided that the Exhibit Contractor assumes full responsibility for the system that he is using, and pays costs for power, operation, maintenance, and restoration of the system. Provide temporary filters to adequately filter air being distributed through the ductwork to the supply outlets; disposable filters shall be placed in front of all exhaust registers to keep construction dirt out of exhaust ductwork. The Exhibit Contractor shall thoroughly clean the interior of the air handling units and ductwork prior to acceptance of the work.

H. Upon conclusion of the temporary heating period, remove all temporary piping, temporary heating units, or other equipment and pay all costs in connection with repairing any damage caused by the installation or removal of temporary heating equipment. Thoroughly clean and recondition those parts of permanent heating and air circulation systems used for temporary service.

2.11 TEMPORARY LIGHT AND POWER

A. Make all arrangements with the General Contractor for temporary electrical service to the construction site; provide all equipment necessary for temporary power and lighting; and pay all charges for this equipment, the installation thereof, and for current used. The electrical service shall be of 120v and 240v for single-phase loads up to 30 amps for all construction tools and equipment without overloading the temporary facilities and shall be made available for power, lighting, and construction operations of all trades.

B. In addition to the electrical service, provide power distribution as required throughout structure. The terminations of power distribution shall be at convenient locations in the

building. Terminations shall be provided for each voltage supply complete with circuit breakers, disconnect switches, and other electrical devices as required to protect the power supply system.

1. Provide double duplex outlets at not more than 200' o.c. both directions throughout this building.

C. A temporary lighting system shall be furnished, installed, and maintained as required to satisfy minimum requirements of safety and security. The temporary lighting system shall afford general illumination in all building areas and shall supply not less than 150 watt lamps on 30' centers both directions of floor area for illumination in the areas of the building where work is being performed.

D. All temporary equipment and wiring for power and lighting shall be in accordance with the applicable provisions of the governing codes. All temporary wiring shall be maintained in a safe manner and used so as not to constitute a hazard to persons or property.

E. When the permanent electrical power and lighting systems are in operating condition, they may be used for temporary power and lighting for construction purposes, provided that the Exhibit Contractor assumes full responsibility for the entire power and lighting system, and pays costs for power, operations, maintenance, and restoration of the system.

2.12 TEMPORARY ROADS AND ACCESS TO SITE

A. Construct and maintain in good usable condition all required temporary roads and access to site, and, when no longer required, remove all temporary construction and restore the site.

B. Where streets now in use are within or adjacent to the work, keep the passageways of such streets open to vehicular and pedestrian traffic to building fronting thereon. Maintain constant access for police, fire and ambulance service.

C. Mud carried off the site and into public roads shall be removed immediately by the Exhibit Contractor.

D. Access to the site for delivery of construction material or equipment shall be made only from locations designated by the Owner.

2.13 TEMPORARY STAIRS, LADDERS, RAMPS

A. Provide and maintain all equipment such as temporary stairs, ladders, ramps, runways, and chutes as required for the proper execution of the work.

B. All such apparatus, equipment, and construction shall meet all requirements of the Labor Law and other state or local laws applicable thereto.

C. As soon as permanent stairs are erected, provide temporary protective treads, handrails, and shaft protection.

2.14 TEMPORARY TOILETS

A. Provide and maintain in a sanitary condition enclosed weather-tight toilets for the use of all construction personnel at a location within the contract limits. Upon completion of the work, toilets shall be removed. Installation shall be in accordance with all applicable

codes and regulations of authorities having jurisdiction. The number of toilet rooms required shall be in accordance with the ANSI Standard Safety Code for Building Construction or other local authorities.

2.15 TEMPORARY WATER SERVICE

A. Provide at a point within 10 feet of the building (or buildings) all water necessary for construction purposes. Make all temporary connections to existing mains; provide temporary meter; and make arrangements to pay for the temporary water service including cost of installation, maintenance thereof, and water used.

B. Furnish drinking water with suitable containers and cups for use of employees. Drinking water dispensers shall be conveniently located in the building where work is in progress.

C. When the permanent water supply and distribution system has been installed, it may be used as a source of water for construction purposes, provided that the Exhibit Contractor assumes full responsibility for the entire water distribution system, and pays costs for operation, maintenance, and restoration of the system including the cost of water used.

D. At the completion of the construction work or at such time after the Contractor makes use of the permanent water installation, all temporary water service equipment and piping shall be removed, and all worn or damaged parts of the permanent system shall be replaced and equipment placed in first class condition equal to new.

2.16 SECURITY

A. Provide sufficient watchman service to prevent illegal entry or damage during nights, holidays, or other periods when work is not being executed, and such other control watchmen as required during working hours.

B. Provide all temporary enclosures required for protecting the project from the exterior, for providing passageways, for the protection of openings both exterior and interior, and any other location where temporary enclosures and protection may be required.

C. Take adequate precautions against fire; keep flammable material at an absolute minimum; and ensure that such material is properly handled and stored. Except as otherwise provided herein, do not permit fires to be built or open salamanders to be used in any part of the work.

2.17 WATER AND SNOW CONTROL

A. From the commencement to the construction of the completion of the work, keep all parts of the site and the project free from accumulation of water, and supply, maintain, and operate all necessary pumping and bailing equipment.

B. Remove snow and ice as necessary for the protection and prosecution of the work, and protect the work against weather damage.

C. The Contractor shall take over responsibility for site drainage upon entering the premises and shall maintain such drainage until completion of the work so as not to adversely affect the adjacent areas.

2.18 ENVIRONMENTAL CONTROLS

A. The Contractor shall comply with all applicable Federal, State and local laws, regulations, ordinances, codes and standards concerning environment control. Particular attention shall be given, without limitations, to:

1. Minimization of dust, containment of chemical vapors, control of engine exhaust gases, and control of smoke from temporary heaters.

2. Reduction of water pollution by control of sanitary facilities, proper storage of fuels and other potential contaminants, and prevention of siltation from land erosion.

3. Minimization of noise levels.

4. Proper and legal disposal, off site unless otherwise provided, of waste and spoil resulting from construction activities.

5. See Section 01811 – Air Quality Management and Section 01812 - Waste Management for other requirements.

PART 3 EXECUTION

3.1 REMOVAL

A. Maintain all temporary facilities and controls as long as needed for the safe and proper completion of the work. Remove all such temporary facilities and controls as rapidly as progress of the work will permit or as directed by the Designer or Owner.

END OF SECTION 01500

SECTION 01570 — TRAFFIC REGULATION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment and services necessary to complete the traffic regulation as specified herein, as follows:

1. Flagmen.
2. Flares and Lights.
3. Haul Routes.
4. Traffic Signs and Signals.
5. Removal.

1.3 RELATED SECTIONS

A. Construction facilities and temporary controls - Section 015000.

1.4 SIGNS, SIGNALS, AND DEVICES

A. Post Mounted and Wall Mounted Traffic Control and Information Signs.

B. Traffic Control Signals: As approved by local jurisdictions.

C. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.

D. Flagmen Equipment: As approved by local jurisdictions.

1.5 FLAGMEN

A. Provide trained and equipped flagmen to regulate traffic when construction operations or traffic encroach on public traffic lanes.

1.6 FLARES AND LIGHTS

A. Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

1.7 HAUL ROUTES

A. Consult with authority having jurisdiction in establishing public thoroughfares to be used for haul routes and site access.

B. Confine construction traffic to designated haul routes.

C. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

1.8 TRAFFIC SIGNS AND SIGNALS

A. At approaches to site and on site, install at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.

B. Install and operate traffic control signals to direct and maintain orderly flow of traffic in areas under Contractor's control, and areas affected by Contractor's operations.

C. Relocate as Work progresses, to maintain effective traffic control.

1.9 REMOVAL

A. Remove equipment and devices when no longer required.

B. Repair damage caused by installation.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

(Not Applicable)

END OF SECTION 01570

SECTION 01600 — MATERIALS AND EQUIPMENT

PART 1 – GENERAL

1 .1 RELATED DOCUMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

1 .2 DESCRIPTION

A. The work of this section consists of the general procedures for handling, storing, and protecting material and equipment.

1 .3 TRANSPORTATION AND HANDLING

A. Arrange deliveries of materials in accordance with construction schedules; coordinate to avoid conflict with work and conditions at the site. Deliver materials in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible. Contractor is encouraged to obtain materials in biodegradable or recyclable/reusable packaging that uses the minimum amount of packaging possible.

1 .4 STORAGE AND PROTECTION

A. Store materials in accordance with manufacturer's instructions, with seals and labels accessible for inspection.

B. Interior Storage: Maintain temperature and humidity within the ranges required by manufacturer's instructions.

C. Exterior Storage:

1. Store products subject to damage by the elements in weather tight enclosures.

2. Store fabricated products above the ground, on blocking or skids; prevent soiling or staining. Cover products subject to damage or deterioration with impervious sheet coverings; provide adequate ventilation to avoid condensation.

D. Protection After Installation: It is important for all finished surfaces to remain protected during construction. Scratches, rubs, nicks and dents will not be acceptable in exposed finished building elements such as log columns, wood panels, concrete topping slabs, gypsum wallboard walls, painted finishes, etc. Provide adequate coverings as necessary to protect installed materials from damage resulting from natural elements, traffic, and subsequent construction. Remove when no longer needed.

END OF SECTION 01600

SECTION 01740 — WARRANTIES

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

Section 01770 " PROJECT CLOSEOUT"

1.02 SUMMARY

A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers standard warranties on products and special warranties.

1. Refer to the General Conditions for terms of the Exhibit Contractor's special warranty of workmanship and materials.

2. General closeout requirements are included in Section 01770 "PROJECT CLOSEOUT."

3. Specific requirements for warranties for the Work and products and installations that are specified to be warranted, are included in the individual Sections.

4. Certifications and other commitments and agreements for continuing services to the Owner are specified elsewhere in the Contract Documents.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Exhibit Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Exhibit Contractor.

1.03 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Exhibit Contract Documents. The Exhibit Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Exhibit Designer!s Recourse: Written warranties made to the Exhibit Designer are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise

available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights or remedies.

1. Rejection of Warranties: The Exhibit Designer reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

    a. The Exhibit Designer reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to counter sign such commitments are willing to do so.

2. Special Warranties:

    a. Shall not deprive the Owner of other rights they may have under other provisions of Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Exhibit Contractor under requirements of Contract Documents.

    b. Commence on Date of Beneficial Occupancy for that space or system, as defined in General Conditions, unless specifically specified otherwise in particular specification section.

1.04 SUBMITTALS:

A. Submit written warranties to the Owner prior to the date certified for Beneficial Occupancy.

1. When a designated portion of the Work is completed and accepted for beneficial occupancy or used by the Owner, submit properly executed warranties to the Exhibit Designer within fifteen days of completion of that designated portion of the Work.

2. When a special warranty is required to be executed by the, or the Exhibit Contractor General Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner for approval prior to final execution.

3. Refer to individual Sections of Division-2 through -16 for specific content requirements, and particular requirements for submittal of special warranties.

B. Form of Submittal: At Final Completion, Exhibit Contractor shall compile two copies of each required warranty properly executed by the Exhibit Contractor, subcontractor, supplier, or manufacturer. Warranty documents shall be organized into an orderly sequence based on the table of contents of the Project Manual.

1. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
2. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation.
3. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
4. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES," the Project title or name, and the name of the Exhibit Contractor.

5. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

END OF SECTION 01740

SECTION 01770 – PROJECT CLOSEOUT

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

Section 01740, “WARRANTIES”

Section 01781, “PROJECT RECORD DOCUMENTATION”

Section 01782, “OPERATION & MAINTENANCE DOCUMENTATION”

Section 01800, “CLEANING”

Section 018200, “DEMONSTRATION AND TRAINING”

1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:

1. Inspection procedures.
2. Project record document submittal.
3. Operating and maintenance manual submittal.
4. Submittal of warranties
5. Final cleaning.

B. Closeout requirements for specific construction activities are included in the appropriate Sections in Divisions-2 through -16.

1.03 PARTIAL ACCEPTANCE

A. Partial Owner Acceptance: The Owner reserves the right to occupy and to place and install equipment in completed areas of building, before Final Acceptance, provided such occupancy does not interfere with completion of the Work. Such placement of equipment and partial occupancy, or beneficial occupancy shall not constitute acceptance of the total Work.

1. The Exhibit Designer will prepare a notice of Partial Acceptance for each specific portion of the Work to be occupied before Owner occupancy.
2. Before partial Owner occupancy, exhibit systems shall be fully operational, and required tests and inspections shall be successfully completed. On occupancy, Owner will provide, operate, and maintain exhibit systems serving occupied portions of building.

3. On occupancy, Owner will assume responsibility for maintenance and cleaning of exhibits.

1.04 SUBSTANTIAL COMPLETION

A. Substantial Completion is defined as that state when the Exhibit Contractor has complied with the Contract requirements, except for minor deviations, and the project is sufficiently complete and capable of being occupied and used by the Owner for the intended purpose.

B. Preliminary Procedures: Before requesting inspection for Substantial Completion, complete the following:

1. Notification: The Exhibit Contractor shall notify the Owner fourteen (14) days prior to the Exhibit Contractor!s intended date for requesting inspection for Substantial Completion.

2. Documentation: Provide supporting documentation for completion as indicated elsewhere in the Contact Documents and a statement showing an accounting of changes to the Contract Sum.

3. Punch List: Submit a list to the Owner of incomplete items, the value of incomplete construction, and reasons Work is not complete.

4. Releases: Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.

5. Manuals: Submit operation and exhibit maintenance manuals and exhibit maintenance kit.

6. Security: Make final changeover of permanent locks and transmit keys to the Owner. Advise Owner of changeover in security provisions.

7. Startups: Complete startup testing of all exhibit systems and instructions of the Owner operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mock-ups, construction tools, and similar elements.

8. Commissioning: The successful functional performance tests for Commissioning shall be complete. See Section 01280 – Demonstration and Testing.

9. Training: Conduct Operational Training Sessions as required for museum staff to familiarize with the exhibit systems using the Exhibit Maintenance Manuals as an instructional aid.

C. Inspection Procedures: On receipt of a request for inspection, the Exhibit Designer will either proceed with inspection or advise the Exhibit Contractor of unfulfilled requirements. The Exhibit Designer will notify the Exhibit Contractor of Substantial Completion following the inspection or advise the Exhibit Contractor of construction that must be completed or corrected before Substantial Completion.

1. The Exhibit Designer will repeat the inspection when requested and when assured that the Work is substantially complete.

2. Results of the completed inspection will form the basis of the requirements for Final Acceptance.

1.05 FINAL ACCEPTANCE

A. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include certificates of insurance for products and completed operations where required.

2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.

3. Submit a certified copy of the Exhibit Designer's final inspection list of items to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance, and the list has been endorsed and dated by the CM.

4. Submit consent of surety to final payment.

5. Submit a final liquidated damages settlement statement.

6. All Commissioning Corrective Action Report (CAR) logs shall be closed.

7. Submit Record Documents and similar record information.

8. Complete final clean-up requirements including touch-up painting of marred surfaces.

B. Re-inspection Procedure: The Exhibit Designer will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except items whose completion has been delayed because of circumstances acceptable to the Exhibit Designer.

1. Upon completion of re-inspection, the Exhibit Designer will prepare a certificate of final acceptance, or advise the Exhibit Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

2. If necessary, re-inspection will be repeated. Additional re-inspections can be done, if needed, but will require that Exhibit Contractor directly reimburse Exhibit Designer.

1.06 EVIDENCE OF PAYMENTS AND RELEASE OF LIENS

a. Per Owner!s requirements.

1.07 FINAL ADJUSTMENT OF ACCOUNTS

A. Final Statement of Accounting: Submit to Owner and Designer. Show adjustments to Contract Sum:

1. Original Contract Sum.

2. Additions and deductions resulting from:

a. Previous Change Orders.
b. Allowances.
c. Unit Prices.
d. Deductions for uncorrected Work.
e. Deductions for inspection payments.

f. Other adjustments.

3. Total Contract Sum as adjusted.

4. Previous payments.

5. Retainage.

6. Sum remaining due.

B. Owner will prepare final Change Order reflecting approved adjustments to Contract Sum that are not included in Change Orders previously processed.

1.08 FINAL APPLICATION FOR PAYMENT

A. Final Application for Payment: Submit in accordance with procedures and requirements stated in Conditions of the Contract.

PART 2 – PRODUCTS Not Used

PART 3 – EXECUTION

3.01 CLOSEOUT PROCEDURES

A. Operating and Maintenance Instruction: Arrange for each installer of equipment that requires regular maintenance to meet with the museum!s personnel to provide instruction in proper operation and maintenance. If installers are not experienced in procedures, provide instruction by manufacturer's representatives. Include a detailed review of the following items.

1. Exhibit maintenance manuals.

a) per Section .01782

2. Record documents/ As-builts

3. Exhibit Maintenance Kit
   a) Spare parts and materials.
   b) keys and tools
   c) lubricants
   d) fuels
   e) cleaning products

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Start-up.

2. Shutdown.

3. Emergency operations.

4. Noise and vibration adjustments.

5. Safety procedures.

6. Economy and efficiency adjustments.

7. Effective energy utilization.

3.02 FINAL CLEANING

A. General: General cleaning during construction is required by the General Conditions and included in other Division 1 Sections.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

1. Complete the following cleaning operations before requesting inspection for Final Acceptance:

a. Remove labels that are not permanent labels.
b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compound and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials.
c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films and similar foreign substances. Restore reflective surfaces to their original reflective condition. Vacuum all surfaces of the interstitial spaces.
d. Wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean light fixtures and lamps.
e. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

C. Pest Control: Engage an experienced exterminator to make a final inspection, and rid the Project of rodents, insects and other pests.

D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction. Remove temporary construction, if any, and restore site to original condition.

E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful or dangerous materials into drainage systems. Remove waste materials from the site and dispose of in a lawful manner.

END OF SECTION 01770

SECTION 01781 – PROJECT RECORD DOCUMENTS

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

1.02 SUMMARY

A. This section includes administrative and procedural requirements for Project Record Documents. Required Project Record Documents include the following:

1. Marked-up copies of Contract Drawings.

2. Marked-up copies of Shop Drawings.

3. Newly prepared drawings.

4. Marked-up copies of Specifications, addenda, and Change Orders.

5. Marked-up Product Data submittals.

6. Record Samples.

7. Field records for variable and concealed conditions.

8. Record information on Work that is recorded only schematically.

9. Requests for Interpretation

B. Maintenance of Documents and Samples: Store record documents and samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain record documents in good order and in a clean, dry, legible condition. Make documents and samples available at all times for the Owner!s and Exhibit Designer!s inspections.

1.03 RECORD DRAWINGS

A. Markup Procedure: During construction, maintain a set of blue- or black-line white prints of Contract Drawings and Shop Drawings for Project Record Document purposes.

1. Mark these Drawings to show the actual installation where the installation varies from the installation shown originally. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later. Items required to be marked include, but are not limited to, the following:

a. Dimensional changes to the Drawings.
b. Revisions to details shown on the Drawings.
c. Depths of foundations below the first floor.
d. Locations and depths of underground utilities.

e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Construction Change Directives.
k. Changes made following the Exhibit Designer's written orders.
l. Details not on original Contract Drawings.

2. Mark record prints of Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. Where Shop Drawings are marked, show cross-reference on Contract Drawings location.

3. Mark record sets with red erasable colored pencil. Use other colors to distinguish between changes for different categories of the Work at the same location.

4. Mark important additional information that was either shown schematically or omitted from original Drawings.

5. Note alternate numbers, Change Order numbers, and similar identifications.

B. Responsibility for Markup: The individual, installer, subcontractor or other entity who obtained the record data shall prepare the markup on record drawings.

1. Accurately record information in an understandable drawing technique.

2. Record data as soon as possible after obtaining it. Record and check the markup prior to enclosing concealed installations.

3. Prior to Final Acceptance, submit record drawings to the Owner and Exhibit Designer for their records. Organize into sets, and bind and label.

C. Preparation of Record Drawings: Prior to Final Acceptance, review completed marked-up record drawings with the Owner and Exhibit Designer. When authorized, prepare a full set of corrected copies of the Contract Drawings and Shop Drawings.

1. Incorporate changes and additional information previously marked on print sets. Erase, redraw, and add details and notations where applicable. Identify and date each drawing. Include the printed designation "PROJECT RECORD DRAWINGS" in a prominent location on each drawing.

a. Encircle each area of change or additional information with a free-form cloud-shape drawn on the reverse side of the transparency..
b. Identify changes and additional information by printing the Change Order Number or other change reference designation, when applicable, within the cloud-shape encircled area.

2. Refer instances of uncertainty to the Owner for resolution.

3. The Exhibit Fabricator is responsible for printing Record Drawings.

4. Review: Before copying and distributing, submit corrected drawings and the original marked-up Contract Documents to the Owner for review and acceptance of the general scope of changes, additional information recorded and quality of drafting. If acceptable, the

Owner will return transparencies and the original marked-up prints to the Exhibit Fabricator for organizing into sets, printing, binding, and final submittal.

D. Copies and Distribution: After completing the preparation of Record Drawings, print 4 copies of each drawing, whether or not changes and additional information were recorded. Organize the copies into manageable sets. Bind each set with durable-paper cover sheets. Include appropriate identification, including titles, dates, and other information on the cover sheets. A digital set should also be provided.

1. Organize and bind original marked-up set of prints that were maintained during the construction period in the same manner.

2. Organize record transparencies into sets matching the print sets. Place these sets in durable tube-type drawing containers with end caps. Mark the end cap of each container with suitable identification.

3. Submit the marked-up record set, transparencies, and the copy sets to the Owner for the Exhibit Designer!s records.

E. Newly Prepared Record Drawings: Prepare new drawings instead of following procedures specified for preparing record drawings where new drawings are required when neither the original Contract Drawings nor Shop Drawings are suitable to show the actual installation. New drawings may be required when a Change Order is issued as a result of accepting an alternate, substitution, or other modification.

1. Provide Drawings in a scale that allows for the scope of detailing and notations required to record the actual physical installation and its relationship to other construction.

2. When completed and accepted, integrate newly prepared Drawings with procedures specified for organizing, copying, binding and submitting record drawings.

1.04 RECORD SPECIFICATIONS

A. During the construction period, maintain 4 copies of the Project Specifications, including addenda and other modifications issued, for Project Record Document purposes.

1. Mark the Specifications to indicate the actual installation where the installation varies from that indicated in Specifications. Note related project record drawing information, where applicable. Give particular attention to substitutions, selection of product options, and information on concealed installations that would be difficult to identify or measure and record later.

a. In each Specification section where products, materials or units of equipment are specified or scheduled, mark the copy with the proprietary name and model number of the product furnished.
b. Record the name of the manufacturer, supplier, installer, and other information necessary to provide a record of selections made and to document coordination with record Product Data submittals and maintenance manuals.

2. Upon completion of markup, submit Record Specifications to the Owner for the Exhibit Designer's records.

1.05 RECORD PRODUCT DATA

A. During the construction period, maintain one copy of each Product Data submittal for Project Record Document purposes.

1. Mark Product Data to indicate the actual product installation where the installation varies substantially from that indicated in Product Data submitted. Include significant changes in the product delivered to the site and changes in manufacturer's instructions and recommendations for installation.

2. Give particular attention to information about concealed products and installations that cannot be readily identified and recorded later.

3. Note related Change Orders and markup of record Drawings, where applicable.

4. Upon completion of markup, submit a complete set of record Product Data to the Owner for the Exhibit Designer's records.

5. Where record Product Data is required as part of maintenance manuals, submit marked-up Product Data as an insert in the manual instead of submittal as record Product Data.

1.06 RECORD SAMPLE SUBMITTAL

A. Immediately prior to the date of Final Completion, the Exhibit fabricator shall meet with the Owner at the site to determine which of the Samples maintained during the construction period shall be transmitted to the Exhibit Designer for record purposes.

B. Comply with the Owner 's instructions for packaging, identification marking and delivery to the Architect's sample storage space. Dispose of other samples in a manner specified for disposing of surplus and waste materials.

1.07 MISCELLANEOUS RECORD SUBMITTALS

A. Refer to other Specification sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Prior to Final Acceptance, complete miscellaneous records and place in good order, properly identified and bound or otherwise organized to allow for use and reference.

B. Submit to the Owner for the Exhibit Designer's records.

C. Miscellaneous records include, but are not limited to, the following:

1. Field records on excavations and foundations.

2. Field records on underground construction and similar work.

3. Survey showing locations and elevations of underground lines.

4. Invert elevations of drainage piping.

5. Surveys establishing building lines and levels.

6. Authorized measurements utilizing unit prices or allowances.

7. Records of plant treatment.

8. Ambient and substrate condition tests.

9. Certifications received in lieu of labels on bulk products.

10. Batch mixing and bulk delivery records.

11. Testing and qualification of tradespersons.

12. Documented qualification of installation firms.

13. Load and performance testing.

14. Inspections and certifications by governing authorities.

15. Leakage and water-penetration tests.

16. Fire-resistance and flame-spread test results.

17. Final inspection and correction procedures.

PART 2 –PRODUCTS Not used

PART 3 – EXECUTION Not used

END OF SECTION 01781

SECTION 01782 – OPERATION AND MAINTENANCE DOCUMENTATION

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

1.02 SUMMARY

A. This section includes administrative and procedural requirements for operation and maintenance manuals and instruction, including the following.

1. Preparing and submitting instruction manuals covering the care, preservation and maintenance of exhibit materials and finishes

2. Preparing and submitting exhibit operation and maintenance manuals for equipment and building operating systems.

3. Instruction of Government operating personnel in the operation and maintenance of exhibit systems and equipment..

B. Additional Requirements: Refer to the individual Specification sections for additional requirements for the care and maintenance of exhibit materials and finishes, and for the operation and maintenance of the various pieces of equipment and operating systems.

C. Related Sections:

Section 01500 "CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS"

Section 01740 "WARRANTIES"

1.03 QUALITY ASSURANCE

A. Exhibit Operation and Maintenance Manual Preparation: In preparation of manuals, use personnel thoroughly trained and experienced in the maintenance of the material or finish involved, or in the operation and maintenance of the equipment or system involved.

1. Where manuals require written instructions, use the personnel skilled in technical writing where necessary for communication of essential data.

2. Where manuals require drawings or diagrams, use draftspersons capable of preparing drawings clearly in an understandable format.

B. Instructions for the museum!s personnel: Use instructors thoroughly trained and experienced in the operation and maintenance of the equipment or system involved to instruct museum staff operation and maintenance personnel.

1.04 SUBMITTALS

A. Submittal Schedule: Comply with the following schedule for submitting operation and maintenance manuals:

1. The Owner will return 1 copy of the draft with comments within 15 calendar days after receipt.

2. Make corrections or modifications to comply with the Owner!s comments.

3. Submit 4 copies of each approved manual to the Owner within 15 calendar days after receipt of the Owner's comments.

B. Form of Submittal: Prepare operation and maintenance manuals in the form of an instructional manual for use by museum staff and contract operating and maintenance personnel. Organize into suitable sets of manageable size. Where possible, assemble instructions for similar products into a single binder.

1. Binders: For each manual, provide heavy-duty, commercial-quality, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to receive 8-1/2-by-11-inch paper. Provide a clear plastic sleeve on the spine to hold labels describing contents. Provide pockets in the covers to receive folded sheets.

   a. Where 2 or more binders are necessary to accommodate data, correlate data in each binder into related groupings according to the Specifications table of contents. Cross-reference other binders where necessary to provide essential information for proper operation or maintenance of the product.

   b. Identify each binder on front and spine, with the printed title "EXHIBIT OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter covered. Indicate volume number for multiple volume sets of manuals.

2. Dividers: Provide heavy paper dividers with celluloid-covered tabs for each separate section. Mark each tab to indicate contents. Provide a typed description of the product or major parts of equipment included in the section on each divider.

3. Protective Plastic Jackets: Provide protective, transparent, plastic jackets designed to enclose diagnostic software for computerized electronic equipment.

4. Text Material: Where maintenance manuals require written material, use the manufacturer's standard printed materials, where available. If manufacturer's standard printed materials are not available, provide specially prepared data, neatly typewritten, on 8-1/2-by-11-inch , 20-lb/sq. ft. white bond paper.

5. Drawings: Where manuals require drawings or diagrams, provide reinforced, punched binder tabs on drawings and bind in with text.

   a. Where oversize drawings are necessary, fold drawings to the same size as text pages and use as a foldout.
   b. If drawings are too large to be used practically as a foldout, place the drawing, neatly folded, in the front or rear pocket of binder. Insert a typewritten page indicating drawing title, description of contents and reference to the applicable location in the manual.

C. Submittal for Final Manuals: If specifically requested by the Exhibit Contractor and approved by the Owner and Exhibit Designer, written and graphic portions of final manuals may be submitted in a CD ROM electronic format acceptable to the Architect. Manual content and specific information to be included in each type of manual shall comply as specified for bound manuals.

Content that is not included in CD ROM electronic format shall be assembled into binders with dividers and other requirements specified for bound manuals. CD ROM disks and binders shall be fully and clearly labeled, with disks and associated binders for each manual boxed or otherwise packaged for accessible storage together.

1.05 EXHIBIT MANUAL CONTENT

A. In each exhibit manual, include information specified in the individual Specification section and the following information where applicable for each major component:

1. General material, finish, system or equipment description.

2. Design factors and assumptions.

3. Copies of applicable Shop Drawings and Product Data.

4. Material, finish, system or equipment identification, including:

   a. Name of manufacturer.
   b. Model number.
   c. Serial number of each component.

5. Equipment operating data:

   a. Operation instructions.
   b. Emergency instructions.
   c. Wiring diagrams.
   d. Inspection and test procedures.

6. Maintenance procedures and schedules.

7. Precautions against improper use and maintenance.

8. Copies of warranties and service contracts.

9. Repair instructions, including listings of spare parts for equipment.

10. Sources of required maintenance materials and related services.

B. Organize each manual into separate sections for each related product or piece of equipment. To the extent applicable, each manual shall contain a title page, table of contents, general information, copies of Product Data, written text, drawings and copies of each warranty and service contract issued.

1. Title Page: Provide a title page in a transparent, plastic envelope as the first sheet of each manual. As a minimum, provide the following information:

   a. Subject matter covered by the manual.
   b. Name and address of the Project.
   c. Name of Government user agency.
   d. Date of submittal.
   e. Name, address, and telephone number all contractors who produced work for the exhibit, identifying the portion of the work that they provided.

f. Cross-reference to related products in other operation and maintenance manuals, if applicable.

2. Table of Contents: After title page, include a typewritten table of contents for each volume, arranged systematically according to the Specifications format. Include a list of each product included, identified by product name or other appropriate identifying symbol and indexed to the content of the volume. Where more than one volume is required to accommodate the data, provide a comprehensive table of contents for all volumes in each volume of the set.

3. General Information: Provide a general information section immediately following table of contents, listing each product included in the manual, identified by product name. Under each product, list the name, address, and telephone number of the subcontractor or installer and the maintenance contractor. Clearly delineate the extent of responsibility for each of these entities. Include a local source for replacement parts for equipment.

4. Product Data: General System or equipment description. Where the manuals include manufacturer's standard printed data, include only those sheets that are pertinent to the part or product installed. Mark each sheet to identify each part or product included in the installation. Where the Project includes more than one item contained in the product data, identify each item, using appropriate references from the Contract Documents. Identify data that is applicable to the installation, and delete references to information that is not applicable.

5. Directories: listing names, addresses, and telephone numbers of Exhibit Designer, Engineers, Construction Manager, Exhibit Contractor and Contractor.

6. Written Text: Prepare written test to provide necessary information where manufacturer's standard printed data is not available, and the information is necessary for proper maintenance of materials or finishes, or for proper operation and maintenance of equipment or systems. Prepare written text where it is necessary to provide additional information or to supplement data included elsewhere in the manual. Organize text in a consistent format under separate headings for different procedures. Where necessary, provide a logical sequence of instruction for each operation or maintenance procedure. Mark product data to clearly identify specific products and component parts.

7. Drawings: Provide specially prepared drawings where necessary to supplement manufacturer's printed data to illustrate the relationship of component parts of equipment or systems or to provide control or flow diagrams. Coordinate these drawings with information contained in Project Record Drawings to assure correct illustration of the completed installation. Provide reinforced punched binder tabs on drawings and bind in with text. Oversize Drawings:

   a. Fold drawings to same size as text pages and use as fold-out.
   b. Drawings too large to be used as fold-out, place folded drawing in front or rear pocket of binder. Insert typewritten page indicating drawing title, description of contents, and drawing location at appropriate location in manual.
   c. Copies of applicable shop drawings and product data.
   d. Arranged by product, system, or process flow, and subdivided by Specification section. Identify the following as applicable to each drawing:
      1) Significant design criteria.
      2) List of equipment.
      3) System or equipment identification, including:
         - Name of manufacturer.
         - Model number.

- Serial number of each component.

4) Parts list for each component.
5) Operating instructions.
6) Maintenance instructions and schedules for equipment and systems.
7) Emergency instructions.
8) Wiring and piping diagrams.
9) Inspection and test procedures
10) Precautions against improper use and maintenance.

C. Warranties, and Service Contracts: Provide a copy of each warranty or service contract in the appropriate manual for the information of the Government's operating personnel. Provide written data outlining procedures to follow in the event of product failure. List circumstances and conditions that would affect the validity of warranty.

D. Where required for full understanding, include a copy of applicable Project Record Drawings. Do not use original Project Record Documents as part of operation and maintenance manuals.

1.06 EXHIBIT MATERIAL AND FINISHES MAINTENANCE MANUALS

A. Submit 3 copies of each materials and finishes manual, in final form, to the Exhibit Designer. Provide one section for architectural products, including applied materials and finishes. Provide a second section for products designed for moisture protection and products exposed to the weather.

B. Architectural Products: Provide manufacturer's data and instructions for the care and maintenance of architectural products, including applied materials and finishes.

1. Manufacturer's Data: Provide complete information on architectural products, including the following, as applicable:

a. Manufacturer's catalog number.
b. Size.
c. Material composition.
d. Color.
e. Texture.
f. Reordering information for custom manufactured products.

2. Care and Maintenance Instructions: Provide care and maintenance information, including manufacturer's recommendations for types of cleaning agents to be used and methods of cleaning. Provide information about cleaning agents and methods that could prove detrimental to the product. Include manufacturer's recommended schedule for cleaning and maintenance..

C. Moisture Protection and Products Exposed to the Weather: Provide complete manufacturer's data with instructions for the inspection, maintenance and repair of products exposed to the weather or designed for moisture-protection purposes

1. Manufacturer's Data: Provide detailed manufacturer's information, including the following, as applicable.

a. Applicable standards.
b. Chemical composition.
c. Installation details.
d. Inspection procedures.

e. Maintenance information.
f. Repair procedures

D. Schedule: Provide complete information in the materials and finishes manual on products specified in the following sections.

1.07 EXHIBIT AV SYSTEMS OPERATION AND MAINTENANCE MANUALS

A. General: Submit 6 copies of each equipment and systems maintenance manual, in final form, to the CM. Provide separate manuals for each unit of equipment, each building operation system, and each electric and electronic system.

B. Equipment and Systems: Provide the following information for each piece of equipment, each building operation system, and each electric or electronic system, where applicable:

1. Description: Provide a complete description of each unit and related component parts, including the following, as applicable:

a. Equipment or system function.
b. Operating characteristics.
c. Limiting conditions.
d. Performance curves
e. Engineering data and tests.
f. Complete nomenclature and number of replacement parts.

2. Manufacturer's Information: For each manufacturer of a component part or piece of equipment, provide the following, as applicable:

a. Printed operation and maintenance instructions.
b. Assembly drawings and diagrams required for maintenance.
c. List of items recommended to be stocked as spare parts.

3. Maintenance Procedures: Provide information detailing essential maintenance procedures, including the following, as applicable:

a. Routine operations.
b. Troubleshooting guide.
c. Disassembly, repair, and reassembly.
d. Alignment, adjusting, and checking.

4. Operating Procedures: Provide information on equipment and system operation procedures, including the following, as applicable:

a. Startup procedures.
b. Equipment or system break-in.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Instructions on stopping.
f. Shutdown and emergency instructions.
g. Summer and winter operating instructions.
h. Required sequences for electric or electronic systems.
i. Special operating instructions.

5. Servicing Schedule: Provide a schedule of routine servicing and lubrication requirements, including a list of required lubricants for equipment with moving parts.

6. Controls: Provide a description of the sequence of operation and as-installed control diagrams by the control manufacturer for systems requiring controls.

7. Piping Identification: Provide as-installed, color-coded, piping diagrams, where required for identification.

8. Valve Tags: Provide charts of valve-tag numbers, with the location and function of each valve.

9. Circuit Directories: For electric and electronic systems, provide complete circuit directories of panelboards, including the following, as applicable:

   a. Electric service
   b. Controls.
   c. Communication.

C. Schedule: Provide complete information in the equipment and systems manual on products specified in the following sections.

1.08 SPARE PARTS AND MAINTENANCE MATERIALS

A. Provide tools, spare parts, maintenance and extra stock materials in quantities specified in individual Specification sections.

   1. Deliver to Project site and place in locations as directed; obtain receipt from subcontractors and suppliers.

B. Submit letter at time of inspection for Substantial Completion listing items and quantities; attach receipts.

1.09 INSTRUCTIONS FOR GOVERNMENT PERSONNEL

A. Prior to the Substantial Completion inspection, instruct the Government's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Provide instruction at mutually agreed times.

B. Use operation and maintenance manuals for each product, piece of equipment or system as the basis of instruction. Review contents in detail to explain all aspects of operation and maintenance.

C. Posted Logs and Instructions: Place operating logs and instructions in see-through vinyl or other weather protective sleeves or framed enclosures, and post for use by Government personnel in locations approved by the Exhibit Designer.

   1. Post operating log sheets with spares at or near the applicable equipment.

   2. Post flow schematics, wiring diagrams, valve lists, control sequences, start-up and shut-down instructions, and similar information and instructions in the appropriate equipment rooms.

END OF SECTION 01782

SECTION 01800 — CLEANING

PART 1 - GENERAL

1.00 RELATED DOCUMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

1.01 PROGRESS CLEANING

A. Exhibit Contractor shall retain stored items in an orderly arrangement allowing maximum access, not impeding traffic or the progress of other Work, and providing required protection of materials.

B. Exhibit Contractor shall not allow accumulation of scrap, debris, waste material, and other items not required for construction of the Work, and shall maintain the site in a neat and orderly condition at all times.

C. Exhibit Contractor shall provide adequate storage for all items awaiting removal from the job site, observing requirements for fire protection and protection of the ecology. Store volatile waste in covered metal containers and remove from premises daily. Disposal of volatile fluid wastes in storm or sanitary systems or streams or waterways is not permitted.

D. Daily, and more often if necessary, contractor shall inspect the site and pick up all scrap, debris, and waste material.

E. Weekly, and more often if necessary, Exhibit Contractor shall clean the job site and legally dispose of waste materials and rubbish off the Owner's property.

F. Comply with the requirements of the Section 01811 Waste Management.

1.02 MATERIALS

A. Exhibit Contractor shall use only the cleaning materials and equipment that are compatible with the surface being cleaned, as recommended by the manufacturer of the material.

1.03 FINAL CLEANING

A. "Clean," for the purpose of this article, and except as may be specifically provided otherwise, shall be interpreted as meaning the level of cleanliness generally provided by skilled cleaners using commercial quality building maintenance equipment and material.

B. Prior to completion of the work, contractor shall remove form the job site all tools, surplus materials, equipment, scrap, debris, and waste.

C. Site: contractor shall clean all floor surfaces in the vicinity of the work to remove all debris, dust, and dirt.

D. Furniture and furnishings:

1. Just prior to acceptance or occupancy contractor shall visually inspect all exposed surfaces.

2. Exhibit Contractor shall remove grease, dust, dirt, stains, labels, fingerprints, and other foreign materials from interior and exterior of finished surfaces as follows:

   a. Glass and Plexiglas: clean inside and out, leaving absolutely no streaks, fingerprints, paint droppings, etc.

   b. Painted surfaces: remove marks, stains, fingerprints, and dirt, touch-up as required to match adjacent finish.

   c. Tile: remove dust, dirt, excess grout or adhesive if any.

   d. Casework: contractor shall apply the polish or cleaner recommended by the manufacturer of the material being polished or cleaned as required.

   e Metal: remove all temporary protective covering, clean as required.

E. Exhibit Contractor shall schedule final cleaning as approved by the Owner or Owner's designated representative to enable the Owner to accept a completely clean work.

END OF SECTION 01800

SECTION 01811 — CONSTRUCTION AIR QUALITY MANAGEMENT

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

1.2 CONSTRUCTION AIR QUALITY MANAGEMENT GOALS FOR THE PROJECT

A. The Owner has established that this Project shall minimize the detrimental impacts on Indoor Air Quality (IAQ) resulting from construction activities. Factors that contaminate indoor air, such as dust entering HVAC systems and ductwork, improper storage of materials on site, and poor housekeeping, shall be minimized.

1.3 SUMMARY

A. This Section includes requirements for the development of a Construction Indoor Air Quality Management Plan.

1. Management Plan (referred to as “the Plan”): Develop the Plan for approval by the Owner, Exhibit Designer and Architect. The Plan shall be implemented throughout the duration of the project construction and before occupancy, and shall be documented as outlined in the Submittal Requirements of this Section. The Plan is included as part of the LEED Building requirements for the project (EQ Credits 3.1 and 3.2).

1.4 RELATED SECTIONS

A. All sections of the Specifications related to interior construction, MEP systems, and items affecting indoor air quality.

B. Volatile Organic Compound (VOC) Limits For Adhesives, Sealants & Architectural Coatings - Section 01811.

C. Painting - Section 09900.

1.5 DEFINITIONS

A. Volatile Organic Compounds (VOCs): Chemical compounds common in and emitted by many building products, including solvents in paints, coatings, adhesives and sealants, wood preservatives; composite wood binder, and foam insulations. Not all VOCs are harmful, but many of those contained within building products contribute to the formation of smog and can irritate (or worse) building occupants by their smell and/or health impact.

B. Materials that Act as “Sinks” for VOC Contamination: Absorptive materials, typically dry and soft (such as textiles, carpeting, acoustical ceiling tiles and gypsum board) that

readily absorb VOC!s emitted by “source” materials and release them over a prolonged period of time.

C. Materials that Act as “Sources” for VOC Contamination: Products with high VOC contents that emit VOCs either rapidly during application and curing (typically "wet" products, such as paints, sealants, adhesives, caulks and sealers) or over a prolonged period (typically “dry” products such flooring coverings with plasticizers and engineered wood with formaldehyde).

1.6 REFERENCES

A. “IAQ Guidelines for Occupied Buildings Under Construction,” First Edition, November 1995, Chapter 3; The Sheet Metal and Air Conditioner Contractors National Association (SMACNA), (703) 803-2980, www.smacna.org

B. ANSI/ASHRAE 52.2-1999, “Method of Testing General Ventilation Air-Cleaning Devices for Removal Efficiency by Particle Size,” www.ashrae.org

1.7 CONSTRUCTION IAQ MANAGEMENT PLAN

A. The Contractor shall prepare and submit a Construction IAQ Management Plan to the Owner for approval. The Construction IAQ Management Plan shall meet the following criteria:

1. Construction activities shall be planned to meet or exceed the minimum requirements of the Sheet Metal and Air Conditioning National Contractors! Association (SMACNA) “IAQ Guidelines for Occupied Buildings under Construction,” First Edition, 1995, Chapter 3.

2. Absorptive materials shall be protected from moisture damage when stored on site and after installation.

3. If air handlers are to be used during construction, filtration with a Minimum Efficiency Reporting Value (MERV) of 8 must be at each return air grill, as determined by ASHRAE 52.2-1999.

4. All filtration media shall be replaced immediately prior to occupancy. Filtration media shall have a Minimum Efficiency Reporting Value (MERV) of 13 as determined by ASHRAE 52.2-1999.

5. A “Sequence of Finish Installation Plan” shall be developed, highlighting measures to reduce the absorption of VOCs by materials that act as “sinks.”

B. Upon approval of the Plan by the Owner and Architect, it shall be implemented through the duration of the construction process and before occupancy, and documented in accordance with the Submittal Requirements of this Section.

C. Further description of the Construction IAQ Management Plan requirements is as follows:

1. SMACNA Guidelines: Chapter 3 of the referenced “IAQ Guidelines for Occupied Buildings Under Construction,” outline IAQ measures in five categories as listed below. The Construction IAQ Management Plan shall be organized in accordance with the SMACNA format, and shall address measures to be implemented in each

of the five categories (including subsections). All subsections shall be listed in the Plan; items that are not applicable for this project should be listed as such.

a. HVAC Protection
   - Return Side
   - Central Filtration
   - Supply Side
   - Duct Cleaning

b. Source Control
   - Product Substitution
   - Modifying Equipment Operation
   - Changing Work Practices
   - Local Exhaust
   - Air Cleaning
   - Cover or Seal

c. Pathway Interruption
   - Depressurize Work Area
   - Pressurize Occupied Space
   - Erect Barriers to Contain Construction Areas
   - Relocate Pollutant Sources
   - Temporarily Seal the Building

d. Housekeeping

e. Scheduling
   - Protect of Materials from Moisture Damage: As part of the "Housekeeping" section of the Construction IAQ Management Plan, measures to prevent installed materials or material stored on-site from moisture damage shall be described. This section should also describe measures to be taken if moisture damage does occur to absorptive materials during the course of construction.
   - Replacement of Filtration Media: Under the "HVAC Protection" section of the Construction IAQ Management Plan, a description of the filtration media in all ventilation equipment shall be provided. The description shall include replacement criteria for filtration media during construction, and confirmation of filtration media replacement for all equipment immediately prior to occupancy.
   - Sequence of Finish Installation for Materials: Where feasible, absorptive materials shall be installed after the installation of materials or finishes which have high short-term emissions of VOCs, formaldehyde, particulates, or other air-borne compounds.

     Absorptive materials include, but are not limited to: carpets; acoustical ceiling panels; fabric wall coverings; insulations (exposed to the airstream); upholstered furnishings; and other woven, fibrous or porous materials. Materials with high short-term emissions include, but are not limited to: adhesives, sealants and glazing compounds (specifically those with petrochemical vehicles or carriers); paints, wood preservatives and finishes; control and/or expansion joint fillers; hard finishes requiring adhesive installation; gypsum board (with associated finish processes and products); and composite or engineered wood products with formaldehyde binders.

     Pre-Occupancy Phase: Schedule a building flush-out by supplying air volume required by LEED Credit EQ3.2

     Develop a separate sequencing plan that identifies feasible opportunities

to meet the above-stated goals for the project. The plan shall be submitted to the Architect and Owner in accordance with the Submittal Requirements of this Section.

1.8 LEED BUILDING SUBMITTALS

A. The Contractor shall submit the following LEED required records and documents:

1. A copy of the Construction IAQ Management Plan and the Sequence Installation Plan, as defined in this Section.

2. Product cut-sheets for all filtration media used during construction and installed immediately prior to occupancy, with MERV values highlighted. Cut sheets shall be submitted with the Contactor!s or Subcontractor!s "approved! stamp as confirmation that the products are the products installed on the project.

3. Provide the Architect or Owner!s Representative with a minimum of 18 photographs, comprised of at least six photographs taken on three different occasions during construction. The photographs shall document the implementation of the Construction IAQ Management Plan throughout the course of the project construction. Examples include photographs of ductwork sealing and protection, temporary ventilation measures, and conditions of on-site materials storage (to prevent moisture damage). Photographs shall include integral date stamping, and shall be submitted with brief descriptions of the Construction IAQ Management Plan measure documented, or be referenced to project meeting minutes or similar project documents which reference to the Construction IAQ Management Plan measure documented.

PART 2 - PRODUCTS

(Not Applicable)

PART 3 - EXECUTION

3.1 IMPLEMENTATION AND COORDINATION

A. Implement the Construction IAQ Management Plan, and coordinate the Plan with all affected trades. Designate one individual as the Construction IAQ Representative, who will be responsible for communicating the progress of the Plan with the Owner and Architect on a regular basis, and for assembling the required LEED Building documentation. The Contractor shall include provisions in the Construction IAQ Management Plan for addressing conditions in the field that do not adhere to the Plan, including provisions to implement a stop work order, or to rectify non-compliant conditions.

B. Subcontractors shall be responsible for the implementation of specific control measures, as specified in the Construction IAQ Management Plan. Subcontractors shall coordinate their responsibilities through the Construction Manager and their designated Construction IAQ Representative.

END OF SECTION 01811

SECTION 01812 — CONSTRUCTION WASTE MANAGEMENT

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 RELATED SECTIONS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

B. All sections of the Specifications involving demolition or construction activities.

1.3 SUMMARY

A. This Section includes requirements for Construction Waste Management (CWM), with criteria for recycling and/or salvaging demolition and construction waste generated during the project. A Construction Waste Management Plan shall be developed for approval by the Owner and Architect. The Plan shall be implemented throughout the duration of the project, and shall be documented per the Submittal Requirements of this Section. Construction Waste Management is included as part of the LEED Building requirements for the project.

1.4 PROJECT WASTE MANAGEMENT REQUIREMENTS

A. The Owner has established that this Project shall generate the least amount of waste possible, and that processes that ensure the generation of as little waste as possible due to error, inaccurate planning, breakage, mishandling, contamination, or other factors shall be employed.

B. Of the inevitable waste that is generated, as many of the waste materials as economically feasible shall be returned, reused, salvaged, or recycled. Waste disposal in landfills shall be minimized.

C. Diversion Requirements: The end-of-project recycling rate shall equal, at minimum, **75%** by weight of the total project waste from construction, demolition, and land clearing activities on site. Excavation soil and hazardous waste are excluded from the calculation.

D. Due to the nature and location of the Site, recycling on site may not be possible (to be determined by the Contractor). The Waste Contractor(s) should include off-site opportunities to recycle and reuse removed materials in the Construction Waste Management Plan.

E. As regards these requirements, the Contractor shall develop, for the Owner's review, a Construction Waste Management Plan for this project

1.5 CONSTRUCTION WASTE MANAGEMENT PLAN

A. The Contractor shall prepare and submit a Construction Waste Management Plan (CWM) to the Owner and Architect for approval. The CWM Plan shall outline the provisions to be implemented to recycle and salvage demolition and construction waste generated during the project.

B. Upon approval of the CWM Plan by the Owner and Architect, it shall be implemented throughout the duration of the project, and documented in accordance with the Submittal Requirements of this Section.

C. The CWM Plan shall include, but not be limited to, the following components:

1. *Listing of Targeted Materials*: Develop a list of the waste materials from the Project that will be targeted for reuse, salvage, or recycling. The following materials shall be accounted for (materials that will not be recycled shall be indicated as such):

   a. Cardboard, paper, packaging.
   b. Clean dimensional wood, palette wood.
   c. Beverage containers.
   d. Land clearing debris.
   e. Concrete.
   f. Concrete Masonry Units (CMU).
   g. Asphalt.
   h. Metals from banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
   i. Drywall.
   j. Carpet and pad.
   k. Paint.
   l. Rigid foam.
   m. Glass.
   n. Plastics.

2. *Landfill Information*: Provide the name of the landfill(s) where trash will be disposed of and the applicable landfill tipping fee(s).

3. *Sorting Method*: Provide a description of the proposed means of sorting and transporting the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site for off-site sorting).

4. *Packaging Waste*: Provide an estimate of packaging materials generated, and note whether suppliers will eliminate or take back packaging.

5. *Field Conditions:* Include provisions in the Construction Waste Management Plan for addressing conditions in the field that do not adhere to the CWM Plan, including provisions to implement a stop work order, or to rectify non-compliant conditions.

6. *Recycling Facilities:* Provide the name of the recycling facilities(s) where materials will be sent for recycling, how it will be recycled, and the applicable fee(s).

7. *Additional Information:* Include any additional information deemed relevant to describe the scope and intent of the CWM Plan to the Owner and Architect.

D. Subcontractor Requirements: Construction Waste Management and recycling requirements shall be incorporated into all Subcontractor!s contracts.

1.6 SUBMITTAL REQUIREMENTS

A. The Contractor and/or Subcontractors shall submit the following LEED BUILDING certification items:

1. A copy of the Construction Waste Management Plan.

2. Calculations and supporting documentation to demonstrate end-of–project recycling rates which meet the requirements of the Construction Waste Management Plan of this Section.

B. Monthly Reporting: The process for recording and assembling documentation shall be as follows:

1. Record and document the total weight (in tons) of all demolition and construction waste materials sent to the landfill. Monthly Waste Management Reporting Forms shall be used as the basis for determining the total amount of waste land filled for the project. The monthly reporting forms shall specify:

   a. The number of Dumpsters or other containers sent to the landfill for that month;
   b. The volume (in cubic yards) of each Dumpster or container sent to the landfill for that month;
   c. The type of waste contained in each Dumpster or container, and the weight of the waste in each Dumpster or container. If the weight of the waste is not directly measured for each Dumpster or container, the following Solid Waste Conversion Factors shall be used to convert the volume of waste to weight:
      1). Solid Weight Conversion Factors:

Mixed Waste	350 lbs/cubic yard
Wood	300 lbs/cubic yard
Cardboard	100 lbs/cubic yard
Gypsum Wallboard	500 lbs/cubic yard
Rubble	1,400 lbs/cubic yard
Steel	1,000 lbs/cubic yard

   d. Identification of the Landfill: Provide the name of the landfill that will be accepting the materials. Receipts or other proof of facility reception of materials is required.

2. Record and document the total weight (in tons) of all demolition and construction waste materials recycled or salvaged. Monthly Waste Management Reporting Forms shall be used as the basis for determining the total amount of waste recycled or salvaged for the project. The monthly reporting forms shall specify:

   a. The number of Dumpsters or other containers of recycled or salvaged materials for that month;
   b. The volume (in cubic yards) of each Dumpster or container of recycled or salvaged materials for that month;
   c. The type of recycled or salvaged material contained in each Dumpster or container; and
   d. The weight of the recycled or salvaged material in each Dumpster or container. If the weight of the material is not directly measured for each Dumpster or container, the Solid Waste Conversion Factors listed for landfill waste (see above) shall be used, where applicable, to convert the volume of material to weight. For materials not contained in the Solid Waste Conversion Factors above (e.g. glass), propose a conversion factor for review by the Owner and Architect.
   e. Provide the name of the receiving facilities/companies that will be purchasing or accepting the recycled or salvaged materials. Receipts or other proof of facility reception of materials is required.
   f. For materials separated for recycling off-site, establish a method for tracking the weight of the recycled material. The method shall be included in the CWM Plan for the Owner!s and Architect!s review and approval.

3. Calculate the end-of-project recycling rate percentage by dividing the recycled and salvaged waste (in tons) by the total waste generated (recycled, salvaged, and land filled waste – also in tons), and multiplying by 100.

PART 2 PRODUCTS

(Not Applicable)

PART 3 EXECUTION

3.1 IMPLEMENTATION

A. The Contractor shall be responsible for coordination and implementation of the overall Construction Waste Management Plan, as well as coordination of the Plan with all affected trades.

B. The Contractor shall designate one individual as the on-site Construction Waste Management Representative, who will be responsible for communicating the progress of the Plan with the Owner and Architect on a regular basis, and for assembling the required LEED documentation.

C. The Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project.

D. Separation Facilities: If waste sorting will be done on site, the Contractor shall lay out and label a specific area to facilitate separation of materials for potential recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials.

3.2 MEETINGS

A. Conduct Construction Waste Management meetings. Meetings shall include Subcontractors affected by the CWM Plan. At a minimum, waste management goals and issues shall be discussed at the following meetings:

1. Pre-bid meeting.

2. Pre-construction meeting.

3. Regular job-site meetings.

B. Monthly Waste Management Reporting Forms: Monthly Waste Management Reporting Forms, as required in the Submittal Requirements of this Section, shall be submitted to the Owner and Architect for review throughout the duration of the project.

END OF SECTION 01812

SECTION 01820 — DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents and Owner provided General Conditions.

1.02 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner 's operation and maintenance personnel, including the following:

1. Demonstration of operation of all exhibit systems, subsystems, and equipment.

2. Training in operation and maintenance of exhibit systems, subsystems, and equipment.

1.03 SUBMITTALS

A. Instruction Program: Submit 2 copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, instructors' names for each training module, and learning objective and outline for each training module.

1. At completion of training, submit 2 complete training manuals for Owner's use.

B. Qualification Data: For facilitator and instructors, to demonstrate their capabilities and experience include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

E. Demonstration and Training Video: Submit 2 copies at end of each training module.

1.04 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that required for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, experienced in operation and maintenance procedures and training.

C. Pre-instruction Conference: The Exhibit Fabricator, vacillator and instructors shall conduct a conference at the Project site to review methods and procedures related to demonstration and training including, but not limited to, the following:

1. Inspect and discuss locations and other facilities required for instruction.

2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and other facilities.

3. Review required content of instruction.

4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.05 COORDINATION

A. Coordinate instruction schedule with Owner operations. Adjust schedule as required to minimize disrupting Owner operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by the Exhibit Designer.

PART 2 - PRODUCTS

2.01 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections, and as follows:

1. All equipment and systems listed in individual specification sections that also require Operations and Maintenance manuals

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
   a. System, subsystem, and equipment descriptions.
   b. Performance and design criteria if Contractor is delegated design responsibility.
   c. Operating standards.
   d. Regulatory requirements.
   e. Equipment function.
   f. Operating characteristics.
   g. Limiting conditions.
   h. Performance curves.

2. Documentation: Review the following items in detail:
   a. Emergency manuals.
   b. Operations manuals.
   c. Maintenance manuals.
   d. Project Record Documents.
   e. Identification systems.
   f. Warranties and bonds.
   g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:
   a. Instructions on meaning of warnings, trouble indications, and error messages.
   b. Instructions on stopping.
   c. Shutdown instructions for each type of emergency.
   d. Operating instructions for conditions outside of normal operating limits.
   e. Sequences for electric or electronic systems.
   f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:
   a. Startup procedures.
   b. Equipment or system break-in procedures.
   c. Routine and normal operating instructions.
   d. Regulation and control procedures.
   e. Control sequences.
   f. Safety procedures.
   g. Instructions on stopping.
   h. Normal shutdown instructions.
   i. Operating procedures for emergencies.
   j. Operating procedures for system, subsystem, or equipment failure.
   k. Seasonal and weekend operating instructions.
   l. Required sequences for electric or electronic systems.
   m. Special operating instructions and procedures.

5. Adjustments: Include the following:
   a. Alignments.
   b. Checking adjustments.
   c. Noise and vibration adjustments.
   d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:
   a. Diagnostic instructions.
   b. Test and inspection procedures.

7. Maintenance: Include the following:
   a. Inspection procedures.
   b. Types of cleaning agents to be used and methods of cleaning.
   c. List of cleaning agents and methods of cleaning detrimental to product.
   d. Procedures for routine cleaning
   e. Procedures for preventive maintenance.
   f. Procedures for routine maintenance.
   g. Instruction on use of special tools.

8. Repairs: Include the following:
   a. Diagnosis instructions.
   b. Repair instructions.
   c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
   d. Instructions for identifying parts and components.
   e. Review of spare parts needed for operation and maintenance.

PART 3 PART - EXECUTION

3.01 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training. Assemble training modules into a combined training manual.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

3.02 INSTRUCTION

A. Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Exhibit Contractor and the Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with the Contracting Officer's Representative, with at least 7 days' advance notice.

D. Evaluation: At conclusion of each training module, assess and document each participant!s mastery of module by use of an oral, written or demonstration performance-based test.

E. Demonstration and Training Videos: Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. Record on high quality on Digital Video Disc (DVD).

2. At beginning of each training module, record each chart containing learning objective and lesson outline.

F. Cleanup: Collect and remove used and leftover educational materials. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

END OF SECTION 01820

SECTION 04400 — STONE CLADDING

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents.

1.2 WORK INCLUDED

A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the stone cladding as shown on the drawings and/or specified herein, including, but not limited to, the following:

1. Provide and Install stone slabs at the LAND Minerals & Rocks display:

   a. Slate
   b. Limestone
   c. Granite
   d. Sandstone
   e. Marble
   f. Quartzite
   g. Shale

2. Provide and Install Sandstone slabs at the LAND Colorado Plateau countertops.

3. Provide and Install stacked Sandstone & Limestone slabs at the LAND Stratigraphy wall :

   a. Moenkopi - Triassic
   b. Chinle - Triassic
   c. Kayenta - Jurassic
   d. Navajo - Jurassic
   e. Temple – Jurassic
   f. Carmel – Jurassic
   g. Dakota - Cretaceous
   h. Tropic - Cretaceous
   i. Wahweap
   j. Kaparowitz
   k. Wasatch

4. Coordination and Integration of Owner provided stone samples into exhibits.

5. Anchors, dowels, cramps, bolts, nuts, threaded studs, expansion shields, inserts, loose clips, loose angles, struts, relieving angles, support angles, shims, steel frame supports, wire anchors, tape, and all other fastening devices and accessories necessary for complete setting and anchorage of stone facings to structural support.

6. Protection of stone during transit, storage, erection, and installation. Cleaning of stone prior to acceptance.

7. Structural design for the support of stone slabs by Exhibit Contractor!s Professional Engineer, including Building Department filing requirements.

1.3 RELATED SECTIONS

Section 05500 - Metal Fabrications

1.4 DOCUMENTATION

A. The drawings (elevation and design details) and specifications are an outline of the criteria and performance requirements of the work. The requirements shown by the drawings and details are intended to establish basic dimensions of the stone module and the seam lines and profiles. Within these parameters, the Exhibit Contractor is responsible for the design and engineering of the system, including whatever modifications or additions may be required to meet the specified requirements and maintain the visual design concept and exhibit functionality for the entire work of this Section.

B. It is recognized that the design details do not cover every condition. It is, however, intended that any conditions not detailed shall be developed through the Exhibit Contractor's shop drawings to the same level of aesthetics and in compliance with performance criteria, as indicated for detailed areas and stipulated in these specifications. The Exhibit Contractor, by accepting a contract for the work, acknowledges this and agrees that the Exhibit Designer shall have the final say as to all matters whether detailed or not on the design details.

1.5 QUALITY ASSURANCE

A. The Exhibit Contractor, by commencing the work of this Section, assumes overall responsibility, as part of his warranty of the work, to assure that all assemblies, components and parts shown or required within the work of this Section, comply with the Contract Documents. The Exhibit Contractor shall further warrant:

1. That all components, specified or required to satisfactorily complete the installation, are compatible with each other and with the conditions of installation and expected use.

2. The overall effective integration and correctness of individual parts and the whole of the system.

3. Compatibility with adjoining substrates, materials and work of other trades.

4. There shall be no premature material failure due to improper design and fabrication of the stone. All materials are to fully perform to their normal life expectancy.

5. Each and every piece of stone shall be subject to the Exhibit Designer's approval, and any piece or pieces which may be rejected after having been set shall be carefully cut out and replaced with new suitable stone without delay, and without cost. Any piece or pieces damaged in the removal and resetting of defective pieces shall also be removed, and suitable, approved pieces provided and set.

B. Examination Criteria: All examinations, selections and approvals shall be for the purpose of achieving a final appearance of stone with the greatest possible uniformity, and will be based upon the following criteria:

1. Color within approved, pre-selected color ranges and finish.

2. Sequence matching of adjacent stone units, as approved by the Exhibit Designer.

3. Performance criteria of the stone cladding as an interactive, touchable exhibit.

1.6 SUBMITTALS

A. Shop Drawings: Prior to construction of mock-up, submit shop drawings for the fabrication and installation of all work and associated components. Include:

1. Plans and Elevations at scale of 1”=1!-0”.

2. Details of mounting, connectors, and hardware at 3” = 1!-0”. Show details of all conditions for every member, joint, anchorage and provision for expansion and contraction and joint treatment.

3. Include coordination details for related and adjoining work, insert drawings and erection diagrams. Show relative layout for all adjacent walls, beams, columns and slabs, all correctly dimensioned.

B. Provide structural calculations, prepared by a Professional Engineer licensed in the State of Utah, prepared in compliance with referenced documents and these specifications. Calculations shall include the following information:

1. Analysis for all applicable loads on substrate.

2. Analysis for all applicable loads on anchors.

3. Analysis of stress in stone and required interactive performance and safety factors.

C. Safety factors required at anchor locations shall be 2.0 times the values noted above for the allowable stresses.

D. Review of calculations and shop drawings by the Exhibit Designer will not relieve the Exhibit Contractor of any responsibilities for providing a system within the required performance requirements. Calculations shall be signed and sealed by the Exhibit Contractor!s Engineer.

E. Manufacturer's Data

1. Submit copies of manufacturer's specifications and installation instructions for mounting hardware required. Include data substantiating that materials comply with specified requirements.

F. Samples

1. Submit samples of all materials and finishes and details. Samples include standard submission samples, visual mock-up samples, sample slabs, production samples, and additional samples as described below.

2. Samples shall demonstrate the complete range of visual properties of the material and finish as specified in PART 2 – MATERIALS. The single exposed surface grain, i.e. head, rift or lift, as proposed by the Exhibit Contractor and approved by the Exhibit Designer.

3. Samples shall be the following sizes:

a. Reference photographs of all stone types from quarry sources.
b. (3) Standard Submission Samples: 12” x 12” of each specified stone type.

4. Range Samples: None required.

1.7 FABRICATION AND ERECTION TOLERANCES

A. Tolerances are as follows:

1. All joints to adjacent materials shall be 1/4” wide.

2. Stone face dimension tolerance (flatness) shall be variable 1”-3” in depth.

3. Stone thickness tolerance shall be 2”-5”.

B. Variation From Plumb: Stone slabs are 10” from vertical, variation should not exceed 1” in 5 ft. max.

1.8 PERFORMANCE REQUIREMENTS

A. Structural Requirements: The work, as erected, shall be designed to withstand a lateral force of 30 psf (or greater if required by Code) applied over field surface normal to face of stone. Deflection under this load shall be limited to L/360 or 3/8” whichever is less.

B. Interactivity: The forces applied to the stone by touching shall not damage the stone, force it out of alignment or otherwise loosen fasteners and connections.

C. Methods and fabrication and assembly (except as specified herein) shall be at the discretion of the Exhibit Contractor provided that the visible design effect is not changed and the strength qualities, as demonstrated by engineering calculations are not reduced.

D. Remedial measures shall maintain standards of quality and durability and are subject to approval by the Exhibit Designer.

E. Anchors

1. Adequate number and size of anchors shall be provided to satisfy the load requirements and design criteria.

1.9 CODES AND STANDARDS

A. All work shall be performed in accordance with the prevailing Building Code, or the requirements of this Specification, whichever are more stringent.

B. Stone Cladding System shall conform to, but not be limited to, the following codes and standards:

1. National Building Granite Quarries Assoc. (NBGQA).

2. American National Standards Institute (ANSI). American National Standards Institute (ANSI).

3. American Society for Testing and Materials (ASTM).

1.10 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protect stone during storage and construction against moisture, soiling, staining, and physical damage.

B. Handle stone to prevent chipping, breakage, soiling or other damage.

1.11 GUARANTEE

A. Unless stated otherwise in these Specifications, guarantee shall state that all work is in accord with Drawings and Specifications, as amended by any changes thereto

authorized by the Exhibit Designer, free from defects in materials and workmanship for a period of five (5) years from date of acceptance of the work by the Owner or failure of system to meet performance requirements. Exhibit Contractor shall agree to repair or replace defective materials and workmanship during the guarantee period at no additional cost to the Owner.

B. Defective materials and workmanship are hereby defined to include evidence of abnormal deterioration, aging, structural failure of components resulting from exposure to normal load and forces, failure of operating parts to function normally, sealant failures, deterioration or discoloration of finishes in excess of normal aging, and failure to fulfill other specified performance.

PART 2 PRODUCTS

2.1 STONE

A. All Stone slabs shall be from a local Utah or Intermountain West source.

B. Stones to be of monolithic quarried slab with dimensions as shown in drawings.

a. Slate - layered surface showing scaling with mineral deposits (quartz, kspar, clay minerals,magnetite) at Minerals/ Rocks exhibit

b. Limestone with marine fossils (horn corals, brachiopods and fossils from cephalopod) at Fossils exhibit; with mineral deposits (calcite and dolomite) at Minerals/ Rocks exhibit

c. Granite, Alta Stock with mineral deposits (quartz, plagioclase, kspar, horneblende and sphene) at Minerals/ Rocks exhibit

d. Sandstone, desert bronze, rippled to show natural deposition patterns at Colorado Plateau exhibit; with mineral deposits (quartz) at Minerals/ Rocks exhibit

e. Marble (mineral deposits of forterite, diopside, termolite, talc)

f. Quartzite with mineral deposits (quartz) at Minerals/ Rocks exhibit

g. Shale with mineral deposits (quartz, kspar, clay minerals,magnetite) at Minerals/ Rocks exhibit

C. Approved local stone suppliers:

1. Quarry Direct LLC
   Jason Russon
   186 W200 N Fairview, UT 84629
   (801) 376 1231
   www.quarrydirectstone.com

2. Apollo Marble and Granite
   153 W. 4650 S
   Salt Lake City, UT 84107
   (801) 486-0844
   www.apollogranite.com

3. Statestone
   (801) 262-9323 (Dennis McKay)

4640 South Commerce Dr (300 west)
Salt Lake City, UT
www.statestone.com

4. Delta Stone
(435) 654-3336 (Aaron or Robert Hicken)
2276 South Deniels Road, Herber City UT
www.deltastoneproducts.com

5. Or equal as approved by the Designer.

D. Finishes

1. Cleft (irregular) facing surface, to reveal stone!s natural physical properties as described above.

2. All edges are saw cut 90 degrees to face.

E. Examinations

1. Examination at the Quarry: Quarried blocks and slabs shall be made available for inspection by the Exhibit Designer and the Owner at his request prior to approval of quarried materials.

2.2 ACCESSORY MATERIALS FOR STONEWORK

A. Stone Support

1. Manufacturer and General: Stone support systems, anchors and accessories shall be manufactured by a company specializing in the design and fabrication of stone approved by the Exhibit Designer. Provide all fastening devices, wire anchors, support angles, relieving angles, anchors, coping anchors, dowels, cramps, bolts, nuts, shims, expansion shields, flashing, etc., necessary to properly secure stone walls to the structure.

2. Steel:

a. Sheet, Bar and Plate: AISI Type 302/304 non-magnetic, conforming to ASTM A167.

b. Fasteners, Anchor Bolts, Nuts and Washers: AISI Type 302/304 non-magnetic, ASTM A167.

c. Shims: AISI type 302/304, non-magnetic.

2.3 FABRICATION

A. All stone shall be well-cured and seasoned before cutting. Cut stone units with bed, unless otherwise approved by the Exhibit Designer.

B. Stone shall be cut to sizes, shapes, profiles and dimensions approximating the shapes indicated in the design drawings.

C. Exposed surfaces and edges of stone units shall be free from cracks, broken corners, chipped arrises, scratches or other defects affecting appearance. Patching or filling not permitted.

D. Backs of stone units shall be sawn to true planes, parallel to face plane.

E. Cut stone units full and true on faces, reveals, beds, joint and top, to the full dimensions required by drawings. All edges shall be “irregular” according to the performance requirements for interactivity as stated above.

F. Make faces of stone units in same plane flush at joints. All finished surfaces shall be true in line and face.

G. Sawn surfaces and edges shall be cleaned of all rust stains and iron particles.

H. No patching or use of stone with chipped edges or faces shall be permitted.

I. Thickness: Provide stone panel of thickness shown on drawings. Saw-cut back surfaces which will be concealed in the finished work.

2.4 CUTTING, DRILLING AND FITTING

A. Provide holes and sinkages required for anchors, dowels, other devices required to support and/or suspend stone, and to accommodate other items which connect to or penetrate the stone.

PART 3 EXECUTION

3.1 INSTALLATION

A. Qualification of Workmen: All work shall be performed by skilled workmen, trained and experienced in this type of work.

B. Anchors: A minimum of 3 anchors shall be required on all pieces up to 3 square feet in area.

C. Set stone and install stone support systems in accordance with drawings and final shop drawings for stonework. Provide anchors, supports, fasteners, and other attachments shown, or necessary to secure stonework in place. Shim and adjust accessories as required for proper setting of stone. Completely fill holes, slots and other sinkages for anchors, dowels, fasteners, and supports during setting of stones.

D. Before setting in the wall, all stones shall be thoroughly cleaned on all exposed surfaces by washing with fiber brush and soap powder, followed by a thorough drenching with clear water.

END OF SECTION 04400

SECTION 05500 — METAL FABRICATION

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents.

1. 2 WORK INCLUDED

A. Provide materials, labor, equipment and services necessary to furnish, deliver and install all work of this Section as shown on the drawings, as specified herein and/or as required by job conditions.

B. Work Included. This Section generally includes the following:

1. Metal framing, supports and armatures and custom fabricated hardware as described in the Exhibit Contract Documents, including but not limited to:

a. stone slab supports
b. exhibit casework framing
c. exhibit case brackets
d. handrails and exhibit rails
e. partition supports
f. video monitor and equipment housings
g. misc hardware

2. Structural design and engineering of the metal framing described in the Exhibit Contract Documents by Exhibit Contractor!s Professional Engineer, including municipal filing requirements.

1.3 RELATED SECTIONS

Section 04400 - Stone Cladding
Section 12353 - Exhibit Casework
Section 16500 - Exhibit Lighting

1.4 SUBMITTALS

A. Product Data: Prior to fabrication submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.

B. Shop Drawings showing gauge, thickness, size and construction for each member and indicating the method of assembling components, with true profiles, connections to adjoining work, methods of anchoring, and anchorage templates.

1. As a part of the preparation of Shop Drawings, Contractor shall retain a Professional Engineer, licensed in the State of Utah, to review and design the metal framing described in the Exhibit Contract Documents. Exhibit Contractor!s Engineer shall supervise the design,

review and sign and seal Shop Drawings, visit points of manufacture and construction, and submit structural calculations and drawings to the Building Department as required.

2. The metal structure supporting exhibit systems shall conform to the Building Code, which references the International Building Code 2006 edition. IBC 2006 requires compliance with reference standard ASCE 7-05 with respect to seismic criteria for architectural components.

3. Exhibit Contractor!s Structural Engineer shall coordinate the support of metal framing with base building structure as required.

C. Samples: Three (3) of each bracket and hardware type to be provided for coordination with owner provided mounts and Casework mock-up. See "Section 12353 Exhibit Casework" for further requirements.

D. Mock-up: an 8! wide Exhibit Casework Steel Frame and Partition System with associated hardware and support brackets. See "Section 12353 Exhibit Casework" for further requirements.

1.4 QUALITY ASSURANCES

A. Qualifications of Manufacturer: Products used in the work of this Section shall be produced by steel fabricators with no less than (5) years experience and regularly engaged in manufacture of similar items and with a history of successful production acceptable to the Exhibit Designer.

B. Shop Assembly: Pre-assemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for re-assembly and coordinated installations.

1.5 PRODUCT HANDLING

A. Protect materials from deterioration and damage by moisture, temperature change, contamination, corrosion and other causes.

PART 2 PRODUCTS

2.01 MATERIALS GENERAL

A. Where exposed to view, use only materials, which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.

B. Metal: All steel shall be new and free from defects which might impair strength, durability or appearance to meet the following requirements:

1. Steel Plates, Structural Shapes and Bars: ASTM A36 A572, or A992.

2. Cold-Formed Steel Framing: ASTM C1007.

3. Steel Tubing: Cold formed, ASTM A 500; or hot-rolled, ASTM A501.

4. Structural Steel Sheet: Hot-rolled, ASTM A570; or cold-rolled ASTM A611, Class 1; of grade required for design loading. Gauges: U.S. Standard Gauge.

C. Grout

1. Metallic Non-Shrink Grout: Pre-mixed, factory-packaged, ferrous aggregate grout.

2. Non-Shrink Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

D. Fasteners

1. Visible Fasteners: Countersunk, flat-head, hex-socket, type bolts or machine screws into tapped holes in supporting steel.

    a. Finish to match surrounding materials.

    b. All visible fasteners are subject to Exhibit Designer's approval.

2. General Fasteners: Provide zinc-coated fasteners where built into exterior walls. Select fasteners for the type, grade and class required.

3. Screws and bolts shall be U.S. Standard.

4. Bolts and Nuts: Regular hexagon head type, ASTM A307, Grade A.

5. Lag Bolts: Square head type.

6. Machine Screws: Cadmium plated steel.

7. Wood Screws: Flat head steel.

8. Plain Washers: Round steel.

9. Toggle Bolts: Tumble-wing type.

10. Lock Washers: Helical spring type carbon steel.

E. Paint

1. Visible Steel: See "Section 09920 Painting" for custom finish specification on steel.

2. Not-Visible Steel: Use manufacturer's or contractor's standard, fast-curing, lead-free, "universal" Primer, selected for to normal atmospheric corrosion, for compatibility with finish paint systems indicated.

3. Priming paint for ferrous metals shall be approved red lead rust inhibitive type complying with PPG Co., Red Lead Primer No. 6-203 or approved equal.

4. Galvanizing Repair Paint: High zinc dust content paint for galvanized steel.

F. Rough Hardware

1. Furnish fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required and shown on drawings for framing and supporting exhibitry.

2. Fabricate items of sizes, shapes and dimensions required. Furnish steel washers.

G. Miscellaneous Framing and Supports.

1. Fabricate miscellaneous metal framing and supports to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing.

2. Except as otherwise shown, fabricate from structural steel shapes and plates, of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.

H. Sleeves

1. Fabricate custom mounting sleeves of steel plate and rod for support of museum artifacts graphics and displays as indicated in the Design Drawings.

2.02 FABRICATION

A. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

B. Perform cutting, fitting and drilling necessary so that work may be properly set in place to permit engaging work to be properly installed. File or grind smooth exposed edges.

C. Furnish screws, bolts and other fastening devices needed for assembling and for attachment to engaging materials so as to avoid unnecessary cutting and drilling.

D. At exposed connections use concealed fasteners wherever possible. Use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Include washers where necessary.

E. Provide for anchorage of type shown, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.

F. Cut, reinforce, drill and tap miscellaneous metal work to receive finish hardware.

2.03 SHOP PRIMING FERROUS METAL

A. Apply shop primer to surfaces of metal fabrications except those which are galvanized unless otherwise indicated, and in compliance with requirements of SSPC-PA1 "Paint Application Specifications No. 1" for shop painting.

B. Surface Preparation: Prepare ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:

1. Interiors (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning".

PART 3 - EXECUTION

3.01 PREPARATION

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

B. Furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.02 INSTALLATION

A. General: Metal work shall be well formed to designated shapes and sizes with sharp lines and angles. Shearing and punching shall leave clean, true lines and surfaces.

B. Rebates, lugs and brackets shall be provided to permit assembly in a neat, substantial manner. Fastenings shall be concealed where possible. There shall be no wind in the built-up parts. Joints exposed to the weather shall be formed to exclude water

C. Steel: Permanent connections for steel work shall be riveted where practicable. Rivet and bolt heads shall be countersunk flush with surface.

3.03 CUTTING, DRILLING AND FITTING:

A. Perform cutting, fitting and drilling necessary so that work may be properly set in place to permit engaging work to be properly installed.

B. Furnish screws, bolts and other fastening devices needed for assembling and for attachment to engaging materials so as to avoid unnecessary cutting and drilling. Proper washers shall be included as necessary.

C. Sharp exposed edges shall be filed or ground smooth and round and free from burrs.

3.04 WELDING:

A. Welding shall be done in accordance with the requirements of the American Welding Institute.

B. Welding shall be either oxyacetylene or electric arc process.

C. Use only certified/licensed welders.

D. Wherever possible, welding operations and the tensioning of high strength bolt connections shall be done in shop. If such connections must be done in field, the calculated stresses in the welds or bolts shall be less than 50% of basic allowable values.

E. If required, be responsible for providing a statement by he Exhibit Contractor's licensed structural engineer certifying that this condition exists. Pay expenses incurred by this or by the authorities' requirement for controlled inspections, at no extra cost to Owner. Provide proof of welders' certification on demand.

F. Exposed joints shall be finished smooth, flush and be practically invisible.

3.05 PROTECTION:

A. Protect all protruding pieces for damage during construction.

3.06 ADJUST AND CLEAN

A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.

B. For Galvanized Surfaces: Clean field welds, bolted connections and abraded areas and apply zinc-rich galvanizing repair paint to comply with ASTM A780

END OF SECTION 05500

SECTION 06100 — ROUGH CARPENTRY

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents.

1. 2 WORK INCLUDED

A. Provide materials, labor, equipment and services necessary to furnish, deliver and install all work of this Section as shown on the drawings, as specified herein and/or as required by job conditions.

B. Work Included: This Section generally includes the following:

1. Miscellaneous wood framing, backing and supports

1.3 RELATED SECTIONS

Section 05500 - Metal Fabrications
Section 06430 - Exhibit Woodwork

1.4 REFERENCE STANDARDS

A. Lumber Standards: Comply with PS 20 and with applicable rules of the respective grading and inspecting agencies for species and products used.

B. Plywood Product Standards: Comply with PS 1 (ANSI A 199.1) or, for products not manufactured under PS 1 provisions, with applicable APA Performance Standard for type of panel specified.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's specifications and installation instructions for manufactured materials.

B. Wood Treatment Data: Where required by code, treat wood products for permanent installation under this section with fire retardant in accordance with AWPA standards.

1. Include certification by treating plant stating type of preservative and process used, net amount of preservative retained and conformance with applicable standards.
2. Include statement that moisture content of treated materials was reduced to levels indicated prior to shipment to project site.

1.6 QUALITY ASSURANCE

A. Inspection Agencies: Inspection agencies and abbreviations used for reference of lumber grade and species include the following:

1. Southern Pine Inspection Bureau (SPIB)
2. West Coast Lumber Inspection Bureau (WCLIB)

3. Western Wood Products Association (WWPA)

B. Grade Stamps: Use lumber factory-marked with grade stamp of inspection agency to show compliance with grading rule requirements. Stamp must identify grading agency, grade, species, and moisture content at time of surfacing and mill.

1.7 PRODUCT HANDLING

A. Keep materials under cover and dry. Protect against exposure to weather and contact with moist surfaces. Stack lumber and plywood; provide for air circulation within and around stacks.

1.8 COORDINATION

A. Fit rough carpentry work to other work; scribe and cope as required for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports for attachment of other work.

PART 2 - PRODUCTS

2. 1 LUMBER – GENERAL

A. Lumber Standards: Mill lumber to comply with PS 20 "American Softwood Lumber Standard" and applicable grading rules of inspection agencies certified by American Lumber Standards Committee's (ALSC) Board of Review.

1. Lumber for framing, bridging, blocking, grounds, furring, nailers, etc. shall be construction grade or better.

B. Nominal sizes are indicated, except as shown by detail dimensions. Provide sizes and moisture contents as required by PS 20.

1. Provide dressed lumber, S4S, unless otherwise indicted.
2. Moisture Content: 19 % maximum at time of shipment for sizes 2" or less in nominal thickness.

2. 2 MISCELLANEOUS LUMBER

A. General: Provide wood for support or attachment of other work including bucks, nailers, blocking, furring, grounds and similar members. Provide lumber of sizes indicated and as follows:

1. Moisture Content: 19 % maximum.

2. Grade: Standard Grade light framing size lumber of any species or board size lumber as required. No. 3 Common or Standard grade boards per WCLIB or WWPA rules or No. 3 per SPIB rules.

2. 3 FASTENERS AND ANCHORAGES

A. Provide fasteners of type, size, material and finish as required for condition of use.

B. Where rough carpentry work is exposed to moisture, provide fasteners and anchorages with cadmium plating or a hot-dip zinc coating (ASTM A 153).

2. 4 WOOD TREATMENT BY PRESSURE PROCESS

A. Preservative Treatment: Comply with applicable requirements of AWPA Standards C2 (Lumber) and C9 (Plywood) and of AWPB Standards listed below. Mark each treated item with the AWPB Quality Mark.

1. Where required by code, pressure-treat lumber and plywood with fire-retardant chemicals, "Dricon" by Hickson Corporation or approved equal, applied in accordance with manufacturer's directions.

2. Pressure-treat wood members in contact with masonry or concrete with water-borne preservatives to comply with AWPB LP-2. After treatment, kiln-dry lumber and plywood to a maximum moisture content of 15 %.

3. Complete fabrication of treated items prior to treatment where possible. If cut after treatment, coat cut surfaces with heavy brush coat of chemical used for treatment to comply with AWPA M4.

2. 5 TREATMENT OF ORGANIC MATERIALS

A. All organic materials to be treated to assure that they are pest free. See Casework spec. for Conservation standards for organic materials that will be in contact with artifacts.

PART 3 - EXECUTION

3. 1 INSTALLATION – GENERAL

A. Discard units of material with defects that might impair quality of work and units, which are too small to use.

B. Set carpentry work to required levels and lines with members plumb and true and cut and fitted.

C. Securely attach carpentry work to substrate by anchoring and fastening as required by recognized standards.

D. Countersink nail heads on exposed carpentry work and fill holes.

E. Select fasteners of size that will not penetrate from opposite side of members that will be exposed. Make tight connections between members. Install fasteners without splitting of wood; pre-drill as required.

3. 2 FRAMING INSTALLATION

A. Provide framing members of sizes and install at spacings shown; comply with National Forest Products Association recommendations. Do not splice structural members between supports.

B. Provide necessary furring, accessories, framing and blocking at walls and ceilings as shown on drawings or as required.

3. 3 NAILERS, BLOCKING AND GROUNDS

A. Provide where required for attachment of other work. Form to shapes as shown and cut as required for true line and level of work to be attached. Coordinate location with other work involved.

B. Attach to substrates to support applied loading. Countersink bolts and nuts flush with surfaces when necessary.

END OF SECTION 06100

SECTION 06403 — EXHIBIT WOODWORK

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents.

1.2 WORK INCLUDED

1. LAND gallery MDF partition panels (X-MDF-1)
2. LIFE wall panels with laminated wood veneer (X-WD-3)
3. Exhibit rail substrate (X-WD-2)
4. Exhibit tables and bases with laminated wood veneer (X-WD-1)
5. Exhibit Casework interior partitions, decks and lifts.
6. Misc. exhibit woodwork.

1.3 RELATED SECTIONS

Section 06100 - Rough Carpentry
Section 09920 - Painting
Section 10000 - Silkscreened Graphics
Section 12353 - Exhibit Casework

1.4 DEFINITIONS

A. Exhibit Woodwork includes wood panels, furring, blocking, shims, and hanging strips for installing woodwork items, unless concealed within other construction before woodwork installation.

1.5 SUBMITTALS

A. General: Submit in accordance with Section 01330 – Submittal Procedures.

B. Product Data: For each type of product indicated, including fasteners, hinges, hardware and accessories, and finishing materials and processes.

C. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.

D. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Exhibit Fabricator!s verification of all dimensions coordinated with survey drawings of as built conditions.

2. Show details full size.

3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.

4. Show locations and sizes of cutouts and holes for items installed using dimensions taken from measurement of actual hardware.

5. Show veneer leaves with dimensions, grain direction, exposed face, and identification numbers indicating the flitch and sequence within the flitch for each leaf.

E. Samples for Initial Selection: Manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available for each type of material indicated.

1. Shop-applied transparent finishes and tinted lacquered.

2. Shop-applied opaque paint finishes.

F. Samples for Verification:

1. Provide (3) 8” x 8” MDF panels with shop-applied tinted clear lacquer finish including edges for panels.

2. Provide (3) 8” x 8” quarter sawn maple veneered MDF panels, with veneer leaves representative of and selected from flitches to be used for transparent-finished woodwork. Include veneer at edges and at least one face-veneer seam.

3. Provide (3) 8” x 8” COR product veneered, with veneer leaves representative of and selected from flitches to be used for transparent-finished woodwork. Include veneer at edges and at least one face-veneer seam. With shop-applied clear satin finish including edges for panels.

4.

5. Provide (3) 8” x 8” MDF panels with shop-applied clear satin finish including edges for panels.

6. Provide (3) 8” x 8” Appleply panels with shop-applied opaque painted finish including edges for panels, for each color specified.

7. Corner pieces as follows:

a. Provide (1) corner joint for MDF exhibit panels (with finish as specified)

b. Provide (1) corner joint for exhibit case partitions and lifts (with finish as specified)

8. Provide samples of all exposed hardware and accessories, one unit for each type and finish.

G. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of Exhibit Designers, and other information specified.

H. Material Safety Data Sheets, for all applicable products.

1.6 QUALITY ASSURANCES

A. Installer Qualifications: An experienced installer who has completed exhibit woodwork similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Fabricator Qualifications: A firm experienced in producing exhibit woodwork similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

C. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production and installation of exhibit woodwork.

D. Quality Standard: Unless otherwise indicated, comply with AWI's "Architectural Woodwork Quality Standards" for grades of interior woodwork, construction, finishes, and other requirements.

1. Provide AWI Quality Certification Program certificate indicating that woodwork complies with requirements of grades specified or proof that the Exhibit Fabricator meets or exceed the AWI requirements.

E. Mockup: Before fabricating exhibit woodwork, build mockups for each form of construction and finish required to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work:

1. Build a full size LAND MDF panel minimum size 4! x 8! to demonstrate the following;

   a) coordination with adjacent elements (stone panels and inset casework)
   b) mount system
   c) edge detailing at reveals
   d) reveals between adjoining panels
   e) proposed range of aesthetic effects and workmanship

2. Build a full size LIFE partition panel minimum size 4! x 8! to demonstrate the following;

   a) curvature
   b) veneers and finishes
   c) edge detailing at reveals and openings into dioramas
   d) reveals between adjoining panels
   e) proposed range of aesthetic effects and workmanship

3. Build a full size typical exhibit plinth or base to demonstrate the following;

   a) curvature
   b) veneers and finishes
   c) edge detailing at reveals and openings
   d) reveals between adjoining panel
   e) proposed range of aesthetic effects and workmanship

4. Notify Exhibit Designer one month in advance of dates and times when mockups will be fabricated and installed.

5. Obtain Exhibit Designer's approval of mockups before commencing with exhibit woodwork fabrication.

1.7 PRODUCT HANDLING

A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other than installation areas, store only in areas where environmental conditions can be and are maintained to the level that will prevent defects from forming in the finished work.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

2. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on Shop Drawings.

3. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.9 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that interior Exhibit Designer woodwork can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide materials that comply with requirements of the AWI quality standard for each type of woodwork and quality grade specified, unless otherwise indicated.

B. Wood Products:

1. Medium-Density Fiberboard- Formaldehyde Free (MEDITE II) with clear lacquer finish to comply with ANSI"A208.2 - (X-MDF-1)

a. Medite II
Sierra Pine Composite Solutions
P.O. Box 4040
2685 North Pacific Highway
Medford, OR 97501
Tel 541-773-2522

b. Or equal as approved by Exhibit Designer.

2. LIFE Panels - (X-WD-3) Quarter sawn maple hardwood veneer on Wiggleboard flexible plywood substrate w/ colored stain and clear lacquer finish to comply with HPVA"HP-1.

a. Georgia Pacific, Inc
PO Box 751692
Charlotte,"NC"28275
www.gp.com

b. Or equal as approved by Exhibit Designer.

3. Exhibit rail substrate – (X-WD-2) Certified 100% Post consumer recycled paper in water based resin, class A fire rated – LEED product

a. Paperstone - color: Obsidian, 1” thick
PanelTech, Inc.
Hoquiam, WA
Tel. 360-538-9815
www.paperstoneproducts.com

b. Or equal as approved by Exhibit Designer.

4. Round / Curved exhibit bases - (X-WD-1) Sustainable Forestry Initiative (SFI) certified engineered wood veneer – LEED product

a. COR Products, Inc. – color: Natural, 3/4” thick & 1/8” for curved radius
290 Standish Ave
West Orange, NJ 07052
Tel. 973-731-4952
www.corproducts.com

b. Or equal as approved by Exhibit Designer.

5. Exhibit Case Partitions, Decks, Lifts - (X-WD-4) Forest Stewardship Council (FSC) certified plywood veneer with uniform laminations of Alder and Birch hardwood to have no urea formaldehyde – LEED product

a. ApplePly, 3/4" thick
States Industries, Inc
P.O. Box 7037_
Eugene, OR 97401
Tel. 541-688-7871
www.statesind.com

b. Or equal as approved by Exhibit Designer.

2.2 HARDWARE AND ACCESSORIES

C. Hardware Standard: Comply with BHMA"A156.9 for items indicated by referencing BHMA numbers or items referenced to this standard.

D. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA"A156.18 for BHMA finish number indicated.

1. Steel, countersunk, flat head, hex-socket machine screws with finish as per Section 05500 –Metal Fabrications.

E. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA"A156.9.

2.3 INSTALLATION MATERIALS

F. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.

G. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.

H. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip galvanized anchors and inserts on inside face of exterior walls and elsewhere as required for corrosion resistance. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

PART 3 PART - EXECUTION

A. PREPARATION:

1. Condition woodwork to average prevailing humidity conditions in installation areas before installation.

2. Before installing exhibit woodwork, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

B. INSTALLATION:

1. Quality Standard: Install woodwork to comply with AWI Section 1700.

2. Install woodwork level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb (including tops) to a tolerance of 1/8 inch in 96 inches.

3. Scribe and cut woodwork to fit adjoining work, and refinish cut surfaces and repair damaged finish at cuts.

4. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with recommendations of chemical treatment manufacturer, including those for adhesives used to install woodwork.

5. Anchor woodwork to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing as required for complete installation. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork and matching final finish if transparent finish is indicated.

6. Complete the finishing work specified in this Section to extent not completed at shop or before installation of woodwork. Fill nail holes with matching filler where exposed. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats were applied in shop.

7. Wood Moisture Content: Comply with requirements of referenced quality standard for wood moisture content in relation to ambient relative humidity during fabrication and in installation areas.

8. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

9. Fabricate woodwork to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:

10. Complete fabrication, including assembly, finishing, and hardware application, to maximum extent possible, before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

11. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements indicated on Shop Drawings before disassembling for shipment.

12. Notify Exhibit Designer seven days in advance of the dates and times woodwork fabrication will be complete.

13. Shop cut openings, to maximum extent possible, to receive hardware, appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates measured form actual hardware to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

C. ADJUSTING AND CLEANING

1. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

2. Clean, lubricate, and adjust hardware.

3. Clean woodwork on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 06430

SECTION 09771 — FABRICS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents.

1.2 WORK INCLUDED

A. The Work of this Section includes all labor, materials, equipment and services necessary to complete the fabric wrapped panels and fabrics as shown on the drawings and/or specified herein, including, but not limited to, the following:

1 Fabric-wrapped artifact case decks, buildups, back panels, etc., within Exhibit Casework.
2 Stretched Fabric scrim at PAST WORLDS (water at eocene diorama).
3 Stretched Fabric panels in OUR BACKYARD (overhead leaves).

1.3 RELATED SECTIONS

Section 05500 - Metal Fabrications
Section 12353 - Exhibit Casework

1.4 SUBMITTALS

A. General: Submit in accordance with Section 01330 SUBMITTALS.

B. Product data for each type of fabric and installation accessories required. Submit written data on physical characteristics, durability, resistance to fading, flame resistance characteristics, and certification of environmentally safe standards.

C. Samples:

1 Provide (3) twelve-inch (12”) square samples for each fabric and color specified.
2 Provide (3) fabric-wrapped or stretched twelve-inch (12") square samples of each type of substrate or frame specified.
3 Provide data on Adhesive Compatibility and Conservation.

D. Maintenance Data:

1 Provide the Exhibit Designer with a manual which shall describe the care, cleaning and maintenance of the installed fabrics.

1.5 TESTING

A. All Products specified under this Section and used inside Exhibit Cases will have to be submitted for testing and need to be approved by the Owner!s Conservator.

1.6 QUALITY ASSURANCES

A. Qualifications of Manufacturer: Products used in the work of this Section shall be produced by

manufacturers regularly engaged in manufacture of similar items and with a history of successful production acceptable to the Exhibit Designer.

1.7 DELIVERY, STORAGE AND PRODUCT HANDLING

A. Protect materials from deterioration and damage by moisture, temperature change, contamination, and other causes.

B. Deliver the panels, and accessory items to the areas of the building where installation is scheduled. Coordinate for the proper scheduling of this work. Store materials in areas designated, and carefully protect panels from damage.

PART 2 PRODUCTS

1.8 MATERIALS:

A. Fabric: Cotton/ Silk blend, 54 inch minimum wide roll, solid color, weight approx. 8oz/ yard. Color to be determined by Exhibit Designer. Fabric to be approved by the Client!s Conservator.

1 Acceptable Products (for Exhibit Casework decks and backing panels):

a. Creation Baumann –Ultra or Rendez-vous (100% cotton), Color: TBD by Exhibit Designer
Creation Baumann Inc, US Office
110 North Centre Avenue
Rockville Centre, NY 11570
Tel 800 727 6770
www.creationbaumann.com

b. Donghia Textiles – Antoinette or Leonardo Series (cotton/ silk), Color: TBD by Exhibit Designer
Donghia, Inc.
256 Washington Street
Mount Vernon, NY 10553
Tel. 914-662-2377
www.donghia.com

d. Or approved equal in accordance with Section 01600.

2 Acceptable Products (for OUR BACKYARD overhead leaves):

a. Creation Baumann – Basic Plus series, Color TBD by Designer
Creation Baumann Inc, US Office
110 North Centre Avenue
Rockville Centre, NY 11570
Tel 800 727 6770
www.creationbaumann.com

b. Or approved equal in accordance with Section 01600.

3 Acceptable Products (for PAST WORLDS Eocene Diorama):

a. Gerriets - theatrical fabric, silver bobbinette
Gerriets International

130 Winterwood Avenue
Rockville Centre, NJ 08638
Tel 800 369 3695
www.gi-info.com

b. Or approved equal in accordance with Section 01600.

B. Exhibit Casework Artifact Support Panels

1. Adhesive: As per Fabric Manufacturer recommendation. Adhesive to be approved by the Client!s Conservator.

2. Substrate: MDF (MEDITE II) or ApplePly Panel. Substrate to be approved by the Client!s Conservator.

1.9 FABRICATION:

A. Panel Fabrication Workmanship:

1 Fabric shall be applied in a consistent direction within each Case, and from Case to Case in adjacent exhibits.

2 Fabric shall show no evidence of adhesive bleed-through.

3 Weave of fabric shall remain even and straight across the face of wrapped surfaces, and shall not be stretched, pulled, or distorted.

4 Contractor shall inspect fabrics before incorporating them into the Work. Any piece of fabric which shows any discoloration, pulled threads, or other blemishes which would be visible in the finished Work shall not be used.

5 Panel shall be covered with a single piece of fabric. If fabric needs to be seamed provide drawing indicating seem location prior to fabrication. The fabric shall wrap over all of the edges of build-up panel with a minimum of a 3/4 inch margin.

PART 3 EXECUTION

1.10 EXAMINATION

A. Study the Contract drawings and specifications with regard to the work as shown and required under this section so as to insure its completeness.

B. Examine surfaces and conditions to which this work is to be attached or applied, and notify the Exhibit Designer of any conditions or surfaces which are detrimental to the proper and expeditious installation of the work. Starting on the work, shall imply, acceptance of the surfaces and conditions to perform the work as specified.

C. Verify dimensions taken at the job site, affecting the work. Bring field dimensions, which are at variance to the attention of the Designer. Obtain decision regarding corrective measures before the start of installation.

D. Cooperate in the coordination and scheduling of the work of this section with the work of other sections so as not to delay job progress.

1.11 INSTALLATION

1 Fabric-covered surfaces shall be handled carefully and maintained absolutely clean and free of dust until final acceptance. Fabric-covered surfaces shall be covered with a protective wrapping until installed in Exhibit Cases. Contractor's installers shall wear disposable white cotton gloves when handling fabric-covered surfaces during installation in Exhibit Cases.

1.12 CLEAN-UP & PROTECTION

A. Upon completion of the work, remove all waste, excess materials, tools and equipment from the job site.

B. Prior to acceptance of the installation, fabrics which are damaged, stained, discolored, torn, ripped or otherwise not acceptable, shall be repaired and/or replaced with new material of same dye-batch.

C. Protect installed panels from damages by other trades. Install and maintain protective materials over panels if necessary.

D. After the installation is completed provide representatives to instruct the Clients maintenance personnel in the care, cleaning and maintenance of the installed panels.

END OF SECTION 09771

SECTION 09920 — PAINTING

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents.

1.2 WORK INCLUDED

A. The Work shall include, but is not limited to the following:

1. Prime and finish painting, including touching up of and repairing of abraded, damaged or rusted prime coats.
2. Painting of MDF, wood and metal as indicated on the drawings.
3. Painting of any surface not specifically mentioned to be painted herein or on drawings but for which painting is obviously necessary to complete the work.

1.3 RELATED SECTIONS

Section 05500 Metal Fabrications
Section 05700 Ornamental Metal
Section 06430 Exhibit Woodwork
Section 10000 Silkscreened Graphics

1.4 MATERIALS AND EQUIPMENT NOT TO BE PAINTED

A. Surfaces not to be painted shall be left completely free of droppings and accidentally applied materials. Unless otherwise indicated, the following shall not be painted:

1. Non-ferrous metals
2. Concealed surfaces not exposed to view
3. Items furnished with factory finish
4. Moving mechanical equipment parts
5. Code-required labels

1.5 SUBMITTALS

A. General: Submit in accordance with "Section 01330 Submittals".

B. Materials List: Prior to delivery, submit to the Exhibit Designer a complete list of all materials and applications. This shall in no way be construed as permitting substitution of materials for those specified or accepted for this Work by the Exhibit Designer.

1. Include certificates attesting to compliance with Specifications, verifying compatibility of finish and intermediate coats with prime coats applied under this or other Sections and verifying compatibility of coatings with the substrates to which they will be applied.

C. Samples and Product Literature: Prior to beginning Work, submit samples for review of color, sheen and texture. Provide a listing of materials and application for each coat of each finish sample. Submit three (3) of each of the following to the Exhibit Designer for review.

1. Provide color system of the paint manufacturer from which the Exhibit Designer will select the paint colors;
2. Provide (3) 12" x 12" x 3/4” Plywood panels with finished edges for each color of paint and finish by type with finish applied;
3. Provide (3) 12" x 12" x 3/4” MDF panels with finished edges for each color of paint and finish by type with finish applied;
4. Provide (3) 12" x 12" x 3/4” Wood Veneered panels with finished edges for each color of paint and finish by type with finish applied;
5. Provide (3) 12" x 12" x 1/4” steel panels, 6” length of bar stock with fasteners with finish applied;

D. Furnish the Exhibit Designer with a schedule indicating completion of the respective coats of paint for the various areas and surfaces.

1.6 QUALITY ASSURANCES

A. Qualification of Painters: Use only qualified journeyman painters for the mixing and application of paint on exposed surfaces.

B. Source Limitations: Obtain Block Fillers and primers for each coating system from the same manufacturer as the finish coats.

C. LEED Compliance: All paint and coating products must be low VOC content paints.

1.7 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Order materials sufficiently in advance and in adequate quantities to avoid delays of the Project. Paints shall be ready-mixed, unless otherwise directed by the Exhibit Designer.

B. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label with the following information:

1. Name or title of material
2. Product Description
3. Manufacturer's stock number and date of manufacture
4. Manufacturer's name
5. Contents by volume for major pigment and vehicle constituents
6. Thinning instructions
7. Application instructions
8. Color name and number
9. VOC content

C. Storage and Protection.

1. Store only approved materials at the job site in an area used solely for the storage of paint materials and related equipment. Use a dry, well-ventilated space with a temperature range between 60 and 80 degrees F. Store materials not in use in tightly covered containers maintained in clean condition and free of foreign material and residue.
2. Protect paint materials before, during and after application, and ensure the prompt and safe disposal of related waste products.
3. Protect finished work and materials of other trades, and in the event of damage, immediately make all repairs and replacements.

1.8 PROJECT CONDITIONS

A. Examine areas to receive painting, and notify Exhibit Designer of any conditions observed that would be detrimental to the quality of completed work.

B. Apply paints only to surfaces that are clean, dry and free from frost in an atmosphere that is free from dust and airborne material that might become embedded on freshly painted surfaces.

C. Do not apply paint when relative humidity exceeds 85% unless specifically permitted by the manufacturer and approved by the Designer.

D. Commence painting only after lighting fixtures have been installed and are in use, or after temporary lighting providing 50 average foot candles has been provided.

E. Equipment: Provide scaffolding, ladders and other equipment necessary for the proper execution of the work of this section, all conforming to applicable laws, rules and regulations.

F. Protection: Provide and maintain warning signs and coverings and other protection to prevent damage to work of this section and to the work of others.

PART 2 - PRODUCTS

2.1 MATERIALS – GENERAL

A. Paint shall arrive to the job site in factory labeled unopened containers, color-mixed except for tinting of undercoats and possible thinning.

B. Provide prime paint produced by the same manufacturer as the finish coats. Use only thinners approved by the paint manufacturer, and use only to recommend limits

C. Paint colors, surface treatment and sheens are indicated on the Contract Drawings. Certain colors may require paint manufacturer to prepare special factory mixes to match colors selected by the Designer.

D. Paint surfaces as specified. However, the Exhibit Designer reserves the right to change finishes within the range of flat, eggshell, semi-gloss or gloss, without additional cost to the Owner.

E. Mixed colors shall match the color selection made by the Exhibit Designer prior to application of the coating.

F. For alkyd paints, provide certification from manufacturer that selected colors will be available for at least 5 years from time of application. Certification shall state that the colors will not differ due to changes in their chemical composition, particularly resultant from quantities and types of solvents used.

G. Unless otherwise noted, specified products are manufactured by Benjamin Moore & Co. Provide products specified or equivalent products manufactured by the following:

1. PPG Industries
2. Sherwin Williams
3. Or approved equal.

H. Pigments: Pure, non-fading and of types to suit paints, substrates and service indicated.

I. Linseed Oil: Raw or boiled, as required, and of approved manufacture as per ASTM D234 and D260, respectively.

J. Turpentine: Pure distilled gum spirits of turpentine, per ASTM D13.

K. Driers, Putty, Spackling Compound, Patching Plaster, etc.: Best quality, of approved manufacturer.

L. Heat Resistant Paint: Where required, use heat resistant paint when applying paint to heating lines and equipment.

M. Galvanizing Cleaner: Porter Prep. No. 99, applied per manufacturer's instructions.

N. Galvanizing Primer: Porter No. 299 Alkyd Zinc Dust Primer applied per manufacturer's instructions.

2.2 PAINT SYSTEMS

A. Plywood (exhibit casework partitions, decks, lifts and panels as indicated)

1. Plywood - Flat Latex finish by Benjamin Moore & Co. (Spray Application in Shop).
   a. Prime Coat: Benjamin Moore (spray application)
   b. Second - Fourth Coats: Benjamin Moore: Moorecraft Super Spec Latex Flat No. 275 (spray application)
   c. Color: to be specified by Exhibit Designer
   d. Sand between coats.
   e. Apply according to manufacturer's recommendations.

B. MDF (medium density fiberboard)

1. MDF - Waterborne Clear Satin Varnish by Benjamin Moore & Co. (Spray Application in Shop).

   a. Prime Coat: Benjamin Moore & Co.!s interior Wood Finishes Quick-Dry Sanding Sealer No. 413. (spray application)
   b. Second - Third Coats, Benjamin Moore!s Stays Clear Acrylic Polyurethane No. 423. Satin. (spray application)
   c. Color: clear.
   d. Apply at spreading rate recommended by manufacturer.
   e. Apply according to manufacturer's recommendations.

C. Veneered and COR Panels

1. Veneered and COR panels - Waterborne Clear Satin Varnish by Benjamin Moore & Co. with integral color tinting (Spray Application in Shop).

   a. Prime Coat: Benjamin Moore & Co.!s interior Wood Finishes Quick-Dry Sanding Sealer No. 413. (spray application)
   b. Second - Third Coats, Benjamin Moore!s Stays Clear Acrylic Polyurethane No. 423. Satin Finish. (spray application)
   c. Color: clear.
   d. Apply at spreading rate recommended by manufacturer.

e. Apply according to manufacturer's recommendations.

D. Exhibit Millwork and Bases @ LAND

1. Suede coat finish – Mankiewicz Nextel- Suede Coating or Ralph Lauren Suede
   a. Prime Coat: Nextel primer
   b. Second - Third Coats, Nextel Suede coating
   c. Color: TBD by Exhibit Designer
   d. Apply at spreading rate recommended by manufacturer.
   e. Apply according to manufacturer's recommendations.

E. Exposed Ferrous Metal

1. Ornamental Metals – Tinted matte black lacquer to match Base building spec.
   a. Color: to be specified by Exhibit Designer, sample to match Exhibit Designer provided sample
   b. sand between coats.
   c. Apply according to manufacturer's recommendations.

F. Concealed Ferrous Metal

1. Flat Alkyd Finish
   a. Prime Coat: Iron Clad Retardo Rust Inhibitive Primer (163)
   b. Second and Third Coats: Alkyd Dulamel (207)
   c. Color: as specified by Exhibit Designer.
   d. Apply according to manufacturer's recommendations.

PART 3 PART - EXECUTION

3.1 INSPECTION

A. Examine the areas and conditions where the painting is to be performed and notify the Designer of conditions detrimental to the completion of the work.

B. Do not proceed with the work until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean surfaces to be painted before applying paint or treatments. Remove oil and grease with clean cloths and cleaning solvents prior to mechanical cleaning.

B. Program the cleaning and painting so that dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Mix and prepare painting materials in strict accordance with the manufacturer!s directions to produce a mixture of uniform density. Remove film, and strain if necessary.

D. Protect adjacent work and materials by covering, masking or other method.

E. Remove and protect hardware, accessories, plates, lighting fixtures, factory finished work and similar items, or provide in-place protection. Upon completion of each space, carefully replace all removed items.

F. Remove electrical panel box covers and doors before painting walls. Paint separately and re-install after all paint is dry.

G. Metal Surfaces: Fill dents, cracks, hollow places, open joints and other irregularities in metal work to be painted with approved metal filler and sand to a smooth, hard finish, flush with adjoining surface.

1. Weld Fluxes: Remove weld fluxes, splatters and alkali contaminants from metal surfaces in an approved manner and leave surface ready to receive painting.
2. Bare Metal: Thoroughly clean off all foreign matter such as grease, rust, scale and dirt before priming coat is applied. Clean surfaces by flushing with mineral spirits.
3. Shop Primed Metal: Clean off foreign matter as specified for “Bare Metal”. Prime bare, rusted, abraded and marred surfaces with approved primer after proper cleaning of surfaces. Sandpaper all rough surfaces smooth.
4. Galvanized Metal: Wipe down surface as per SSPC Spec. SP-1. Clean with galvanize cleaner, then wash with clear water.

H. Gypsum Board Surfaces: Scrape off all projections and splatters, spackle all holes or depressions, including taped and spackled joints and sand smooth.

I. Wood Surfaces: Clean, sand and touch-up prime coat. Conform to standards of approved Job Mock-Up.

J. Cementitious Surfaces: Roughen to remove glaze if necessary, and remove efflorescence, chalk, dust and oils.

1. Test for the presence of alkali. If present, treat and allow surface to dry 24 hours before applying paint. Re-coat “hot spots,” appearing after applying primer until all suction is sealed. Surfaces which are to receive Latex Primer need no treatment.

2. Test for moisture content using an electronic moisture meter. Do not apply paint or sealer to any surface or to latex type filler where the moisture content exceeds 8% as measured by the moisture meter.

3.3 APPLICATION

A. Application may be by brush or roller or by electrostatic spray where scheduled.

B. Apply paint by spray in accordance with the manufacturer!s directions.

C. All materials shall be applied under adequate illumination, evenly spread and flowed on smoothly to avoid runs, sags, holidays, brush marks, air bubbles and excessive stipple.

D. Coverage and hide shall be complete. When color, stain, dirt or undercoats show through final coat of paint, the surface shall be covered by additional coats until the paint film is of uniform finish, color, appearance and coverage at no additional cost to the Exhibit Designer.

E. Tint each undercoat a lighter shade where multiple coats are applied. All coats shall be dry to manufacturer!s recommendations before applying succeeding coats.

F. All suction spots or “hot spots” after the application of the first coat shall be touched up before applying subsequent coats.

G. Take care to ensure that all surfaces, including edges, corners, crevices, welds and exposed fasteners, receive a film thickness equivalent to that of flat surfaces.

H. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Paint surfaces behind (out of the sight line) permanently fixed equipment or furniture with prime coat only.

I. Match colors and textures to approved samples and mockups, and remove finish and repaint surfaces that do not comply.

J. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint before final installation of equipment.

K. “Touching-Up” of Factory Finishes: Unless otherwise indicated, materials with a factory finish shall not be painted at the project site. To “touch-up,” use the factory finished material manufacturer!s recommended paint materials to repair abraded, chipped or otherwise defective surfaces.

L. Paint Thickness: Follow the specified minimum dry film (MDF) thickness requirements in the application of two-coat and three-coat work; the MDF for each coat shall not be less than 1.5 mils., or as recommended in paint manufacturer's printed specifications:

1. Three-coat work shall not be less than 5.0 mils total.

2. Two-coat work shall not be less than 3.0 mils total.

3.4 CLEAN UP

A. During the progress of the work, remove from the site all discarded paint materials, rubbish, cans and rags at the end of each work day.

B. Upon completion of painting work, clean glass and other paint spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or damage finished surfaces.

C. At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

3.5 PROTECTION

A. Protect work of other trades, whether to be painted or not, against damage by the painting and finishing work. Leave all such work undamaged. Correct any damages by cleaning, repairing or replacing and repainting, as acceptable to the Exhibit Designer.

B. Provide “Wet Paint” signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work after completion of painting operations.

END OF SECTION 09920

SECTION 10000 — SILK-SCREENED GRAPHICS

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents.

1.2 WORK INCLUDED

A. The Work in this Section shall include, but is not limited to, all labor, materials, equipment, etc. necessary to prepare and screen all the silk screened text and art as shown in drawings and specified herein.

1 Silkscreened graphics on prefabricated exhibit panels and partitions

1.3 RELATED SECTIONS

Section 05500 - Metal Fabrications
Section 06430 - Exhibit Woodwork
Section 09912 - Painting

1.4 SUBMITTALS

A. General: Submit in accordance with Section 01330.

B. Product Data: Prior to fabrication submit manufacturer's specifications and installation instructions for products used in silk-screening process, including paint products.

C. Shop Drawings: Submit shop drawings for approval for all exhibit components that are to receive silk-screened text and or artwork, indicating size, material, and integration of panels into exhibits.

D. Samples:

1 The Exhibit Contractor shall submit samples, to verify quality standards to be met (e.g. small text or thin line clarity, color registration, image quality)

2 Silkscreen artwork for use in fabrication of the samples shall be provided by the Exhibit Designer.

3 The Exhibit Contractor shall submit (3) 12” x 12” graphics based on graphic production files provided by the Exhibit Designer to verify quality standards to be met.
Submittals will include;

a. each color specified
b. multiple colors
c. each type of finished substrate (e.g. glass, wood, metal)

1.5 QUALITY ASSURANCES

A. Exhibit Contractor qualifications shall be a firm who can submit supporting documentation of having been continuously in the business of installing producing silk-screened graphics of the type and kind specified herein for no less than five (5) years.

1.6 PRODUCT HANDLING

A. Protect materials from deterioration and damage by moisture, temperature change, handling, and other causes.

1.7 DELIVERY, STORAGE AND PRODUCT HANDLING

A. Exhibit Contractor shall protect Silk-Screened Panels against dampness during and after delivery and while installation is underway.

B. Exhibit Contractor shall protect Silk-Screened Panels from surface damage, scratches and abrasion during installation of Exhibits. Exhibit Contractor shall replace all damaged Silk-Screened Panels that cannot be touched up to the satisfaction of the Exhibit Designer. Exhibit Contractor shall replace or retouch damaged work prior to final acceptance by the Exhibit Designer at no additional cost to the Exhibit Designer.

PART 2- PRODUCTS

2.1 MATERIALS GENERAL

A. INK: Oil base, matte, epoxy enamel or such high quality ink to be compatible with the surface receiving the screen.

B. SCREEN: Synthetic fabric with weave fineness equal to a 120-220 silk mesh, or as required by nature of artwork.

C. PANELS: As indicated on Drawings and on the graphic panel schedule.

D. PAINT: Spray lacquer, satin finish all sides and edges.

2.2 PRODUCTION

A. METHOD: All artwork on screens to be photographically reproduced employing the "indirect" method of stencil preparation, unless otherwise approved by the designer.

B. WORKMANSHIP:

1 Ink application to be continuously even and opaque.

2 Edges of art and type to be razor-sharp with absolutely no evidence of bleeding.

3 There are to be no mesh marks or saw-toothing.

4 Accurate registration required.

5 All minor imperfections are to be touched-up or cleaned-up, leaving the finished work perfect in every respect.

6 All production screen mesh shall be appropriately stretched around rigid frames as per U.S industry standards.

C. ORIGINAL ART:

1 The Exhibit Designer will furnish all camera-ready art work for preparation and silk screening.

2 Mechanical art shall typically be furnished as digital files at full size or percentage thereof. Exhibit Contractor to prepare film positives at full size suitable for stencil preparation. All silk screened art to be output directly from full-scale digital files to1200 dpi Linotronic film or equal. In some cases, over-sized graphics may be output to film negatives at 2400 dpi for enlargement. Art may not be enlarged more than 400% to achieve full size.

3 Instruction boards and/or elevations provided by Exhibit Designer will include production notes, dimensions and reference codes used in drawings and schedules.

4 When the camera-ready art is produced, Exhibit Contractor shall notify designer if there are any problems or discrepancies between the graphic elevations for production and the camera-ready art.

D. SILKSCREENING:

1 Silk-Screening shall be performed on surfaces indicated in the Drawings and the Graphic Panel Schedule.

2 Exhibit Contractor shall allow silkscreen enamels to dry at least 48 hours prior to installation of finished surfaces in exhibit.

3 All positive or negative films for silk screening shall be of proper size and quality.

2.3 COORDINATION / NOTIFICATION

A. Due to the close dimensional tolerances required to successfully execute the work, Exhibit Contractor shall closely coordinate Silk-Screened Panel sizes, locations, and mounting hardware with all adjoining work. If any dimensional discrepancies are found, Exhibit Contractor shall notify designer before proceeding with the work affected.

B. Exhibit Contractor to notify Exhibit Designer if hardware conflicts with Silk-Screened Graphics.

C. Exhibit Contractor shall notify Exhibit Designer if original material is scratched or otherwise damaged in any way which would appear in the produced panel, before proceeding with production of that panel.

2.4 INSPECTION

A. Exhibit Contractor to inspect all panels prior to installation. Panels to be inspected against signed-off galleys to insure the proper use of fonts, that all graphic elements are present; that color applications are correct; and that all spot-colors match approved control samples.

B. Exhibit Designer retains the right to reject any panels after installation that do not meet the requirements above.

C. Exhibit Contractor shall afford the Exhibit Designer and or Exhibit Designer access to facilities for inspecting the graphic work before, during, and after the production stage throughout the course of fabrication. Exhibit Contractor shall give five days notice to the Exhibit Designer and or Exhibit Designer before work is ready for inspection.

D. Exhibit Contractor to alert Exhibit Designer of any conflicts between panel hardware and applied graphics prior to fabrication.

E. Exhibit Contractor shall remove and replace any work found defective after installation at no additional cost to the Exhibit Designer.

2.5 OWNERSHIP OF GRAPHICS

A. All graphics-related products required shall become the property of the Owner upon completion of the project and shall be transmitted to the Exhibit Designer at no additional cost. This includes, but is not limited to:

1 Artwork
2 Positive and Negative Films
3 Photographic Products
4 Exhibit Contractors Digital Production Files

PART 3 PART - EXECUTION

3.1 PREPARATION:

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

B. Coordinate work of this Section with related work of other sections.

3.2 PROTECTION:

A. During shipping and on-site storage, the Exhibit Contractor shall ensure that all Silk-Screened Art will be adequately protected with bubble-wrap and cardboard corner protectors (for individual panels) up to the point of installation. The Exhibit Contractor shall also ensure that all Silk-Screened Art will be handled in such a way that they will be perfect and unmarred when installation is complete.

3.3 INSTALLATION

A. Exhibit Contractor shall remove and replace any work found defective after installation at no additional cost to the Exhibit Designer.

B. Silk-Screened Panels shall be handled carefully and maintained absolutely clean and free of dust until final acceptance. Silk-Screened Panels shall be covered with a protective wrapping until installed in Exhibits. Exhibit Contractor's installers shall wear disposable white cotton gloves when handling Silk-Screened Panels during installation in Exhibits.

3.4 CLEANING

A. Upon completion of the work and when all danger of damage to graphics and photographs is past, Exhibit Contractor shall inspect and clean all work contained in this section to the satisfaction of the Exhibit Designer and the Exhibit Designer.

END OF SECTION 10000

SECTION 10200 — DIGITAL OUTPUTS

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents.

1.2 WORK INCLUDED

A. The Exhibit Contractor shall furnish all labor, materials, equipment, etc., necessary to produce and install all Digital Outputs as detailed in the Drawings and Schedules, and as specified in this document.

1 Laminated Graphics (lg)
2 Inkjet (ij)
3 Direct to substrate (ds)

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's, Exhibit Contractor's and finisher's specifications and installation instructions for each product.

B. Shop Drawings: Prior to fabrication and/or purchase prepare shop drawings of work and submit to and obtain Exhibit Designer's approval thereof. Shop drawings shall be based on drawings, specifications and field measurements essential for proper fitting of Photomurals with other construction or existing Exhibit Designer, and shall present complete information as to illustrate for the Exhibit Contractor the general character of the Photomurals. Actual artwork to produce Digital Photo Prints will be provided by the Exhibit Designer as digital files.

C. Samples:

1 The Exhibit Contractor shall submit samples of each application, based on graphic production files provided by the Exhibit Designer to verify quality standards to be met. Quantity of samples must be submitted according to the requirements set forth in Section 01330 – Submittals.

2 Exhibit Contractor shall submit for approval, completed samples of each photographic print listed below. These shall be submitted as complete assemblies, panel w/ protective UV film as specified in this section.

a. Color photograph with dropped-in caption on contrasting background.

3 In addition, Exhibit Contractor shall submit to the Exhibit Designer test strips at full scale for panels over 4 feet in the shortest dimension, and for any area for which image resolution may not be adequate, or the acceptability of the outcome otherwise uncertain. Area to be tested shall be selected by Exhibit Designer. Exhibit Designer shall provide photo originals.

1.4 PRODUCT HANDLING

A. Exhibit Contractor shall protect Digital Output panels against dampness during and after delivery and while installation is underway.

B. Exhibit Contractor shall protect Digital Output panels from surface damage, scratches and abrasion during installation of exhibits. Exhibit Contractor shall replace all damaged Digital Output panels that cannot be touched up to the satisfaction of the Exhibit Designer. Exhibit Contractor shall replace damaged work prior to final acceptance by the Exhibit Designer at no additional cost to the Exhibit Designer.

PART 2- PRODUCTS

2.1

A. Approved Digital Output Products and Methods:

1. Laminated Graphics (LG) – 1/16” - 1/8” Digital High Pressure Phenolic Laminate

   a. Izone
      www.izone.com
      2526 Charter Oak Drive Suite 100, Temple, TX 76502

   b. Folia
      www.folia.ca
      110 Rue Wellington, Huntingdon QC, Canada JOS 1H0

   c. Or equal as approved by Exhibit Designer.

2. Inkjet (IJ) – Inkjet print wrapped on substrate

   a. Durst Rho
      www.fusion-imaging.com
      601 Boro Street, Kaysville, UT 84037

   c. Or equal as approved by Exhibit Designer.

3. Direct to Substrate (DS) – Flat bed printer with Quadro Array Technology ink

   a. Durst Rho
      www.fusion-imaging.com
      601 Boro Street, Kaysville, UT 84037

   c. Or equal as approved by Exhibit Designer.

2.2 FILMS:

A. PROTECTIVE FILM: Seal Print Shield, satin finish, as manufactured by Seal Products Incorporated, Naugatuck, CT 06770

B. ADHESIVE FILM: "Optimount", as manufactured by Seal Products Incorporated, Naugatuck, CT 06770

2.3 ORIGINAL PHOTOGRAPHY AND ART

A. The position and size of each photo panel will be specified in the Drawings and Schedules to be provided by the Exhibit Designer. Image crops will be specified on the cropping guides provided by the Exhibit Designer.

B. The Owner will supply original artwork as well as all scans smaller than 12”x12”. Final high resolution scans of the original material submitted for output shall be provided by the Exhibit Contractor. Each of the files or the items to scan will be marked with a reference number, as well as reference numbers of the loaning photographer or institution. In all cases, these numbers must be used as reference for production and should remain intact. All acetate sleeves, covers, envelopes, etc. associated with each original must be kept with it and returned to the Exhibit Designer. Specific cropping information will be provided with each original and shall be returned with the original to the Exhibit Designer.

2.4 PRODUCTION

A. METHOD:

1 Digital files as provided by the Exhibit Designer must not be altered without notification.

2 Digital files that require rasterization in PhotoShop for must be rasterized at 400 dpi. To ensure the best possible resolution for type and images.

3 All photographic art must be prepared as RGB

4 All blends and spot colors must be specified as RGB

B. WORKMANSHIP:

1 All spot colors to match control samples as provided in submittals above.

2 All blends should appear smooth with no evidence of “stepping”.

3 Type and photographs should be as sharp as technically possible.

C. DELIVERABLES:

1 The Exhibit Designer will furnish all digital files, typically at full scale with appropriate crop marks.

2 All placed photographic images provided shall be prepared as RGB files at 400 dpi at final size to ensure the best possible resolution.

3 In some cases, FPO art shall be provided in the production files. In this case, Original Art shall also be provided in the form of transparencies, or reflective art or digital files. Exhibit Contractor will then scan Original art per the specifications above and replace images exactly for final output.

4 Instruction boards and/or elevations provided by Exhibit Designer will include production notes, dimensions and reference codes used in drawings and schedules.

5 Exhibit Contractor shall notify Exhibit Designer if there are any problems or discrepancies between the graphic elevations for production and the digital files provided.

2.5 COORDINATION / NOTIFICATION

A. Due to the close dimensional tolerances required to successfully execute the Work, Exhibit Contractor shall closely coordinate photo panel sizes, locations, and mounting hardware with all adjoining work. If any dimensional discrepancies are found, Exhibit Contractor shall notify Exhibit Designer before proceeding with the Work affected.

B. Exhibit Contractor shall notify Exhibit Designer if original material is scratched or otherwise damaged in any way which would appear in the produced photograph, before proceeding with production of that image.

C. When proofs are pulled, as per requirements under Submittals above, Exhibit Contractor shall notify Exhibit Designer if there are any problems or discrepancies between the Graphic Elevations for Production and the Digital Image output.

2.6 INSPECTION

A. Exhibit Contractor shall afford the Exhibit Designer access to facilities for inspecting the graphic work before, during, and after the production stage throughout the course of fabrication Exhibit Contractor shall give five days notice to the Exhibit Designer before work is ready for inspection.

B. Exhibit Contractor to alert Exhibit Designer of any conflicts between panel hardware and applied graphics prior to fabrication.

2.7 OWNERSHIP OF GRAPHICS

A. All graphics-related products required shall become the property of the Owner upon completion of the project and shall be transmitted to the Exhibit Designer at no additional cost. This includes, but is not limited to:
   1 Photographic Products
   2 Digital Production Files Exhibit Contractors and Exhibit Designers

PART 3 PART - EXECUTION

3.1 PREPARATION:

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

B. Coordinate work of this Section with related work of other sections.

3.2 PROTECTION:

A. During shipping and on-site storage, the Exhibit Contractor shall ensure that all Digital Outputs will be adequately protected with bubble-wrap and cardboard corner protectors (for individual panels) up to the point of installation. The Exhibit Contractor shall also ensure that all Digital Outputs will be handled in such a way that they will be perfect and unmarred when installation is complete.

3.3 LABELING:

A. All Digital Outputs shall be appropriately labeled in a concealed place with the graphic reference number as provided on the mechanicals, photography or art.

3.4 FABRICATION

A. Digital files must not be reduced in resolution from their original size during any print process.

3.5 ORIGINAL PHOTOGRAPHY AND ART

A. The position and size of each photo panel will be specified in the Drawings and Schedules to be provided by the Exhibit Designer. Image crops will be specified on the cropping guides provided by the Exhibit Designer.

B. The Exhibit Designer shall supply all original material in the form of color or black and white transparencies and/or negatives and original artwork. Each of these items to print will be marked with a reference number, as well as reference numbers of the loaning photographer or institution. In all cases, these numbers must be used as reference for production and should remain intact. All acetate sleeves, covers, envelopes, etc. associated with each original must be kept with it and returned to the Exhibit Designer. Specific cropping information will be provided with each original and shall be returned with the original to the Exhibit Designer.

C. IMAGES

1 Images on graphic panels to be provided by Exhibit Contractor as final hi-resolution RGB images unless otherwise indicated by Exhibit Designer.

2 For larger images and murals, images will be provided to the Exhibit Contractor in each graphic layout as low-resolution FPO (for Position Only) files. Exhibit Contractor shall replace FPO images with hi-resolution versions of the same image.

3 Exhibit Contractor should allow for high-resolution scans to be made from Exhibit Designer's original photography and artwork in the quantities indicated on the Graphic Elevations.

4 Digital images will be provided to the Exhibit Contractor in the form of slides, transparencies, prints, negatives, books, and original artwork. Exhibit Contractor shall scan images at the appropriate resolution required for optimum results: at final size, images shall have a resolution of 400 dpi or greater.

5 The Owner will supply all original material for high-resolution. Each of these items to scan will be marked with a reference number, as well as reference numbers of the loaning photographer or institution. In all cases, these numbers must be used as reference for production and should remain intact. All acetate sleeves, covers, envelopes, etc. associated with each original must be kept with it and returned to the Exhibit Designer.

6 Exhibit Contractor shall allow Exhibit Designer's graphic designer forty-eight (48 hours console time at Exhibit Contractor!s production facility to assemble and manipulate large Digital Files in Photoshop as required).

7 Image crops will be indicated by the FPO images in the Digital Files, and on Graphic Elevations provided by Exhibit Designer.

3.6 MOUNTING

A. METHOD: Exhibit Contractor shall drymount Digital Output Inkjet Panels to substrate with Optimount Mounting film or approved equal. Print paper shall be wrapped onto back of the substrate panel at all panel edges, and corners neatly folded. Wrapped panel shall then be covered with UV protective film, also wrapped onto the back of the panel. Where back of panel is

visible, apply a finish backing as indicated in the Drawings and Schedules, and as specified in this document.

B. WORKMANSHIP

1 Where the digital outputs require multiple strips of photo paper on same substrate, joint between adjacent strips shall be hairline tight, image perfectly aligned across joint, and color consistent across joint. Exposed edges of paper at joint shall be touched up as required with waterbased marker to match adjacent color values.

2 Where mural is divided into multiple panels, photopaper and protective film shall be wrapped to inside face of panel joints. Image shall be perfectly aligned across joint, and color consistent across joint

3 All materials shall be applied with roller press, and shall be free and clear of dust particles, air pockets and creasing of any kind.

3.7 INSTALLATION

A. Exhibit Contractor shall remove and replace any work found defective after installation at no additional cost to the Exhibit Designer.

B. Exhibit Designer retains the right to reject any panels after installation that do not meet the requirements above.

C. Exhibit Contractor shall afford the Exhibit Designer!s graphic designer access to facilities for inspecting the graphic work before, during, and after the production stage throughout the course of fabrication. Exhibit Contractor shall give one month!s notice to the Exhibit Designer before work is ready for inspection.

D. Exhibit Contractor to alert Exhibit Designer of any conflicts between panel hardware and applied graphics prior to fabrication.

E. Exhibit Contractor shall remove and replace any work found defective after installation at no additional cost to the Exhibit Designer.

3.8 CLEANING

A. Upon completion of the work and when all danger of damage to graphics and photographs is past, Exhibit Contractor shall inspect and clean all work contained in this section to the satisfaction of the Exhibit Designer.

END OF SECTION 10200

SECTION 10300 — PHOTOMURALS

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents.

1.2 WORK INCLUDED

A. The Exhibit Fabricator shall furnish all graphic production, labor, materials, equipment, etc., necessary to produce and install all Digital Color Photo Print Panels (hereinafter referred to as Digital C-prints.

1.3 SUBMITTALS

A. General: Submit in accordance with Section 01330.

B. Product Data: Submit manufacturer's, fabricator's and finisher's specifications and installation instructions for each product.

C. Shop Drawings: Prior to fabrication and/or purchase prepare shop drawings of work and submit to and obtain designer's approval thereof. Shop drawings shall be based on drawings, specifications and field measurements essential for proper fitting of Photomurals with other construction or existing Exhibit Designer, and shall present complete information as to illustrate for the Exhibit Contractor the general character of the Photomurals. Actual artwork to produce Photomurals will be provided by the Exhibit Designer as digital files

D. Samples:

1 Exhibit Contractor shall submit for approval (3) or more test strips for each type of Photomural with a cropped image of area of 3" or more in height and width. Test strip shall be 12" x 12". Area to be tested shall be selected by Exhibit Designer. Exhibit Designer shall provide photo originals.

2 Exhibit Contractor shall submit for approval one (3) completed 48 “ x 48” samples of each photo mural type. These shall be submitted as complete assemblies, wrapped with specified protective film.

1.4 PRODUCT HANDLING

A. Exhibit Contractor shall protect Photomurals against dampness during and after delivery and while installation is underway.

B. Exhibit Contractor shall protect Photomurals from surface damage, scratches and abrasion during installation of exhibits. Exhibit Contractor shall replace all damaged Digital Photo panels that cannot be touched up to the satisfaction of the Exhibit Designer. Exhibit Contractor shall replace damaged work prior to final acceptance by the Exhibit Designer at no additional cost to the Owner.

PART 2- PRODUCTS

2.1 PHOTOMURALS

A. Approved products;

1. Evergreen Fabric Jet Text
www.dickson-coatings.com
415 Avenue de Savoie, Saint Clair de la Tour 38357 La tour du pin

2. Rollout
www.rollout.ca
301-321 Railway Street, Vancouver BC Canada V6A 1A4

3. Or equal as approved by the Exhibit Designer

2.2 SUBSTRATES:

A. Gypsum Wall Board, 3/8-inch thick with X-PT-6 on GA-214-96 (Level 5) drywall finish provided by the GC. All murals on GWB substrates wrap around GWB edge reveals as indicated in drawings and in the Graphic Panel Schedule.

B. 3/16-inch Medite II medium-density fiberboard as indicated in drawings and in the Graphic Panel Schedule.

C. 3/16-inch 1/16-inch Plexiglas, or other substrate as indicated in the Graphic Panel Schedule.

D. At Exhibit Contractor's option, Exhibit Contractor may use Masonite tempered presswood for panels that are not in case interiors.

2.3 FILMS:

A. PROTECTIVE FILM: Seal Print Shield, satin finish, as manufactured by Seal Products Incorporated, Naugatuck, CT 06770

B. ADHESIVE FILM: "Optimount", as manufactured by Seal Products Incorporated, Naugatuck, CT 06770

2.4 ORIGINAL PHOTOGRAPHY AND ART

A. The position and size of each photo panel will be specified in the Drawings and Schedules to be provided by the Exhibit Designer. Image crops will be specified on the cropping guides provided by the Exhibit Designer.

B. The Exhibit Designer shall supply all original material in the form of color or black and white transparencies and/or negatives and original artwork. Each of these items to print will be marked with a reference number, as well as reference numbers of the loaning photographer or institution. In all cases, these numbers must be used as reference for production and should remain intact. All acetate sleeves, covers, envelopes, etc. associated with each original must be kept with it and returned to The Exhibit Designer. Specific cropping information will be provided with each original and shall be returned with the original to the Exhibit Designer.

2.5 PRODUCTION

A. METHOD:

1 Digital files as provided by the Exhibit Designer must not be altered without notification.

2 Digital files that require rasterization in PhotoShop must be rasterized at 400 dpi. To ensure the best possible resolution for type and images.

3 All photographic art must be prepared as RGB

4 All blends and spot colors must be specified as RGB

B. WORKMANSHIP:

1 All spot colors to match control samples as provided in submittals above.

2 All blends should appear smooth with no evidence of “stepping”.

3 Type and photographs should be as sharp as technically possible.

C. DELIVERABLES:

1 The Exhibit Designer will furnish all digital files, typically at full scale with appropriate crop marks.

2 All placed photographic images provided shall be prepared as RGB files at 400 dpi at final size to ensure the best possible resolution.

3 In some cases, FPO art shall be provided in the production files. In this case, Original Art shall also be provided in the form of transparencies, or reflective art or digital files. Exhibit Contractor will then scan Original art per the specifications above and replace images exactly for final output.

4 Instruction boards and/or elevations provided by Designer will include production notes, dimensions and reference codes used in drawings and schedules.

5 Exhibit Contractor shall notify designer if there are any problems or discrepancies between the graphic elevations for production and the digital files provided.

2.6 COORDINATION / NOTIFICATION

A. Due to the close dimensional tolerances required to successfully execute the Work, Exhibit Contractor shall closely coordinate photo panel sizes, locations, and mounting hardware with all adjoining work. If any dimensional discrepancies are found, Exhibit Contractor shall notify Designer before proceeding with the Work affected.

B. Exhibit Contractor shall notify Designer if original material is scratched or otherwise damaged in any way which would appear in the produced photograph, before proceeding with production of that image.

C. When proofs are pulled, as per requirements under Submittals above, Exhibit Contractor shall notify Designer if there are any problems or discrepancies between the Graphic Elevations for Production and the Digital Image output.

2.7 INSPECTION

A. Exhibit Contractor shall afford the Exhibit Designer or exhibit designer access to facilities for inspecting the graphic work before, during, and after the production stage throughout the course of fabrication Exhibit Contractor shall give five days notice to the Exhibit Designer before work is ready for inspection.

B. Exhibit Contractor to alert designer of any conflicts between panel hardware and applied graphics prior to fabrication.

2.8 OWNERSHIP OF GRAPHICS

A. All graphics-related products required shall become the property of the Owner upon completion of the project and shall be transmitted to the Exhibit Designer at no additional cost. This includes, but is not limited to:

1 Photographic Products

2 Digital Production Files Exhibit Contractors and Exhibit Designers

PART 3 PART - EXECUTION

3.1 PREPARATION:

A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.

B. Coordinate work of this Section with related work of other sections.

3.2 PROTECTION:

A. During shipping and on-site storage, the Exhibit Contractor shall ensure that all Photomurals will be adequately protected with bubble-wrap and cardboard corner protectors (for individual panels) up to the point of installation. The Exhibit Contractor shall also ensure that all Photomurals will be handled in such a way that they will be perfect and unmarred when installation is complete.

3.3 LABELING:

A. All Photomurals shall be appropriately labeled in a concealed place with the graphic reference number as provided on the mechanicals, photography or art.

3.4 FABRICATION

A. Digital files must not be reduced in resolution from their original size during any print process.

3.5 ORIGINAL PHOTOGRAPHY AND ART

A. The position and size of each photo panel will be specified in the Drawings and Schedules to be provided by the Exhibit Designer. Image crops will be specified on the cropping guides provided by the Exhibit Designer.

B. The Exhibit Designer shall supply all original material in the form of color or black and white transparencies and/or negatives and original artwork. Each of these items to print will be marked with a reference number, as well as reference numbers of the loaning photographer or institution.

In all cases, these numbers must be used as reference for production and should remain intact. All acetate sleeves, covers, envelopes, etc. associated with each original must be kept with it and returned to the Exhibit Designer. Specific cropping information will be provided with each original and shall be returned with the original to the Exhibit Designer.

C. IMAGES

1 Images on graphic panels to be provided by Designer as final hi-resolution RGB images unless otherwise indicated by Exhibit Designer.

2 For larger images and murals, images will be provided to the Exhibit Contractor in each graphic layout as low-resolution FPO (for Position Only) files. Exhibit Contractor shall replace FPO images with hi-resolution versions of the same image.

3 Exhibit Contractor should allow for high-resolution scans to be made from Exhibit Designer!s original photography and artwork in the quantities indicated on the Graphic Elevations. Exhibit Contractor shall allow for approximately fifty (50) high-resolution scans to be made from the Exhibit Designer!s original photography and artwork, to be used for mural-scaled images.

4 Digital images will be provided to the Exhibit Contractor in the form of slides, transparencies, prints, negatives, books, and original artwork. Exhibit Contractor shall scan images at the appropriate resolution required for optimum results: at final size, images shall have a resolution of 400 dpi or greater.

5 The Exhibit Designer shall supply all original material for high-resolution scanning. Each of these items to scan will be marked with a reference number, as well as reference numbers of the loaning photographer or institution. In all cases, these numbers must be used as reference for production and should remain intact. All acetate sleeves, covers, envelopes, etc. associated with each original must be kept with it and returned to the Exhibit Designer.

6 Exhibit Contractor shall allow Exhibit Designer forty-eight (48 hours console time at Exhibit Contractor!s production facility to assemble and manipulate large Digital Files in Photoshop as required).

7 Image crops will be indicated by the FPO images in the Digital Files, and on Graphic Elevations provided by Exhibit Designer.

3.6 MOUNTING

A. METHOD: Exhibit Contractor shall drymount photomurals to substrate with Optimount Mounting film or approved equal. Photomural paper shall be wrapped onto back of the substrate panel at all panel edges, and corners neatly folded. Wrapped panel shall then be covered with UV protective film, also wrapped onto the back of the panel. Where back of panel is visible, apply a finish backing as indicated in the Drawings and Schedules, and as specified in this document.

B. WORKMANSHIP:

1 Where mural require multiple strips of photo paper on same substrate, joint between adjacent strips shall be hairline tight, image perfectly aligned across joint, and color consistent across joint. Exposed edges of paper at joint shall be touched up as required with water-based marker to match adjacent color values.

2 Where mural is divided into multiple panels, photomural and protective film shall be wrapped to inside face of panel joints. Image shall be perfectly aligned across joint, and color consistent across joint.

3 All materials shall be applied with roller press, and shall be free and clear of dust particles, air pockets and creasing of any kind.

3.7 INSTALLATION

A. Refer to the Drawings and Schedules for mounting techniques.

B. Exhibit Contractor shall remove and replace any work found defective after installation at no additional cost to the Exhibit Designer.

3.8 CLEANING

A. Upon completion of the work and when all danger of damage to graphics and photomurals is past, Exhibit Contractor shall inspect and clean all work contained in this section to the satisfaction of the Exhibit Designer and the Exhibit Designer.

END OF SECTION 10300

SECTION 10500 — ETCHED AND DIMENSIONAL GRAPHICS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents.

1.2 WORK INCLUDED

A. Work included: The Exhibit Contractor shall furnish all labor, materials, equipment, etc. necessary to prepare and fabricate all the etched and cut metal text and art as shown in drawings, specified herein, or both. The work of this section includes but is not necessarily limited to the following:

1. Sandblasted graphics and letters in stone
2. Routed letters in MDF
3. Photochemically (acid) etched and filled graphics at Past Worlds Section Intros
4. Water jet or laser cut letters in steel graphic panels.
5. Terrazzo Floor Inlaid Graphics: water jet cut metal letters.
6. Laser cut dimensional aluminum letters.

B. Related Work specified elsewhere;

Section 05500 — Metal Fabrications

Section 04400 — Stone

1.3 SUBMITTALS

A. Samples:

1. The Exhibit Contractor shall submit samples of each application, based on graphic production files provided by the Exhibit Designer to verify quality standards to be met. Quantity of samples must be submitted according to the requirements set forth in Section 01330 Submittals. Submittals will include samples;

a. Land Intro: (3) 12” x 12” samples of sandblasted graphics in stone slab based on digital files provided by the Exhibit Designer.

b. Land Section Intros: (3) 12” x 12” sample of routed graphics in MDF based on digital files provided by the Exhibit Designer.

c. PW Section Intros: (3) 12” x 12” samples of 1/4” thick steel panels with water jet cut letters; painted steel finish, based on digital files provided by the Exhibit Designer.

d. PW Section Intros: (3) 12” x 12” samples of 1/4” thick etched with ink filled letters in steel panels based on digital files provided by the Exhibit Designer.

e. LK Terrazzo Floor Inlaid Graphics: water jets cut metal letters, (3) 12” x 12” samples of 1/8” aluminum.

f. Gallery Intros: (3) 12” x 12” samples of 1/2” aluminum dimensional letters, paint finish, based on digital files provided by the Exhibit Designer.

2. Artwork for use in fabrication of the samples shall be provided by the Exhibit Designer.

A. Site Survey and Shop Drawings: No work may commence until the site survey and all relevant shop drawings have been reviewed and final “Approval with no exceptions” has been granted by the Exhibit Designer. Specifications and Field measurements essential for proper fitting of metal graphic panels and inlaid graphic elements with the work of the General Contractor, and shall present complete information as to illustrate for the General Contractor character of the floor graphics and work required to coordinate.

1. Site survey and Coordination Drawings shall be completed by the Exhibit Contractor to verify the locations of all inlaid floor graphics and to coordinate the work related to the concrete floor with the General Contractor. Drawings and shall demonstrate;

a) relationship of the work to the floor structure showing elevations and locations of fasteners, anchors and all surrounding conditions.

b) verification of peak identifier locations by sightlines to actual peaks.

c) verification of all dimensions with indication of any discrepancies between actual installation and contract documents,

d) description of sequence of erection.

e) submit certified copies of each survey conducted.

2. Shop Drawings shall clearly illustrate all aspects of the floor graphics including:

a) the relationship of the work to the structure and all surrounding conditions,

b) the arrangement of components,

c) full size details,

d) all dimensions and thicknesses, materials and finishes,

PART 2– PRODUCTS

2.0 MATERIALS

A. INK (FILL): Acrylic polyeurathane or such high quality ink to be compatible with the metal surface receiving the fill. All fill colors are baked.

B. PHOTO-RESIST: photo-resistant emulsion for transferring film positive art via UV exposure to metal substrate.

C. PANELS: As indicated in the Graphic Spreadsheets.

D. FINISH: Matte black tinted lacquer X-MTL-1 (see Section 05500-Metal Fabrication): COR-TEN steel at exterior North Star panel to match base building sample

2.1 PRODUCTION

A. METHOD: All art and text to be output to 100% film positives. Metal surfaces are treated with photo-resist emulsion. Art to be etched is photographically transferred to treated metal surfaces via UV exposure. Art is etched using a controlled-depth acid attack.

1. Etched depth of type and art to range between .015” and .020” for stainless steel

2. Halftone camera-ready art preparation: Harlequine rip; 35 line screen/ Eulcidean dot 45 degree.

B. WORKMANSHIP:

1. Edges of art and type to be razor-sharp with absolutely no evidence of bleeding

2. There are to be no mesh marks or saw-toothing.

3. Accurate registration required.

4. All minor imperfections are to be touched-up or cleaned-up, leaving the finished work perfect in every respect.

5. Fill colors to be consistent in color and application and must not bleed past etched area.

6. Etched depths to be consistent.

7. Halftone artwork to be consistent with approved control samples for density and quality.

C. The Exhibit Designer will furnish all camera-ready art work for preparation and etching and cutting. Mechanical art shall typically be furnished as film positives at full size, suitable for transfer preparation. All etched art to be output directly from full-scale digital files to1200 dpi Linotronic film or equal. In some cases, over-sized graphics may be output to film negatives at 2400 dpi for enlargement. Art may not be enlarged more than 200% to achieve full size.

D. Instruction boards and/or elevations provided by Designer will include production notes, dimensions and reference codes used in drawings and schedules.

E. When the camera-ready art is produced, Exhibit Contractor shall notify designer if there are any problems or discrepancies between the graphic elevations for production and the camera-ready art.

2.2 INSPECTION

A. Exhibit Contractor to inspect all panels prior to installation. Panels to be inspected against signed-off galleys to insure the proper use of fonts, that all graphic elements are present; that color applications are correct; and that all spot-colors match approved control samples.

B. Designer retains the right to reject any panels after installation that do not meet the requirements above.

C. Exhibit Contractor shall afford Contracting Officer or exhibit designer access to facilities for inspecting the graphic work before, during, and after the production stage throughout the course of fabrication. Exhibit Contractor shall give five days notice to Contracting Officer before work is ready for inspection.

D. Exhibit Contractor to alert designer of any conflicts between panel hardware and applied graphics prior to fabrication.

E. Exhibit Contractor shall remove and replace any work found defective after installation at no additional cost to the Contracting Officer.

2.3 PRODUCT HANDLING

A. Exhibit Contractor shall protect metal panels against damage during and after delivery and while installation is underway.

B. Exhibit Contractor shall protect metal panels from surface damage, scratches and abrasion during installation of exhibits. Exhibit Contractor shall replace all damaged metal panels that cannot be touched up to the satisfaction of the Exhibit Designer. Exhibit Contractor shall replace or retouch damaged work prior to final acceptance by Exhibit Designer at no additional cost to the Designer.

2.4 OWNERSHIP OF GRAPHICS

A. All graphics-related products required shall become the property of the Owner upon completion of the project and shall be transmitted to Owner at no additional cost. This includes, but is not limited to:

1. Artwork
2. Positive and Negative Films
3. Photographic Products
4. Digital Production Files

PART 3 – EXECUTION

3.0 INSTALLATION

A. Protection: During shipping and on-site storage, the Exhibit Contractor shall ensure that all metal panels will be adequately protected with bubble-wrap and cardboard corner protectors (for individual panels) up to the point of installation. The Exhibit Contractor shall also ensure that all metal panels will be handled in such a way that they will be perfect and unmarred when installation is complete.

B. Labeling: All metal panels shall be appropriately labeled in a concealed place with the graphic reference number as provided on the mechanicals, photography or art.

C. Exhibit Contractor shall remove and replace any work found defective after installation at no additional cost to the Owner.

3.1 CLEANING

A. Upon completion of the work and when all danger of damage to graphics and photographs is past, Exhibit Contractor shall inspect and clean all work contained in this section to the satisfaction of the Exhibit Designer.

3.2 COORDINATION / NOTIFICATION

A. Due to the close dimensional tolerances required to successfully execute the work, Exhibit Contractor shall closely coordinate dimensional letter sizes, locations, and mounting hardware with all adjoining work. If any dimensional discrepancies are found, Exhibit Contractor shall notify designer before proceeding with the work affected.

B. Exhibit Contractor to notify designer if hardware conflicts with etched graphics.

C. Exhibit Contractor shall notify designer if original material is scratched or otherwise damaged in any way which would appear in the produced panel, before proceeding with production of that panel.

END OF SECTION 10500

SECTION 10900 — TOPOGRAPHIC MODELS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents.

1.2 WORK INCLUDED

A. The Exhibit Contractor shall furnish all labor, materials, equipment, etc., necessary to produce, transport, and install a topographic Model of Utah and the Intermountain West as described herein and in the Drawings and Reference Materials. Work shall include a cast model with paint finish or digital output with sealed finish. Surface will describe the land contours and vegetation of the area in three dimensions.

1.3 RELATED SECTIONS

Section 06430 Exhibit Woodwork
Section 05500 Metal Fabrication

1.3 SUBMITTALS

A. SAMPLES AND PRODUCT LITERATURE: Prior to selecting a modeling system the Exhibit Contractor must submit selection quantities described in Section 01330 - Submittal Procedures, to the Owner and the Exhibit Designer for review and selection;

1. Samples: (3) 12” x 12” min. samples of three topographic modeling types, materials, finishes and finished graphic treatments.

2. Manufacturer!s product literature: product descriptions, warrantees, maintenance instructions, etc.

C SHOP DRAWINGS: Prior to fabrication, Exhibit Contractor shall prepare shop drawings of Work and submit to and obtain Exhibit Designer's approval thereof. Shop drawings shall be based on Drawings, Specifications, and Reference Materials, and shall present complete information as to fabrication, installation, and proper fitting of the topographic model with other construction or existing architecture, including location and anchorage requirements of any mounting hardware.

C MOCK-UPS: Partial mockup of the topographic model is required as part of a progress review by the Exhibit Designer and The Owner.

1. Build a mockup 30” x 30” to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work to demonstrate the following;

a) topography and overall form
b) levels of vertical distortion
c) surfaces and finishes
d) graphic content

2. Notify Exhibit Designer one month in advance of dates and times when mockup will be fabricated and ready for review.

3. Coordinate and facilitate a Progress Meeting as a quality control review of the mock-up as described in Section 01312 - Project Meetings.

5. Obtain Exhibit Designer's approval of mockup before commencing with fabrication.

D PROGRESS PHOTOGRAPHS: The Exhibit Contractor shall submit progress photographs for Owner's and Exhibit Designer's approval before proceeding with the Work. Upon review, Owner shall have the right to require any modifications necessary in Owner's opinion to achieve topographical accuracy.

1. Photographs and video should be clearly labeled and dated. Images shall be clear and well-lit, with a minimum of background clutter. Topographic Models shall be filmed in their entirety, with close-ups to show detail.

2. Videos or photographs shall be submitted at the following milestones:

   a. After terrain has been fully sculpted
   b. After all painting and graphic treatments have been completed

1.4 QUALITY ASSURANCE

A. The Exhibit Contractor shall be a qualified Exhibit Contractor with at least seven years proven experience in high-quality museum exhibits of similar scale and complexity as this project.

B. Subcontractors shall be recognized and established companies producing the highest quality, first- class construction and installation of their work in their respective fields.

C. Guarantee of Work:

1. Except as otherwise specified, Exhibit Contractor shall guarantee his/her work against defects resulting from the use of inferior materials, equipment, or workmanship for one (1) year from the date of Substantial Completion of the Contract, or from full occupancy of the gallery, whichever is earlier.

2. All materials and /or completed fabrications must have a ten-year structural service life in the exhibit environments described. Materials must have the capability of resisting any visible damage for a (5) year active service life.

PART 2 - PRODUCTS

2.1 PERFORMANCE STANDARDS

A. All materials used should simulate the natural environments of the given area. Details should include waterways; physiographic provinces; geologic features, cities, towns, highways, interstates and county lines as defined by the Exhibit Designer.

C. The Owner will provide digital topographic dataset and graphic production files (in Adobe illustrator format) for fabrication of the topographic model. Final determination of the graphical information contained is to be determined by the Owner and the Exhibit Designer.

D. Scale is 1:360,00 with at least 4x vertical distortion. Final determination of allowable vertical distortion and is to be determined by the Designer in coordination with the Exhibit Fabricator based on samples required and available space. Extent of the topography as depicted in the Drawings. The model shall be oriented to true north relative to the building.

E. Final selection of a specific material or technique must be approved by the Exhibit Designer.

2.2 ACCEPTABLE MANUFACTURERS:

A. Archetype 3D Images Inc
1634 63rd Street Unit 1
Boulder CO 80301
303 449 7646
www.archetype3d.com

B. Solid Terrain Modeling
340 Fillmore Street
Fillmore, CA 93015
800 548-7621
www.stm-usa.com/

C. or approved equal

2.3 MATERIALS:

A. WOODEN SUBSTRATE: Fire rated MDF construction for base. No part of the substrate shall be visible.

B. RESIN OR FIBERGLASS: Finish material for model to be determined based on approved samples. The entire topographic model should be created as one piece unless approved by Exhibit Designer otherwise. If seaming is required there shall be no visible joints or seam once installed and touched up.

C. PAINT/ SEALANT: All coatings to be have VOC levels and allowed to off-gas prior to delivery to the site. The finish shall be durable enough to withstand the touching and scratching of visitors. Finish is to be matt with no reflections.

D. PROTECTIVE COVER: As the topographic model will be frequently covered by a modular flooring system the Exhibit Contractor is required to provide a custom-fitted protective cover of foam or other durable lightweight material approved by the Designer to protect the model during floor installations.

PART 3 - EXECUTION

3.1 MEASUREMENTS

A. Exhibit Contractor shall be responsible for verifying and guaranteeing all critical measurements, including those provided by Exhibit Designer, Owner, and others. For the purpose of these specifications, critical dimensions shall mean those dimensions which are critical for a proper fit into the surrounding work of the General Contractor. All such dimensions shall be shown on Shop Drawings.

3.2 SHOP FABRICATION

A. All exhibits included in the Scope of Work shall be shop fabricated, unless otherwise identified in bid proposal by Exhibit Contractor.

3.3 COORDINATION BETWEEN TRADES

A. Exhibit Contractor shall coordinate work to ensure that the topographic model will fit properly into the space provided by other General Contractor and otherwise fit and are well-integrated with any surfaces they rest on or objects they are touching or holding.

B. Failure of this Exhibit Contractor to make known his/her own needs and to determine the requirements of others shall not be cause for additional compensation to correct interferences, or for extra work which could have been avoided by proper coordination.

3.4 INSTALLATION

A. Exhibit Contractor shall provide all mounting hardware required for complete installation. Exhibit Contractor shall indicate handling points and any vulnerable areas.

3.5 CLEANING

A. The Exhibit Contractor shall restore any damage that occurred during shipping or installation.

B. After a minimum period of one week after final installation, and when it has been determined that all airborne dust has settled the Exhibit Contractor shall thoroughly clean all components so that there are completely free of dust and debris.

END OF SECTION 10900

SECTION 10950 – SCENIC, DIORAMAS, MODELS AND TAXIDERMY

PART 1 - GENERAL

1.1 GENERAL

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications and the Exhibit Contract Documents.

1.3 DESCRIPTION OF WORK

A. The Exhibit Contactor shall furnish all labor, materials, equipment, etc., necessary to produce, transport, and install sculptured rock surfaces, scenic groundforms and surface treatments and full scale dioramas as described herein and in the Drawings and Reference Materials. Work shall include specified groundforms, flora, fauna and scenery. Taxidermy provided by Exhibit Contractor as scheduled and installed as specified. Final scenic layout and content will be a result of discussions between the Owner, Exhibit Contractor and Exhibit Designer.

Scenic Treatments include:

1. PAST WORLDS Platform Groundforms
   a. Pleistocene Platform, grassland
   b. Eocene Platform, lakeshore mud & stromatolites
   c. Late Cretaceous Platform, mud cracks
   d. Jurassic Platform, rippled sand
   e. All Platforms, smooth cementicious skim coat
2. LAND Stratigraphic Column- LD3.E03.sx01
3. FIRST PEOPLES Median Village Digsite- FP2.E01.sx01

Dioramas include:

1. LIFE Ecosystem Mojave/ Hot Desert- LF6.E01.sx01
2. LIFE Ecosystem Cold Desert- LF6.E02.sx01
3. LIFE Ecosystem Montane Forest- LF6.E03.sx01
4. LIFE Ecosystem Alpine- LF6.E04.sx01
5. LAKE Shoreline- LK2.E03.sx01
6. LAKE Wetlands- LK2.E02.sx01
7. PAST WORLDS Late Cretaceous- PW4.E03.sx01
8. PAST WORLDS Eocene- PW3.E02.sx01

Models include:

1. LAKE Migrating Birds- LK2.E04.sx01
2. FIRST PEOPLES Activity Tables Tools- FP5.E06.in01
3. FIRST PEOPLES Activity Tables Packrat Midden- FP7.E01.in01

1.3 RELATED SECTIONS

Section 06430 Exhibit Woodwork
Section 09912 Painting
Section 10300 Photo Murals
Section 16500 Exhibit Lighting
Section 11130 AV Systems

1.4 SUBMITTALS

A. SHOP DRAWINGS & SITE SURVEY: Prior to fabrication, Exhibit Contactor shall prepare measured shop drawings of Work and submit to and obtain Exhibit Designer's approval thereof. Shop drawings shall be scaled drawings (plans, sections, elevations and details) based on Drawings, Specifications, and Reference Materials, and shall present complete information as to fabrication, installation, and proper fitting of the Scenic and Diorama elements within the Exhibit Area indicated, including location and anchorage requirements of any mounting hardware. These drawings must be based on measured field surveys of existing conditions and coordinated with the work of the General Contractor.

B. PHOTOGRAPHS OF PROPOSED PLANTS AND ANIMALS: Prior to fabrication, Exhibit Contactor shall submit photographs of prospective flora and obtain the Owner!s approval thereof. References Images are provided to identify each species but shall not serve as guides in providing scientific accuracy. It is assumed that the Exhibit Contractor will conduct its own research.

C. SAMPLES AND PRODUCT LITERATURE: Samples of all material types and related products literature are to be submitted to the Exhibit Designer for approval prior to use.

1. Samples including; quantities described in Section 01330 - Submittal Procedures, size representative of actual final product.

   a. All typical plant materials by type including grasses, flowers, lichens, leaves, branches, trees, etc

   b. (3) 12 x 12 inch sections of all unique surface treatments such as soil and rock, bark, water (both natural and artificial),etc.

   c. (3) sets of all visible hardware, mounting systems, armatures, etc.

   d. (3) 12 x 12 inch samples of substrates, support systems, etc.

2. Product Manufacturer!s Data: product descriptions, materials including VOC content, warrantees, maintenance instructions, etc.

3. Proposed Pest Control and Desiccation Systems: For all natural materials used.

D. ARTIST!S SKECTCHES & MAQUETTES: Prior to fabrication the Exhibit Contactor shall prepare and submit to the Exhibit Designer sketches and/or scale models of the scenic treatments and general character of all scenic elements. Artist!s Sketches should indicate form, texture, posture, location, and interaction of all scenic elements.

E. MOCK-UPS: Partial and Full scale mockups of each scenic treatment and diorama are required as part of a progress review by the Exhibit Designer and the Owner.

1. Build a partial mockup to verify selections made under sample submittals and to demonstrate aesthetic effects and qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for the completed Work to demonstrate the following;

   a) topography and overall form

b) quality of taxidermy and models
b) surface textures and finishes
c) placement of taxidermy and other materials
d) durability

2. Build a full-scale mockup of one of the LIFE Dioramas for testing lighting and av systems, mural artwork, and integration of all scenic components. It is assumed that this is a progress review of the genuine article at substantial completion of the Work but the Exhibit Designer and Owner shall have the right to require any modifications necessary in their opinion to achieve scientific accuracy and realism. This mockup shall consist of;

   a) fully finished scenic work, including ground forms, scenic plants and animals
   b) mockups of surrounding structure and enclosure
   b) full scale print of photomural
   c) theatrical lighting instruments as specified
   d) audio visual systems as specified

3. Notify Exhibit Designer one month in advance of dates and times when mockup will be fabricated and ready for review.

4. Coordinate and facilitate an Off-Site Progress Meeting as a quality control review of the mock-up as described in Section 01312 - Project Meetings.

5. Obtain Exhibit Designer's approval of mockup before commencing with final fabrication and installation.

F. PROGRESS PHOTOGRAPHS: The Exhibit Contactor shall submit progress photographs for Exhibit Designer's review and approval before proceeding with the Work. Upon review, The Exhibit Designer and Owner shall have the right to require any modifications necessary in their opinion to achieve biological accuracy.

1. Photographs should be clearly labeled and dated. Images shall be clear and well-lit, with a minimum of background clutter. Dioramas shall be documented in their entirety, with close-ups to show detail.

2. Photographs shall be submitted at the following milestones:

   a. After groundforms have been fully sculpted but not finished.
   b. After all individual components such as models and groundforms have been built and finished but not yet installed.
   c. After all scenery and flora have been placed and installed.

1.5 QUALITY ASSURANCE

A. The Exhibit Contactor shall be a qualified Contactor with at least seven years proven experience in high-quality museum exhibits of similar scale and complexity as this project.

B. Subcontractors shall be recognized and established companies producing the highest quality, first- class construction and installation of their work in their respective fields.

C. Guarantee of Work:

2. Except as otherwise specified, Exhibit Contactor shall guarantee his/her work against defects resulting from the use of inferior materials, equipment, or workmanship for one (1) year from the date of Substantial Completion of the Work, or from full occupancy of the gallery, whichever is earlier.

3. All materials and /or completed fabrications must have a ten year structural service life in the exhibit environments described. Materials must have the capability of resisting any visible damage for a (5) year active service life.

3. If the Exhibit Contactor cannot guarantee a certain material or construction that is shown or is specified, or if he/she cannot furnish guarantees that are required, then Exhibit Contactor shall inform the Owner and the Exhibit Designer to that effect in the submitted materials.

4. If, within any guarantee period, repairs or changes are required in connection with guaranteed work, which, in the opinion of the Owner, is rendered necessary as the result of the use of materials, equipment or workmanship which are inferior, defective, or not in accordance with the terms of the Contract, the Exhibit Contactor shall promptly upon receipt of notice from the Owner, and without expense to the Owner or Exhibit Designer place in satisfactory condition in every particular all of such guaranteed work, correct all defects therein.

PART 2 - PRODUCTS

2.1 PERFORMANCE STANDARDS

A. All materials used should simulate the natural environments of the given scenic treatment. When actual flora is used it must be properly cleaned, desiccated, treated for pest control and sealed.

B. Synthetic materials are to have low VOC levels and allowed time to off - gas prior to arrival on site. All colors are to replicate the natural environment.

C. Materials specified herein are intended to establish the standards of quality required for the Work of this Section. Listing of materials herein does not imply their use nor does it eliminate other materials from consideration.

D. Final selection of a specific material, treatment or technique for each exhibit element must be approved by the Exhibit Designer.

E. Acceptable Scenic and Modeling Studios:

1. Academy Studios
   70 Galli Drive
   Novato, CA 94949
   Tel. 415-883-1031
   www.academystudios.com

2. Dixon Studios
   912 S Park
   Tucson, AZ 85719
   Tel. 520-628-4216

www.dixonstudios.com

3. Pangaea Designs (for Dinosaurs)
   2445 Eliot Street
   Denver, CO 80211
   Tel.303-477-9058
   www.pangaeadesigns.com

4. Research Casting International
   15 Dufferin Ave
   Trenton, ON
   CANADA, K8V 5C8
   Tel. 613-394-7007
   www.rescast.com

5. Split Rock Studios
   2071 Gateway Boulevard
   St. Paul, MN 55112
   Tel. 651-631-2211
   www.splitrockstudios.com

6. Taylor Studios
   1320 Harmon Drive
   Rantoul, IL 61866
   www.taylorstudios.com

7. Or other as approved by the Designer

2.3 MATERIALS:

A. WOODEN BASE: Fire rated plywood or MDF construction for base and structure of Dioramas to be engineered for supporting the weight of Scenic Work, Dioramas and Taxidermy.

B. SCENIC GROUNDFORMS: All scenic work is to be sculpted to match the Drawings and Reference materials and additional research by the Exhibit Contractor. Final products and finishes used are to be submitted to and approved by Exhibit Designer.

1. Occupancy and Loading:

   a. Scenic Groundforms in the FIRST PEOPLES Media Village Digsite must be able to withstand continuous and prolonged occupancy by visitors as this is an activity zone and will be occupied by adults and children and must withstand a live loading of 150 lbs per sq ft.

   b. Scenic Groundforms in the PAST WORLDS Platforms will be occasionally occupied by museum staff for leaning and maintenance of the exhibits and must withstand a live loading of 150 lbs per sq ft.

   c. Scenic Groundforms in the LIFE and LAKE and PAST WORLDS Dioramas are not occupied.

2. Approved Materials;

a. Milestone Hybridized Cement
Artisan Finishes Inc.
902 1st Ave South
Seattle,"WA 98134
Tel. 206 -340-0830
www.cementics.com/

b. Skimstone
Rudd Company, Inc.
1141 NW 50th St.
Seattle WA 98107
Tel. 206.789-1000
www.skimstone.com

c. Senergy
BASF Wall Systems
3550 St. John's Bluff Road
South_Jacksonville, FL 32224-2614
Tel 904·996·6000
www.senergy.cc

d. Or other as approved by Designer

3. Finishes: Scenic Groundforms are to be durable surfaces with matt (no luster) surfaces. All surfaces should be free of loose materials. Periodic cleaning including removal of dust will be by compressed air. Scenic work shall not have any visible seams or joints between pieces and are to appear continuous with surrounding surfaces.

4. All occupied or touchable scenic treatments and groundforms must be sound attenuated, so as not to sound hollow when walked on or touched.

C. WATER: Water elements are to be cast with clear resin and have no scratches or surface imperfections. There shall be no air bubbles or clouding.

D. FLORA: Flora elements will be either cast from actual approved specimens or sculpted of synthetic materials from a core of twisted wire or polyester rope.

1. All plant specimens and Models are subject to review and approval by the Designer and Owner!s botanical curator.

2. Suggested finish materials for plants and trees are;

a. Polygem Epoxy #4755

b. Urethane HMP 45.5.

3. All natural materials are to be fully desiccated, treated for pest control and sealed.

E. FAUNA TAXIDERMY & MODELS: All taxidermy and models will be newly created, lifelike mounted skins or anatomically correct models mounted in poses described in the Drawings, Scenic Schedule and Reference Images.

1. All Taxidermy and Models are subject to review and approval by the Designer and Owner!s zoological curator.

2. All natural materials are to be fully desiccated, treated for pest control and sealed.

3. Surface finishes on models are to be natural/ realistic, non-reflective finishes.

F. MOUNTING ASSEMBLIES: All mounting hardware required for models, artifacts, specimens and taxidermy are to be supplied and integrated into the Work. No hardware or fasteners are to be visible.

PART 3 - EXECUTION

3.1 TIME OF COMPLETION & FABRICATION SCHEDULE

A. The Exhibit Contactor shall prepare an estimated progress schedule for the Work. The schedule shall be related to the entire Project to the extent required by the Contract Documents. This schedule shall indicate the dates for the starting and completion of the various stages of fabrication and shipping and shall be revised as required by the conditions of the Work, subject to the Owner's approval.

B. Two in-shop meetings shall be planned after approval of materials to review shop drawings, development of scenic elements, reduced scale models and full-scale mock-ups and progress on actual scenic elements. All elements are subject to the Exhibit Designer!s review and approval prior to delivery and installation.

3.3 MEASUREMENTS

A. Exhibit Contactor shall be responsible for verifying and guaranteeing all critical measurements, including those provided by Exhibit Designer, Owner, and others. For the purpose of these specifications, critical dimensions shall mean those dimensions which are critical for a proper fit of cast figure to surrounding exhibits and reproductions. All such dimensions shall be shown on the shop drawings.

B. Exhibit Contactor shall be responsible for verifying dimensions that are required for proper coordination with other work, including but not limited to exhibits and Owner provided materials.

3.4 SHOP FABRICATION

A. All exhibits included in the Scope of Work shall be shop fabricated, unless otherwise identified in bid proposal by Exhibit Contactor.

3.5 COORDINATION BETWEEN TRADES

A. Exhibit Contactor shall coordinate work to ensure that the Scenic Work, Dioramas and Models will fit properly into the Interior provided by the General Contractor and the work of subcontractors and otherwise fit and are well-integrated with any surfaces they rest on or objects they are touching or holding.

B. Failure of this Exhibit Contactor to make known his/her own needs and to determine the requirements of others shall not be cause for additional compensation to correct interferences, or for extra work which could have been avoided by proper coordination.

3.6 SHIPPING AND HANDLING

A. Exhibit Contactor shall store, handle, and ship all Scenic Work, Dioramas and Models in such a way that they shall be perfect, free of dust and dirt and abrasions, and unmarred when they arrive and are unpacked. Exhibit Contactor shall securely and safely crate all Scenic Work, Dioramas and Models. Crates shall be marked with indications of opening sequence. Crates shall be constructed in such a way as to properly protect the completed figures and any accessories from damage including breakage, scratches and indentations of any sort. Each element of the Work shall be adequately protected with bubble-wrap and foam padding, and supported or braced with framework, as required, up to the point of unpacking.

B. All shipments shall be made with a professional shipping company and shall be fully insured. Owner shall be notified of shipment(s) in advance.

3.7 INSTALLATION

A. Exhibit Contactor shall provide all transportation, lodging, labor, and materials necessary to install the Scenic Work, Dioramas and Models.

B. Exhibit Contactor shall provide all mounting hardware required for complete installation. Exhibit Contactor shall indicate handling points and any vulnerable areas.

3.8 CLEANING

A. The Exhibit Contactor shall restore any damage that occurred during installation.

B. After a minimum period of one week after final installation, and when it has been determined that all airborne dust has settled the Exhibit Contactor shall thoroughly clean all exhibit components so that there are completely free of dust and debris.

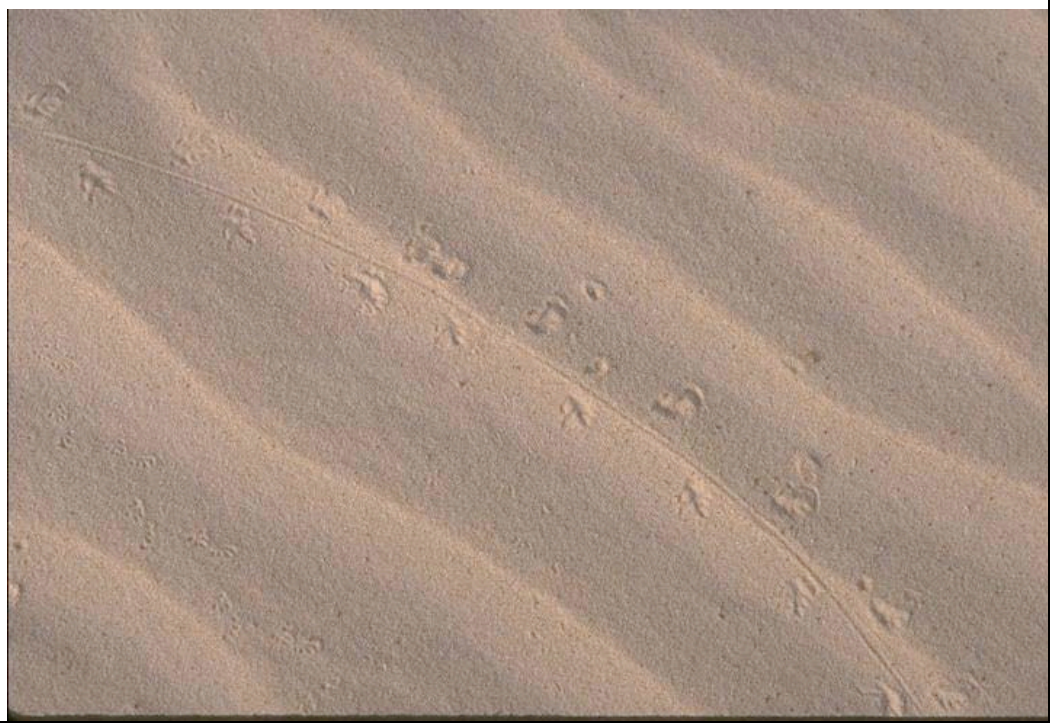
C. The Exhibit Designer and the Owner shall review for acceptance.

END OF SECTION 10950

Past Worlds Platforms Groundform Treatment

Exhibit Area/ Description	**Pictorial Reference**
Pleistocene-Spongy/grassy groundcover	

Eocene Lakeshore- Warm grey cracked mud and bird trackways	

Late Cretaceous-Rippled Sand with Dino trackways	

Late Jurassic- Red/Brown cracked mud	

First Peoples Median Village Digsite Scenic Treatment

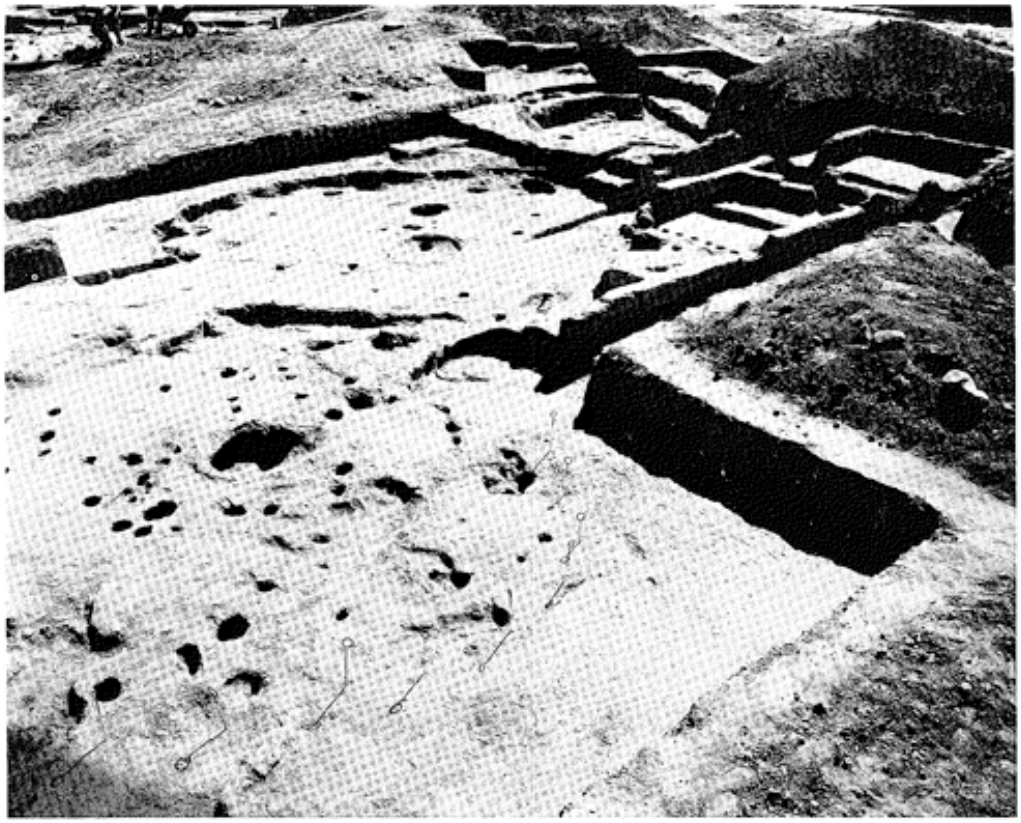


FIG. 19. View of Area B looking southwest. Structure 15 in foreground.

Median Village Site

FIG. 22. Structure 10 intruded into by Structure 11 (left) and Structure 12 (right)

Surface close up

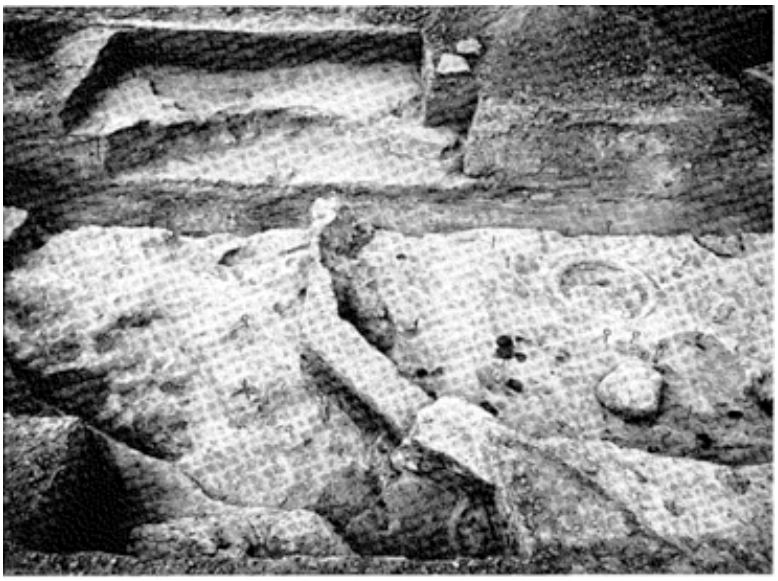
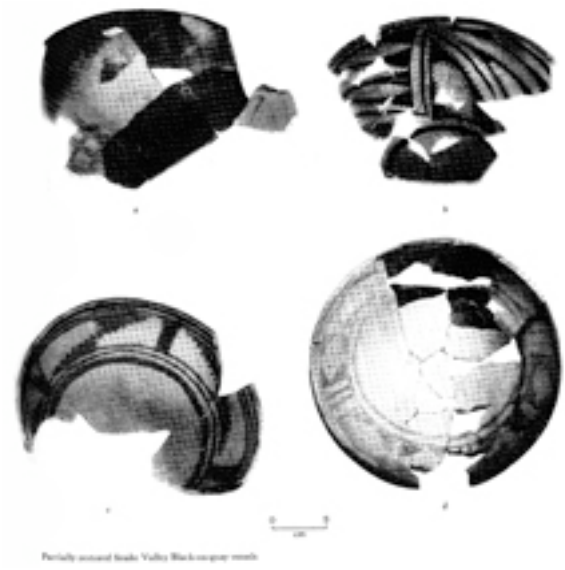


FIG. 21. Structure 9 (left) intruded into by Structure 11 (right); view to southwest. Chaining pins mark postholes

Closeup of selected area for scenic recreation

Surface references

Objects excavated at Median Village



Pottery Sherds

Bone Bead

Projectile Points

Mano

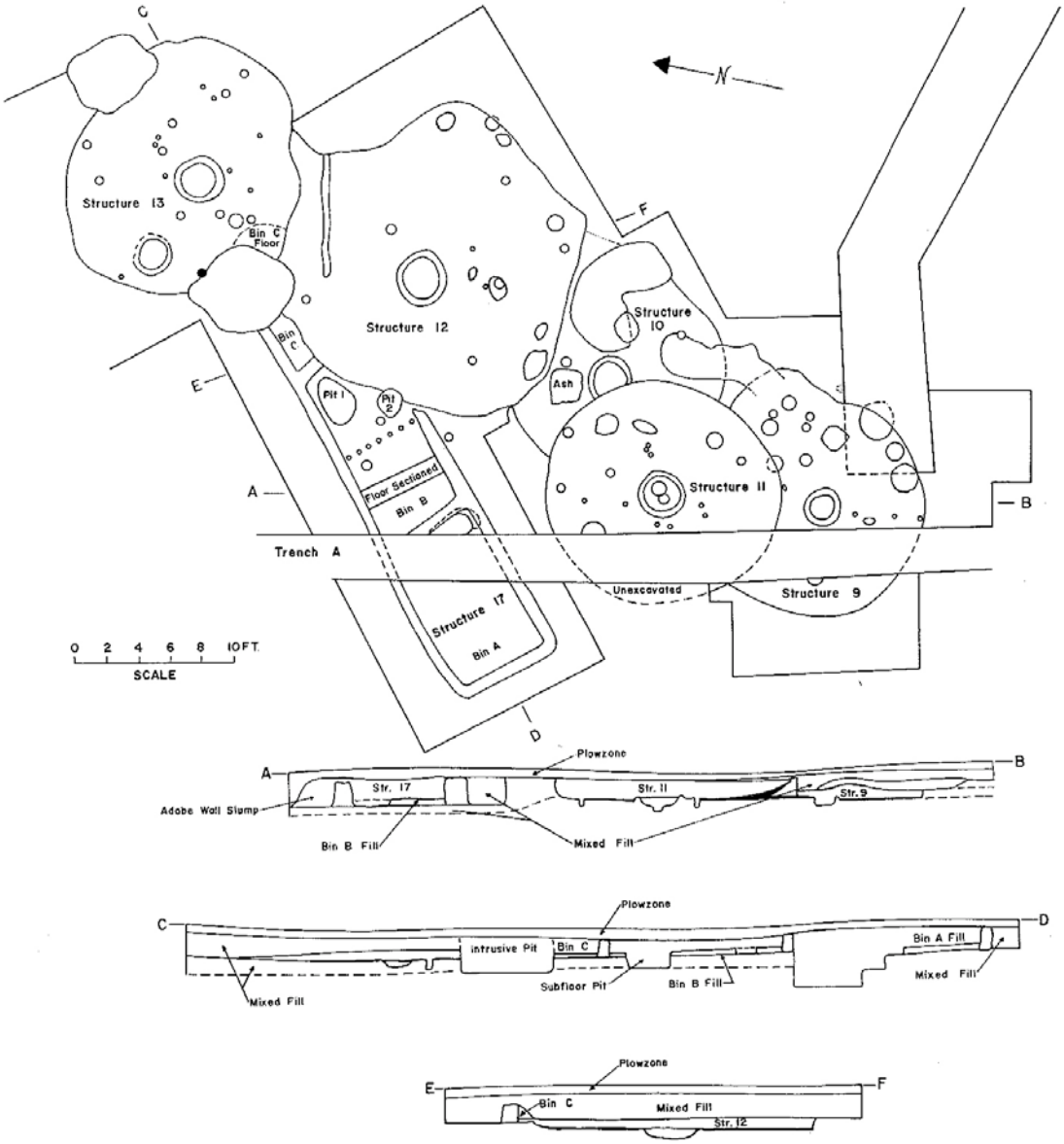


FIG 20. Area B plan and profile map.

Scenic reconstruction focuses on areas 9, 10 and 11 in area B

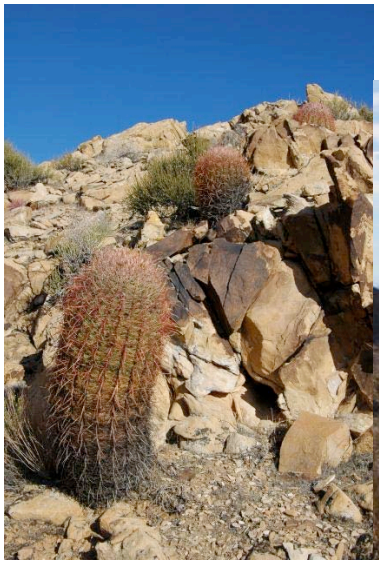
Contemporary archaeologists at work

SECTION 10950 – SCENIC, DIORAMAS, MODELS AND TAXIDERMY

Life Ecosystem- Hot Desert Mojave LF6.E01.sx01

Visitors see a diorama representing the Beaverdam Wash area of Southwest Utah and learn how the extremes of heat and water availability affect the animals and plants that live in deserts. Visitors see up close the interdependencies of this ecosystem (cryptobiotic soils, plant and insect pollination) and appreciate its fragile nature. Soundscape will give visitors a sense of the daytime inhabitants of the ecosystem. (Early spring/ summer)

General reference images:



Groundform description: flat and sandy, with flat rocks, layered into rock shelf in one area to provide an overhang for pallid bat under shelving rocks on ground.

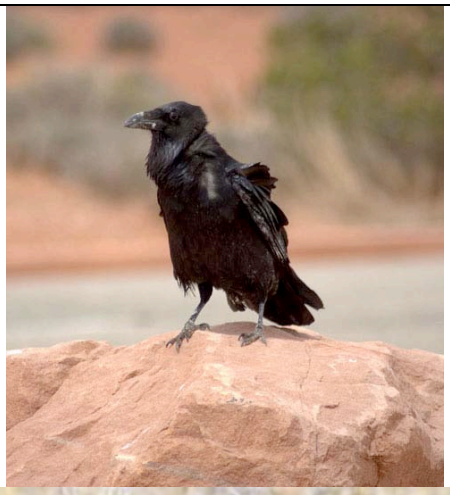
Elements include: biologic soil crust (cryptobiotic soil), cholla cactus w. cactus wren and nest (and woodrat in burrow), Joshua tree (background model), creosote bushes, creosote lac insect (moved to rail and magnify); soil cross section showing kangaroo rat burrow (cutaway), soil cutaway showing cholla cactus (shallow) and yucca (deep) roots; gopher tortoise eating prickly pear cactus; banana yucca w. yucca moth (resting on plant/ hanging out near flower); annual lupine; desert moss; raven w. pecked juvenile gopher tortoise shell; coyote stalking antelope ground squirrel; pallid bat under rock eating scorpion; tarantula hawk dragging tarantula backwards into burrow. Note that priority plants are indicated by * in the location column.

Location	Plants/Animals in Context	Pictorial Reference	Type (model, taxidermy, etc.)	Source (existing UMNH Collections, to be borrowed, fabricated)
Close up/magnify	biologic soil crust		model	fabricator

	Campylorhynchus brunneicapillus cactus wren and nest		taxidermy (wren) model (nest)	fabricator
	Tegeticula baccatella, yucca moth asleep in yucca flower		models	fabricator

	Tachardiella larreae lac insect on creosote		models	fabricator
Very nearground	*Pepsis formosa/thisbe* tarantula hawk and *Aphonopelma* sp. tarantula		models	fabricator
Cutaway	*Dipodomys deserti* desert kangaroo rat asleep in burrow		taxidermy (squirrel) model (burrow)	fabricator

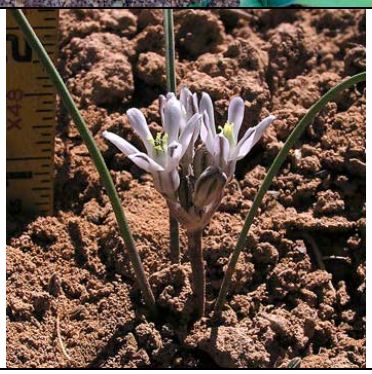
Cutaway	Cholla cactus and yucca root systems		models	Fabricator

Nearground	pallid bat eating scorpion		taxidermy (bat) model (scorpion)	fabricator
	Corvus corax raven w. pecked juvenile gopher tortoise shell		taxidermy (raven) model (shell)	fabricator

	wren nest in cholla		models	fabricator
Nearground	*Lupinus sparsiflora* annual lupine		models	fabricator

	desert moss *Syntrichia caninervis*		model	fabricator
	Mammillaria !tetrancistra !(Pincussion !cactus) !		model	fabricator
*	*Echinocactus !polycephalus !*var. !*polycephalus* !Manyhead !barrel !cactus !1-3 !models !		model	fabricator
	Camissonia chamaenerioides Slenderpod camissonia !		model	fabricator

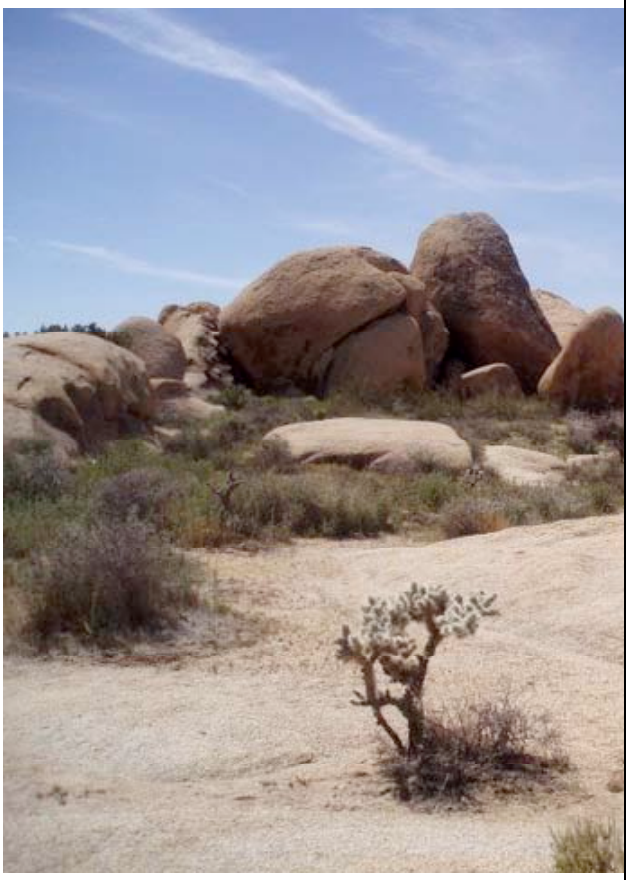
	!*Proboscidea* !*parviflora* !Unicorn !plant !Note: !!we !will !show !only !last !year''s !fruit. !!Bloom !time !is !July-Oct. ! ! ! !		model	fabricator
	!*Chaenactis* !*macrantha* !Showy !dusty maiden!		model	fabricator
*	*Eriophyllum* !*wallacei* !Wallace !eriophyllum !3-4 !models !		model	fabricator
*	*Eriophyllum* *lanosum* ! annual ! eriophyllum! 3-4 !models		model	fabricator

	!*Chorizanthe !rigida* ! ridid spineflower !		model	fabricator
*	*Cucurbita !foetidissima* !Coyote !gourd !1 mode showing !last !year'ls !gourd !(fruit), !and !this!years !bloom !		model	fabricator
	!*Androstephium !breviflorum* !Funnel !lily! ! !		model	fabricator

* Nearground/ background	*Aristida! purpurea* ! Purple !threeawn grass, model- !several !clumps ! !		model	fabricator
* Nearground-background	*Sporobolus !contractus* !Spike !dropseed !model -several !clumps !		model	fabricator
* Nearground-background	*Encelia !virginensis* !Virgin encelia !2-3 models !		model	fabricator
Nearground-background	!*Ambrosia !salsola* !burrobush !		model	fabricator

Nearground	*Opuntia acanthocarpa* cholla cactus with *Neotoma lepida,* wood rat and nest at base		models	fabricator
	Creosote bush *Larrea tridentata* with lac insects		models	fabricator
	Yucca baccata banana yucca with yucca moth		models	fabricator

Midground:	*Gopherus agassizii* gopher tortoise eating prickly pear cactus		models	fabricator
	Ammosper-mophilus leucurus coyote stalking antelope ground squirrel		taxidermy	fabricator

	Creosote bush		model	fabricator
Background *	Joshua tree (Young) *Yucca brevifolia* and little leaf horsebrush (Tetradymia glabrata) which is a nurse plant to Joshua tree.		models	fabricator

*	Adult Joshua tree next to a model of burrobrush or white-bur sage (Ambrosia dumosa)		models	fabricator

SECTION 10950 – SCENIC, DIORAMAS, MODELS AND TAXIDERMY

Life Ecosystem- Cold Desert Diorama LF6.E02.sx01

Visitors see a diorama representing a valley/foothill gradient in the Bonneville Basin and learn about the interconnectedness of the plant and animal species that live there. Soundscape will give visitors a sense of the daytime inhabitants that live there (early summer, daytime).

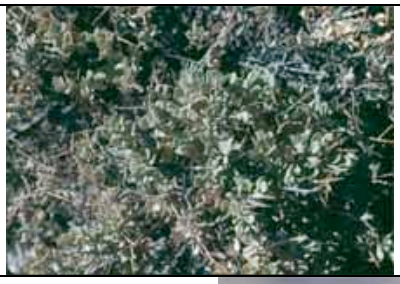
Groundform description: flat with fine soil, porous ground and desert pavement; slight slope downward from right to left.

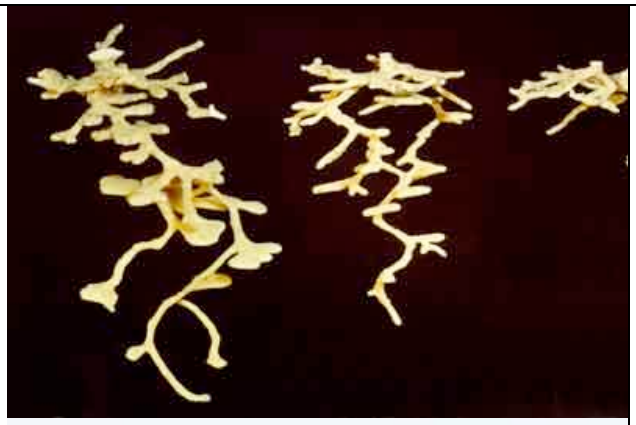
Overall scene: plant gradation from playa (30%) to pinon-juniper foothills (70%) (left to right); greasewood, shadscale, iodine bush, sagebrush, uphill is pinon-juniper, with cheat grass and thistle.

Elements include: Close-up/magnified shadscale leaves, soil cutaway/section showing harvester ant nest and spadefoot toad burrow; Mormon cricket feeding on saltbush or sagebrush, short horned lizard eating ants, sagebrush and broomrape, greater sage grouse, pygmy rabbit hiding under sagebrush, pinon jay distributing seeds, Paiute ground squirrel, paint brush, dyers woad, broad-tailed hummingbird (visiting paintbrush), pronghorn (stepping into scene), iodine bush, greasewood, one-needled pinon (background) w. nuts and cones in foreground, invasive plants (cheatgrass and Russian thistle), Utah juniper (background) and other characteristic plants and animals associated with the cold desert community. Note that priority plants are indicated by * in the location column.

Location notes: harvester ant nest near sagebrush; paintbrush and broomrape parasitic on sagebrush

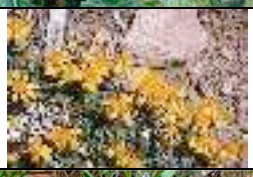
Note: All elements will be fabricated.

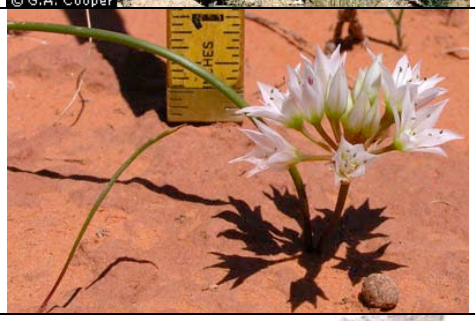
Location	**Plants/ Animals in Context**	**Pictorial Reference**	**Type (model, taxidermy, etc.)**	**Source- (existing UMNH Collections, to borrow, or fabricate)**
Close-up/magnify Playa	shadscale leaves		model	fabricator
Very near ground Playa or PJ	*Anabrus simplex* Mormon cricket feeding on saltbush or sagebrush		models	fabricator
Very near ground Playa or PJ	*Pogono-myrmex occidentalis* harvester ant hill and cutaway section showing ants		models	fabricator

Playa or PJ	ref. image for ant hill internal structure			
Very near ground Playa or PJ	*Spea hammondi* Western spadefoot toad in burrow		models	fabricator (UMNH has existing model A0054)

	Phrynosoma douglassi Short horned lizard eating ants		models	fabricator (UMNH has existing model A0055)
Near ground PJ	*Brachylagus idahoensis* Pygmy rabbit hiding under sagebrush		taxidermy	fabricator
	Gymnorhinusc yanocephalus pinon jay distributing seeds		taxidermy	fabricator
Middleground PJ	*Nicotiana attenuata* Coyote tobacco !			

*	*Stipa!comata* Needle !and thread grass		model	fabricator
* Intermediate !area- more !closely !associated !with !PJ !	*Sporobolus airoides* Alkali sacaton!		model	fabricator

	Elymus! spicatus Bluebunch wheatgrass ! ! !		model	fabricator
*	*Sphaeralcea!grossulariifoli!* Gooseberry leaf globemallow 2 models ! ! !		model	fabricator
*	*Stenotus! acaulis* Goldenweed 1 !model		model	fabricator
* Intermediate !area !between !Playa !and !PJ! !! !	*Abronia! fragrans* ! Fragrant sand verbena 1 model !		model	fabricator
*	*Caulanthus crassicaulis* Thickstem wild cabbage 1 !model !		model	fabricator

	Packera multilobata Lobeleaf groundsel ! ! !		model	fabricator
*	*Lewisia! rediviva* ! Bitterroot perhaps! behind Horned lizard 1 model ! ! ! !		model	fabricator
	Astragalus!cibarius ! Silky ocoweed !		model	fabricator
*	*Allium nevadense* Nevada!onion 1 !model !popping !up !with !sand !verbena !		model	fabricator
* Intermediate !area !between !playa !and !PJ	*Lycium!andersonii* Anderson wolfberry !		model	fabricator

	Tetradymia !glabrata !Littleleaf !horsebrush ! ! !		model	fabricator
	Atriplex!canescens ! Four wing saltbush ! !!		model	fabricator
*	*Krascheninnikovia !lanata* !Winterfat 1 bunch, show almost in !fruit.		model	fabricator
PJ	*Selasphorus platycercus* Broad-tailed hummingbird hovering near paintbrush		taxidermy	fabricator

PJ	*Castilleja chromosa* desert paintbrush		models	fabricator
PJ	dyer's woad *Isatis tinctoria*		model	fabricator

Playa	shadscale *Atriplex confertifolia*		models	fabricator
Playa (intermed)	greasewood *Sarcobatus*		models	fabricator
Playa	iodine bush *Allenrolfea occidentalis*		models	fabricator

PJ (intermed)	flat-topped broomrape *Orobranche fasciculata*			
PJ (intermed)	sagebrush *Artemisia tridentata*		models	fabricator

Middleground-including tracks of all mammals PJ	*Pinus moonphylla,* one-needle pinon *Bromus tectorum,* cheatgrass *Salsola kali,* Russian thistle *Juniperus scopuloruma,* juniper	 	models	fabricator

	male sage grouse *Centrocercus urophasianus* posturing PJ		taxidermy	fabricator
	pronghorn *Antilocapra Americana* Playa		taxidermy	fabricator

SECTION 10950 – SCENIC, DIORAMAS, MODELS AND TAXIDERMY

Life Ecosystem- Montane Forest Diorama LF6.E03.sx01

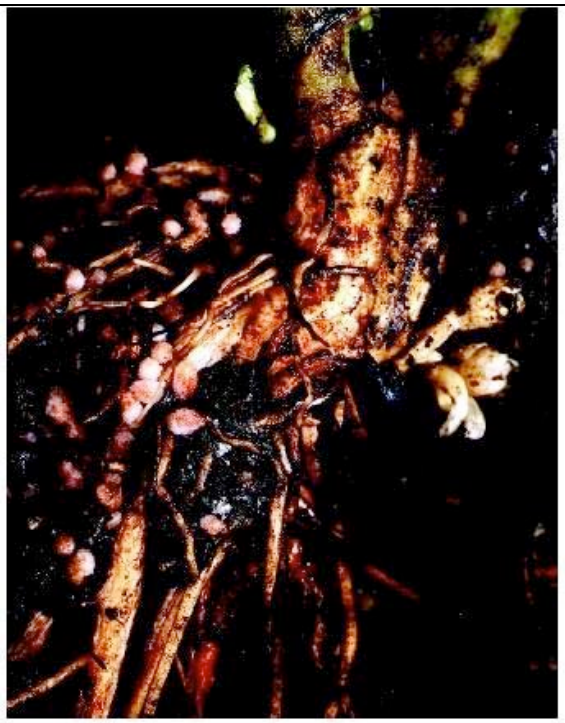
Visitors see a diorama representing a forested canyon on the Wasatch Front and learn about the interconnectedness of plants and animals. One area of the forest should be a more open canopy where wildflowers would appear. Soundscape will give visitors a sense of daytime inhabitants (mid-summer, daytime).

Groundform Description: steeply sloping up from nearground to background and from left to right; ground is soil with leaf litter and boulders (right side)

Elements Include: Red squirrel on decomposing log w. shelf fungus holding cone, soil cutaway showing lupine roots, Rocky Mountain maples (background) with seeds in foreground and in the air, Gambel Oak (background), curl-leaf mountain mahogany (background), Mountain alder (background), Sub-alpine fir log with spruce budworm, Engelmann spruce with bark beetle and three-toed woodpecker eating the beetles, wild flowers in a clearing/more open sunny spot; less mature trees, aspen with fungus, lupine, oak and maple galls, Western garter snake eating a boreal toad under a log, Steller!s jay, elk, mule deer skull or antler, mountain lion crouching (elevated), Uinta chipmunk in grass and other characteristic plants (including fungi and leaves w/galls) and badger and pocket gopher.

Note: All elements will be fabricated, except “mountain lion” and “elk” which are existing taxidermy in UMNH collection. Note that priority plants are indicated by * in the location column.

Location	Plants/ Animals in context	Pictorial Reference	Type (model, taxidermy, etc)	Source (existing UMNH Collections, to be borrowed, fabricated)
Close-up/magnify	spruce beetle spruce budworm (on fallen spruce log) nitrogen-fixing bacteria	 	models	fabricator

				
Ground cross section showing	lupine roots and nitrogen-fixing bacteria		models	fabricator
Nearground	*Tamias umbrinus* Uinta chipmunk on ground, in grass		taxidermy	fabricator
Nearground	decomposing log w. shelf fungus		models	fabricator

	Trametes veriscolor and *Cryptoporus volvatus, Veiled polypore on dead conifer*		models	fabricator

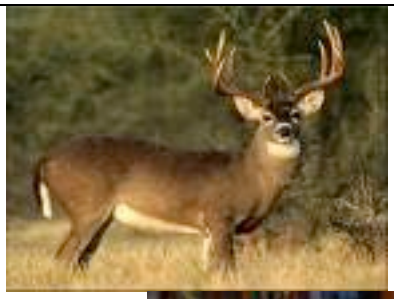
	Pleurotus populinus summer oyster		models	fabricator
	Pleurotus pulmonarius, mountain or bank cockshell		models	fabricator

	Amanita muscaria, Fly amanita mushroom		models	fabricator
*Under leaf litter on the ground- (possibly showing a cutaway and connection to the spotted corral root)	*Boletus edulis,* King Bolete mushroom		models	fabricator
	Armillaria mellea, Honey mushroom		models	fabricator

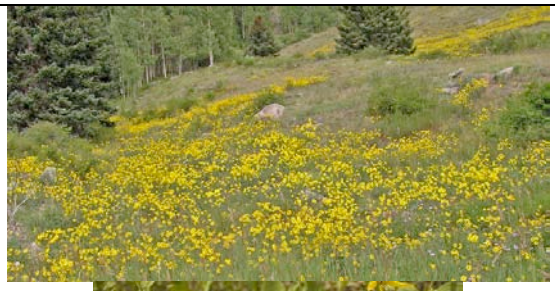
	Sarcodon imbricatus, fungus		models	fabricator
	Caloscypha fulgens below log,		models	fabricator
	Steller's jay *Cyanocitta stelleri* on top wildflowers, including lupine *Lupinus pusillus*		Taxidermy (Jay) models	fabricator

	Tamasciurus hudsonicus Red squirrel on log		taxidermy	fabricator
	Ganoderma applanatum, artists! conk on aspen		models	fabricator

Under log	*Thamnophis elegans* Western garter snake		model	fabricator (UMNH has model A0066)
	Bufo boreas boreal toad		model	fabricator (UMNH has model A0065)
Middleground	*Ips pilifrons,* spruce with beetle		models	fabricator
	Choristoneura occidentalis Western spruce budworm			
	3-toed woodpecker *Picoides tridactylus* eating beetles		taxidermy (woodpecker) models (beetles)	fabricator
	oak or maple with galls		models	fabricator
	badger digging after pocket gopher		taxidermy	fabricator

Midground/b ackgound	*Puma concolor* mountain lion eying elk		taxidermy	Existing UMNH Collections
	Odocoileus hemionus mule deer skull		antlers	Existing UMNH collections A0069
	elk		taxidermy	Existing UMNH Collections

	junipers, subalpine fir *Abies lasiocarpa,* Rocky Mountain maple *Acer glabrum,* mountain alder *Alnus tenuifolia,* quaking aspen *Populus tremuloides,* culleaf mountain mahogany *Cercocarpus ledifolia,* Gambel oak *Quercus gambelli*		models	fabricator

Background *	*Eucephalus engelmannii* Engelmann aster (4 models),		models	fabricator
	Heliomeris multiflora Showy goldeneye		models	fabricator
	Mertensia ciliata Mountain bluebell		models	fabricator

	Symphoricarpos oreophilus Snowberry		models	fabricator
	Penstemon whippleanus		models	fabricator

*	*Penstemon cyananthus* Wasatch penstemon 5-7 models		models	fabricator
	Carex geyeri Elk sedge dry clump		models	fabricator

*	*Carex hoodii* Hood Sedge, 3 big dry clumps	 	models	fabricator
*	*Juncus drummondii* Drummond rush (2 smaller clumps),	 	models	fabricator

*	*Phleum alpinum* Alpine timothy (4 clumps)	 	models	fabricator
	Deschampsia elongata Slender hairgrass	 	models	fabricator

	Thalictrum fendleri Meadowrue one male and one female if possible		models	fabricator

	Aquilegia caerulea Columbine	 	models	fabricator

	Eriogonum heracleoides Whorled buckwheat		models	fabricator

*	*Corallorhiza maculata* Spotted corral root at least 1 clump of motile individuals located close to the Mycorrhizal, King bolete (if possible show a cutaway connecting these two species by root structures)	 Corallorhiza maculata photo: Iza Goroff	models	fabricator

SECTION 10950 – SCENIC, DIORAMAS, MODELS AND TAXIDERMY

Life Ecosystem- Alpine Diorama LF6.E04.sx01

Visitors see a diorama representing a rock outcrop, talus, and associated tundra at the edge of the tree line, and learn about the interconnectedness of the plants and animals as well as how they adapt to life at extremely high elevations and low temperatures. Soundscape will give visitors a sense of daytime inhabitants. Golden eagle in background mural. (July, daytime)

Groundform: rocks grading into talus, then to tundra; steeply sloping; rocks are covered w. lichens

Elements include: Group of around 10 Magdalena Alpine butterflies flying over rockslide, marmot, Clark!s nutcracker feeding on pine seeds, Rufous hummingbirds visiting a penstemon, 2 white-tailed ptarmigans foraging, snowshoe hare (in brown pelage), bighorn sheep skull, pika w. hay pile, dwarf shrew eating spiders in talus rock formation, spiders, diptera, Whitlow “grass,” sedge, bristlecone pine in Krumholtz formation and pine cones, Engelmann spruce (background), Mat willow (background), moss campion (tundra), bristlecone, lichen, diptera tbd, spiders tbd in talus.

Note: All elements will be fabricated; mammals in taxidermy.

Location notes: talus: pika, rocks w. lichens, Draba at edge of talus, marmot, sheep skull, spiders at edge of talus, shrew at edge of talus; ptarmigan can be anywhere; moss campion on tundra

Location	Plants/ Animals in context	Pictorial Reference	Type (model, taxidermy, etc)	Source- (existing UMNH Collections, to borrow, or fabricate)
Nearground	*Carex albonigra,* sedge, *Draba globosa* Whitlow grass, *Silene acaulis,* moss campion		models	fabricator
	Erebia magdalena group of Magdalena Alpine butterflies flying over rockslide		models	fabricator
	shrew eating spiders		taxidermy (shrew) models (diptera/ spiders)	fabricator

	additional diptera/spiders		models	fabricator
	Clark's nutcracker *Nucifraga columbiana* feeding on pine seeds		taxidermy (nutcracker) models (seeds)	fabricator
	moss campion		model	fabricator
	dwarf shrew *Sorex nanus* eating spider in talus		taxidermy (shrew), model (spider)	fabricator

	rufous hummingbirds *Selasphorus rufus* visiting a penstamon		taxidermy (hummingbirds) model (penstamon)	fabricator
	pika *Ochotona princeps* and haystack		taxidermy (pika) model (haystack)	fabricator
Middleground	yellow-bellied marmot *Marmota flaviventris*		taxidermy	fabricator
	Lagopus leucura 2 white-tailed ptarmigan foraging		taxidermy	fabricator
	Lepus americanus snowshoe hare		taxidermy	fabricator
	bighorn sheep skull		purchase	fabricator

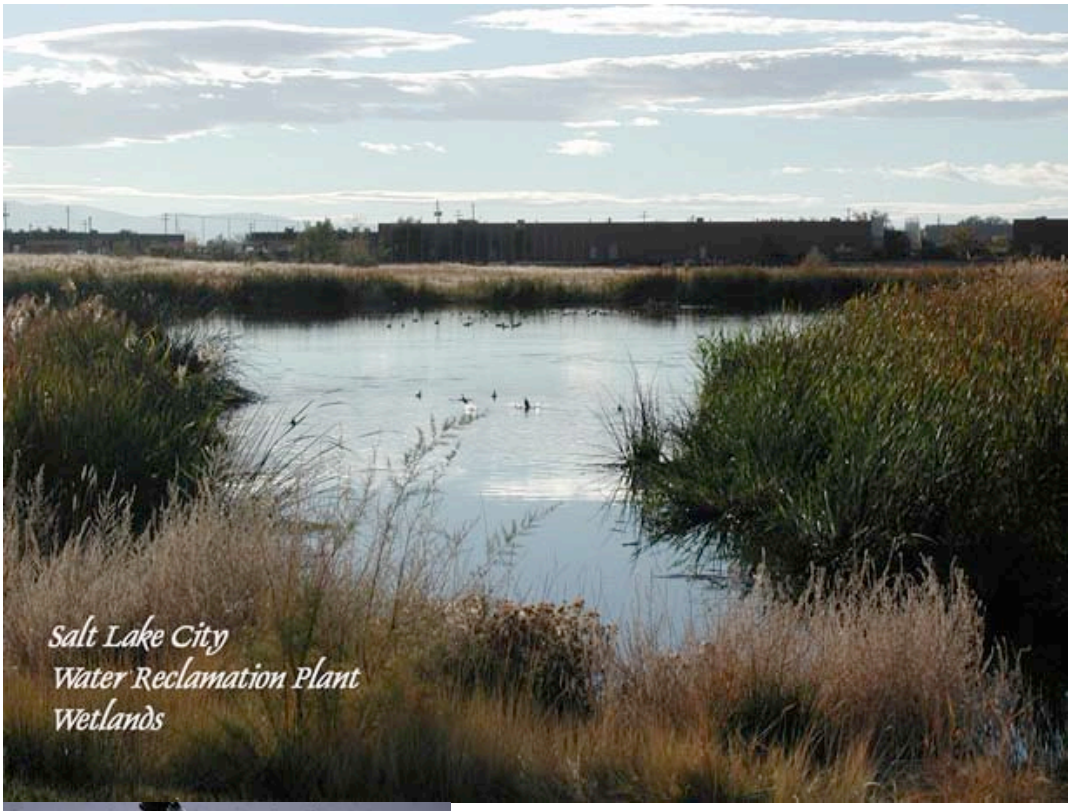
	Pinus longaeva Krumholtz pine		model	fabricator
Midground/ background	rocks with lichens *Peltigera aphthosa, Collema polycarpon, Collema tenax*		use real rocks, model lichens	fabricator
Background	mat willow *Salix arctica,* additional krumholtz pine and Engelmann spruce *Picea engelmanni*		models	fabricator

SECTION 10950 – SCENIC, DIORAMAS, MODELS AND TAXIDERMY

Lake- Wetlands Diorama LK2.E02.sx01

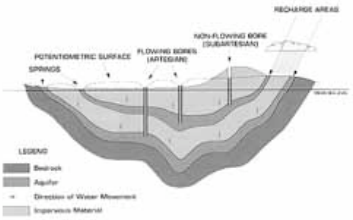
Visitors see a diorama representing the wetlands near Great Salt Lake; place reference Bear River Refuge or Shoreline Preserve. Focus is on fresh water habitat.

General reference images:

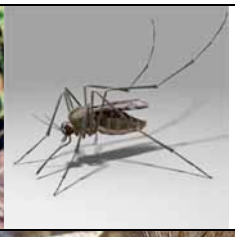
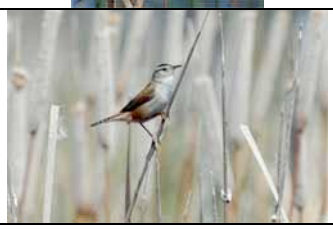


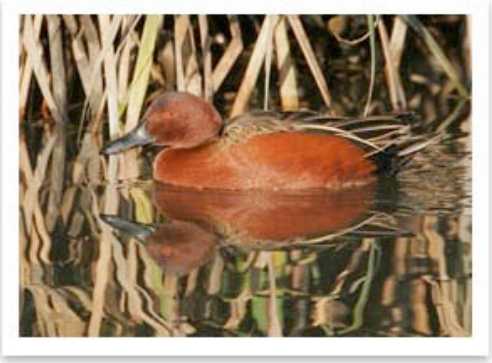
Elements include: Filtration plant/soil cross-section, marsh marigold, bulrushes, cattails, duckweed, hornwort, pondweed, rushes, crayfish, mosquitoes, water strider, diving beetle, chub and carp, garter snakes, dragonflies perching on cattails, leopard frog eating a mosquito, muskrat eating cattail roots, yellow-headed blackbird, marsh wren, egret or heron feeding just above, cinnamon teal swimming, eared grebe w/ nest, and other characteristic plants and animals/identifier species associated with the Great Salt Lake wetlands community.

SECTION 10950 – DIORAMAS, MODELS AND TAXIDERMY

Plants/Animals in Context	**Pictorial Reference**	**Type (model, taxidermy, etc.)**	**Source (existing UMNH Collections, to be borrowed, or fabricated)**
Filtration plant/soil cross section		model	fabricator
Ranunculus Marsh marigold		model	fabricator
Bulrushes		model	fabricator
Typha latifolia Cattails		model	fabricator
Duckweed		model	fabricator
Hornwort		model	fabricator

Lemma Pondweed		model	fabricator
Crayfish in water		model	fabricator
Mosquitoes		model	fabricator
Water strider on water surface		model	fabricator
Diving beetle under water		model	fabricator
Chub or carp under water		model	fabricator
Garter snake		model	fabricator
Dragonflies perching on cattails		models	fabricator

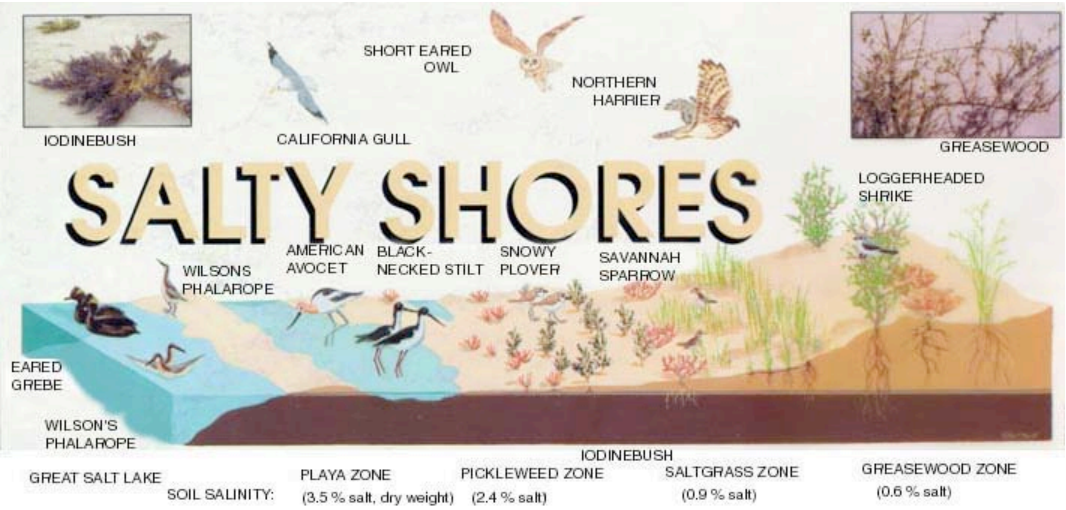
Rana pipiens Leopard frog eating a mosquito		models	fabricator
Ondatra zibethica Muskrat eating cattail roots		Taxidermy (muskrat) model (cattail roots)	UMNH collections-specimen is in an eating position
Xanthocephalus xanthocephalus Yellow-headed blackbird		taxidermy	UMNH collections-male available
Marsh wren		taxidermy	UMNH collections

Heron feeding on crayfish or frog underwater (photo ref. for heron only)		Taxidermy (heron) model (crayfish or frog)	fabricator
Eared grebe w. nest		taxidermy	fabricator
Anas cyanoptera Cinnamon teal		taxidermy	UMNH has a cinnamon teal pair

Shoreline Diorama LK2.E03.sx01

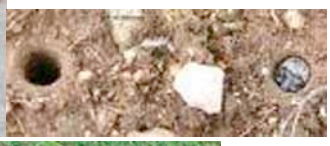
Visitors see a diorama representing a lake with shoreline/mudflat, playa, pickleweed, and saltgrass zones, and learn how the shores of the Great Salt Lake are home to a multitude of plant and animal species adapted to live in salty areas. Visitors see how different plant species can withstand different levels of salt in the soil, and so tend to be found in zones depending on the concentration of salt. Visitors see that where rainfall has lowered salt levels, certain plants such as iodine bush grow and provide food and shelter for a host of animals of different sizes, and can appreciate how though the playas, salt flats and marshes are not as lush as freshwater wetlands, they can still support diverse food webs.

General reference images:



Elements include: pickleweed, salt grass, iodine bushes, inkweed, wolf spiders, grasshoppers, Savannah sparrows, soil cross section showing tiger beetle burrow and vole runway, vole eating salt grass, vagrant shrew eating a Mormon cricket, avocets feeding on shore, Northern harrier flying overhead, harrier nest, snowy plover nest and other characteristic plants and animals/identifier species associated with the lake community.

Plants/ Animals in Context	**Pictorial Reference**	**Type (model, taxidermy, etc.)**	**Source (existing UMNH Collections, to be borrowed, purchased)**
Salicornia utahensis Pickleweed perennial, must appear close to ground water), and Salicornia annual		models	fabricator
Saltgrass		models	fabricator
Iodine bush		models	fabricator
Inkweed		models	fabricator
Spiders		models	fabricator

Grasshoppers		models	fabricator
Savannah sparrows		taxidermy	fabricator
Soil cross section showing tiger beetle burrow and vole runway		models	fabricator
Sorex vagrans Vagrant shrew eating Mormon cricket		taxidermy (shrew) and model (cricket)	fabricator
Vole eating Salt grass		Taxidermy (vole) model (Salt grass)	fabricator

Avocets feeding at water's edge		taxidermy	fabricator
Northern harrier flying overhead		taxidermy	fabricator
Snowy plover nest		model	fabricator

SECTION 10950 – SCENIC, DIORAMAS, MODELS AND TAXIDERMY

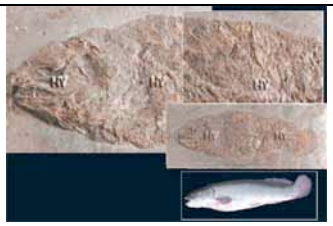
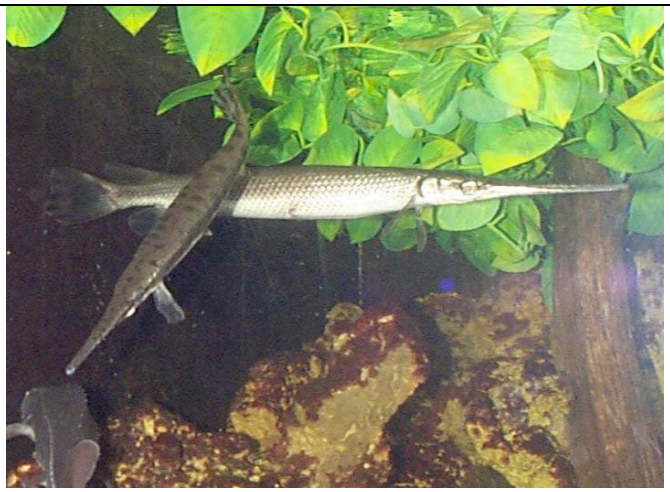
Past Worlds- Eocene Lakeshore Tableau PW3.E02

Visitors see a diorama representing the Fossil Lake and its shoreline.

General reference images:

Groundform: Flat, surface is mud with cracks and bird and croc. Tracks

Elements include: Stromatolites creating an undulating vertical wall from the flat bottom of lake to surface, sticking out of water surface by 6-12 inches, white oolitic sand in bottom of lake, insect larvae in water, 2 *Presbyornis* fossil mounts w. nest w. 8 eggs and tracks in mud-cracked surface, crocodile nest, crocodile chasing school of fish, hard-shelled turtle (*Baptemys*), softshell turtle, bowfin, small dead horse on bottom of lake, crayfish, 2 gars swimming on bottom of lake, baby/young caiman in water, mosquitoes, damselflies, caddisflies w. eggs on stromatolites, scorpion flies, marchflies, mosquitoes, sycamore, poplar, willow and birch tree leaves (floating on surface of lake).

Elements to Include	**Pictorial Reference**	**Type (model, taxidermy, etc.)**	**Source (existing UMNH Collectionsto be borrowed, or fabricated)**
Bony fish		model	fabricator
Bony fish		model	fabricator
bowfin		model	fabricator
Gars		model	fabricator

caddis fly larva		model	fabricator
horse Hyracotherium (size of a small cat) dead and fallen to lake bottom		model	fabricator
Caddis fly		model	fabricator
Caiman		model	fabricator
Eocene bird tracks		model	fabricator
Nest with goose eggs		model	fabricator

Croc nest		model	fabricator
Crocodile chasing fish		model	fabricator
Marsh fly		model	fabricator
Mosquito		model	fabricator
Oolitic sand		model	fabricator
Poplar leaves		model	fabricator

Birch leaves		model	fabricator
Sycamore leaf		model	fabricator
Willow leaf		model	fabricator
Presbyornis tracks		model	fabricator

Scorpion fly		model	fabricator
stromatolites		model	fabricator
Softshell turtle		model	fabricator
Hardshell turtle		model	fabricator

Past Worlds- Late Cretaceous Tableau PW4.E03.sx01

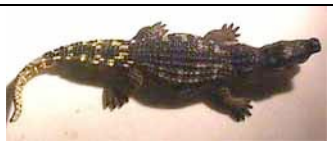
Visitors see a diorama representing a swampy bayou of the Lower Cretaceous era, includes a running water feature, and so dense with plants that visitors cannot see the sky.

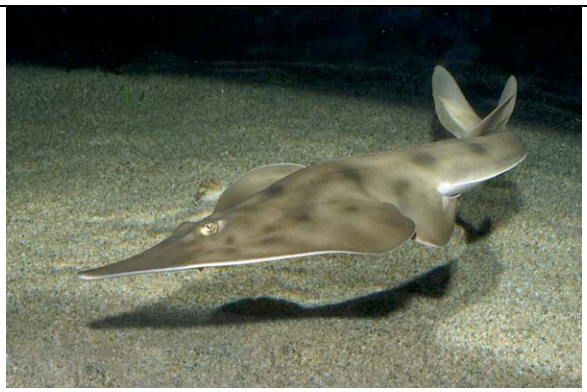
General reference images:

Groundform: flat, sloping slightly upward towards the back of the scene; surface is damp soil with leaf litter; stream cuts through scene

Elements include: *Deinosuchus* lurking in background, small, feathered *Troodon* scavenging partial ceratopsian carcass with maggots, wasps and beetles on it, empty dinosaur nest w. broken eggshell, stream with mud turtle, soft-shell turtle on bank, varanoid lizard sunning on log, small boa-like snake in tree or on log, helodermatid, small shrew-like mammals (*Alphadon* types), guitar fish, dead gar, dragonflies, moths, butterflies, earwigs, flies, ant nest near stream, fallen sequoia conifer, log grown over with lichen and fungi, dense undergrowth, cones and leaves, and other characteristic plant and animals/identifier species associated with the Lower Cretaceous community.

Elements to Include	**Pictorial Reference**	**Type (model, taxidermy, etc.)**	**Source (existing UMNH Collections to be borrowed, or fabricated)**
Alphadon		model	fabricator
Ant nest		model	fabricator
Boa snake		model	fabricator
butterfly		model	fabricator
ceratopsian (partial dead carcase)		model	fabricator

Deinosuchus		model	fabricator
Dragonfly		models	fabricator
Fly		models	fabricator
Gar		model	fabricator

Guitar fish		model	fabricator
Log with lichen fungus		model	fabricator
moth		model	fabricator
troodon		model	fabricator
turtle		model	fabricator

varanoid lizard		model (2 of these, or 1 of these and 1 heloderm atid)	fabricator
beetle (on dead plant)		models	fabricator
maggot (on dinosaur carcase)		models	fabricator

wasps (on dinosaur carcase)		models	fabricator
helodermatid (note it should have a long tail)		model	fabricator

Lake Migration Models LK2.E04.sx01

White Pelican

White Faced Ibis

Tundra Swan

First Peoples Activity Table- Tools FP5.E06.in01

Axe
L: 13-17 in
W: 3-7 in
H: 1-2 in

Large Point
L: 3-5 in
W: 1-3 in

Small Point
L: 1-2 in
W: 1/2-1 in

Pestle
L: 6-8 in
W: 1.5-3 in
D: 1.5-3 in

Hammer
L: 6-20 in
W: 2-5 in

Bone Tool
L: 4 in
W: 0.625 in

Packrat Midden FP7.E01.in01

Pack Rat Midden
L: 9 in
W: 6 in
H: 3 in

SECTION 10960 — INTERACTIVE EXHIBITS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section shall be governed by the Contract Documents. Provide materials, labor, equipment and services necessary to furnish, deliver and install all work of this Section as shown on the drawings, as specified herein and/or as required by job conditions.

1.2 WORK INCLUDED

A. The Work of this section shall include all mechanical and electromechanically interactive exhibits (.in) and special exhibits (.sx) as described in the Design Documents. The following list elaborates on the desired visitor experience to be incorporated into the Exhibit Contractor!s prototyping of each exhibit for the Exhibit Designer!s review and approval before commencing with final engineering and fabrication:

1. PAST WORLDS
   Ice Age Dinner Party PW2.E04.in03

   Learning outcome:
   The Ice Age in Utah was crowded with plant-eaters, meat-eaters, and omnivores. Each had different teeth and jaw structures adapted for their different diets.

   What visitors do:
   Visitors seat themselves around a 42" diameter circular dinner table set with meals for Ice Age guests. As host, they choose the right meal for the diner at their seat. Sound effects triggered by correct selections create a dinner party conversation. Each of five stations represents a different Ice Age mammal. These animals (cave bear, giant ground sloth, mammoth, dire wolf, bison or camel) are shown on the stools, and at a "place card" at the appropriate table setting. Visitors are prompted to choose the right meal for each animal (herbivore, carnivore, or omnivore).The visitor uses a rotating finger wheel to dial-in one of three possible meal images into view within a round window that represents a dinner plate. Ratchets in the turning mechanism provide centering for meal images within windows and also offers resistance between selections. When the right meal is selected a sound is heard followed by a short audio description.

2. FIRST PEOPLES
   Weaving Interactive Table FP5.E02.in01

   Learning outcomes:
   Utah!s first peoples had sophisticated ways of weaving and pleating the natural materials that were available to them. They made an incredible range of beautiful but also functional objects.

   What visitors do:
   A tabletop with 6 stations offers 3 different ways to try plaiting, twining and cordage. Visitors pick a station, and plait the tethered nylon cords following the diagrams to twine, plait, cordage. Visitors see objects made by prehistoric weaving and basketry techniques- from sandals to winnowing baskets - in the center case, related to the associated method.

2. FIRST PEOPLES
   Ceramics Interactive Table FP5.E08.in01

   Learning outcomes:

Pots are useful cooking, storage, and serving pieces. They can also be decorated, in styles that reflect personal taste and cultural heritage.

What visitors do:
Visitors approach a tabletop with 4 replica pots in the center; 2 stations with blank pot graphics and tethered decorating tools, 2 stations with a partial pot on an armature on the perimeter. Visitors pick a station, and use the stamps and tools to decorate the pot graphic; they can choose to copy the pot in the center, or develop their own design; cues encourage them to look at the center pots - where are the different design elements? what are they? At the reassemble the pot stations, visitors see a partial pot, and a bin of pot shards. They are encouraged to look carefully at the shape and pattern of the sherds, and see if they can insert the sherds into the gaps in the pot.

3. FIRST PEOPLES
Rock Art Activity FP8.E01.in01

Learning outcomes:
America's first artists left paintings and carvings on rock surfaces, perhaps as early as 10,000 years ago. These prehistoric images, known as rock art, may have been maps, or markers, or calendars, or stories.

What visitors do:
Visitors approach a magnet board with rock art symbol magnets, and compose their own rock art panel. They can refer to the photos of rock art from different places in Utah, and are encouraged to tell a story about their rock art panel.

4. FIRST PEOPLES
Tool Interactive Table FP5.E06.in01

Learning outcomes:
Utah!s first peoples used a diversity of tools that they created using the natural materials that were available to them. Every tool has a specific function that relates to these people!s ancient life ways.

What visitors do:
Visitors approach a tabletop with 3 concentric rings. The outer ring has graphics of different activities and poses the question what tool would you use? The middle ring has mounted tools (axe, large point, small point, pestle, hammer, bone tool), and the center ring covers the speaker. Visitors rotate the center ring to match tool to activity/use (i.e. what tool would you use to grind corn?). When you line up the right tool to activity, you hear the sound of the tool being used. (Arrow hissing through air, grinding stone against stone)

5. FIRST PEOPLES
Packrat Midden Table FP7.E01.in01

Learning outcomes:
Packrats gather plant materials from their environment and form them into middens. These middens are environmental time capsules, recording the plant life around the midden, and giving us clues to climate change.

What visitors do:
A tabletop with central case holds a packrat midden and perimeter ring with inset magnifiers. Visitors move around the table to the different magnifier stations and see evidence in the midden (grass, corn, corn pollen, charcoal, other plants). Adjacent to each magnifier is a caption explaining what that piece of evidence tells us about the passage of time and climate

6. LAKE
Wetlands Filtration LK2.E02.in01

Learning outcomes:
Wetlands along the lakes shore play an important role in filtering groundwater, and storing freshwater.

What visitors do:
At one end of the wetlands diorama, visitors see a cluster of plants along a tilted plane, and a bin holding transparent and black balls. Visitors turn a crank handle to release the "water" (transparent balls with larger black balls representing pollutants).
As the balls roll down the plane running through the wetland interactive many of the large marbles are caught in cages. The water balls pass through and around the cages and fall into a collection area at the foot of the plane. Some pollutant balls bypass the cages and also collect with the water balls.
To reset and start the interactive a visitor turns the crank 1/2 turn. This tilts the plane, releasing the pollutant balls back, where they collect with the water balls, and are returned to the top of the tilted plane.

7. LAKE
Great Salt Lake Through Time LK3.E01.in01

Learning Outcome:
The Great Salt Lake did not always look as it did today. In fact, its levels have changed many times filling the Valley to ancient shorelines, which are still visible today. At one point about 13,000 years ago the place where you are currently standing in this museum was completely under the water.

What visitors do;
Visitors dial back time and see how the lake levels have changed. Key stages in the Lake's history are modeled in this interactive by changing the water level across a topographic map within a six-foot circular acrylic tank. The map replicates the Salt Lake City Region and illustrates area topography; it includes scale models of the Museum, the Utah State Capitol Building and Kennecott Stack. Surrounding the tank is a cantilevered circular graphic rail. Graphics that represent six time periods from 24,400 BP to today are shown on a raised part of the rail that can be rotated in two directions.
Visitors rotate the raised panel to select a time period, and watch as the water level in the tank is adjusted in response to their selection. Six different historic levels can be modeled ranging from the high of Lake Bonneville through to the Great Salt Lake!s 1963 historic low. Distinct shorelines are created by the intersection between the water level and the topographic map. A ratchet mechanism provides resistance between setting positions. In order to initiate a water level change a selection must be held for several seconds (TBD) at which point the ring becomes locked. The lock-out lasts for the until the newly selected water level is reached.

Prototyping should include: General operation, mechanical soundness and durability, feel of the rotating graphic rail and ratchet, the accuracy of the water levels and shorelines, the durations of the level changes and rail lock-out, water evaporation and strategies to avoid internal tank condensation.

8. LAND
Erosion Table LD3.E01.in01

Learning Outcome:
Visitors will understand the power and infinite potential of water as a force that moves and shapes the land.

This activity is derived from the real process of wind and water erosion that have shaped Utah!s landscape. The Colorado and Green Rivers flow through the rugged terrain of the Colorado Plateau molding and shaping as they go. The erosion table combines freeform play and experimentation based on a real phenomenon.

What visitors do:
Visitors control water to create a diverse array of erosion patterns in a flat bed of sand that they smooth out and manipulate. The patterns they create will vary depending on how they distribute the sand and how quickly the water is released to flow through the sand.

9. LAND
Earthquake Simulator LD4.E03.in01

Learning Outcome:
Visitors understand that Utah and the Intermountain West are active fault zones, with faults large and small occurring daily.

What visitors do:
On a tabletop map of the western United States visitors press a button located at the epicenter of a historic earthquake and experience the magnitude and waveform of the quake as they stand on shake platform. Nearby a large wall mounted monitor displays the seismographic read out for that earthquake and describes the type of fault movement that caused the quake. The platform, flush with the surrounding floor, uses x and y axis movement to create the simulation of the quake.

10. LAND
Expansion LD4.E06.in01

Learning outcomes:
Utah is actually part of a much larger Basin and Range formation. This distinctive washboard of mountains and valleys is the result of an expansion process that has been taking place for millions of years. Our mountains in western Utah are actually still moving farther apart.

What visitors do;
This interactive shows how the Basin and Range province formed. The interactive is built into a counter and protected by an acrylic cover. A lever protrudes from between simulated rock layers in the counter. The visible part of the interactive is comprised of parallel angled “blocks” that separate as the lever is pulled to the left. As the expansion occurs the “secondary blocks” descend between the “primary blocks” that remain level as they move. A concealed scissor mechanism simultaneously replicates this action across the interactive. A hydraulic or electromechanical device resets the interactive to the compressed configuration after it is expanded and the operator releases the handle.

11. LIFE
Keratin Tree LF2.E02.in02

Learning outcomes:
Visitors understand that genetic variation is one basis for building a tree of life.

What visitors do:
Visitors see rows of letters representing the amino acids in part of the sequence of a keratin protein for 14 different animals. Next to this set of sequences is a tree with graphics of the 14 animals, and screens at the end points and at the branching points. As visitors look across the rows they notice that most of the letters are the same and match in neat vertical columns. At least three of the columns show that there is sometimes a variation in this pattern. Visitors push a button to select one of 3 highlighted column positions on the keratin sequences. Letters appear on the screens at the end points to

match the amino acid letters at the chosen position. Then the screen at the first node (goat sheep) becomes active, with 4 of the amino acid letters appearing, one after another, a cue to begin there. Visitors are asked to pick the amino acid letter present in the common ancestor (at the node). Visitors touch a screen at the node to change the letter, stopping to indicate their choice. If they are correct, the portion of the tree to the right of the node (including the end animals) lights up, and the next node on the tree blinks. Working sequentially, visitors pick the amino acids at each node until the entire tree lights up. Advanced facilitated mode: A museum staffer or facilitator can activate a "hard" version of the game by pushing a hidden button. In the hard version, there is no feedback until all correct node selections have been made at which point the entire tree lights up.

12. LIFE
Build A Cell LF3.E01.in01

Learning outcome:
Visitors understand that plant and animal cells have many similar elements, but key differences.

What visitors do:
Visitors are invited to help build a cell. They select anatomical parts from the plant and animal cell bins, and try to insert them into the openings in the 2 cells.
The animal parts and cell, made of latex, are "squishier" and the plant parts and cell, made of clear epoxy, are more rigid. These properties reflect the nature of plant and animal cells. When a part is inserted in the right opening, the visitor hears feedback via a speaker mounted inside the cell (now I can make more proteins!). Once all the cell components are inserted, the whole cell lights up. Visitors hit a reset button, which activates a release mechanism so that the cell part pieces eject and fall into a bin below.

13. LIFE
Protein Synthesis LF2.E02.in01

Learning outcome:
Visitors understand that DNA stores information that is translated into proteins.

What visitors do:
A large sculpture of a DNA helix descends from overhead. The two strands of DNA 'un-zip,' separating the base pairs. Part of the DNA strand is inset into a ribosome subunit; this is the piece visitors will work on. Visitors first make an mRNA strand by matching RNA bases to the DNA strand. Next, they form an amino acid chain, acting as transfer RNA to pair up an amino acid to the correct 3 base sequence (codon) on the mRNA strand. Using a color-coded key, visitors pick from a bin of amino acid puzzle pieces. They match the 3 amino acids in sequence; when the chain is completed, it lights up. The lit chain extends to the Keratin Tree game.
Visitors are encouraged to detach the puzzle pieces and return to the bin.

14. LIFE
Jaw Movement LF4.E03.in01

Learning outcome:
Visitors understand that animals have evolved different shapes and configurations of jaws and teeth for different diets.

What visitors do:
Visitors see a set of skulls; the skulls are flat, but dimensional, and life sized; they include key Utah critters like pronghorn, mountain lion, and desert tortoise. Graphics of the animal are adjacent to the skulls.
Visitors manipulate the skulls and jaws to see how the animal chews. Some of the jaws move up and down, while others move back and forth or side to side.

15. LIFE
Pollination LF4.E02.in01

Learning outcome:
Visitors find that pollinators and the flowers they pollinate have co-evolved.

What visitors do:
Visitors see 2 dials - one with flowers and one with pollinators. They turn the pollinator dial to match the pollinator to the flower. They find that some flowers are pollinated by bats, others by wasps, and others by butterflies. When they make a correct match, a graphic congratulates them, and points out the co-evolved features of the plant and pollinator.

16. Interactive materials and surfaces including:

a. LAKE gel floor tiles.
b. FIRST PEOPLES heat sensitive paint on GWB substrate.
c. FIRST PEOPLES Interactive drawing pads.

17. Interactive mechanical hardware and interfaces including:

a. touch object brackets
b. flip book hinges
c. sliding magnifiers and lenses
d. smell samples

1.3 RELATED SECTIONS

Section 05500 Metal Fabrications
Section 06430 Exhibit Woodwork
Section 16500 Exhibit Lighting
Section 1130 AV Systems
Section 10200 Digital Outputs

1.4 QUALITY ASSURANCES

A. The fabricator and the installer shall be one of the same firm who can substantiate that the firm has been continuously engaged in the fabrication and installation of electromechanical interactive work similar to that described herein for not less than seven (7) years.

B. Technical design, engineering and prototyping of electromechanical exhibits is the Exhibit Contractor's responsibility.

1. The Design Documents are intended to provide performance and aesthetic and functional specifications for the design, fabrication and installation of electromechanical exhibits of this

Section. This Exhibit Contractor is responsible for the engineering and design of the components and materials as well as fabrication, installation, and performance of the fabrications.

2. Exhibit Design Drawings shown are intended to establish the basic dimensions, finishes, motion, location, connections, and profiles of electromechanical exhibits. The Exhibit Contractor is responsible for the design and engineering of the fabrication within these parameters. The drawings are design requirements, unless specifically noted as completely engineered and designed on the drawings.

3. Exhibit design control drawings do not cover some conditions or modifications, which may be required. The Exhibit Contractor, by accepting this Work, acknowledges this and agrees that the Exhibit Designer shall have final acceptance of all matters whether detailed or not for the exhibit design details.

C. Engineer qualifications: Professional engineers experienced in providing engineering services of the kind required that have resulted in the successful installation of electromechanical exhibits as similar as possible in material, design and extent to that indicated for this Project.

D. All work shall comply with all building and applicable life safety codes and is subject to the Owner!s code consultant!s review.

E. All electromechanical exhibits exposed to direct visitor contact or having visitor interface shall be engineered to withstand normal wear and tear of such contact. Exhibit Contractor shall warrantee in writing all electromechanical exhibits free of defects and able to withstand visitor contact. The period of the warrantee shall be one year. Exhibits failing to function as specified during this period shall be repaired at the Exhibit Contractor!s expense.

F. Contractor shall provide written instructions on the maintenance of all electromechanical exhibits – See Section 01782 Operations Demonstration and Training. Owner shall be responsible for providing proper maintenance under the terms of the warrantee.

1.5 SUBMITTALS

A. SAMPLES & PRODUCT LITERATURE: The samples and certificates in the following list are required to be submitted by the Exhibit Contractor to the Exhibit Designer for review. An omission of an item or items does not relieve the Contractor from this responsibility, and for compliance with the Contract Documents of which this is a part.

1. Interactive surfaces:

   a. (3) 30” x 30” LAKE gel floor tiles with integrated graphics (based on digital file provided by Exhibit Designer)
   b. (3) 24” x 24” FIRST PEOPLES heat sensitive paint.
   c. (3) 12” x 12” FIRST PEOPLES Interactive drawing pads.

2. (3) each of all exposed hardware including but not limited to, flip book hinges, sliding magnifiers and lenses.

3. (3) each of all electro-mechanical parts: push buttons, sensors and handsets.

4. Product literature for specialty materials and manufactured hardware, supplies, electrical and mechanical components, and parts.

B. SHOP DRAWINGS

1. Submit shop drawings for review in accordance with the Design Documents.

2. Shop drawings shall indicate by plans, elevations, sections and details of the work of this Section, showing in detail large scale construction, methods of installation and attachment, type, size, spacing and location of welds, bolts or other anchorage devices and shall give all pertinent data as to thickness, dimensions and exposed finishes.

3. Shop drawings shall indicate the work which is furnished by this Section and installed by other trades and the work of other trades which adjoin or butt the work of this Section.

4. As requested by the Exhibit Designer provide additional details, sections and calculations to fully describe the work to be provided.

5. Where items, anchorages, inserts are scheduled to be set into the concrete or built into the work by other Contractors for the installation of exhibits provide setting drawings, templates, instructions and directions for their installation. Coordinate delivery with other work to avoid delay of job progress.

D. PROTOTYPES

1. Prior to final fabrication and installation of all interactives shall be prototyped and tested by the Exhibit Contractor and reviewed by Exhibit Designer and Owner. Build mockups and prototypes to comply with the following requirements, using materials indicated for the completed Work to demonstrate the following;

   a) functionality
   b) accessibility, ergonomics and ease of use
   c) integration of hardware, products and systems
   d) durability

2. Fabrication schedule should be planned so that a minimum four weeks are allowed for prototyping testing and review prior to installation.

3. Notify Exhibit Designer one month in advance of dates and times when prototype will be fabricated and ready for review.

4. Prototypes shall demonstrate the aesthetic effects and functional qualities of materials and systems as well as the defined visitor experience, ergonomics and mechanical functioning of all interactives.

PART 2 - PRODUCTS

2.1 FABRICATION - GENERAL REQUIREMENTS

A. Workmanship and finishes shall be first class in every respect and in accordance with the best practices. Employ skilled workers in the fabrication and erection of this work.

2.2 SPECIALTY PRODUCTS

A. Interactive Surfaces:

1. LAKE Interactive Gel Floor, custom color gel floor with integral graphics and edges cut to lake level contours flush with surrounding terrazzo surface (by GC).

   a. Groundplans, Ltd.
      136 East 56th Street, Ste. 4G
      New York, NY, USA#10022
      Tel. 212-888-9366
      groundplans.com

b. Or equal as approved by the Exhibit Designer.

2. FIRST PEOPLES Heat sensitive surface

a. LCR Hallcrest, Inc. Color Changing Temperature Sensitive Graphic Material R25C5W.
Liquid Crystal Resources, L.L.C.
1820 Pickwick Lane
Glenview, IL 60026
847-998-8580
www.hallcrest.com

b. Alsa Corp. Eclipse Heat sensitive paint.
Alsa Corporation
2640 E. 37th Street
Vernon, CA 90058
323-581-5200
www.alsacorp.com

c. Or equal approved by Exhibit Designer.

3. FIRST PEOPLES drawing activity to have a hand stylus that displaces aluminum powder on the back of screen leaving a solid line (similar to Etch- a Sketch)

PART 3 - EXECUTION

3.1 TIME OF COMPLETION & FABRICATION SCHEDULE

A. The Exhibit Contactor shall prepare an estimated progress schedule for the Work. The schedule shall be related to the entire Project to the extent required by the Contract Documents. This schedule shall indicate the dates for the starting and completion of the various stages of fabrication and shipping and shall be revised as required by the conditions of the Work, subject to the Exhibit Designer!s approval.

3.2 EXAMINATION

A. Two in-shop prototyping reviews shall be planned after approval of materials to review shop drawings, development of electromechanical elements and progress on actual exhibit elements. In the first review the Exhibit Designer shall review the progress and provide evaluations of the prototypes and finalize the fabrication of the Work.

B. A second shop review will constitute a verification that all issues have been adequately addressed and revisions implemented to the Satisfaction of the Exhibit Designer prior to delivering and installing the exhibit.

3.3 MEASUREMENTS

A. Exhibit Contactor shall be responsible for verifying and guaranteeing all critical measurements, including those provided by Exhibit Designer, Owner, and others. All such dimensions shall be shown on the shop drawings.

B. Exhibit Contactor shall be responsible for verifying dimensions that are required for proper coordination with other work, including but not limited to exhibits and Owner provided materials.

3.4 SHOP FABRICATION

A. All exhibits included in the Scope of Work shall be shop fabricated, unless otherwise identified in bid proposal by Exhibit Contactor.

3.5 COORDINATION BETWEEN TRADES

A. Exhibit Contactor shall coordinate work to ensure that the Interactive Exhibits will fit properly into the Interior provided by the General Contractor and the work of subcontractors and otherwise fit and are well-integrated with any surfaces they rest on or objects they are touching or holding.

B. Failure of this Exhibit Contactor to make known his/her own needs and to determine the requirements of others shall not be cause for additional compensation to correct interferences, or for extra work which could have been avoided by proper coordination.

PART 4 INSTALLATION

4.1 SHIPPING AND HANDLING

A. Exhibit Contactor shall store, handle, and ship all Interactive Exhibits in such a way that they shall be perfect, free of dust and dirt and abrasions, and unmarred when they arrive and are unpacked. Exhibit Contactor shall securely and safely crate all Interactive Exhibits. Crates shall be marked with indications of opening sequence. Crates shall be constructed in such a way as to properly protect the completed Interactive Exhibits and any accessories from damage including breakage, scratches and indentations of any sort. Each element of the Work shall be adequately protected with bubble-wrap and foam padding, and supported or braced with framework, as required, up to the point of unpacking.

B. All shipments shall be made with a professional shipping company and shall be fully insured. Owner shall be notified of shipment(s) in advance.

4.2 INSTALLATION

A. Exhibit Contactor shall provide all transportation, lodging, labor, and materials necessary to install the Interactive Exhibits.

B. Exhibit Contactor shall provide all mounting hardware required for complete installation. Exhibit Contactor shall indicate handling points and any vulnerable areas.

4.3 DOCUMENTATION & MANUALS

A. Provide documentation binders for all mechanical parts replacements and maintenance procedures for the future upkeep of all interactives as per Section 01782 Operations and Maintenance and Section 01820 Demonstration and Training. The Exhibit Contractor is to conduct a staff training session for all interactives that will require regular maintenance.

4.4 CLEANING AND PROTECTION

A. Protect installed work using adequate and suitable means during and after installation until acceptance.

B. Repair, remove and/or replace surfaces and materials that become marred, scratched, bent or damaged in any way.

C. Clean surfaces of grime and dirt using acceptable and recommended means and methods. Take care not to damage, mar or stain adjacent materials.

END OF SECTION 10960

SECTION 10970 — LIVE DISPLAYS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section shall be governed by the Contract Documents. Provide living animals, materials, labor, equipment and services necessary to furnish, deliver and install all work of this Section as shown on the drawings, as specified herein and/or as required by job conditions.

1.2 WORK INCLUDED

A. The Work shall include, but is not limited to the following Live Exhibits and their required life support systems and environments:

1. OUR BACKYARD
   a. Black Widow Spider
   b. Wolf Spider
   c. Tarantula Spider
   d. Jumping Spider
   e. Centipede
   f. Jerusalem Cricket
   g. Velvet Ants
   h. Beetles
   i. Desert Hairy Scorpion
   j. Mormon Cricket
   k. Praying Mantis
   l. King Snake
   m. Collared Lizard
   n. Ant Colony
   o. Woodhouse Toad
   p. Boreal Toad and Chorus Frog
   q. Tiger Salamander

2. LAKE
   a. Brine Shrimp
   b. Halloccus Bacteria

3. LAND
   a. Pothole Crustaceans

4. LIFE
   a. Tarantulas
   b. Seed Harvester Ants
   c. Stickleback Fish
   d. Algae, Elodea, Volvox & Water Lily

1.3 RELATED SECTIONS

Section 05500 Metal Fabrication
Section 06430 Exhibit Woodwork
Section 16500 Exhibit Lighting

1.4 QUALITY ASSURANCES

A. The fabricator and the installer shall be one of the same firm who can substantiate that the firm has been continuously engaged in the fabrication and installation of live displays and life support environments and work similar to that described herein for not less than five (5) years.

B. Technical design and prototyping of Live Displays are the Exhibit Contractor's responsibility.

1. The Contract Documents are intended to provide performance and aesthetic specifications for the design, fabrication and installation of live displays of this Section and establish the basic dimensions, finishes, location, connections, and profiles of exhibits. The Exhibit Contractor is responsible for the engineering and design of the components and materials as well as fabrication, installation, and performance of the fabrications.

2. Exhibit design control drawings do not cover some conditions or modifications, which may be required. The Exhibit Contractor, by accepting this Contract for the Work, acknowledges this and agrees that the Exhibit Designer shall have final acceptance of all matters whether detailed or not for the exhibit design details.

D. All Live Displays shall comply with all required life safety and local public health and sanitation codes.

E. All habitats must meet or exceed the standards set by the Animal Welfare Act and enforced by the Animal and Plant Health Inspection Service (APHIS) of the U.S. Department of Agriculture (USDA).

F. All habitats must be completely sealed to prevent the contamination of other exhibits or museum facilities by Live Displays.

1.5 SUBMITTALS

A. SAMPLES: The materials samples and certificates in the following list are required to be submitted by the Exhibit Contractor to the Exhibit Designer for review. An omission of an item or items does not relieve the Exhibit Contractor from this responsibility, and for compliance with the Design Documents of which this is a part.

1. (3) each of all unique habitat substrates, materials, mediums, scenic forms, etc.

B. SHOP DRAWINGS

1. Submit shop drawings of each Living Exhibit habitat for review. Shop drawings shall indicate by plans, elevations, sections and details of the work of this Section, showing in detail all methods of installation and attachment, type, size, spacing and location of access panels and life support system, joints, welds, fasteners, bolts or other anchorage devices and shall give all pertinent data as to thickness, dimensions and exposed finishes.

2. Shop drawings shall indicate the work which is furnished by this Section and installed by other trades and the work of other trades which adjoin or butt the work of this Section.

3. As requested by the Exhibit Designer provide additional details, sections and calculations to fully describe the work to be provided.

4. Where items, anchorages, inserts are scheduled to be set into the concrete or built into the work by other Prime Contractors for the installation of exhibits provide setting drawings, templates, instructions and directions for their installation. Coordinate delivery with other work to avoid delay of job progress.

C. PRODUCTS

1. Submit product literature to Exhibit Designer for review in accordance with the requirements of the Contract Documents.

2. Identify sources of live animal and plant species. Indicate compliance with all USDA importation and International exportation regulations for living products.

3. Submit printed manufacturer's literature, data sheets, certificates of UL listing, and/or catalog cuts for all items which are pre-manufactured and will be provided as part of the work.

D. PROTOTYPES

1. Prior to installation of the Lake and Life live display tubes and table top aquarium exhibits shall be prototyped with substrates and lighting for reviewed by Exhibit Designer and Owner to confirm ease of access and maintenance.

2. Fabrication schedule should be planned so that a minimum four weeks are allowed for prototyping and testing prior to installation.

3. Notify Exhibit Designer one month in advance of dates and times when prototype will be fabricated and ready for review.

4. Prototypes shall demonstrate the aesthetic effects and qualities of materials as well as assuring a healthy habitat for live plants/ animals and the mechanical functioning of all exhibits.

1.6 DELIVERY, STORAGE & HANDLING

A. Deliver materials to the job ready for use, and fabricated in as large sections and/or assemblies as practical. Assemblies shall be identical to the reviewed submittals.

B. Store materials under cover in dry and clean locations off the ground. Take every precaution not to damage or mar finishes. Remove materials which are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials at no additional cost.

PART 2 - PRODUCTS

2.1 FABRICATION - GENERAL REQUIREMENTS

A. Workmanship and finishes shall be first class in every respect and in accordance with the best practices. Employ skilled workers experienced in the construction, detailing and operation of habitats for living plants and animals in the fabrication and erection of this work.

B. Approved Living Exhibit Consultant:

a. ImpersaNature Studios, Inc.
8415 S. 700 W. #11
Sandy UT, 84070
Tel. 801-618-9776
Impersanaturestudios.com

b. Or equal as approved by Exhibit Designer

2.2 SUMMARY OF HABITAT & MAINTENANCE REQUIREMENTS

Area	Description of Habitat	Live specimens	Size of habitat	Habitat Specifications: Wet-dry, Sand, earth, substrate, etc. Plants	Maintenance Requirements: Access, lighting, filtration, heat
OB	Live insect zoo-mounted cases on wall or cases on shelves	Black widow	1 gallon max.	In woodpile	
		Wolf Spider	1 gallon	Mimic natural environment- local rocks can be sterilized, sand, etc.	During day- lights can be low, bright lights at night. Lighting is primarily to enable public viewing. Food- worms, crickets, roaches
		Tarantula	1 gallon	Utah varieties are small	
		Jumping Spider	1 gallon		
		Centipede	1 gallon		
		Jerusalem Cricket	1 gallon		
		velvet ants	1 gallon		
		beetle	1 gallon		
		desert hairy scorpion	1 gallon		
		Mormon cricket	1 gallon		
		Praying mantis	1 gallon		
	Walls of “underground” crawlspace contain inset terrariums	King Snake	120 gallon-48” x 24” x 25” H	Requires hiding places in habitat	Heating important- caloric heat tape can be used to gradually heat environments. Spec thermostat as part of this system. Red light, blue lights or led!s can be used to illuminate. Lights are to enable visitor viewing. UVA and UVB lights can be used in back of house.
		Collared Lizard	40 square- 40” x 40” x 18” H	Requires hiding places in habitat	
		Ant Colony	5 gallon tank dimensions24” x 24” x 17” H		

	Pond-side animal habitat-terrariums with round wall openings	Woodhouse Toad	120 gallon- 48” x 48” x 25” H	Collection of these is highly regulated- suggestion to get juveniles from captivity and breed them.	
		Boreal Toad Chorus Frog	120 gallon- 48” x 48” x 25” H	Size contingent on both species	
		Tiger salamander	40 square- 24” x 24” x 17” H		

Lake	Biota tube	Brine Shrimp	5! x 1! diameter tube with 3” thick double wall		Brine shrimp use light as focal point, otherwise remain quite static. Lighting to run vertically inside the tube and light the entire structure. Heat tape could also be used here. Aerator required below & holes on top. Changeout of 50% of the water twice a week. Moderating temperature and not overfeeding are critical to brine shrimp!s survival.
	Winogradsky column	Halococcus Bacteria	5! x 1! diameter tube. with 1” thick double wall		Lighting to run vertically inside the tube and light the entire structure. Aeration will help things move around.
Life	Problem of Size	Tarantulas (with past molts displayed)	30” diameter half dome	Dry environments, ground dwelling. Mexican red leg variety or Antilles pink toe, both examples of terrestrial types that live on the ground.	

	Population	Colony of seed harvester ants	30” diameter half dome	Thin walled sides and flat area on top	
	What Populations Do	Stickleback fish	30” diameter half dome		Hide filtration system with plants, Fluval or Eheim canister filter - water runs through mechanical and chemical filtration.
	Economy of Life - Photosynthesis Display	Algae, Elodea, Volvox & Water Lily	5! x 1! diameter tube		growing with sunlight from heliostat
Land	Colorado Plateau- glass tank	Pothole Crustaceans	2! diameter pothole, 5” deep	Need stabilized temperature, triops are very carnivorous and will live an average of 30-45 days.	Access from below.

PART 3 - EXECUTION

3.01 TIME OF COMPLETION & FABRICATION SCHEDULE

A. The Exhibit Contactor shall prepare an estimated progress schedule for the Work. The schedule shall be related to the entire Project to the extent required by the Contract Documents. This schedule shall indicate the dates for the starting and completion of the various stages of fabrication and shipping and shall be revised as required by the conditions of the Work, subject to the Exhibit Designer!s approval.

3.02 EXAMINATION

A. Two in-shop prototyping reviews shall be planned after approval of materials to review shop drawings, development of Living Exhibit elements and progress on actual exhibit elements. In the first review the Exhibit Designer shall review the progress and provide evaluations of the exhibits and finalize the fabrication of the Work.

B. A second shop review will constitute a verification that all issues have been adequately addressed and revisions implemented to the Satisfaction of the Exhibit Designer prior to delivering and installing the exhibit.

C. A final review of each installed habitat with Live Displays is subject to the review and approval of the Exhibit Designer, Owner and local public health official who has jurisdiction.

3.03 MEASUREMENTS

A. Exhibit Contactor shall be responsible for verifying and guaranteeing all critical measurements, including those provided by Exhibit Designer, Owner, and others. All such dimensions shall be shown on the shop drawings.

B. Exhibit Contactor shall be responsible for verifying dimensions that are required for proper coordination with other work, including but not limited to exhibits and Owner provided materials.

3.04 SHOP FABRICATION

A. All exhibits included in the Scope of Work shall be shop fabricated, unless otherwise identified in bid proposal by Exhibit Contactor.

3.05 COORDINATION BETWEEN TRADES

A. Exhibit Contactor shall coordinate work to ensure that the Interactive Exhibits will fit properly into the Interior provided by the General Contractor and the work of subcontractors and otherwise fit and are well-integrated with any surfaces they rest on or objects they are touching or holding.

B. Failure of this Exhibit Contactor to make known his/her own needs and to determine the requirements of others shall not be cause for additional compensation to correct interferences, or for extra work which could have been avoided by proper coordination.

PART 4 INSTALLATION

4.01 SHIPPING AND HANDLING

A. Exhibit Contactor shall store, handle, and ship all Live Displays in such a way that they shall be perfect, free of dust and dirt and abrasions, and unmarred when they arrive and are unpacked. Exhibit Contactor shall securely and safely crate all Live Displays. Crates shall be marked with indications of opening sequence. Crates shall be constructed in such a way as to properly protect the habitats and Live Displays and any accessories from damage including breakage, scratches and indentations of any sort. Each element of the Work shall be adequately protected with bubble-wrap and foam padding, and supported or braced with framework, as required, up to the point of unpacking.

B. All shipments shall be made with a professional shipping company and shall be fully insured. Owner shall be notified of shipment(s) in advance.

4.02 INSTALLATION

A. Exhibit Contactor shall provide all transportation, lodging, labor, and materials necessary to install the Live Displays.

B. Exhibit Contactor shall provide all mounting hardware required for complete installation. Exhibit Contactor shall indicate handling points and any vulnerable areas.

4.03 DOCUMENTATION & MANUALS

A. Provide documentation binders for all life support systems. mechanical and electrical parts replacements and maintenance procedures for the future upkeep of all Live Displays as per Section 01782 Operations and Maintenance and Section 01820 Demonstration and Training. The Exhibit Contractor is to conduct a staff training session for all interactives that will require regular maintenance.

4.04 CLEANING AND PROTECTION

A. Protect installed work using adequate and suitable means during and after installation until acceptance.

B. Repair, remove and/or replace surfaces and materials that become marred, scratched, bent or damaged in any way.

C. Clean surfaces of grime and dirt using acceptable and recommended means and methods. Take care not to damage, mar or stain adjacent materials.

END OF SECTION 10970

SECTION 10980 – SOLAR INSTRUMENTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section shall be governed by the Contract Documents. Provide materials, labor, equipment and services necessary to furnish, deliver and install all work of this Section as shown on the drawings, as specified herein and/or as required by job conditions.

1.2 WORK INCLUDED
1.3

A. The Work shall include, but is not limited to the following Solar Instruments:

1. SKY
   Sun Image SK2.E01
   A roof mounted heliostat uses mirrors to project sunlight through a skylight and into building. The heliostat tracks the sun's movement, so that as long as the sun is visible the image of the sun can be transferred to the helioscope which projects the image of the sun's surface onto a table.!!Visitors look at a real-time projected image of the sun's surface and see evidence of solar activity including dark spots and flares.

2. SKY
   Spectral Projection SK1.E01
   A beam splitter send some of the sunlight form the heliostat to a diffusion grating which projects a full spectrum or rainbow of light onto a projection surface.

3. LIFE
   Economy of Life LF3.E03
   A beam splitter sends some of the sun"s light from the heliostat down a light pipe to shine into the top of a large glass tank filled with living plants and algae (Elodea, Volvox, and a water lily). Visitors watch as oxygen bubbles form on the Elodea leaves, indicating photosynthesis. Using a magnifier, they view the Volvox colonies swimming.!Visitors feel the heat of the sun, life's ultimate energy source, and see living plants and cyanobacteria.!

1.4 RELATED SECTIONS

Section 05500 Metal Fabrication
Section 06430 Exhibit Woodwork
Section 10960 Interactive Exhibits
Section 10970 Living Exhibits

1.4 QUALITY ASSURANCES

A. The fabricator and the installer shall be one of the same firm who can substantiate that the firm has been continuously engaged in the engineering fabrication and installation of Solar Instruments and work similar to that described herein for not less than five (5) years.

B. Technical design, engineering and prototyping and installation of Solar Instruments are the Exhibit Contractor's responsibility.

1. The Contract Documents are intended to provide performance and esthetic specifications for the design, fabrication and installation of electromechanical exhibits of this Section. This Trade Contractor is responsible for the engineering and design of the components and materials as well as fabrication, installation, and performance of the fabrications.

2. Exhibit design control drawings shown are intended to establish the basic dimensions, finishes, motion, location, connections, and profiles of exhibits. The Exhibit Contractor is responsible for the design and engineering of the fabrication within these aesthetic parameters. The drawings are design requirements, unless specifically noted as completely engineered and designed on the drawings.

3. Exhibit design control drawings do not cover some conditions or modifications, which may be required. The Exhibit Contractor, by accepting this Contract for the Work, acknowledges this and agrees that the Exhibit designer shall have final acceptance of all matters whether detailed or not for the exhibit design details.

C. Engineer qualifications: Professional engineers licensed to practice in Utah and experienced in providing engineering services of the kind required that have resulted in the successful installation of Solar Instrument exhibits as similar as possible in material, design and extent to that indicated for this Project.

D. All work shall comply with all building and life safety codes.

E. All exhibits exposed to direct visitor contact or having visitor interface shall be engineered to withstand normal wear and tear of such contact. Contractor shall warrantee in writing all exhibits free of defects and able to withstand visitor contact. The period of the warrantee shall be one year. Exhibits failing to function as specified during this period shall be repaired at the contractor"s expense. Contractor shall provide written instructions on the maintenance of all exhibits. Owner shall be responsible for providing proper maintenance under the terms of the warrantee.

1.5 SUBMITTALS

A. SAMPLES & PRODUCT LITERATURE: The Samples and Certificates in the following list are required to be submitted by the Contractor to the Exhibit Designer for review. An omission of an item or items does not relieve the Contractor from this responsibility, and for compliance with the Contract Documents of which this is a part.

1. Submit product literature to Exhibit Designer for review in accordance with the requirements of the Contract Documents.

2. Submit printed manufacturer's literature, data sheets, certificates of UL listing, and/or catalog cuts for all items which are pre-manufactured and will be provided as part of the work.

3. Samples:

a. Provide (3) 4" x 4" samples of proposed Diffraction Grating or alternate lens/ mirror assembly for Spectral Projection.

b. Provide (3) 12" x 12" samples of material specified for Solar and Spectral Projections.

B. SHOP DRAWINGS:

1. Submit shop drawings for review in accordance with the Contract Documents.

2. Shop drawings shall indicate by plans, elevations, sections and details of the work of this Section, showing in detail large scale construction, methods of installation and attachment, type, size, spacing and location of welds, bolts or other anchorage devices and shall give all pertinent data as to thickness, dimensions and exposed finishes.

3. Shop drawings shall indicate the work which is furnished by this Section and installed by other trades and the work of other trades which adjoin or butt the work of this Section.

4. As requested by the Exhibit Designer provide additional details, sections and calculations to fully describe the work to be provided.

5. Where items, anchorages, inserts are scheduled to be set into the concrete or built into the work by other Prime Contractors including the General Contractor for the installation of exhibits provide setting drawings, templates, instructions and directions for their installation. Coordinate delivery with other work to avoid delay of job progress.

D. PROTOTYPES

1. Prior to final fabrication and installation of Sun Image and Spectral projection exhibits shall be prototyped and tested by the Exhibit Contractor and reviewed by Exhibit Designer and Owner. Build mockups and prototypes to comply with the following requirements, using materials indicated for the completed Work to demonstrate the following;

   a) brightness and clarity of the solar projections
   b) accessibility, ergonomics and ease of use
   c) integration of hardware, products and systems
   d) durability and maintenance

2. Fabrication schedule should be planned so that a minimum four weeks are allowed for prototyping testing and review prior to installation.

3. Notify Exhibit Designer one month in advance of dates and times when prototype will be fabricated and ready for review.

4. Prototypes shall demonstrate the aesthetic effects and functional qualities of materials and systems as well as the defined visitor experience, ergonomics and mechanical functioning of all instruments.

1.6 DELIVERY, STORAGE & HANDLING

A. Deliver materials to the job ready for use, and fabricated in as large sections and/or assemblies as practical. Assemblies shall be identical to the reviewed submittals.

B. Store materials under cover in dry and clean locations off the ground. Take every precaution not to damage or mar finishes. Remove materials which are damaged or otherwise not suitable for installation from the job site and replace with acceptable materials at no additional cost.

PART 2 - PRODUCTS

2.01 FABRICATION - GENERAL REQUIREMENTS

A. Workmanship and finishes shall be first class in every respect and in accordance with the best practices. Employ skilled workers and technicians in the fabrication and erection of this work.

1. Approved Engineers and Fabricators;

a. Mr. Kua Patten
Exploratorium
3601 Lyon Street
San Francisco, CA 94123
Tel. 415-353-0432
www.exploratorium.edu

b. Or other as approved by the Exhibit Designer.

2.02 SPECIALTY PRODUCTS

A. Heliostat – Solar tracking device including primary mirror with computer and software to track sun position and secondary mirrors as required to focus a 36” diameter sun image on tabletop display as described in the documents.

1. Approved Product Manufacturers:

a. Practical Solar
MR. David Howell
516 E. 2nd Street, Unit 18
Boston, MA USA 02127
(617) 464-1770
Practicalsolar.com

b. DFM Engineering, Inc.
1035 Delaware Ave. Unit D_
Longmont, CO 80501_
Tel.303-678-8143
www.dfmengineering.com

c. Colt International, Inc
New Lane
Havant, Hampshire
United Kingdom, PO9 2LY
Tel. 02392 451111
www.Bomin-Solar.de

d. Or Other as approved by the Exhibit Designer

B. Telescope – 16” -20” Projection Telescope with Hydrogen Alpha to enhance features so that sun spots are visible & Mylar Filter to cut light so that there is no risk of heat / fire. Telescope to be

coordinated with site conditions and Heliostat requirements to achieve a 36” diameter sun image on tabletop display as described in the documents.

1. Approved Product Manufacturers:

   a. Meade
      Meade Instruments Corporation
      27 Hubble
      Irvine, CA 92618
      Tel. 800-626-3233
      www.meade.com

   b. Celestron
      1-800-303-5873
      www.celestron.com

   c. Or equal as approved by the Exhibit Designer

C. Spectral Projection – Low Dispersion Diffraction Grating 200-600 lines per mm. or alternate Lens/ mirror assembly as required to achieve a Rainbow Spectral projection on a 3" wide, full height curved wall as described in the documents.

1. Approved Product Manufacturers:

   a. Optometrics
      8 Nemco Way
      Stony Brook Industrial Park
      Ayer, MA 01432 USA
      Tel. 978-772-1700
      www.optometrics.com

   b. Or equal as approved by the Exhibit Designer.

D. Solar Tube – 18” diameter solar tube and associated mirrors to provide sunlight for Photosynthesis exhibit as described in the documents.

1. Approved Product Manufacturers:

   a. The Sun Pipe Co., Inc.,
      P.O. Box 5760, Elgin, IL 60121
      Tel. 800-844-4786
      www.sunpipe.com

   b. Parans Kampegatan 4,
      411 04 Goteborg, Sweden
      www.parans.com

   c. Or equal as approved by the Exhibit Designer.

PART 3 - EXECUTION

3.1 TIME OF COMPLETION & FABRICATION SCHEDULE

A. The Exhibit Contactor shall prepare an estimated progress schedule for the Work. The schedule shall be related to the entire Project to the extent required by the Contract Documents. This schedule shall indicate the dates for the starting and completion of the various stages of fabrication and shipping and shall be revised as required by the conditions of the Work, subject to the Exhibit Designer"s approval.

3.2 EXAMINATION

A. Two in-shop prototyping reviews shall be planned after approval of materials to review shop drawings, development of electromechanical elements and progress on actual exhibit elements. In the first review the Exhibit Designer shall review the progress and provide evaluations of the prototypes and finalize the fabrication of the Work.

B. A second shop review will constitute a verification that all issues have been adequately addressed and revisions implemented to the Satisfaction of the Exhibit Designer prior to delivering and installing the exhibit.

3.3 MEASUREMENTS

A. Exhibit Contactor shall be responsible for verifying and guaranteeing all critical measurements, including those provided by Exhibit Designer, Owner, and others. All such dimensions shall be shown on the shop drawings.

B. Exhibit Contactor shall be responsible for verifying dimensions that are required for proper coordination with other work, including but not limited to the work of the General Contractor and Owner provided materials.

3.4 SHOP FABRICATION

A. All exhibits included in the Scope of Work shall be shop fabricated, unless otherwise identified in bid proposal by Exhibit Contactor.

3.5 COORDINATION BETWEEN TRADES

A. Exhibit Contactor shall coordinate work to ensure that the Interactive Exhibits will fit properly into the Interior provided by the General Contractor and the work of subcontractors and otherwise fit and are well-integrated with any surfaces they rest on or objects they are touching or holding.

B. Failure of this Exhibit Contactor to make known his/her own needs and to determine the requirements of others shall not be cause for additional compensation to correct interferences, or for extra work which could have been avoided by proper coordination.

PART 4 INSTALLATION

4.1 SHIPPING AND HANDLING

A. Exhibit Contactor shall store, handle, and ship all Solar Instruments in such a way that they shall be perfect, free of dust and dirt and abrasions, and unmarred when they arrive and are unpacked.

Exhibit Contactor shall securely and safely crate all Solar Instruments. Crates shall be marked with indications of opening sequence. Crates shall be constructed in such a way as to properly protect the completed Solar Instruments and any accessories from damage including breakage, scratches and indentations of any sort. Each element of the Work shall be adequately protected with bubble-wrap and foam padding, and supported or braced with framework, as required, up to the point of unpacking.

B. All shipments shall be made with a professional shipping company and shall be fully insured. Owner shall be notified of shipment(s) in advance.

4.2 INSTALLATION

A. Exhibit Contactor shall provide all transportation, lodging, labor, and materials necessary to install the Solar Instruments.

B. Exhibit Contactor shall provide all mounting hardware required for complete installation. Exhibit Contactor shall indicate handling points and any vulnerable areas.

4.3 DOCUMENTATION & MANUALS

A. Provide documentation binders for all mechanical parts replacements and maintenance procedures for the future upkeep of all interactives as per Section 01782 Operations and Maintenance and Section 01820 Demonstration and Training. The Exhibit Contractor is to conduct a staff training session for all interactives that will require regular maintenance.

4.4 CLEANING AND PROTECTION

A. Protect installed work using adequate and suitable means during and after installation until acceptance.

B. Repair, remove and/or replace surfaces and materials that become marred, scratched, bent or damaged in any way.

C. Clean surfaces of grime and dirt using acceptable and recommended means and methods. Take care not to damage, mar or stain adjacent materials.

END OF SECTION 10980

SECTION 11130 AUDIO-VISUAL SYSTEMS

PART 1 - GENERAL

1.01 GENERAL CONDITIONS

A. Work of this section, as shown or specified, shall be in accordance with the requirements of Division 1 Specifications of the Contract Documents and Owner provided General Conditions.

1.02 SUMMARY

A. Scope of Work

1. The range of audio visual technologies used include experiences based on simple media playback such as immersive audio environments, audio cues within mechanically interactive exhibits, a number of LCD screens and video projections in varying formats. Other exhibits involve larger video projections with touch activated interfaces to content. Additionally there are a number of interactive audio visual based 'trails' through the exhibits. These experiences are based on site specific interactive content that is accessed by handheld devices including the visitor's own smart phones through the University's wireless broadband Ethernet.

2. Furnish and install audio-visual systems as shown on the project drawings and described in this specification. The drawings and specifications do not describe all work required to fulfill the contract. In addition, provide any additional equipment, materials and labor required to make complete and working systems consistent with the intent embodied in the project drawings and specifications

3. Prepare shop drawings and other submittals for review by the exhibit design team prior to construction.

4. Provide all necessary connectors, terminals, punch blocks, patch bays, connector panels, and cover plates.

5. Provide all necessary conduit, surface raceway, boxes, wire and fiber except those items specifically listed as work by others.

6. Provide all equipment required to meet the performance requirements defined in the AV design documents.

7. Coordination

a. The Av Systems integrator will be required to work with University of Utah and existing service providers to insure that exhibits and wireless technologies work within the operating parameters and standards of the University's campus IT department (NetCom).

b. All AV hardware that is built into millwork and graphics must be provided to the exhibit contractor for measurement and integration into exhibit housings and other surrounds. Shipment and delivery of this

hardware should be coordinated with the Exhibit Contractor.

c. The AV Systems Integrator is responsible for coordinating equipment requirements including native file formats for playback with the media producers. It may be necessary to conduct online tests of optimal file formats and compression formats prior to installation of media content on site.

d. The AV Systems Integrator will be responsible for coordinating with the work of the Exhibit Contractor and the General Contractor's MEP and IT Subcontractors to insure that all systems are properly integrated into the base building's IT, electrical and mechanical infrastructure.

8. Terminate of all wiring at panels, terminal closets and equipment racks.

9. Test all installed cabling and equipment.

10. Prepare as-built documents.

11. Provide on-site training in the operation and maintenance of the systems for personnel designated by the museum

12. Provide on-site support for opening week events.

13. Provide a one-year warranty covering all systems installed under this specification

B. Related Work

1. Division 16: Conduit, raceway and standard electrical boxes shall be provided by General Contractor. All 120 VAC circuits for A/V, teleconferencing, and network devices. Installation of AV Integrator provided dimmer racks.

2. CAT5 and fiber optic cables, jacks and patch bays for connection of AV systems to building LAN. Exhibit specific CAT and fiber optic cables are included in AV integrators scope.

1.01 REFERENCES

A. Codes

1. Federal, state, and local codes and requirements.

2. Code compliance is mandatory. Inform the owner if work is shown that appears to conflict with codes.

B. Standards:

1. CSA, UL or other nationally recognized testing laboratory standards.

1.02 SYSTEM DESCRIPTION

A. General: Provide audio-visual systems for sound playback, video projection, computer graphics display, and AV interactive elements

B. The system consists of the following exhibits;

Exhibit Name	Ref	notes
CANYON		
Trail Head	CN4.E01.av01-06	(6x) 17" touchscreen, CPU , 1 CPU & laser printer in gift shop
Trail System	N/A	Server for Trail System
SKY		
Demo Area	SK.av01	Ceiling Spkrs, Controls, W/L mic, floating ALS
Weather Station	SK3.E01.av01	46" monitor,CPU (Instrument N.I.C.), split screen ctrl + weather cam
Snowflake Video	SK3.E01.av02	20" AV monitor, S-Def
NATIVE VOICES		
Demo Area	NV.av01	Ceiling Spkrs, Controls, W/L mic, floating ALS
Storytelling	NV6.E01.av01-04	MP3 w/ focused spkr (4) caption reader
Generational Memory	NV5.E06.av01	(5) frameless 42" Displays S-Def, speakers
Welcome	NV1.E01.av01	MP3 player, speaker, motion sensor
Language Station	NV3.E01.av01	CPU, 17" monitor, KBD / trackball, headphones
LIFE		
Demo Area	LF.av01	Ceiling Spkrs, Controls, W/L mic, floating ALS
Keritan Interactive	LF2.EO2	(24) 2" 5x7 LED displays & electronics
What Cells Can Do	LF3.E02.av01	Video projector, S-Def, focused spkr
Populations Interactive	LF5.E02.av01	Touch interactive
Ecosystems	LF6.E01-E04.av01	(4x) 4 Sprk. Soundscape
Human Interactions	LF6.E05.av01	(4) handsets w/ buttons
Talkback Station	LF6.E05.av02	CPU, 17" monitor w/ kbd station
THE LAND		
Demo Area	LD.av01	Ceiling Spkrs, Controls, W/L mic, floating ALS
Plate Tectonics	LD1.E03.av01	Globe on/off control only Allowance for 32" Omni Globe+software
B&R Biogeography	LD4.E08.av01	26" AV Monitor, S-Def,
Talkback Station	LD4.E04.av01	CPU, 17" monitor, still cam
Jump Seismometer	LD4.E03.av01	CPU, 15" monitor, local
FIRST PEOPLES		
Demo Area	FP.av01	Ceiling Spkrs, Controls, W/L mic, floating ALS
Ceramics, Tools, Weaving	FP5.E02.av01	(3x) 20" AV monitor S-Def w/ sound

	FP5.E05.av01	
	FP5.E06.av01	
Tool Interactive	FP5.E06.in01	Triggered Audio
LAKE		
Demo Area	LK.av01	Ceiling Spkrs, Controls, W/L mic, floating ALS
Sounds of the Lake	*LK2.E01.av01*	(8) speaker soundscape
Watershed	*LK2.E06.av01*	46" AV Monitor, S-Def, speakers, Cap Snsr
People and the Lake	*LK2.E05.av01*	46" AV Monitor, S-Def, speakers, Cap Snsr
PAST WORLDS		
Demo Area	PW.av01	Ceiling Spkrs, Controls, W/L mic, floating ALS
Pleistocene Dinner Table	PW2.E04.av01	Triggered Audio (x5)
Paleo Prep	PW7.E01.av01	20" AV monitor, S-Def, w/ sound
Cleveland Lloyd Quarry	PW5.E03.av01	(4) 32" AV monitor, S-Def, w/ sound
Late Cretaceous	PW4.E01.av01	(6) speaker soundscape
UTAH FUTURE		
Sustainability (basic)	UF3.E01.av01	single 10K LCD, CPU, 15 gobo & sensor
UF Talkback Station2	UF3.E01.av02	CPU, 12" monitor spkrs, microphone, repeat monitor
OUR BACKYARD		
Our Backyard Animal Sounds	OB2.E01.av01	(5x) MP3 players & speakers + 5 spkrs, 2 tracks in trees
Labs	Earth, Naturalist & Dry Cave	(3x) Ceiling Spkrs, Laptop Iface, Controls, Proj,W/L mic, floating ALS
History Now	HV.AV01-AV03	(3x) 20" monitor, CPU, KBD, Trkball
Mockup Allowance		
Central Exhibit Dimmer & Control		dimmer rack, modules, controls, no installation
TOTAL		

C. Systems includes KVM switch to monitor all computers in rack room

D. System includes video multiplexor for monitoring video playback in rack room

E. Many exhibits have motion sensors covering area in front of exhibit to trigger the start of the show. Selecting, providing, installing and wiring a motion sensor is in this scope.

F. Many exhibits have hidden docent pushbutton switches to start and stop specific exhibits. Providing, installing and wiring this momentary switch is in this scope as required

G. Projection exhibits may have dual projectors for back-up. There is no intention to run both projectors at the same time so pixel resolution alignment is not required.

H Some larger exhibits will require a level of full-scale prototyping in coordination with exhibit contractor and media producers. It is assumed that the AV Systems Integrator will provide staging, equipment and facilities for these working prototypes for designer and owner review prior to full implementation

Specific exhibits requiring mockup

- Populations Interactive LF5.E02.av01
- Sustainability Interactive UF3.E01.av01

Mock-up will take place in the AV Integrators shop.

I Provide for shipping sample equipment to Exhibit Contractor s & media producers as required.

1.03 SUBMITTALS

A Include with Bid

1. Qualifications:

   a. Contractor must have completed four major audiovisual installations including audio, video, control and interactive exhibits in a museum environment in the last 5 years.

   b. Submit name and experience of project manager and lead programmer. Lead programmer must be on contractor's permanent staff and not subcontractor..

2. Provide exhibit cost breakouts as shown on bid form.

3. Summary of Equipment and Non-Equipment Costs: Tabulate cost summaries separately for systems. Break down non-equipment costs according to the following categories:

   a. Equipment

   b. Engineering

   c. Installation of Contractor Supplied Equipment

   d. Show control programming

   e. Interactive programming (if any)

   f. General and Administrative

   g. Taxes

4. Substitutions: Submit bids using the specified equipment. Proposals for substitute equipment will be considered where superior or more cost effective equipment can be substituted without negatively affecting the performance of the integrated systems. Such proposals should be justified and be submitted with technical documentation including manufacturer's specifications.

5. List of Replacement Parts: Supply a list of replacement parts to be provided as part of this contract, subject to the following guidelines:

    a. 1 spare lamp set for each video projector,

6. Submit brief description of proposed Show Control and Master Audio System

B. Submittals Required Prior to Fabrication:

1. Provide 3 copies of all submittals and allow a minimum of 14 days for review.

2. Submittal shop drawings to include the following

    a) Functional block diagrams for the audio, video, room control, and network/telecom systems. Label all inputs and outputs.

    b) Rack, frame and backboard elevations for all systems.

    c) Audio, video and network patch panels.

    d) Detailed riser diagram.

    e) Panel details showing all engraving for all systems.

    f) Schematics of all custom circuits.

    g) Detail any modifications to equipment supplied by manufacturers.

    h) Screen images of the audio processor programs showing blocks and all control pages, and a listing of statistics from the compiler showing board, processor and net utilization if applicable.

    i) Chart or other documentation of exhibit programming functionality. This should document:

        1. How the exhibit operates on the floor

        2. How the exhibit is turned on & off

        3. Any staff controls for test/debug

.

C. On completion of the Installation:

1. Submit written notification to the Museum Representative of completion of initial tests, and coordinate checkout schedule.

2. Submit as-built drawings, to include:

    a. Functional block diagrams for the audio, video, room control, and network/telecom systems. Label all inputs and outputs.

b. Rack, frame and backboard elevations for all systems.

c. Audio, video and network patch panels.

d. Wire lists for all systems, assigning wire numbers for every wire.

e. Schematics of all custom circuits.

f. Detail any modifications to equipment.

3. Submit System Operation and Maintenance Manuals as specified in Section 01730, to include:

a. All manufacturers' manuals.

b. In a narrative section illustrated as necessary, describe the typical procedures to be followed in configuring and operating the systems. This manual should be written for a technically literate reader who is not an expert.

c. A programmer's manual, intended to guide an experienced programmer through the custom software, with appropriate references to manufacturer's manuals.

d. A maintenance manual, describing programmed maintenance procedures with appropriate references to manufacturer's manuals.

e. A troubleshooting guide.

f. A summary in tabular form of the operating settings of all adjustable components.

1.04 OTHER GENERAL REQUIREMNETS

A. Field Cooperation: Cooperate at all times with all trades doing work on site to minimize lost time, work stoppages and interference.

B. Store all material until it can safely be installed on site. Coordinate delivery times, storage and protection of the equipment at the site, and acceptance with authorized representatives of the Museum

1.05 WARRANTY

A. Provide a 1 year warranty on the installed systems. Warranty period shall begin on acceptance of the system by the Museum.

B. Warranty shall cover labor and materials required to keep systems functioning as they were at the time of acceptance. Consumables such as projector lamps are not covered by the warranty. Damage or loss due to improper operation of the equipment, fire, flood, earthquake or theft shall not be covered by the warranty.

C. During the warranty period, inspect the system annually and restore all equipment to original performance.

Part-2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

A. Materials and equipment shall be new and shall meet or exceed the latest published specifications of the manufacturer in all respects.

B. Supply the latest model of each piece of specified equipment available at the time of bidding. In the event that models are superseded between bidding and ordering of equipment, notify the Museum and provide the latest model with equal or superior specifications if the cost does not exceed that of the equipment as bid. If the cost of the newer piece exceeds the bid amount the Museum may elect to purchase the newer piece as a change order at additional cost.

2.02 SOFTWARE

A. Show control software will be the responsibility of the contractor. Show control software will operate exhibits as described in media briefs. In addition software will provide for:

Scheduled system on/off following museum operation hours

Manual override of schedule for events

Global volume controls

System status reporting via graphical “map” of exhibit

Any Code mandated fire shutdown.

B. Media software will be the responsibility of Media Producer.

C. Contractor will be responsible for setting up any computers supplied by contractor so they will auto boot with no login to the operating system.

2.03 CUSTOM FABRICATION

A. Unless otherwise specified, custom plates shall be 1/8” brushed aluminum with beveled edges. Labels shall be engraved and paint filled. Anodized finish and infill colors to be approved by Museum Representative.

B. Adopt either EIA 568-A or –B wiring standard for Cat-5 cable to coordinate with data/telecom contractor.

C. Avoid use of mini-din connectors for S-video on custom plates. Use dual 75 ohm BNC on plate and adapters at equipment.

D. Equipment mounted in racks shall be labeled

E. Seismic safety: Attach all permanently installed equipment to the building to minimize risks to personnel and the equipment in the event of earthquake. Brace all hanging equipment appropriately. Obtain the services of an appropriately licensed engineer for design of attachments and mounts where required by codes or prudent practice.

F. All custom fabricated circuits employing integrated circuits and/or discrete components will be built using custom printed circuit boards. Wire wrap or soldered construction on prototyping boards is not acceptable. Exception: Pads and other simple networks that can be built into connector bodies or barrels.

PART 3 EQUIPMENT SCHEDULE

3.1 OVERALL SYSTEMS

1. Show Control

a. Acceptable systems; Crestron / AMX / MSC, Alcorn-Mcbride

b. All exhibits will be under control of a master show control system. Contractor will provide system meeting the following design criteria.

c. System will be modular. No more than (3) exhibits will be connected to a single controller element to prevent single point failure from affecting other exhibits. Units will be networked to allow for overall monitor system however removal of monitor system will not affect exhibit operation.

d. System will provide an overall status monitor to show the status of:

The whole museum (on graphical floor plan)

Individual exhibits

Individual pieces of equipment.

e. System shall be programmable to achieve all functionality in specification including

Master on/off via schedule and buttons with override.

Global Volume Control

Specific exhibit functionality & monitoring

2. Master Audio Control

a. Acceptable systems Media Matrix, BSS, MSC

b. All audio signals will run through the master audio system. Contractor will provide system meeting the following design criteria.

c. System will be DSP based.

d. System will be modular. No more than (3) exhibits will be connected to a single controller. Single point failure will not affect other exhibits

e. All inputs and outputs will be balanced.

f. Each output channel will have volume control, 5 band parametric EQ, delay and limiting functions. Each inputs will have 5 band parametric EQ, limiting and matrix mixing capabilities.

3. Computers

a. Computers will be commercial grade major manufacturer PC's with the following minimum features

Intel Core 2 duo processor > 3Ghz

2Gb Ram, 80GB hard drive, DVD-ROM drive

NVidia Quadro video card**.**

Vista Operating system

4. Media Players

1. At bid time this project is based on Standard Definition playback. The project is aware of the transition to HD and this may be revisited however for the purpose of this bid each video playback will include:

a. Standard Definition Media player with solid state memory with demonstrated record of at least 3 years operation in a museum environment

b. Simultaneous Y/U/V and composite outputs (or DA to achieve this functionality)

c. Cable for future HD upgrade including one Cat5/6 low skew cable and one HD-SDI (SMPTE-292) coax.

3.2 SPECIFIC EXHIBITS

1.CANYON

Trail Head *(6) computer interactives + gift shop printer)*
CN4.E01.av01-06

7)	17" Touch Monitors	ELO 1739L
7)	Computers	HP/Dell Pentium (see computer spec above)
6)	Cat-5 Extender	TBD/ Magenta
1)	Printer (in gift shop)	HP P4014N

Trail System *Server for Smart Phone System*

1) Server 3GH Intel Quad core, Raid 5, (8) 146GB 15Krmp drives
Dual gigabit connection
1) 15" monitor
1) UPS 2200VA rack mount

2.SKY

Weather Station *Weather display*
SK3.E01.av01

1)	46” Monitor	NEC 4620
1)	Computers	HP/Dell Pentium
1)	Cat-5 Extender	TBD/ Magenta
1)	Interface to owners weather inst.	TBD
1)	Sky Cam 5mp @15mps camera	Custom or TimeScience
1)	CPU and software for time-lapse rec.	

1) Hardware and software to display split screen of

Live weather instruments
Live time-lapse sky cam
Feed from UofU Meteorology dept remote sites

Snowflake Video V*ideo playback w/sound, linear media*
SK3.E01.av02

1)	20” LCD flat panels	ToteVision LCD-2007HDL
1)	SD Media Players	Alcorn DVM \ P
	(see general notes above)	DoReMi Nugget
a/r	Master Show Control	
a/r	Master Audio Control	

3.NATIVE VOICES

Storytelling *Audio playback w/4 Caption readers.*
NV6.E01.av01-04

1)	Speaker	Dakota FA-501
1)	MP3 playback	Alcorn 8-TraXX or 4MP3
4)	Caption Displays	Densitron LM4790
4)	electronic drivers for above	Custom
1)	Docent Switch / Sensor	Custom key switch
a/r	Master Show Control	
a/r	Master Audio Control	

Generational Memory *5 seamless plasma, 5 ch synch SD playback*
NV5.E06.av01 *Portrait orientation*

5)	42” seamless plasma	Akira/Orion MIS 4220
1)	SD Media Players	Alcorn DVM \ P
	(see general notes above)	DoReMi Nugget
2)	Display Speakers	Innovox FD-H2
1)	Amplifier	QSC CX-302
1)	Sync gen a/r	
a/r	Master Show Control	
a/r	Master Audio Control	

Welcome *Triggered audio message*
NV1.E01.av01

1)	Speakers	JBL Control 25
1)	MP3 playback	Alcorn 8-TraXX or 4MP3
1)	Sensor	Passive Infrared / TBD
1)	Amplifier	QSC CX-302

Language Station *17" touch monitor, CPU, kbd & trackball, mic & headphones*
NV3.E01.av01

1)	17" Touch Monitors	ELO 1739L
1)	Computers w/ rugged keyboard/trackball	HP/Dell Pentium (see computer spec above)
1)	Cat-5 Extender	TBD/ Magenta
1)	Headphone Amp	Berringer HA-8000
2)	Headphone	TBD Allow $100 ea
1)	Voice Processor	Symetrix 528E
1)	Microphone	Shure MX-395 cardioid

4.LIFE

Keritan Interactive *~24 2" 2 digit readouts, electronics package & programming to run game*
LF2.E02.in01

30)	2" 5x7 Led Dot Array Verify color with designer	LiteON LTP-2157AY
30)	circuit cards for above including Drivers, controller and touch sensor (note this must be PCB)	Custom
1)	Central controller/computer to run game.	Custom
3)	Capacitive sensors to start game	Custom

All programming to provide complete functional interactive
Per media brief.

What Cells Can Do *~4'x'6' projected image linear media w/ sound*
LF3.E02.av01 *+ switch to video microscope.*

1)	5K lumen DLP Projector	Eiki EIP-5000
1)	Lens (contractor sized)	
1)	Set spare lamps	
1)	Projector mounting	Custom
1)	SD Media Players (see general notes above)	Alcorn DVM \ P DoReMi Nugget
1)	Directional Speaker	Dakota FA-501
1)	Pushbutton	Happ / TBD
1)	12" video monitor	
a/r	Master Show Control	
a/r	Master Audio Control	

Populations Interactive *~4'x'6' projected image linear media w/ sound*
LF5.E02.av01

1)	3K lumen Projector SXGA+	Projection Design F30sx
1)	Lens (contractor sized)	
1)	Set spare lamps	
1)	Projector mounting	Custom
1)	Computers	HP/Dell Pentium (see computer spec above)
1)	Fiber Extender	Geffen DVI 1500HD
1)	DVI-VGA converter	Extron DVI-RGB150
1)	Vip Touch Foil 30-40" max 4:3	ViP (co-ordinate size with exhibit fabricator)
1)	Set USB extenders	
a/r	Master Show Control	

Ecosystems *(4) areas of natural sounds*
LF6.E01-E04.av01

Equipment list is for all (4) dioramas

4)	4track MP3 player	Alcorn 8Traxx / or 4MP3
8)	Small speakers	QSC AD-S52 (overhead)
8)	Small speakers	JBL Control 25 (in bushes)
4)	4 channel amplifier	QSC CX-404
16)	Speaker brackets	Custom
a/r	Master Show Control	
a/r	Master Audio Control	

Note DMX feeds to dimmers from show control.

Human Interactions *(4) audio players with mushroom handsets*
LF6.E05.av01

1)	4 track MP3 player	Alcorn 8Traxx / or 4MP3
4)	Small handsets (mushroom shaped)	

Part # RU-9931
Receiver, Western Elec.
5 1/2" long
Weighted hard rubber,
original finish, NOT glossy

Note this is only the shell. Working parts and armored cable are custom by AV Integrator.

1)	multi channel headphone amplifier	Behringer HA-8000
4)	Capacitive sensors/ buttons	Custom / Happ
a/r	Master Audio Control	

Talkback Station *computer blogging station text only*
LF6.E05.av02

1) 17" Monitors (touch optional)	ELO 1739
1) Computers w/ rugged Keyboard/trackball	HP/Dell Pentium (see computer spec above)
1) Cat-5 Extender	TBD/ Magenta

5.THE LAND

Plate Tectonics Video *Globe*
LD1.E03.av01

1) 32" Video Globe w/ 600Myr Paleo Animation	Omni Globe
1) 15" Monitors	NEC ALSCD52V-BK
a/r Master Show Control	
a/r Master Audio Control	

B&R Biogeography *46" SD video playback*
LD4.E08.av01

1) 26" LCD flat panels	Sharp LC26SB24U
1) SD Media Players (see general notes above)	Alcorn DVM \ P DoReMi Nugget
a/r Master Show Control	
a/r Master Audio Control	

Talkback Station *computer blogging station text and still cam*
LD4.E04.av01

1) 17" Monitors (touch optional)	ELO 1739
1) Computers w/ rugged Keyboard/trackball	HP/Dell Pentium (see computer spec above)
1) Cat-5 Extender	TBD/ Magenta
1) Still Camera	Quick Cam Vision Pro
1) USB interface	TBD

Jump Seismometer *CPU, 15" Monitor. Seismometer by owner*
LD4.E03.av01

1) 15" Monitor	NEC ALSCD52V-BK
1) Computer	HP/Dell Pentium (see computer spec above)

6.FIRST PEOPLES

Ceramics, Tools & Weaving *(3) 20" video playback w/ sound, linear media*
FP5.E02.av01

3)	20" LCD flat panels	ToteVision LCD-2007HDL
3)	SD Media Players	Alcorn DVM \ P
	(see general notes above)	DoReMi Nugget
a/r	Master Show Control	
a/r	Master Audio Control	

Tool Interactive *triggered MP3 playback*
FP5.E06.in01

1)	MP3 player	Alcorn 8Traxx / or 4MP3
1)	Small speaker	TBD coord w/ Exhibit Contractor
1)	amplifier	QSC CX-302
a/r	Master Show Control	
a/r	Master Audio Control	

Note trigger switches by Exhibit Contractor

7.LAKE

Sounds of the Lake *(8) speaker natural sound soundscape*
LK2.E01.av01

1)	4track MP3 player	Alcorn 8Traxx / or 4MP3
8)	Small speakers	QSC AD-S52
1)	8 channel amplifier	QSC CX-168
8)	Speaker brackets	Custom
a/r	Master Show Control	
a/r	Master Audio Control	

Watershed *46" video playback w/ sound, SD linear media*
LK2.E06.av01

1)	46" LCD flat panels	NEC LCD 4620-2-AV
2)	Display Speakers	Innovox FD-H2 (cut to length)
1)	Amplifier	QSC
1)	SD Media Players	Alcorn DVM \ P
	(see general notes above)	DoReMi Nugget
a/r	Master Show Control	
a/r	Master Audio Control	

People and the Lake *46" video playback w/ sound, SD linear media*
LK2.E05.av01

1)	46" LCD flat panels	NEC LCD 4620-2-AV
2)	Display Speakers	Innovox FD-H2 (cut to length)
1)	Amplifier	QSC
1)	SD Media Players	Alcorn DVM \ P
	(see general notes above)	DoReMi Nugget
a/r	Master Show Control	
a/r	Master Audio Control	

8.PAST WORLDS

Paleo Prep *video playback w/ sound, SD linear media*
PW7.E01.av01

1)	20” LCD flat panels	ToteVision LCD-2007HDL
1)	SD Media Players	Alcorn DVM \ P
	(see general notes above)	DoReMi Nugget
a/r	Master Show Control	
a/r	Master Audio Control	

Pleistocene Dinner Table *5 track triggered MP3 playback*
PW2.E04.av01

1)	5track MP3 player	Alcorn 8Traxx / or 4MP3
1)	Small speaker	TBD coord w/ Exhibit Contractor
1)	amplifier	QSC CX-302
a/r	Master Show Control	
a/r	Master Audio Control	

Note trigger switches by Exhibit Contractor

Cleveland Lloyd Quarry 4 ch sync *video playback w/sound, linear media*
PW5.E03.av01

4)	32” LCD flat panels	NEC LCD-3220
4)	Display Speakers	Innovox FD-H2 (cut to length)
1)	Amplifier	QSC CX-404
4)	SD Media Players	Alcorn DVM \ P
	(see general notes above)	DoReMi Nugget
1)	Sync gen a/r	
a/r	Master Show Control	
a/r	Master Audio Control	

Late Cretaceous Soundscape *(6) speaker natural sound soundscape*
PW4.E01.av01

1)	4track MP3 player	Alcorn 8Traxx / or 4MP3
6)	Small speakers	QSC AD-S52
1)	8 channel amplifier	QSC CX-168
6)	Speaker brackets	Custom
a/r	Master Show Control	
a/r	Master Audio Control	

9.UTAH FUTURES

Sustainability Interactive Diorama Projections & interactive
UF3.E01.av01

1) 10K Lumen DLP	Panasonic PT-DW-10000U
1) lens	contractor sized
1) set spare lamps	
2) CPU	HP/Dell
1) Graphics Card	TBD
1) Fiber Extender	Geffen DVI 1500HD
1) DVI-VGA converter	Extron DVI-RGB150
3) Gesture Cameras	Sentec STV-160BC
3) Lens	contractor select to cover.
3) Screw on IR filter	Custom
a/r Camera interfaces	
8) IR Illuminators	Custom

1) Custom gesture capture software per interactive write up. This is only the capture system. Media production by others.

Talkback Station *AudioVideo recording station + Playback station*
UF3.E01.av02

1) 20" Monitor w/ camera	Dell SP2009W
1) 32" LCD monitor	NEC LCD 3220
2) Computers w/ rugged keyboard/trackball	HP/Dell Pentium (see computer spec above)
2) Cat-5 Extender	TBD/ Magenta
2) Wall speakers	JBL Control 126W
1) Amplifier	QSC CX-302
1) Voice Processor	Symetrix 528E
1) Microphone	Shure MX-395 cardioid

10. OUR BACKYARD

Our Backyard Animal Sounds (5) *speaker soundscape*
OB2.E01.av01

1) 8track MP3 player	Alcorn 8Traxx / or 4MP3
5) Speakers in tree	3-4" Custom Coord w/ exhibit fab
1) multi channel amplifier	QSC 168

11. OTHER SYSTEMS

Central Dimmer

1) 96 ch ETC Sensor Rack 48 dimmer modules
a/r Pharos controls to implement "Life Intro" gobo effects
DMX input from "Ecosystems"

The installation and wiring of this unit is part of the base building electrical package.

Factory turn-on services and control wiring by AV integrator.

Labs *Projection w/ laptop interface, Central SD media, speakers*

Equipment list is for all (3) labs

3) DLP Projector	Panasonic PT-D5700UL
3) lens	sized by contractor
3) Sets spare lamps	
3) Laptop interface	Extron RGB 460xi
3) SD Media Players	Alcorn DVM \ P
(see general notes above)	DoReMi Nugget
12) Ceiling Speakers	JBL Control 126
1) 70V amp	QSC CX-204V
3) Headworn w/l mics	Sure ULXPro 14/30
1) Complete Assistive listening system	Listen LS-02-072
3) Wall Control Stations	AMX MET-6N
a/r Control system	
a/r Audio System	include individual volume control for each input
1) 8.4" rack mount touch panel	AMX
1) Control software	Custom

"History Now" Stations *computer, monitor on rolling cart*
HV.AV01-AV03

Equipment list is for all (3) carts

3) 20" Monitors	NEC LCD205WNXM
3) Computers	HP/Dell Pentium (see computer spec above)
w/ rugged Keyboard/trackball	

Demo Areas *Wireless mic, controls, speakers*

Equipment list is for all (7) Demo Areas

14) Ceiling Speakers	JBL Control 126
2) 70V amp	QSC CX-204V
7) Headworn w/l mics	Sure ULXPro 14/30
1) Complete Assistive listening system	Listen LS-02-072
7) Wall Control Stations	AMX MET-6N
a/r Control system	
a/r Audio System	include individual volume control for each input
1) 8.4" rack mount touch panel	AMX
1) Control software	Custom

Common Equipment

a/r	racks & accessories	Middle Atlantic MRK series
a/r	AC power distribution & seq.	Middle Atlantic
2)	Rack drawer for remotes	
1)	Dual Rack mount video monitor	Custom / Marshall VR-82 series
a/r	Video multiplexor (connect all video players)	Extron/ Honeywell
a/r)	Ethernet Switch 24port, 1Ghz (connect all computers & controllers)	Netgear/Cisco (coord w/ owner)
a/r)	KVM w/ 2 outputs (connect all computers)	Unimux 32x4
1)	15" Monitors	NEC ALSCD52V-BK
1)	Rack mount keyboard shelf	Custom/ TBD
2min)	UPS Size ups to power racks	Triplite Smart2200RMXL2U

PART 4- EXECUTION

4.01 EXAMINATION

A. Prior to commencing installation, verify all critical dimensions and conditions under which work is to be installed. Notify Museum Representative in writing of any dimensional discrepancies or other conditions detrimental to the proper installation or performance of work. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Insure that no devices (including cameras, monitors, projectors, microphones and loudspeakers) are prevented from achieving their intended function by interfering fixtures, architectural elements, or other audiovisual equipment. Notify Museum Representative in writing of any such problems, and do not proceed with installation until unsatisfactory conditions have been corrected.

C. Contractor is responsible for assuring that no CAT5 cable runs provided by the Contractor exceed 90m. Notify Museum Representative in writing of any runs that will exceed this distance.

D. Carefully verify all required projection and camera lens focal lengths to achieve desired image sizes and projector locations. Notify Museum Representative in writing if no lens will fit the requirements. Note this means no lens, not just the standard lens that comes with the projector.

4.02 INSTALLATION

A. General

1. All cables, regardless of length, will be marked with permanent, non-handwritten number or letter cable markers within six inches of both ends. There shall be no unmarked cables at any place in the system. Marking codes used on cables shall correspond to codes shown on drawings and/or run sheets.

2. All cables shall be installed splice free from backboard, rack or frame to final destination.

3. Each of the cable groups identified in the project drawings are to be run in separate conduit, bundled separately where run in trays, and grouped within racks except where specifically noted.

4. Wherever possible, maintain 3” separation between cable groups. Maintain larger separations where necessary to avoid interference.

5. All cable shall carry at least the NEC CM rating. Use plenum cable everywhere in project other than within racks or in runs completely within conduit.

6. Provide sufficient ventilation within racks to insure that all equipment operates within manufacturer’s recommendations.

7. All boxes and equipment shall be mounted plumb and square.

B. Audio

1. Maintain phasing throughout the audio system.

2. Use crimp type lugs where stranded wire is connected to barrier strips and binding posts.

3. Each rack shall contain a grounding bus bonded to the rack frame and connected to the audiovisual power distribution panel with a #6 or larger conductor. The rack shall show an impedance of at least 100 Kohm to ground when this conductor is lifted.

4. AC outlets within racks shall have ground wires, which shall be connected to the rack ground bus.

5. Connect audio cable shields at one end or both ends to produce best system noise performance. Mic lines and tie lines shall have shields connected at both ends.

C. Video

1. All coaxial cable connections shall be made with crimp type BNC connectors. Provide adapters from BNC to UHF, S-Video or RCA connectors where required.

2. All video receptacles shall be insulated from the panels in which they are installed.

3. Terminate all unused outputs with the appropriate impedance.

4. Video signals may not be looped through connections unless explicitly specified.

5. The lengths of the cables used to carry S-video and component video signals shall be matched to within 1”.

6. Projectors and cameras shall be installed so that images do not move or vibrate perceptibly under normal operating conditions.

4.02 FIELD QUALITY CONTROL

A. In all cases, provide written documentation of tests including date, test equipment used, test equipment configuration and results.

B. Initial Tests and Measurements:

1. Verify the operation of all system equipment.

2. Verify pinout and pairing of all wiring.

3. Verify DCE/DTE (pin 2/3) requirements of all serial cables. Test to verify voltage on both pins. Wire cable as x-over (null modem) if required.

C. Audio-Visual Systems:

1. Verify that audio systems are free from perceptible hum and buzz.

2. Conduct measurements and adjust audio systems to meet performance standards.

3. Measure impedance of all loudspeaker circuits at 1 kHz and verify that transformer tapping is appropriate.

4. Test that all coaxial cables are free from shorts and isolated from ground.

5. Verify that video systems do not exhibit interference effects from AC power circuits (video hum).

6. Align all video projectors and adjust color balance on projectors and monitors.

4.03 MUSEUM TRAINING

A. Provide 20 hours of training to persons designated by the Museum in the operation of the systems in 5 non-contiguous 4-hour sessions.

B. See also "Section 01820 Demonstration and Training" for other requirements.

4.03 FINAL ADJUSTING AND ACCEPTANCE TESTS

A. Inventory all equipment on site and compare to equipment lists in contract documents.

B. Demonstrate operation of all systems and equipment.

C. Review initial testing measurements. Repair system and repeat measurements as required by the Museum Representative. Provide the following test equipment for use in making adjustments and acceptance testing by the Museum Representative:

1. Composite, S video color bar generator.

2. 1/3 octave real time analyzer, calibrated SPL meter, and RMS voltmeter capable of reading in dBu.

3. Audio tone generator and pink noise generator.

4. Audio impedance meter operating at 1 kHz.

5. Audio analyzer capable of measuring frequency response: MLSSA 9.0, TEF 20 or SIA SMAART.

6. Cat 5 tester

7. Video Test Generator both SD & HD

D. Provide personnel expert in the operation and programming of all installed equipment for up to 80 straight time hours and 10 overtime hours to assist owner and consultant for adjustment and acceptance testing.

E. Tests may be suspended at the option of the Museum Representative if the systems fail to operate or if defective equipment requires repair or replacement. Tests will be resumed when the problems have been corrected by the Contractor.

4.04 CLEANUP AND REPAIR

A. The job site should be left clean and any damage caused to premises by installers should be repaired at no cost to Museum.

4.05 PROTECTION OF WORK

A. It is the responsibility of the contractor to protect finished and unfinished work against damage or loss until the date of final acceptance. Contractor shall take measures to prevent damage by dust and other byproducts of construction. Repair damaged work at no cost to the Museum.

B. Museums are full of artifacts and other irreplaceable objects. While most of your work will take place prior to the installation of artifacts there will be some overlap. It is imperative that you take extra care to avoid risks to these objects. If you are unsure ask the museum staff for assistance.
Also many of these items have deep cultural value and no jokes or disrespectful comments will be tolerated.

END OF SECTION

FEATURES

∗2.0 inch (50.8 mm) MATRIX HEIGHT.
∗LOW POWER REQUIREMENT.
∗SINGLE PLANE, WIDE VIEWING ANGLE.
∗SOLID STATE RELIABILITY.
∗5×7 ARRAY WITH X-Y SELECT.
∗COMPATIBLE WITH USASCII AND EBCDIC CODES.
∗STACKABLE HORIZONTALLY.
∗CATEGORIZED FOR LUMINOUS INTENSITY.

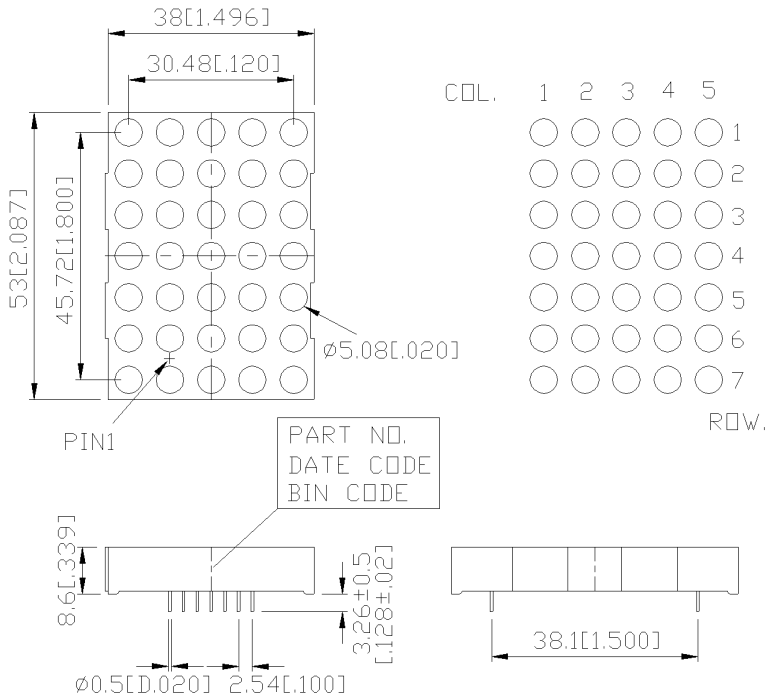
DESCRIPTION

The LTP-2157AY is a 2.0 inch (50.8 mm) matrix height 5×7 dot matrix display. This device utilizes yellow LED chips, which are made from GaAsP on a transparent GaP substrate, and has a gray face and white dot color.

DEVICE

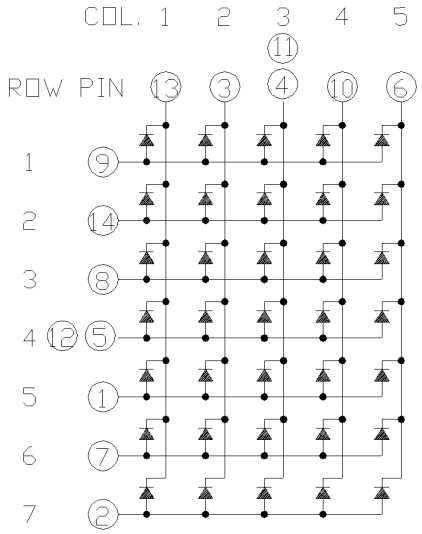
PART NO.	DESCRIPTION
YELLOW	CATHODE COLUMN
LTP-2157AY	ANODE ROW

PACKAGE DIMENSIONS



NOTES: All dimensions are in millimeters. Tolerance is ± 0.25 mm (0.01“) unless otherwise noted.

INTERNAL CIRCUIT DIAGRAM



PIN CONNECTION

No.	CONNECTION
1	ANODE ROW 5
2	ANODE ROW 7
3	CATHODE COLUMN 2
4	CATHODE COLUMN 3*1
5	ANODE ROW 4*2
6	CATHODE COLUMN 5
7	ANODE ROW 6
8	ANODE ROW 3
9	ANODE ROW 1
10	CATHODE COLUMN 4
11	CATHODE COLUMN 3*1
12	ANODE ROW 4*2
13	CATHODE COLUMN 1
14	ANODE ROW 2

NOTES : 1. Pin 4 & 11 are internally connected.
2. Pin 5 & 12 are internally connected.

ABSOLUTE MAXIMUM RATING AT Ta=25°C

PARAMETER	MAXIMUM RATING	UNIT
Average Power Dissipation Per Dot	32	mW
Peak Forward Current Per Dot	80	mA
Average Forward Current Per Dot Derating Linear From 25℃ Per Dot	10 0.12	mA mA/℃
Reverse Voltage Per Dot	5	V
Operating Temperature Range	-35℃ to +85℃	
Storage Temperature Range	-35℃ to +85℃	
Solder Temperature: max 260℃ for max 3sec at 1.6mm[1/16inch] below seating plane.		

ELECTRICAL / OPTICAL CHARACTERISTICS AT Ta=25°C

PARAMETER	SYMBOL	MIN.	TYP.	MAX.	UNIT	TEST CONDITION
Average Luminous Intensity	I_V	1780	4800		μcd	I_P=80mA 1/16Duty
Peak Emission Wavelength	λp		585		nm	I_F=20mA
Spectral Line Half-Width	Δλ		35		nm	I_F=20mA
Dominant Wavelength	λd		588		nm	I_F=20mA
Forward Voltage any Dot	V_F		2.1	2.6	V	I_F=20mA
			3.0	3.7		I_F=80mA
Reverse Current any Dot	I_R			100	μA	V_R=5V
Luminous Intensity Matching Ratio	I_V-m			2:1		I_F=10mA

Note: Luminous intensity is measured with a light sensor and filter combination that approximates the CIE (Commision Internationale De L'Eclairage) eye-response curve.

TYPICAL ELECTRICAL / OPTICAL CHARACTERISTIC CURVES

(25°C Ambient Temperature Unless Otherwise Noted)

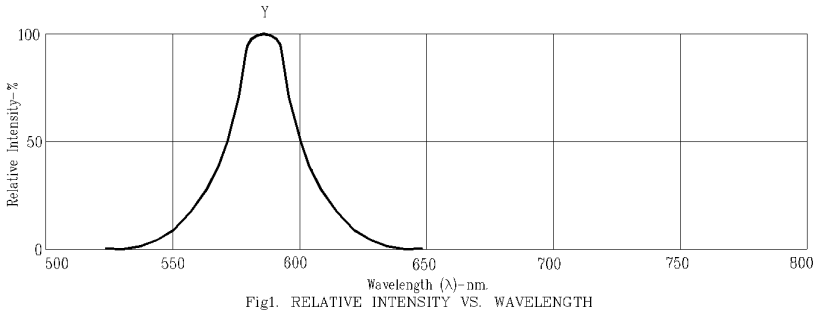


Fig1. RELATIVE INTENSITY VS. WAVELENGTH

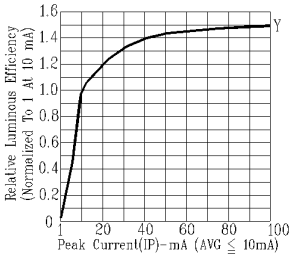


Fig2. RELATIVE LUMINOUS EFFICIENCY (LUMINOUS INTENSITY PER UNIT CURRENT) VS. PEAK CURRENT (REFRESH RATE 1KHz)

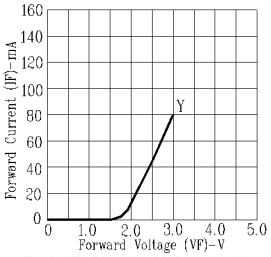


Fig3. FORWARD CURRENT VS. FORWARD VOLTAGE

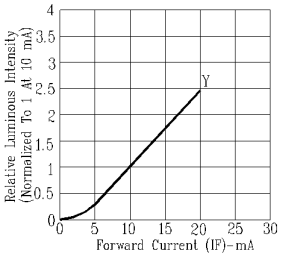


Fig4. RELATIVE LUMINOUS INTENSITY VS. FORWARD CURRENT

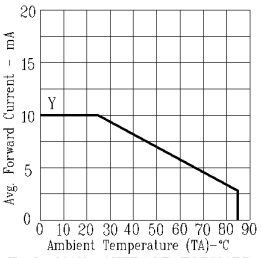


Fig8. MAX. AVERAGE FORWARD CURRENT VS. AMBIENT TEMPERATURE.

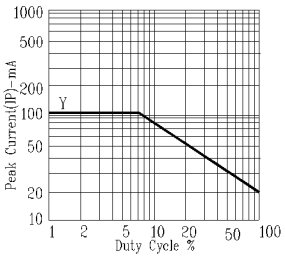
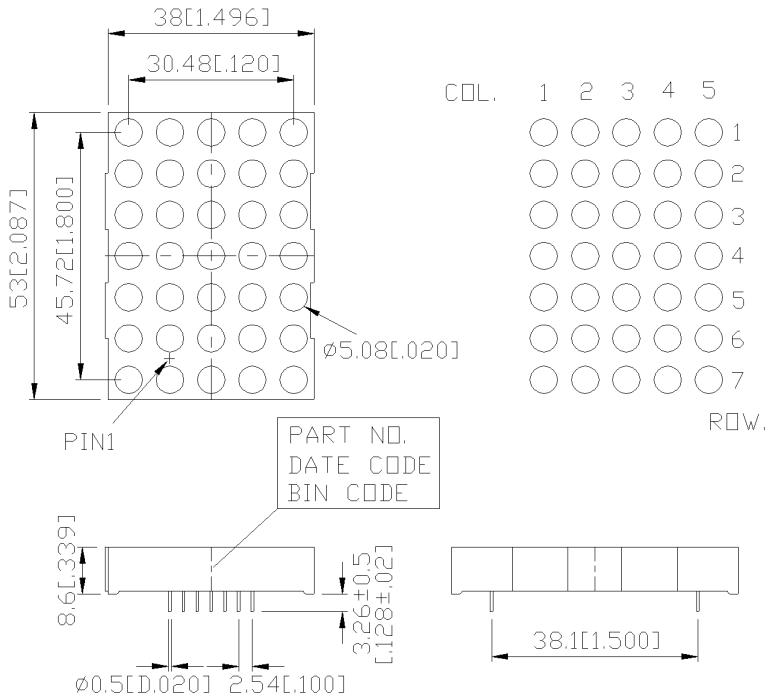


Fig6. MAX. PEAK CURRENT VS. DUTY CYCLE % (REFRESH RATE 1KHz)

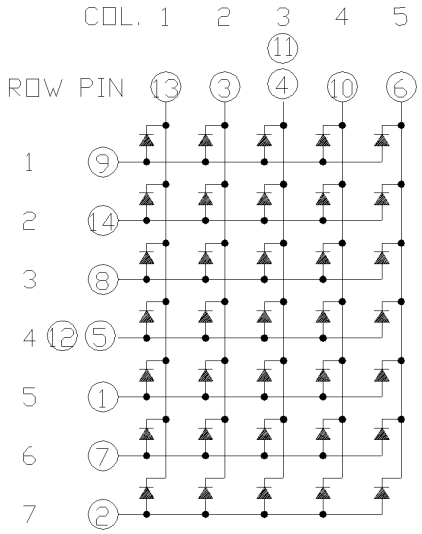
NOTE : Y= YELLOW

PACKAGE DIMENSIONS



NOTES: All dimensions are in millimeters. Tolerance is ± 0.25 mm (0.01“) unless otherwise noted.

INTERNAL CIRCUIT DIAGRAM



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12	ANODE ROW 4*2
13	CATHODE COLUMN 1
14	ANODE ROW 2

NOTES : 1. Pin 4 & 11 are internally connected.
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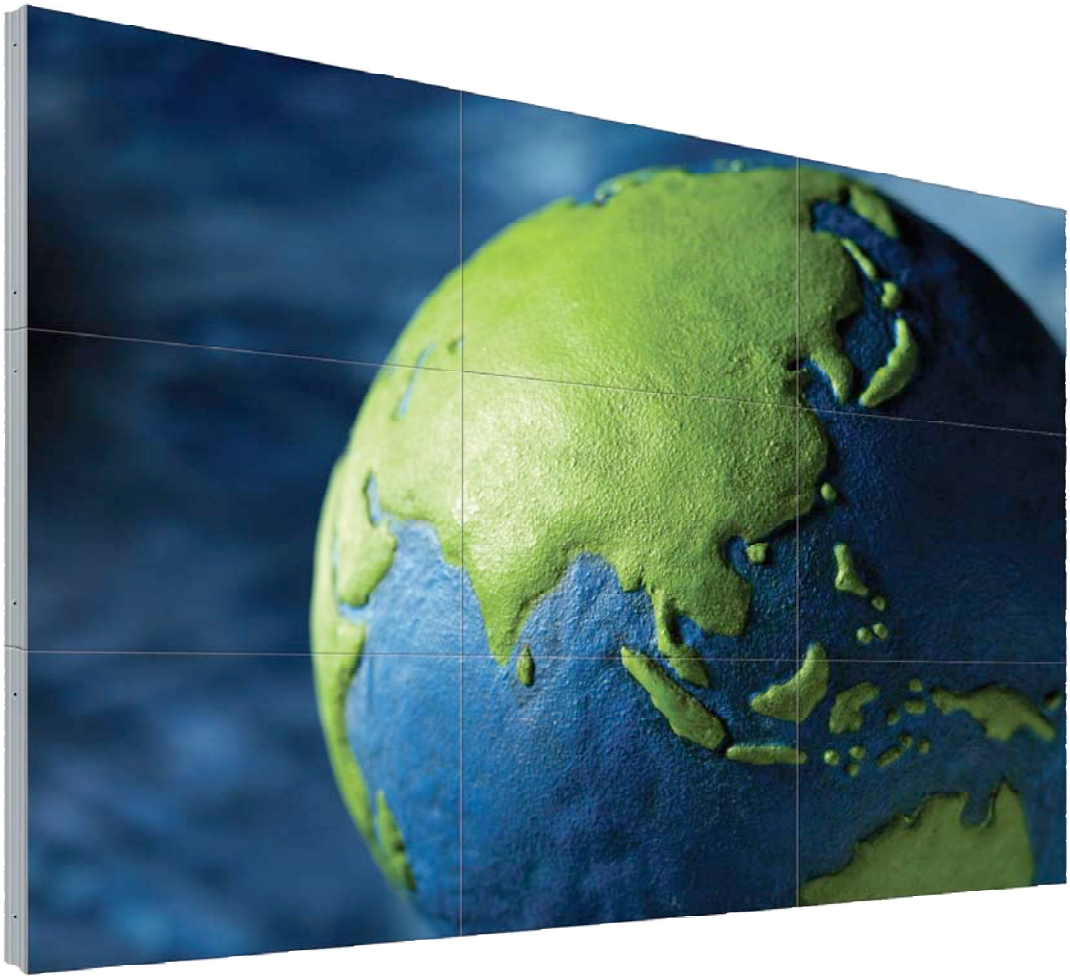
AKIRA
Digital Signage



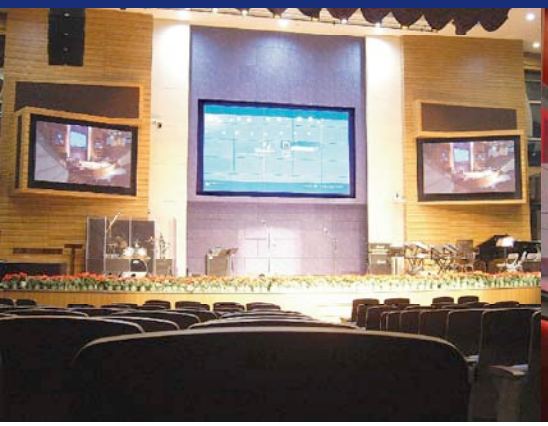
ORION

MIS4220

Infinitely Expandable Multi-Plasma featuring a less than 4 mm seamline

Endless possibilities

MIS4220



FEATURES

- Advanced digital circuit design
- Adopted exclusive digital processor
- User friendly remote control through RS-232
- Auto detection for NTSC, PAL, SECAM
- Image quality enhancement
- 3D comb filter (Y/C separation)
- Motion adaptive de-interlacing

REMOTE/RS-232 CONTROL

- Power ON/OFF control and timer
- Input : PC, DVI, DTV, DVD, S-Video, Video
- Picture adjustment: Contrast, Brightness, Sharpness, Color, Tint
- Auto tracking
- White balance
- Design select
- Slideshow
- Video-wall configuration XxY Matrix

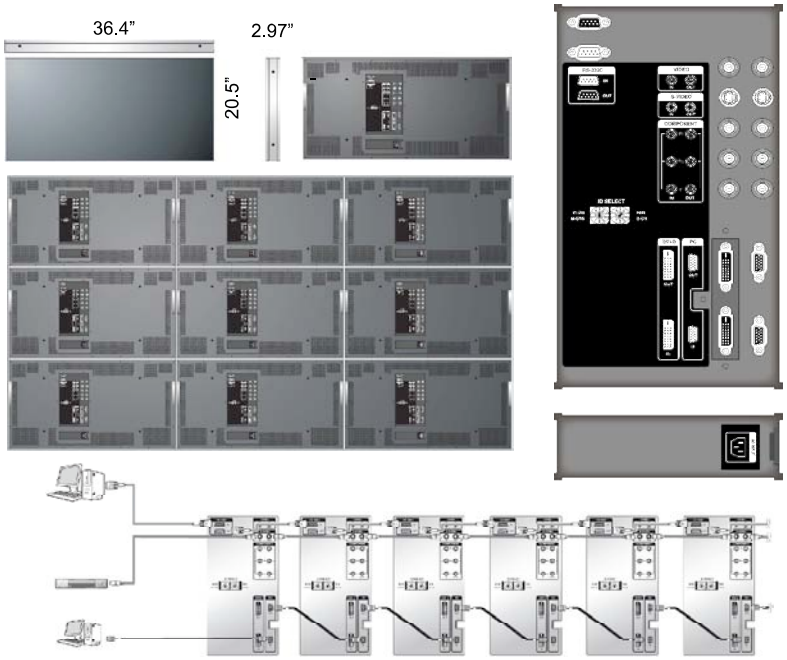
MSCS (Multi-Screen Control System)

- User friendly control program supplied
- Controls up to 8x8 configuration

DISPLAY OPTIONS

Model	MIS4220	
Power Supply	100~240 V AC 50/60Hz	
Power Consumption	350W (Max)	
Display Panel	42"	
Weight	57lbs	
Aspect Ratio	16:9	
Contrast Ratio	10,000:1 (Max)	
Brightness	1,000 cd/m² (w/out film)	
Front Filter	AGAR Anti-glare Anti-reflective	
Pixels	853(H) X 480(V)	
Seam line	Less than 4mm	
Environmental Temperature	0-35° C	
Environmental Humidity	20-70%	
Video Signal	NTSC, PAL, SECAM	
PC Signal	VGA, SVGA,WVGA,XGA,SXGA,WXGA,UXGA	
Frequency	15.5~75kHz(H) 50~85Hz (V)	
Connectors	Input	Output
Video	CVBS:BNC	
Component	Y,Pb,Pr:BNC	
PC	PC RGB: D-Sub 15 pin	
DVI	TMDS:DVI-D 24 pin	
Serial	RS-232C D-Sub 9 pin (Female)	RS-232C D Sub 9 pin (Male)

*Specifications subject to change without notification

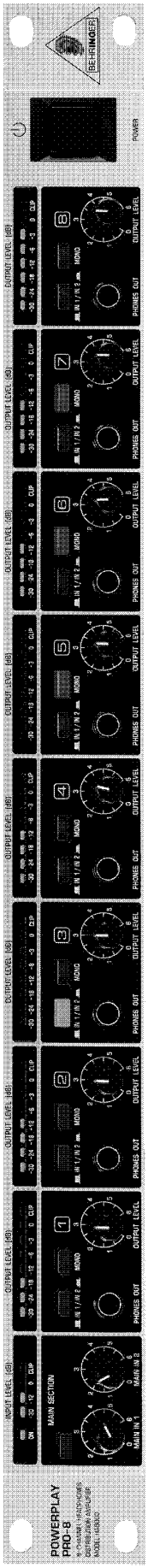


AKIRA

314 Stealth Court Livermore, CA 94551

T: (925) 455-1000 W:www.akiradisplay.com E: info@akiradisplay.com

POWERPLAY PRO-8 HA8000



Technical Specifications

ENGLISH

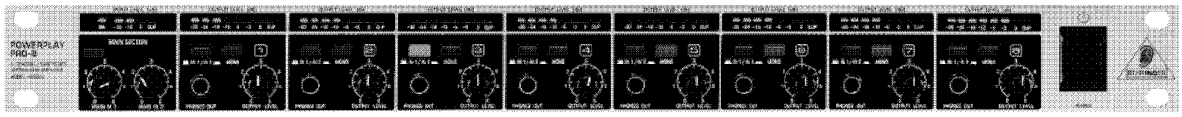
VERSION 1.2 February 2003

www.behringer.com

BEHRINGER
JUST LISTEN.

POWERPLAY PRO-8

8-CHANNEL HIGH-POWER HEADPHONES DISTRIBUTION AMPLIFIER



- ▲ Professional multi-purpose headphones amplifier system for stage and studio applications
- ▲ Eight totally independent stereo high-power amplifier sections in one rack space
- ▲ Two stereo Main inputs for two independent mixes, accessible from all eight channels
- ▲ Eight independent Direct inputs provide up to eight individual stereo mixes
- ▲ Highest sonic quality with virtually all types of headphones even at maximum volume
- ▲ Output level control and accurate 8-digit LED output meter per channel
- ▲ Mono/stereo switch per channel for more flexibility
- ▲ One front and one rear 1/4” TRS phones connector for each channel
- ▲ Direct input connector on each channel for easy connection of any sound source
- ▲ Paralleled outputs allow cascading of several headphones amplifiers
- ▲ Toroidal transformer for noiseless operation and low magnetic interference
- ▲ High-quality components and exceptionally rugged construction ensure long life
- ▲ Conceived and designed by BEHRINGER Germany

SPECIFICATIONS

AUDIO INPUTS	
MAIN IN	HF-filtered, servo-balanced 1/4" TRS connectors
Input impedance	40 kΩ balanced, 20 kΩ unbalanced
Max. input level	+16 dBu balanced and unbalanced
CMRR	typically 40 dB, >55 dB @ 1 kHz
DIRECT IN	1/4" TRS connector (stereo)
Input impedance	15 kΩ
AUDIO OUTPUTS	
PHONES OUTPUTS	1/4" TRS connector (stereo)
POWER AMPLIFIER	
Max. output power	+24 dBm (load impedance 100 Ω)
Min. output load impedance	100 Ω
SYSTEM SPECIFICATIONS	
Frequency response	10 Hz to 150 kHz, +/-3 dB
Noise	22 Hz to 22 kHz >90 dB @ 0 dBu
Dynamic range	22 Hz to 22 kHz: 110 dB
Distortion (THD)	0.006 % typ. @ +4 dBu, 1 kHz, Gain 1
FUNCTION CONTROLS	
Input Level	variable
Output Level per channel	variable
FUNCTION SWITCHES	
Main In 1/Main In 2	switches between Main Input 1 and Main Input 2
Mono	switches this section to mono
DISPLAYS	
Input level	4-digit LED-display: -30/-12/0 dB/CLIP
Output level	8-digit LED-display: -30/-24/-18/-12/-6/-3/0 dB/CLIP
POWER SUPPLY	
Mains voltage	
USA/Canada	120 V~, 60 Hz
Europe/U.K./Australia	230 V~, 50 Hz
Japan	100 V~, 50 - 60 Hz
General export model	120/230 V~, 50 - 60 Hz
Power consumption	30 W
Fuses	100 - 120 V ~: **T 630 mA H** 200 - 240 V ~: **T 315 mA H**
Mains connection	standard IEC receptacle
DIMENSIONS AND WEIGHT	
Dimensions (H x W x D)	approx. 1 ¾" (44.5 mm) * 19" (482.6 mm) * 8 ½" (217 mm)
Weight	approx. 5.19 lbs. (2.35 kg)

BEHRINGER is constantly striving to maintain the highest professional standards. As a result of these efforts, modifications may be made from time to time to existing products without prior notice. Specifications and appearance may differ from those listed or illustrated.

ELECTRONIC GROUP, INC

Adding Value
Stocking Inventory
Integrating System
Solutions

The Ind

Home | Gener

Component Solutions

- Cameras
- Lenses
- Cables
- Framegrabbers
- Monitors
- Lighting
- Software

System Solutions

- Integrated Systems

Technology

- Block Camera
- CameraLink
- Firewire
- Gigabit Ethernet
- High Definition
- Infrared Radiation
- PoCL
- Pan Tilt Zoom (PTZ)
- Progressive Scan
- Ultraviolet
- USB

Applications

- Machine Vision
- Video Conferencing

ROHS Compliance

SENTEC

STC-160BC Machine Vision Cam

2:1 Interlace Cased Cameras

<< Click here for a STC-160BC brochure in Adobe PD

The Sentech STC-160BC series industrial monochrome camera p
camera features high quality reproduction, a 1/3" high resolutio
input, and a 12 pin connector for easy access of power, video si

- AGC / Manual Gain
- Composite Outputs
- 1/3" IT CCD, 768(V) x 494(H)
- Electronic Shutter
- External Sync, (HD/VD) input
- Small size, Lightweight
- 570 TV Lines
- 12 pin Connector
- EIA & CCIR Formats
- 0.2 Lux Minimum Illumination
- 12VDC
- Uses 'CS' mount lenses, 'C' w/adapter

Specifications

Image Sensor:	STC-160 (EIA): 1/3" Monochrome IT CCD STC-165 (CCIR): 1/3" Monochrome IT CCD
Formats:	EIA & CCIR
Effective Picture Element:	EIA: 768 (H) x 494 (V) CCIR: 752 (H) x 582 (V)
Scanning System:	2:1 Interlace
Horizontal Resolution:	570 TV Lines
Horizontal Frequency:	15.734 kHZ
Vertical Frequency:	59.94 Hz
Sync System:	Internal
Minimum Illumination:	0.06 Lux @ F1.2, 50 IRE (AGC On)
S/N Ratio:	>56dB (AGC Off)

>> Site Map

Gamma:	0.45 or 1 Selectable
White Balance:	Auto or Manual
Gain:	On/Off Selectable
Auto Iris:	DC Control
Electronic Shutter:	1/60 to 1/100,000 Second
Back Light:	On/Off Selectable
Video Out:	VS 1.0Vp-p, 75W
Power Supply:	12V DC
Power Consumption:	145mA
Operating Temperature:	-10°C ~ 45°C (14°F ~ 113°F)
Storage Temperature:	-30°C ~ 60 °C (-22°F ~ 140°F)
Weight:	180g (6.35 oz.)
Dimensions:	51 (W) x 51 (H) x55.5 (D) mm (2.04" x 2.04 " x 2.22

STC-160BC

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REVISIONS			
REV	DESCRIPTION	DATE	APPROVED
A	E0200		

1. **Specification subject to change without notice.**
2. **All dimensions and specifications apply to standard modules. This information may vary for modules with optional features.**
3. **All dimensions are in millimeters.**
4. **Precautions:These precautions apply equally to modules from all makers, not just Densitron. Violation of these guidelines may void the warranty and can cause problems ranging from erratic operation to catastrophic display failure.**

Handling precautions:

- This device is susceptible to Electro-Static Discharge (ESD) damage. Observe Anti-Static precautions.

Power supply precautions:

- Identify and, at all times, observe absolute maximum ratings for both logic and LC drivers. Note that there is some variance between models.
- Prevent the application of reverse polarity to V_{DD} and V_{SS}, however briefly.
- Use a clean power source free from transients. Power up conditions are occasionally “jolting” and may exceed the maximum ratings of the module.
- The +5V power of the module should also supply the power to all devices which may access the display. Don’t allow the data bus to be driven when the logic supply to the module is turned off.
- DO NOT install a capacitor between the V_O (contrast) pin and ground. V_{DD} must, at all times, exceed the V_O voltage level. The capacitor combines with the contrast potentiometer to form an R-C network which “holds-up” V_O, at power-down, possibly damaging the module.

Operating precautions:

- DO NOT plug or unplug the module when the system is powered up.
- Minimize the cable length between the module and host MPU. (Recommended max. length 30 cm).
- For models with EL backlights, do not disable the backlight by interrupting the HV line. Unloaded inverters produce voltage extremes which may arc within a cable or at the display.
- Operate the module within the limits of the modules temperature specifications.

Mechanical / Environmental precautions:

- Improper soldering is the major cause of module difficulty. Use of flux cleaner is not recommended as they may seep under the elastomeric connection and cause display failure. Densitron recommends the use of Kester “245” no-clean solder.
- Mount the module so that it is free from torque and mechanical stress.
- Surface of LCD panel should not be touched or scratched. The display front surface is an easily scratched, plastic polarizer. Avoid contact and clean only when necessary with soft, absorbent cotton dampened with petroleum benzene.
- ALWAYS employ anti-static procedure while handling the module.
- Prevent moisture build-up upon the module and observe the environmental constraints for storage temperature and humidity.
- DO NOT store in direct sunlight.
- If leakage of the liquid crystal material should occur, avoid contact with this material, particularly ingestion. If the body or clothing becomes contaminated by the liquid crystal material, wash thoroughly with water and soap.

Notes: (unless otherwise specified)

Unless otherwise specified: Dimensions are mm Tolerances are: X = ± 3, .X = ± 0.5, .XX = ± 0.05	APPROVALS	DATE	DENSITRON CORPORATION TORRANCE, CA	
	DRAWN			
	CHECKED		TITLE 4 LINE X 40 CHARACTERS LCD MODULE	
	ISSUED		DWG. NO. LM4790	SHEET 1 OF 8

1.0 DESCRIPTION

Dot matrix display module consisting of a Liquid Crystal Display, CMOS driver and controller LSI, printed circuit board, metal support frame and array type Light Emitting Diode (LED) backlight.

Available LC fluids types are: NTN (supertwisted nematic), NTN-H (extended temperature range NTN).

Options include on-board negative voltage generation.

2.0 MECHANICAL CHARACTERISTICS

Item	Specifications	Unit
Package Dimensions	280.0 (W) x 88.0 (H) x 11.3 max. (D)	mm
Display format	4 line x 40 characters	-
Character font format	5 (W) x 7 (H) with attached cursor	dots
Driving method	1/16	duty
Dot size	1.0 (W) x 1.77 (H)	mm
Dot pitch	1.05 (W) x 1.82 (H)	mm
Character Size	5.2 (W) x 14.51 (H)	mm
Active display area	239.2 (W) x 63.65 (H)	mm
Viewing area	244.0 (W) x 68.0 (H)	mm
Weight		g

Notes:W-Width;H-Height;D-Depth.

3.0 ABSOLUTE MAXIMUM RATINGS

V_{SS}=0V;T_a=25°C

Item	Symbol	TN, NTN		TN-H, NTN-H		Unit
		Min.	Max.	Min.	Max.	
Logic supply voltage	V_{DD}-V_{SS}	0	7	0	7	V
LC driver supply voltage	V_{DD}-V_O	0	6	0	13	V
Operating temperature Storage temperature (Note 1)	T_{OP} T_{ST}	0 -20	+50 +70	-20 -30	+70 (Note 3) +80	°C
Humidity: Operating (@40°C) Non-operating (@40°C)	- -	- -	85% 95%	- -	85% 95%	RH (Note 2) RH (Note 2)

Notes: 1: Tested to 100 hrs.
2: Refers to non-condensing conditions.
3. With backlight off.

4.0 ELECTRICAL CHARACTERISTICS

V_{DD}=5±0.25V;T_a=25°C

Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Input “High” voltage	V_{IH}	-	2.2	-	V_{DD}	V
Input “Low” voltage	V_{IL}	-	-	-	0.6	V
Output “High” voltage	V_{OH}	I_{OH}=0.205mA	2.4	-	-	V
Output “Low” voltage	V_{OL}	I_{OL}=1.2mA	-	-	0.4	V
Power supply current	I_{DD}	V_{DD}=5.0V	-	5	-	mA

5.0 RECOMMENDED LC DRIVE VOLTAGE (V_{DD}-V_O)

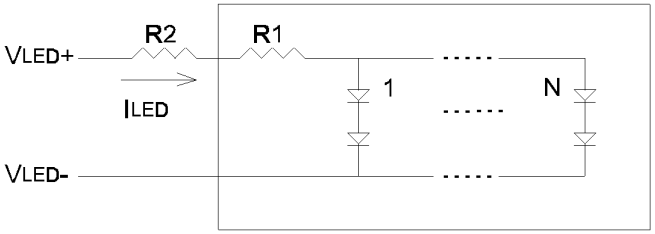
V_{DD}=5.0±0.25V

Temperature	TN	TN-H	NTN	NTN-H
T_a= -20°C	-	-	-	8.3
T_a= 0°C	-	-	5.3	8.1
T_a= 25°C	-	-	4.9	8.0
T_a= 50°C	-	-	4.8	7.9
T_a=70°C	-	-	-	7.8

6.0 BACKLIGHT SPECIFICATIONS:

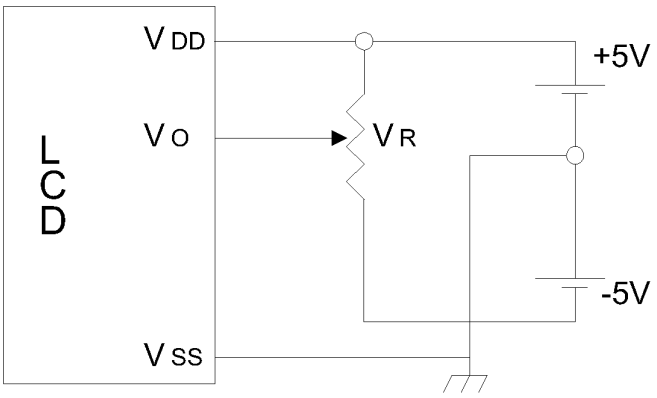
T_a=20°C,60%RH,Darkroom.

Item	Symbol	Typ.	Max.	Unit
LED input voltage	V_{LED}	5	6	V
LED input current	I_{LED}	2200	2300	mA
Built-in current limiting resistor	R1	-	-	Ohms, W
External current limiting resistor (recommended)	R2	0.47 Ohm, 4 W	-	Ohms, W
Number of nodes	N	220	-	-

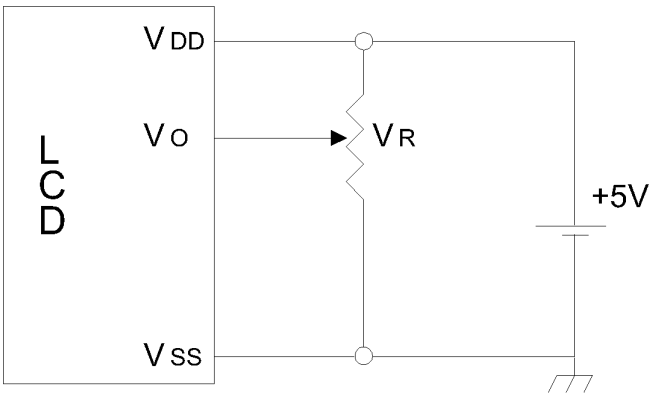


7.0 POWER SUPPLY

TN-H, NTN-H



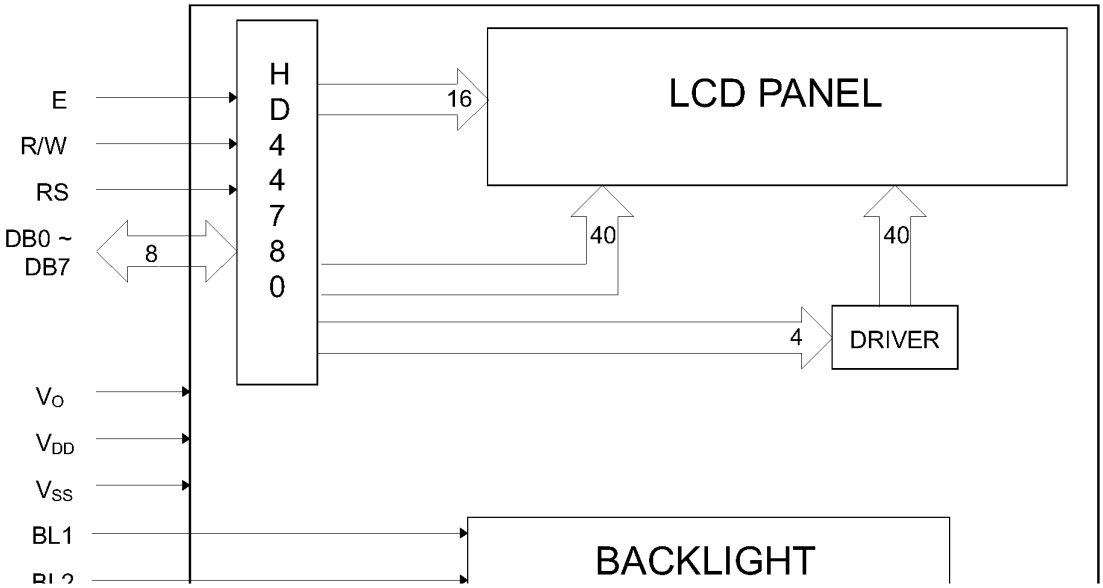
TN, NTN



V_R = 10K - 20K ohm

8.0 INTERFACE DESCRIPTION

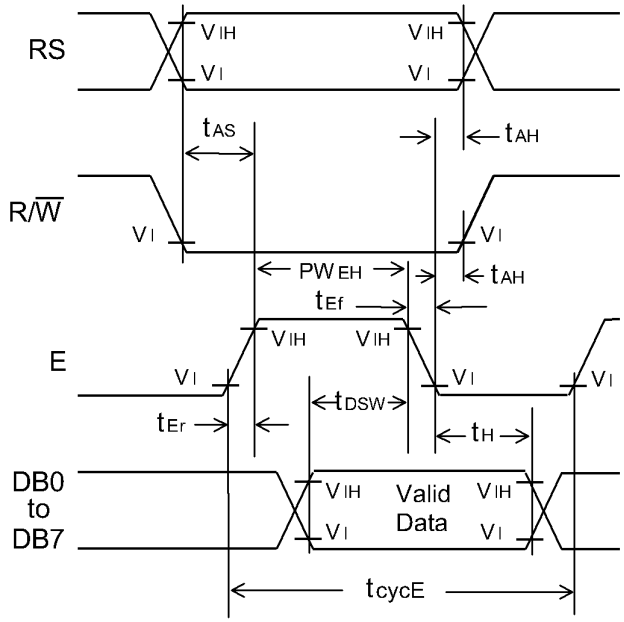
Pin No.	Symbol	I/O	Function
1	V_{SS}	-	Ground (0V)
2	V_{DD}	-	Logic Supply Voltage (+5V)
3	V_O	-	LC Drive voltage for contrast adjustment
4	RS	I	Register Select 0: Instruction Register 1: Data Register
5	R/W	I	Read / Write 0: Data Write (Module←MPU) 1: Data Read (Module→MPU)
6	E1	I	Enable Signal 1 Active High (H→L)
7	DB0	I/O	Bi-directional data bus line 0
8	DB1	I/O	Bi-directional data bus line 1
9	DB2	I/O	Bi-directional data bus line 2
10	DB3	I/O	Bi-directional data bus line 3
11	DB4	I/O	Bi-directional data bus line 4
12	DB5	I/O	Bi-directional data bus line 5
13	DB6	I/O	Bi-directional data bus line 6
14	DB7	I/O	Bi-directional data bus line 7
15	E2	I	Enable Signal 2 Active High (H→L)
16	N/C (V_{EE})	- (O)	No connection (Negative voltage output for models with on-board negative voltage generator)
BL1	V_{LED+}	-	Supply voltage for backlight (+5V)
BL2	V_{LED-}	-	Supply voltage for backlight (0V)



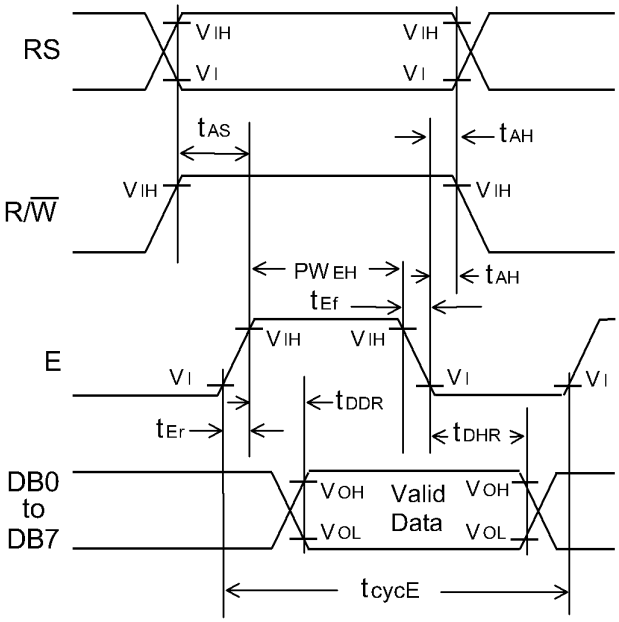
10.0 TIMING CHARACTERISTICS

Item	Symbol	Min.	Typ.	Max.	Unit
Enable cycle time	T_{cycE}	500	-	-	nS
Enable pulse width	PW_{EH}	230	-	-	nS
Enable rise / fall time	t_{Er}/t_{Ef}	-	-	20	nS
Address set-up time	t_{AS}	40	-	-	nS
Address hold time	t_{AH}	10	-	-	nS
Data delay time	t_{DDR}	-	-	160	nS
Data hold time (Write)	t_{DHW}	10	-	-	nS
Data hold time (Read)	t_{DHR}	5	-	-	nS
Data set-up time	t_{DSW}	80	-	-	nS

WRITE OPERATION



READ OPERATION



11.0 DD RAM ADDRESS vs. DISPLAY POSITION

Character	1	2	3	4	5	6	7	8	9	10	11	---	38	39	40
Line 1 *	00	01	02	03	04	05	06	07	08	09	0A	---	25	26	27
Line 2 *	40	41	42	43	44	45	46	47	48	49	4A	---	65	66	67
Line 3 **	00	01	02	03	04	05	06	07	08	09	0A	---	25	26	27
Line 4 **	40	41	42	43	44	45	46	47	48	49	4A	---	65	66	67

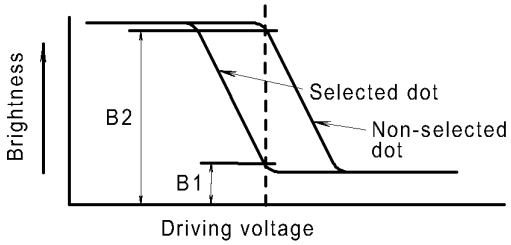
* - Controller 1 (E1)
** - Controller 2 (E2)

12.0 OPTICAL CHARACTERISTICS

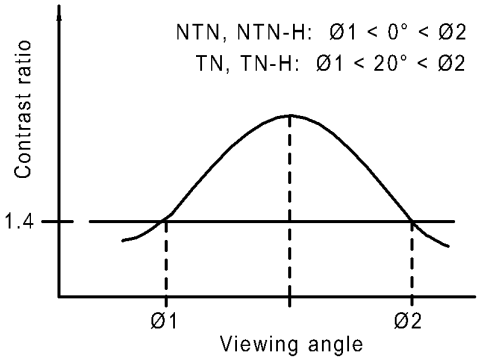
Item	Symbol	Test Condition	Min.	Typ.	Max.	Unit
Contrast ratio TN, TN-H	K	Ø=20° θ=0°	3	-	-	-
Contrast ratio NTN	K	Ø=20° θ=0°	4	-	-	-
Contrast ratio NTN-H	K	Ø=20° θ=0°	5	-	-	-
Viewing angle TN, TN-H	Ø2-Ø1	θ=0° K≥1.4	20	-	-	Deg.
	θ	Ø=20° K=1.4	±30	-	-	Deg.
Viewing angle NTN	Ø2-Ø1	θ=0° K≥1.4	40	-	-	Deg.
	θ	Ø=20° K=1.4	±30	-	-	Deg.
Viewing angle NTN-H	Ø2-Ø1	θ=0° K≥1.4	40	-	-	Deg.
	θ	Ø=20° K=1.4	±40	-	-	Deg.
Response time Rise	t_r	Ø=20° θ=0°	-	150	250	mS
Fall	t_f	Ø=20° θ=0°	-	150	250	mS

DEFINITION OF CONTRAST RATIO (K)

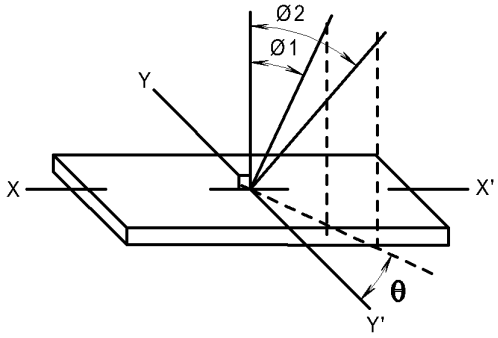
$$K = \frac{\text{Brightness of non-selected dots}}{\text{Brightness of selected dots}}$$



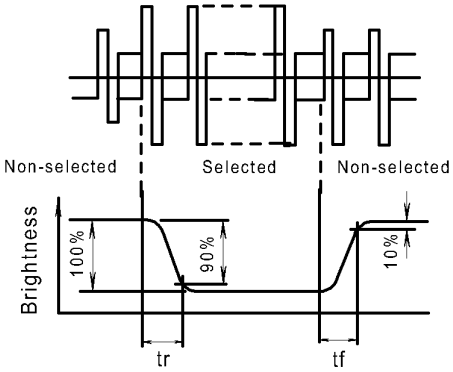
CONTRAST VERSUS VIEWING ANGLE



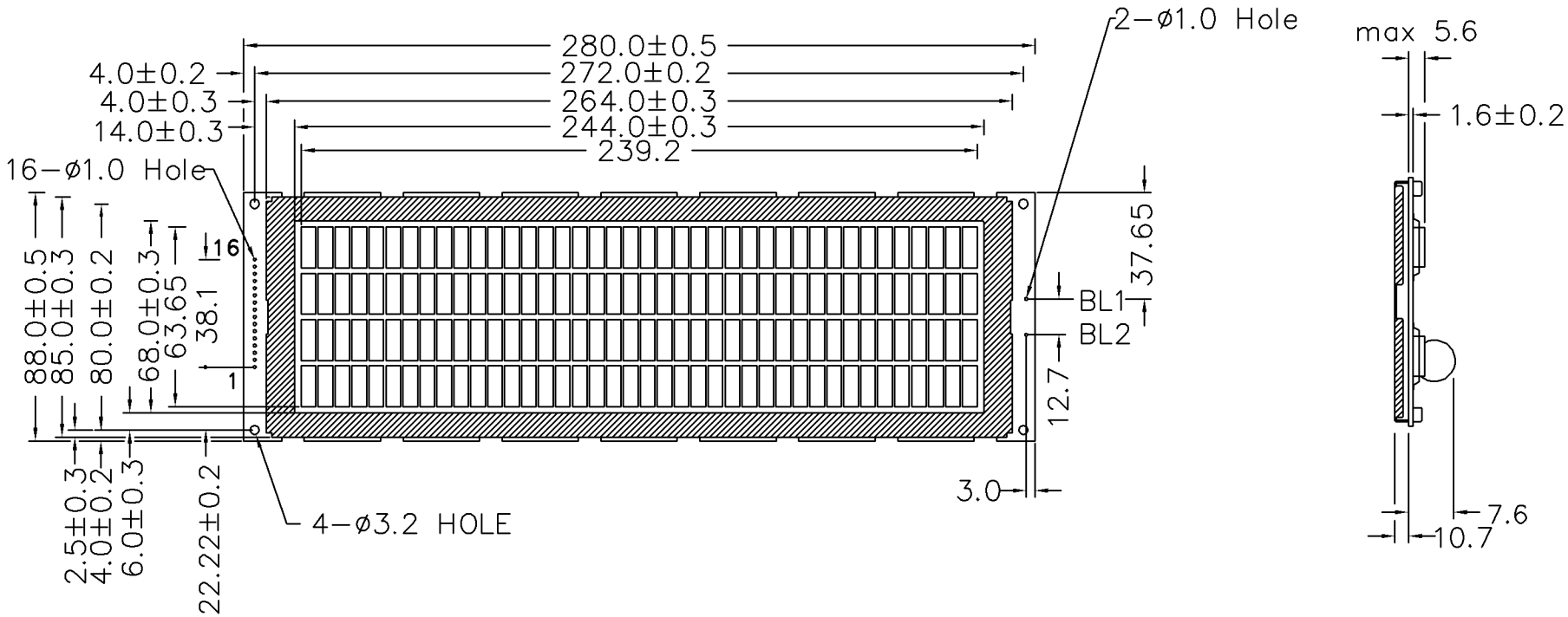
DEFINITION OF ANGLES Ø AND θ

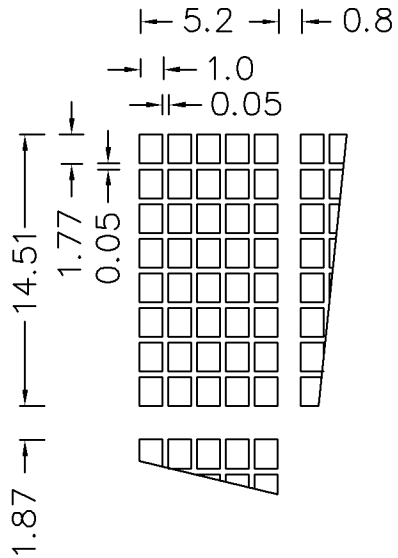


DEFINITION OF OPTICAL RESPONSE



13.0 MODULE DIMENSIONS





DWG. NO.		REV.
LM4790	SHEET 7 of 8	-

14.0 PART NUMBER DESCRIPTION FOR AVAILABLE OPTIONS

LM4790①②4C40③④⑤

OPTION 5.DOC

①

Polarizer Type

B = Transflective: light background with LED backlight
E = Transmissive: dark background with LED backlight
F = Transmissive: light background with LED backlight

②

Backlight Color

G = Yellow-green (standard)
R = Red

③

Fluid Type and Power Supply

S = NTN with +5VDC operation
H = NTN-H with ±5VDC operation
W = NTN-H with +5VDC operation (on-board negative voltage generation)

④

Fluid Type

N = NTN, NTN-H

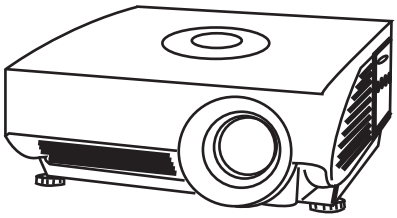
⑤

Background Color for NTN Fluid

B = Blue background
G = Gray background
Y = Yellow background

EIP-5000

XGA Conference DLP® Projector



EIP-5000

KEY FEATURES: Model EIP-5000

5200 ANSI Lumens bright, at 90% uniformity, and 1200:1 contrast ratio.
XGA resolution. UXGA, SXGA+, SXGA, SVGA, VGA & MAC compatible.
DLP™ imaging technology delivers a "seamless" high contrast image.
Power Zoom and Focus Lens. Optional Wideangle and Telephoto lenses.
Horizontal & Vertical Lens Shift. H. V & Geometric Keystone Correction.
Dual Lamp System provides redundancy and permits 4 brightness levels.
Wireless/wired remote. Computer mouse control. 8-power digital zoom.
RS-232 System and Network Control Compatible: Built in DB9, and RJ45.
Smart data compression / expansion, and video scaling. sRGB Compatibility.
Displays both Regular 4:3 and Widescreen 16:9 ratio video formats.
Converts Interlace video to Progressive scan. 2-3 Pulldown Support.
Accepts Analog and Digital (DVI w/HDCP) Video input signals.
Power Management, Keylock Security, and Custom Warmup Screen options.
Unique Projector Stack Control and VideoWall Signal Division features.
3 Year* Projector Warranty!

Included Accessories: Operation manual. CD-Rom (Setup Guide). System lock caution. Quick guide. AC Power Cord 12 ft. (3.6M). Lens Cover. VGA type Computer Input Cable 9.8 ft. (3m). Wireless/wired Remote With Mouse Control and & (2 x AA) Batteries. Remote Mouse Receiver on 5.25ft. (1.6M) USB-A cable.

Optional Accessories: Replacement Lamps. Soft Carry Bag with Wheels and Telescoping Handle. ATA-Style Shipping Case with Wheels and Telescoping Handle. Wideangle and Telephoto lenses. Ceiling Mount. Ceiling Post and Plate. EZ-250 Local Control.

SPECIFICATIONS: Model EIP-5000

Screen Brightness	up to 5200 ANSI Lumens
Illumination Uniformity	90%
Size of Color Palette	16.7 Million
Contrast Ratio	1200:1
Horizontal Resolution	750 TV Lines (S-Video)
Projection Lamp	260 Watt UHP x 2
Estimated Lamp Life	up to 3000 Hours of Use
Imaging System	0.7" DDR DLP™ Single DMD™
Color System	4-Segment, 3X speed color wheel
Screen Pixels	786,432 (1024x768) in stripe configuration
Lens Type	Power Zoom and Focus
Lens Specs	Speed: f:1.8~2.0; FL: .1.01~1.23in. (25.6~31.3 mm)
Lens Ratios	Zoom Max:Min: 1.22:1; Throw:Width: 1.8~2.2:1
Image Diagonal	40~500 in. (102~1270 cm)
Image Width	2.5~33.3 ft. (0.81~10.16 m.)
Throw Distance	4.8~44 ft. (1.5~13.4 m.)
Front Elevation / Maximum Pitch	up to 9° up
Vertical Anti Keystone	Power Lens Shift (Top:Bottom)10:0 ~ 1:1
Horizontal Anti Keystone	Power Lens Shift (L:R~R:L) 6.5:3.5~3.5:6.5
Vertical Keystone Correction	Digital: up-to 30° up or down
Horizontal Keystone Correction	Digital: up to 30° left or right
Geometric Keystone Correction	Digital
Scanning Frequency	Auto: H Sync. 15-126 kHz; V Sync. 43-200 Hz
Dot Clock	12~230 MHz
Image Orientation	Normal, Reversed, Inverted
Local Control / Power Management	Full Function / Auto Shut-Off
Remote Projector & Mouse Ctrl	Wireless/wired x 1
Computer Mouse Control	via External IR Receiver on USB-A cable
Wired Remote Port	MiniStereo x 1
RS-232 Port	DB9 x 1
LAN Port	RJ45 x 1
Computer Native Resolution	1024x768 (XGA)
Computer: Compatibility	UXGA, SXGA+, SXGA, WXGA, XGA, SVGA, VGA & MAC: 13~21; Workstation: SUN, SGI
Computer: Formats	1600 x 1200 through 640 x 480
Computer: Image Sizing	Normal, or Smart Compressed or Expanded
Video: Color Systems	NTSC/PAL/SECAM/NTSC 4.43 / PAL-M&N
Video: Aspect Ratios Supported	4:3 & 16:9

Video: Resolutions Supported	
SDTV (Composite, S-Video, Component)	480i / 540p, 576i
EDTV (DVI w/HDCP)	480p, 576p
HDTV (DVI w/HDCP)	720p (50/60), 1035i (50/60), 1080i (50/60)
Signal Inputs:	
1. Computer: Analog RGB	HD15 x 1
plus Audio: Stereo:	MiniStereo x 1 (L & R)
2a. either Computer: (RGBHV)	BNC x 5
2b. or Video: (RGBHV)	BNC x 5
or (Composite/Component: Y, Pb/Cb, Pr/Cr)	BNC x 3
plus, Audio: Stereo: (L&R) (shared with input 3)	MiniStereo x 1
3a. either Computer - Digital RGB:	DVI-D x 1
3b. or Video - Digital HDCP: (same)	DVI-D x 1
plus, Audio: Stereo: (L&R) (shared with input 2)	MiniStereo x 1
4. Video: Composite -	RCA x 1
plus, Audio: Stereo: (L&R) (shared with input 5)	MiniStereo x 1
5. Video: S-Video -	S-Video x 1
plus, Audio: Stereo: (L&R) (shared with input 4)	MiniStereo x 1
Signal Outputs:	
Data/Video Monitor	HD15 x 1 on input 1 (shared: input 1 & 2)
Audio Line:	Stereo: Ministereo x 1 (L & R) (follows video)
Audio: Amplifier	Stereo: 3 Watts
Audio: Built In Speakers	Stereo: 1.8 in. (4.5 cm) diameter (round) x 2
Operating Noise	as low as 35 dBA
Cabinet Size (HxWxD)	7.1 x 16.1 x 18.5 in. (180 x 410 x 471 mm.)
Overall Size (HxWxD)	7.6 x 16.2 x 18.5 in. (193 x 412 x 470mm.)
Weight	33.2 lbs. (15.1 kg)
Packaged Size	15.4 x 22 x 24.4 in. (390 x 560 x 620 mm.)
Packaged Weight	46.3 lb. (21 kg.)
Power Requirements	100-240V AC, 50/60Hz
Power Consumption	up to 650 W
Heat	up to 2,218 BTU/hr. (559 Kcal/hr)
Power Cord	11.8' (3.6M) Type 3, Detachable
Safety Compliance	UL / cUL
Security Facilities	Kensington® Security Slot
Operating Temperature	41~104^{0}F (5~40^{0}C)
User Maintenance	Clean Air Vents/Covers, Replace Lamp
Warranty (to original end use customer)	
Projector :	3 Yr. / 6000 Hr. *(Parts & Labor to Correct Defects)
Lamp:	90 Days (Failed Lamp Replaced Pro-Rata)
	* Whichever occurs first

Lamp contains Mercury. Do not put in trash. Dispose of as Hazardous Waste, according to Local, State or Federal Laws.

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Visit our World Wide Web site: http://www.eiki.com

1939L 19" LCD Open-Frame Touchmonitor

Features • Specifications • Documentation • Support • Part Numbers • Pricing • Accessories

Elo's chassis LCD monitors have a long-lasting product cycle because the enclosure is controlled by Elo's specifications. Future panel improvements are therefore possible without external changes. The 1939L features a wide viewing angle panel along with a unique, injection-molded minibezel and virtually invisible watertight seal. Available with a choice of touch technology including clear glass IntelliTouch surface wave for the utmost in optical quality.

Features

- High quality panel with 170°x170° viewing angle
- 1000:1 contrast ratio
- Fully RoHS compliant
- Long lasting product cycle-enclosure controlled by Elo specifications
- Future generation panels phased-in without external changes
- Integrated precision minibezel with watertight 0.5 mm seal
- Mounting options including rear-mount and VESA mount
- IntelliTouch or SecureTouch surface wave, AccuTouch Five-Wire Resistive, CarrollTouch Infrared and Surface Capacitive touch technology with dual serial/USB touch interface; Acoustic Pulse Recognition touch technology with USB touch interface
- Multilingual on-screen display (OSD)
- Worldwide agency approvals
- 3-D electronic design files available

Specifications

Model	1939L
Availability	See Part Numbers
Case / bezel color	Steel/black
Display	Size: 19.0" diagonal Type: Active matrix TFT LCD Aspect ratio: 5 x 4
Useful screen area	Horizontal: 14.8" (376 mm) Vertical: 11.9" (301 mm)
Monitor dimensions	Width: 16.3" (415 mm) Height: 13.5" (343 mm) Depth: 2.0" (51 mm)
Optimal (native) resolution	1280 x 1024
Other supported resolutions	1280 x 1024 at 60, 70 or 75 Hz 1280 x 960 at 60 Hz 1152 x 864 at 75 Hz 1024 x 768 at 60, 65 (Sun), 70 or 75 Hz 832 x 624 at 75 Hz (Mac) 800 x 600 at 56, 60, 72 or 75 Hz 720 x 400 at 70 Hz 720 x 350 at 70 Hz 640 x 480 at 60, 66 (Mac), 72 or 75 Hz 512 x 247 at 60 Hz (CGA)

	512 x 256 at 60 Hz (CGA)
Colors	16.7 million
Brightness	LCD panel: 250 cd/m^2 (typical) with AccuTouch: 200 cd/m^2 (typical) with Acoustic Pulse Recognition: 230 cd/m^2 (typical) with CarrollTouch: 230 cd/m^2 (typical) with IntelliTouch: 230 cd/m^2 (typical) with SecureTouch: 230 cd/m^2 (typical) with surface capacitive: 212 cd/m^2 (typical)
Response time	22 msec (typical)
Viewing angle (typical, from center)	Horizontal (left/right): ±89° or 178° total Vertical (up/down): ±89° or 178° total
Contrast ratio	1000:1 typical
Input video format	RGB analog only
Input sync format	Separate horizontal and vertical sync, composite sync and sync-on-green
Input video signal connector	Mini D-Sub 15-Pin VGA type
Input frequency	Horizontal: 31.5-80.0 kHz Vertical: 56.3-75 Hz
Power supply	Type: External AC to DC power brick Monitor input: +12VDC ±5%, 3.2 A typical, 3.8 A max. AC to DC power brick input: 100-240 VAC, 50/60 Hz
Power dissipation	Monitor only: 38 W typical, 46 W max. Monitor and power brick: 43 W typical, 50 W max.
Temperature	Operating: 0°C to 40°C Storage: -20°C to 60°C
Humidity	Operating: 20%-80% Storage: 10%-90% noncondensing
Weight (approx.)	Actual: 11.5 lb (5.2 kg) Shipping: 16.1 lb (7.3 kg) Shipping box dimensions
Warranty	Monitor: 3 years Backlight lamp life: typical 50,000 hours to half brightness MTBF: 50,000 hours demonstrated
Agency approvals	North America/Worldwide: UL, cUL (Recognized), TÜV-T Mark, Argentina S, CE, FCC, VCCI, IC, C-Tick (Class B) Asia: UL, cUL (Recognized), TÜV-T Mark, Argentina S, CE, FCC, VCCI, IC, C-Tick (Class B), BSMI, MIC, CCC, China RoHS
On-screen display (OSD)	Digital OSD or optional remote OSD with 1.8m cable
User's controls	Optional remote OSD: Auto/Sel, up, down, menu OSD buttons: menu, left, right, select, power OSD: contrast, brightness, H/V position, RGB (color temp), clock, phase, recall, language (English, German, Spanish, Japanese, French) OSD disable/enable: power, OSD menu
Mounting options	75 mm or 100 mm VESA mount Rear mount or with included standard mounting brackets Front mount with optional bezel (see Accessories for details) Rack mount with optional bracket (see Accessories for details)
Other features	Fully RoHS compliant Patent pending bezel seal Patented touch technology

Documentation

- Dimensional drawing: MS500786 Rev E (865K PDF)
- CAD drawings available upon request
- User Guide (516K PDF)
- Product data sheet (111K PDF)
- Agency approval certificates (1.0 MB PDF)
- WEEE report (198K PDF)
- Look up the RoHS declaration of compliance by part number

Support

- Drivers
- Platform support
- Technical topics
  - Dual serial/USB controllers
  - Long cables
  - How to mount an open-frame LCD

Part Numbers

All monitors have antiglare surface treatment.

Touch Technology	Touch Interface	Part # (RoHS Compliant)	Availability
AccuTouch	Dual serial/USB	E171252	Everywhere except Asia
Acoustic Pulse Recognition	USB	E810857	Everywhere except Asia
CarrollTouch	Dual serial/USB	E757389	Everywhere except Asia
IntelliTouch	Dual serial/USB	E226971	Everywhere except Asia
SecureTouch	Dual serial/USB	E071566	Everywhere except Asia
Surface capacitive	Dual serial/USB	E665102	Everywhere except Asia
AccuTouch	Dual serial/USB	E138057	Asia
Acoustic Pulse Recognition	USB	E258553	Asia
CarrollTouch	Dual serial/USB	E907238	Asia
IntelliTouch	Dual serial/USB	E638303	Asia
			Asia = China, Taiwan, Korea

Pricing

For pricing information, please:

- login to shop online (U.S. delivery only)
- contact an Elo office
- request a quotation
- contact an authorized Elo distributor (resellers/OEMs only)

Accessories

Front-Mount Bezel: For front mounting. North America part number E163604, available at additional cost. See the dimensional drawing (under Documentation, above) for mounting options and details.

IntelliTouch Stylus Pen: Stylus pen with rubber tip, designed specifically for use with IntelliTouch surface wave touch technology. Part number D82064-000, available at additional cost.

Optional Mounting Brackets: Two standard ("L") mounting brackets are included; additional set of two, part number E147211, available at additional cost, minimum shipment quantity of 50 sets.

Power Cable: A North American power cable and a European power cable are included. For touchmonitors being shipped to the United Kingdom, add a UK power cable at no cost by specifying part number E235317.

Rack-Mount Bracket: For compatibility with 19" industrial racks. North America part number E579652, available at additional cost. See the dimensional drawing (under Documentation, above) for mounting options and details.

Remote On-screen Display (OSD): With 1.8 m cable. Part number E622897, available at additional cost.

Replacement Power Supply Brick: Part number E785134, available at additional cost. Power cables for power brick, also available at additional cost:

- United States: part number E042259
- European: part number E690013

- United Kingdom: part number E235317

Touch/Video Cables: Detachable touch and video cables are included.

1247L 12" LCD Open-Frame Touchmonitor

1247L 12" LCD Open-Frame Touchmonitor - Angled View

Features • Specifications • Documentation • Support • Part Numbers • Pricing • Accessories

Elo's chassis LCD monitors have a long-lasting product cycle because the enclosure is controlled by Elo's specifications. Future panel improvements are therefore possible without external changes. The monitors are available with multiple touch technologies and all feature a unique, injection-molded minibezel and watertight seal, plus a multitude of mounting options.

Features

- Higher brightness, better contrast, and wider viewing angle than most 12" LCDs (300 cd/m^2, 300:1, 120° x 90°)
- Up to 800 x 600 resolution at 75 Hz
- Long lasting product cycle-enclosure controlled by Elo specifications
- Future generation panels phased-in without external changes
- Integrated precision minibezel with watertight 0.5 mm seal
- Multiple mounting options including rear-mount or VESA mount
- IntelliTouch Surface Wave Technology on pure glass for the ultimate in image quality
- Finger or gloved hand operation
- Serial touch interface
- Multilingual remote on-screen display (OSD)
- Worldwide agency approvals
- 3-D electronic design files available

Specifications

Model	1247L
Availability	Worldwide
Case / bezel color	Galvanized sheet metal; black plastic bezel
Display	Size: 12.1" diagonal Type: Active matrix TFT LCD Aspect ratio: 4 x 3
Useful screen area	Horizontal: 9.69" (246 mm) Vertical: 7.27" (184.5 mm)
Monitor dimensions	Width: 11.92" (302.5 mm) Width with bracket: 14.14" (359 mm) Height: 9.53" (242 mm) Depth: 2.36" (60 mm)
Optimal (native) resolution	800 x 600
Other supported resolutions	800 x 600 at 56, 60, 72 or 75 Hz 720 x 400 at 70 Hz 640 x 480 at 60, 66 Hz (Mac), 72 or 75 Hz 640 x 350 at 70 Hz
Colors	262,000
Brightness	LCD panel: 350 cd/m^2 (typical) with IntelliTouch: 320 cd/m^2 (typical)

Response Time	40 msec (typical)
Viewing angle (typical, from center)	Horizontal (left/right): ±65° or 130° total Vertical (up/down): 65°/40° or 105° total
Contrast ratio	500:1 (typical)
Input video format	RGB analog
Input video signal connector	Mini D-Sub 15-Pin VGA type
Input frequency	Horizontal: 31.5-48.1 kHz Vertical: 56.3-75 Hz
Power supply	Type: External brick Input (line) voltage: 100-240 VAC, 50-60 Hz Output voltage/current: 12 volts at 3.33 amps max
Temperature	Operating: 0°C to 40°C Storage: -20°C to 60°C
Humidity	Operating: 20%-85% Storage: 5%-95% noncondensing
Weight (approx.)	Actual: 8.8 lb (4 kg) Shipping: 13.2 lb (6.0 kg) Shipping box dimensions
Warranty	Monitor: 3 years Backlight lamp life: minimum 50,000 hours to half brightness
Agency approvals	UL/cUL (*recognized component), FCC, TÜV-Bauart, CE, VCCI, C-Tick
On-screen display (OSD)	Remote OSD with 1.8m cable
User's controls	Remote OSD: menu, down, up, auto/sel OSD: contrast, brightness, V/H position, recall default, RGB, OSD exit, sharpness, phase, clock, OSD H/V position, OSD time, auto adjust, OSD languages (English, French, German, Spanish, Japanese) and information
Mounting options	75 mm VESA mount Rear mount through bezel or with included standard mounting brackets Rack mount option
Other features	Energy save mode (less than 2 watts) 2 stage DPMS VESA DDC Plug and Play

Documentation

- Dimensional drawing: MS600157 Rev A (232K PDF)
- CAD drawings available upon request
- User Guide
  - English (642K PDF)
  - Spanish (Latin America) (266K PDF)
- Agency approval certificates (804K PDF)
- WEEE report (112K PDF)
- Look up the RoHS declaration of compliance by part number

Support

- Drivers
- Platform support
- Technical topics
  - Dual serial/USB controllers
  - Long cables

Part Numbers

All monitors have antiglare surface treatment.

Touch Technology	Touch Interface	Part # (RoHS Compliant)
IntelliTouch	Dual serial/USB	E655204

Pricing

For pricing information, please:

- login to shop online (U.S. delivery only)
- contact an Elo office
- request a quotation
- contact an authorized Elo distributor (resellers/OEMs only)

Accessories

IntelliTouch Stylus Pen: Stylus pen with rubber tip, designed specifically for use with IntelliTouch surface wave touch technology. Part number D82064-000, available at additional cost.

Power Cable: A North American power cable and a European power cable are included. For touchmonitors being shipped to the United Kingdom, add a UK power cable at no cost by specifying part number 276875-000.

Touch/Video Cables: Detachable touch and video cables are included.

tyco / Electronics

elo TOUCHSYSTEMS

1739L 17” LCD Rear-mount Touchmonitor

High quality panel and surface wave touch technology combined in a compact form factor

Applications

- Casino and amusement games
- Information kiosks
- Self-service
- Industrial process control

Elo’s 1739L 17” LCD rear-mount touchmonitor delivers a cost-effective touch solution for OEM’s and systems integrators, and complements Elo’s expanding family of touch solutions for applications in the retail self-service and gaming/amusement markets. This compact 3000 series touchmonitor is “designed for touch” from the ground up, with Elo’s proven expertise and reliability built in, and not added as an afterthought by altering an existing monitor.

The 1739L features a brilliant wide viewing angle panel to instantly grab and hold the users’ attention, whether they are checking out retail goods with a self-service kiosk or playing games in a casino or arcade. Because the enclosure is controlled by Elo's specifications and tooling, Elo's rear-mount monitors have a long-lasting product cycle—important for continuity through all phases of project rollouts and when servicing. The 1739L uses clear glass IntelliTouch surface wave technology for the utmost in optical quality, durability, and drift-free stability. It also features a unique, injection-molded minibezel with virtually invisible watertight seal, making it ideal for the rigors of public use.

Narrow borders, multiple mounting options, and a dual serial/USB touch interface add to the versatility of the 1739L. Worldwide agency approvals, as set forth on the back side of the spec sheet, cover the entire monitor that is designed, built and supported by Elo, a true single source supplier.

Benefits

- Bright, high contrast display with wide viewing angle to attract and hold users’ attention
- Elo’s pure glass IntelliTouch surface wave technology for excellent optics, durability, and long-term reliability
- “Designed for touch” from the ground up: includes Elo’s patented protective minibezel for sealing against liquids
- Slim and compact outer dimensions
- Long lasting product cycle–enclosure controlled by Elo specifications
- Multiple mounting options
- Dual serial and USB connectivity
- Worldwide agency approvals
- Three-year standard warranty
- Designed, built, and supported by Elo

tyco / Electronics

elo TOUCHSYSTEMS

1739L 17" LCD Rear-Mount Touchmonitor Specifications

Model	1739L
Case/bezel color	Steel/black
Display type	Active matrix TFT LCD
Display size	17.0" diagonal
Useful screen area Horizontal/vertical	 13.3" (338 mm)/10.6" (270 mm)
Monitor dimensions	Width: 14.5" (368 mm) Height: 12.0" (306 mm) Depth: 1.9" (49 mm)
Optimal (native) resolution	1280 x 1024
Other supported resolutions	1280 x 1024 60, 70, 75 Hz; 1280 x 960 60 Hz; 1152 x 864 75 Hz; 1024 x 768 60, 70, 75 Hz; 1024 x 768 65 Hz (Sun); 832 x 624 75 Hz (Mac); 800 x 600 56, 60, 72, 75 Hz; 720 x 400 70 Hz; 720 x 350 70 Hz; 640 x 480 60, 72, 75 Hz; 640 x 480 66 Hz (Mac)
Colors	16.7 million colors
Brightness (typical) LCD panel LCD panel with IntelliTouch LCD panel with surface capacitive LCD panel with CarrollTouch	 280 cd/m^2 257 cd/m^2 238 cd/m^2 257 cd/m^2
Response time (typical) Rise/fall	 15 msec/10 msec
Viewing angle (typical at CR>10) Horizontal (left/right) Vertical (up/down)	 89°/89° 89°/89°
Contrast ratio	1500:1
Input video format	RGB analog
Input sync format	Separate H & V sync, composite sync, and sync-on-green
Input video signal connector	Mini D-Sub 15-Pin VGA type
Scanning frequency Horizontal/vertical	 31.5 - 80.0 kHz/56.3 - 75 Hz
Power dissipation Monitor only Monitor and power brick	 36 W (max.) 40 W (max.)
Power supply	External AC to DC power brick is provided
Input voltage requirement Monitor input AC to DC power brick input	 +12VDC +/- 5%, 2.5A typical, 3.0A maximum 100-240 VAC, 50/60Hz
Temperature Operating/storage	 0°C to 40°C/-20°C to 60°C
Humidity (noncondensing) Operating/storage	 20% to 80%/10% to 90%
Mean time between failures (MTBF)	50,000 hours demonstrated
Backlight lamp life (typical)	50,000 hours to half brightness
Weight (approx.) Actual/shipping	 4.0 kg (8.8 lbs)/5.2 kg (11.5 lbs)
Other features	Digital on-screen display (OSD); Fully RoHS Compliant; Patent pending bezel seal and patented touch technology
Mounting options	75 mm and 100 mm VESA mounting; rear mount with or without bezel, mounting brackets (included)
User's controls	OSD buttons: menu, left, right, select, power; OSD: contrast, brightness, H/V position, RGB (color temp), clock, phase, recall, language (English, German, Spanish, Japanese, French); OSD disable/enable and power disable/enable
Warranty	Touchmonitor: 3 years
Touch interface	Serial and USB
Agency certifications	UL, cUL, SEMKO, CB, TÜV-T, CE/FCC/VCCI/IC/C-TICK (Class B)

Find out more about Elo's extensive range of touch solutions. Go to www.elotouch.com, or simply call the office nearest you.

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DVI 1500 Extender

EXT-DVI-1500HD

User Manual

www.gefen.com

1080P PROGRESSIVE HDTV

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	(800) 545-6900
Fax	(818) 772-9120

Technical Support Hours:
8:00 AM to 5:00 PM Monday through Friday.

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Notice

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1. Introduction / Operation Notes
2. Features
3. Sender Panel Descriptions
4. Receiver Panel Descriptions
5. Connecting and Operating the DVI 1500
6. Network Cable Wiring Diagram
7. Specifications
8. Warranty

INTRODUCTION

The Gefen DVI•1500 allows a single link video signal to be extended over long distances by using multimode LC-LC fiber optic cable. Fiber Optics technology allows the DVI•1500 to carry video signals over long distances that would not be possible with traditional CAT5 extension. The use of fiber optic cabling protects the video signal from electromagnetic interference (EMI) which can degrade the video signal.

How It Works

The DVI•1500S sender unit sits next to your computer, set-top box or DVD player source. Cables supplied with the DVI•1500 connect your DVI source to the send unit. The DVI•1500R receive unit sits next to your DVI display - up to 1640 feet (330 feet with HDCP) away. The display plugs into the back of the DVI•1500R receiver unit. One CAT-5 cable and a multi mode LC fiber optic cable (4 strand) connect the DVI•1500S and the DVI•1500R units to each other.

OPERATION NOTES

READ THESE NOTES BEFORE INSTALLING OR OPERATING THE DVI 1500

- 50 or 62.5 micron multi-mode fiber optic cable is required for operation of the DVI 1500.
- Maximum extension range of 330 feet (100 meters) when the source requires HDCP. One CAT-5, CAT-5e or CAT6 cable is used to transmit DDC and HDCP data back to the source.
- Maximum range of 1640 feet (500 meters) when the source does not require HDCP. This scenario does not require the CAT-5, CAT5e or CAT-6 cable if the source does not require DDC information. If DDC is required, the use of an EDID storage device (part# EXT-DVI-EDIDN, EXT-DVI-EDIDP) can be used to transmit DDC information back to the source.
- HDCP compliant
- Compatible with all DVI and HDMI* displays.

NOTE: *When used with a HDMI to DVI adapter

Features

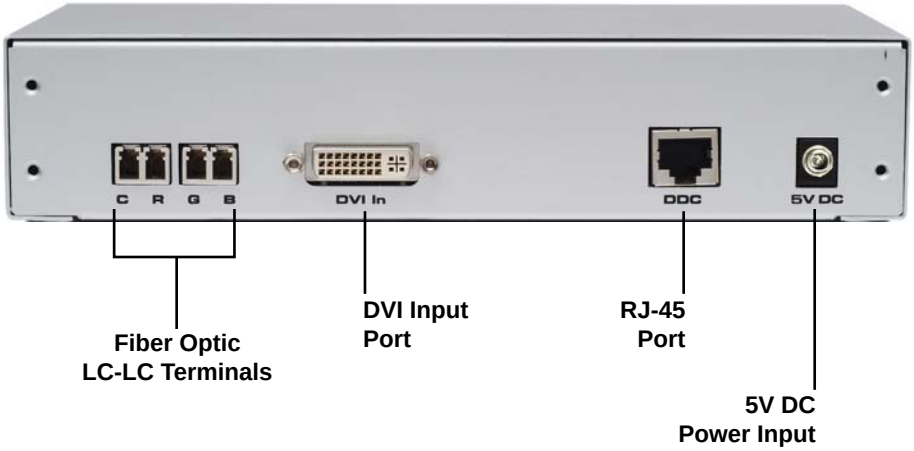
- Extends any DVI (digital visual interface) compliant device up to 1640 feet/500 meters (330 feet with HDCP) from the computer
- Uses a four-strand multimode LC-LC fiber optic cable for video signals
- Uses one CAT-5 cable for DDC and control signals
- Eliminates computer noise where you work
- Supports resolutions up to 1080p, 2K, and 1920 x 1200
- Supports DDWG standard for DVI compliant monitors
- HDCP compliant

Includes:

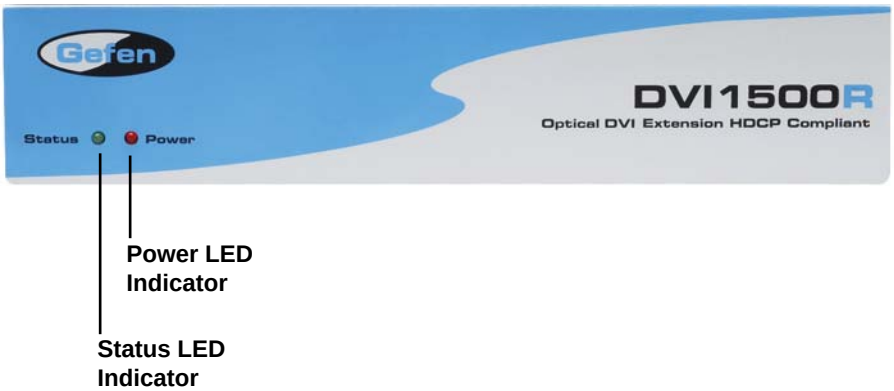
(1) DVI 1500S Sender unit
(1) DVI 1500R Receiver unit
(2) 5V DC Power Supply
(1) 6 ft DVI cable (M-M)
(1) User's Manual

Front Panel

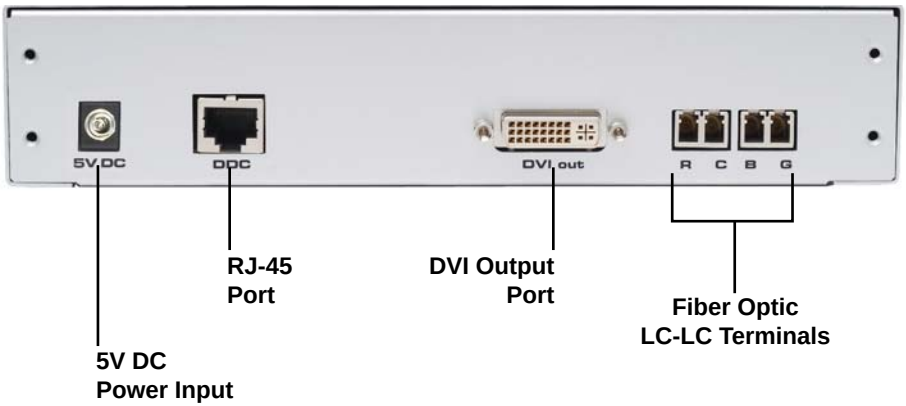
Back Panel



Front Panel



Back Panel



How To Connect The DVI 1500

1. Connect the DVI source to the DVI 1500 sender unit using the supplied DVI cable.

2. Connect a user supplied CAT-5, CAT-5e or CAT-6 cable to the sender unit.

3. Connect four user supplied multi-mode LC terminated fiber optic cables into DVI 1500 sender unit.

NOTE: 50 or 62.5 micron multi-mode fiber optic cable is required for operation of the DVI 1500.

4. Connect the other end of the CAT-5, CAT-5e or CAT-6 cable into the DVI 1500 receiver unit.

5. Connect the other ends of all four multi-mode LC terminated fiber optic cables into the DVI 1500 receiver unit.

NOTE: Please take careful note of the labeling above each fiber optic port on both the sending and receiving DVI 1500 units. The most common user error is to mis-match the fiber optic cable connections on each end, which results in no video being transmitted.

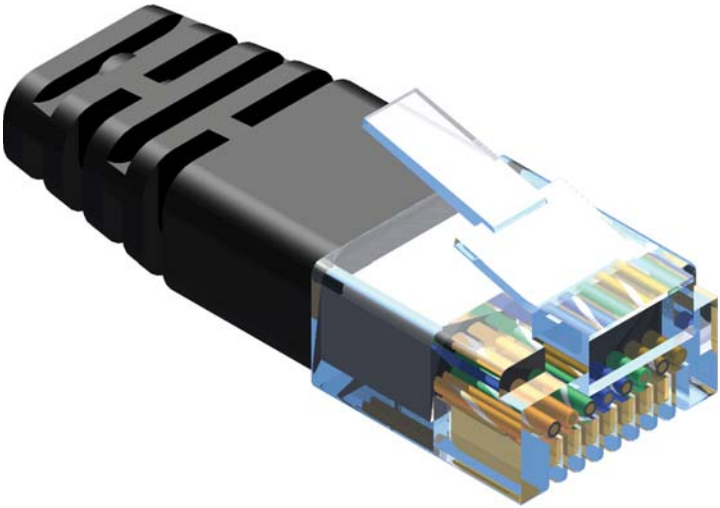
6. Connect the display to the DVI 1500 receiver unit using a user supplied DVI cable.

7. Connect the included 5V DC power supplies into both the DVI 1500 sending and receiving units.

8. Power on the display, followed by the source.

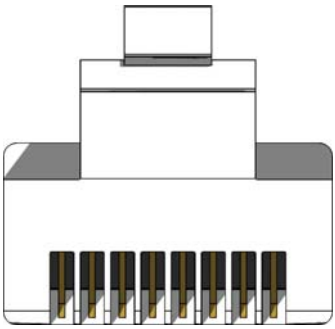
No further adjustments are necessary to operate the DVI 1500.

NETWORK CABLE WIRING DIAGRAM



Gefen has specifically engineered their products to work with the TIA/EIA-568-B specification. Please adhere to the table below when field terminating cable for use with Gefen products. Failure to do so may produce unexpected results and reduced performance.

Pin	Color
1	Orange / White
2	Orange
3	Green / White
4	Blue
5	Blue / White
6	Green
7	Brown / White
8	Brown



CAT-5, CAT-5e, and CAT-6 cabling comes in stranded and solid core types. Gefen recommends using solid core cabling. CAT-6 cable is also recommended for best results.

Each cable run must be one continuous run from one end to the other. No splices or use of punch down blocks.

SPECIFICATIONS

Video Amplifier Bandwidth ..... 225 MHz maximum

Input Video Signal ..... 1.2 Volts p-p

Input DDC Signal ..... 5 Volts p-p (TTL)

Single Link Range ..... 1080p, 2k, 1920 x 1200

DVI Connector ..... DVI-D (19 pin) female

Video Link Connector LC

DDC Link Connector ..... RJ-45 Shielded

Power Supply ..... 5V DC with locking connector

Power Consumption ..... 36W watts x 2 (max)

Link Connectors ..... LC Fiber, Shielded RJ-45

Rack mountable ..... 1U rack space

Dimensions ..... 3.25”D x 4.25”W x 1”H

Shipping Weight ..... 5 lbs.

Rack mountable ..... 1U rack space

BBG 6 A

BLACKBURST AND AUDIO GENERATOR

VERSA™ TOOLS

- Creates up to six blackburst outputs for genlocking
- Generates Color Bars and balanced/unbalanced audio signals
- Compact 1U high, quarter rack width metal enclosure
- Versatile mounting options including rack, under-desk, or projector mounts
- LED power indicator
- External international power supply
- NTSC and PAL compatible

The Extron BBG 6 A Blackburst Generator is designed for use in broadcast, production, and presentation environments that require reference signals for genlocking video systems. It is also useful for system troubleshooting and alignment as it features a Color Bars and audio test signal generator.

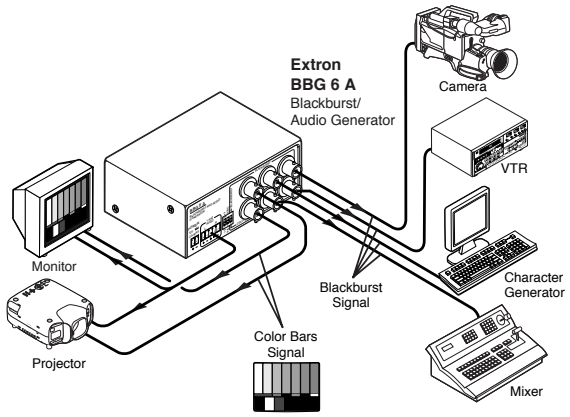
DESCRIPTION

The Extron **BBG 6 A** Blackburst and Audio Generator offers six broadcast quality, NTSC or PAL blackburst output signals, allowing a variety of video equipment to be genlocked to a common reference signal. The output blackburst signal consists of three reference signal components: vertical sync, horizontal sync, and color burst. The first two outputs can also output NTSC SMPTE Color Bars or PAL full-field Color Bars test patterns, selectable via a DIP switch. Additionally, the BBG 6 A comes with a 1 kHz audio generator with balanced or unbalanced audio on captive screw connectors. Part of the VersaTools™ line of products, the BBG 6 A is housed in a 1U high, quarter rack width metal enclosure, making it ideal for installation in small spaces or portable field use.

FEATURES

- **Broadcast quality blackburst outputs** – Six outputs on female BNC connectors for creating blackburst reference signals to feed into genlockable devices
- **Color bar generator** – Two of the blackburst outputs also provide standard SMPTE Color Bars for NTSC and full-field 8-bar for PAL, selectable via DIP switch for easy troubleshooting and alignment
- **Audio test signal** – Built-in audio generator offers 1kHz, balanced/unbalanced output on captive screw connectors for simplified audio troubleshooting. The output level is switchable from +4 dBu to -10dBV via DIP switch
- **Compact metal enclosure** – 1U high, quarter rack width rugged, metal enclosure
- **Versatile mounting options** – Rack, under-desk, and projector-mountable
- **Power indicator** – LED for easy troubleshooting
- **Power supply** – 12VDC external international desktop power supply included for worldwide and daisy chaining capability

APPLICATION DIAGRAM



SPECIFICATIONS

BLACKBURST OUTPUT

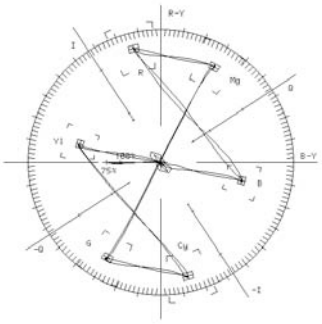
Number/signal type	6 blackburst (two can output Color Bars)
Connectors	6 BNC female
Standards	RS-170A standard for NTSC 3.58, CCIR 624-4 standard for PAL
Impedance	75 ohms
Sync level	40 IRE for NTSC, 43 IRE for PAL
Color burst level	40 IRE for NTSC, 43 IRE for PAL
Setup level	NTSC, 7.5 IRE; PAL, 0 IRE
Tolerance for all levels	±3%
Subcarrier level	NTSC 3,579,545 ±3 Hz / PAL 4,433,618 ±3 Hz

COLOR BAR OUTPUT

Number/signal type	2 Color Bars, switchable, standard SMPTE bars for NTSC, full-field 8-bar for PAL
Connectors	2 BNC female
Standards	NTSC 3.58, PAL
Impedance	75 ohms
Sync level	40 IRE for NTSC, 43 IRE for PAL
Color burst level	40 IRE for NTSC, 43 IRE for PAL
Setup level	NTSC, 7.5 IRE; PAL, 0 IRE
White level	100 IRE
Tolerance for all levels	±3%
Subcarrier levels	NTSC 3.579545 ±3Hz / PAL 4.433618 ±3 Hz

The Vector scope measurement plots the broadcast quality Color Bars output of the BBG 6 A.

APL = 40.8%
System Line L 22 F1 Angle (deg) 0.0
Gain x 1.000
0.000 dB
525 Line NTSC
Setup 7.5%



AUDIO OUTPUT

Number/signal type	1 set (L and R) of stereo sine waves, bal. or unbal.
Connectors	(1) 3.5 mm captive screw connector, 5 pole
Impedance	50 ohms unbalanced, 100 ohms bal.
Signal level	Selectable: professional level, +4dBu (1.23V) bal.; or consumer level, -10dBV (316mV) unbal.
Tolerance for all levels	±3%
Signal frequency	1 kHz

NOTE: 0dBu = 0.775 volts (RMS)

GENERAL

Power	100VAC to 240VAC, 50/60 Hz, 2.5 watts, external, autoswitchable to 12VDC, 1 A power supply. Product requires 0.2 A max.
Rack mount	Yes
Enclosure type	Metal
Enclosure dimensions	1.7" H x 4.3" W x 3.0" D 4.3 cm H x 10.9 cm W x 7.6 cm D
Product weight	0.4 lbs (0.2 kg)
Shipping weight	3 lbs (1.4 kg)
Listings	UL, CUL
Compliances	CE, FCC Class A, VCCI, AS/NZS, ICES
MTBF	30,000 hours
Warranty	3 years parts and labor

Model	Part Number
BBG 6 A	60-535-01

Specifications are subject to change without notice.

Extron Electronics, USA
1230 South Lewis Street
Anaheim, CA 92805
800.633.9876 714.491.1500
FAX 714.491.1517

Extron Electronics, Europe
Beeldschermweg 6C, 3821 AH Amersfoort
The Netherlands
+800.3987.6673 +31.33.453.4040
FAX +31.33.453.4050

Extron Electronics, Asia
135 Joo Seng Rd. #04-01
PM Industrial Bldg.
Singapore 368363
+65.6383.4400 FAX +65.6383.4664

Extron Electronics, Japan
Daisan DMJ Bldg. 6F, 3-9-1 Kudan Minami
Chiyoda-ku, Tokyo 102-0074
Japan
+81.3.3511.7655 FAX +81.3.3511.7656

03-01
68-787-01
REV. A

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Specifications — DVI-RGB 150 DVI Interface

Video

NOTE *The DVI-RGB 150 converts a single link DVI signal to an analog RGB signal.*

NOTE *Using an adaptor (the Extron HDMI to DVI-D adapter, part #26-616-01), the DVI-RGB 150 can accept HDMI signals. It converts HDMI digital RGB signals, but does not support the HDMI digital component (YCrCb) signal format.*

Video input and loop-through

Number/signal type ..... 1 single link DVI-D digital video input
1 single link DVI-D buffered loop-through

Connectors ..... 1 DVI-D female (DVI input)
1 DVI-D female (DVI loop through)

TMDS nominal level ..... 0.4 V to 0.6 V swing

TMDS impedance ..... 100 ohms

DC offset (max. allowable) ..... ±0.5 V

Video output

Number/signal type ..... 1 RGBHV, RGBS, RGsB

Connectors ..... 6 BNC female

Nominal level ..... 0.7 Vp-p for RGB

Level adjustment range ..... -3 dB to 6 dB (x0.7 to x2)

Peaking adjustment range ..... 0 dB to 6 dB (x1 to x2) at 100 MHz

Impedance ..... 75 ohms

Output resolution ..... Follows input, determined by the local DVI loop-through monitor or by the selector on this product.

Resolution selector resolutions and rates

Setting	Resolution	Refresh Low	Refresh High
0	640x480	60 Hz	75 Hz
1	800x600	60 Hz	75 Hz
2	852x480	60 Hz	75 Hz
3	1024x768	60 Hz	75 Hz
4	1024x852	60 Hz	75 Hz
5	1280x768	60 Hz	75 Hz
6	1280x1024	60 Hz	75 Hz
7	1365x768	60 Hz	75 Hz
8	1366x768	60 Hz	75 Hz
9	1400x1050	60 Hz	60 Hz
A	1600x1200	60 Hz	60 Hz
B	480p	60 Hz	60 Hz
C	576p	50 Hz	50 Hz
D	720p	50 Hz	60 Hz
E	1080i	50 Hz	60 Hz
F	1080p	50 Hz	60 Hz

Return loss ..... -35 dB @ 5 MHz

DC offset ..... ±10 mV maximum with input at 0 offset

Output cable driving distance ... 150' (45 m) at 1600 x 1200 with Extron MHR cable
250' (60 m) at 1024 x 768 with Extron MHR cable

Sync

Output type ..... RGBHV, RGBS, RGsB

Output level ..... TTL (5 Vp-p, unterminated)

Output impedance ..... 75 ohms

Polarity ..... Positive or negative (follows input)

General

Power	100 VAC to 240 VAC, 50/60 Hz, 25 watts, internal, autoswitchable.
Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Rack mount	Yes, with an optional 1U rack shelf, part #60-190-01 or 60-604-01; or a 1U, 6" deep rack shelf, part #60-190-10 or 60-604-10. Also furniture mountable with an optional MBU 125 under-desk mounting kit, #70-077-01; or MBD 129 through-desk mounting kit, #70-077-02.
Enclosure type	Metal
Enclosure dimensions	1.7" H x 8.7" W x 6.0" D (1U high, half rack wide) 4.3 cm H x 22.1 cm W x 15.2 cm D (Depth excludes connectors and knobs.)
Product weight	1.6 lbs (0.7 kg)
Shipping weight	4 lbs (2 kg)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Listings	UL, CUL
Compliances	CE, FCC Class A, VCCI, AS/NZS, ICES
MTBF	30,000 hours
Warranty	3 years parts and labor

NOTE *All nominal levels are at ±10%.*

NOTE *Specifications are subject to change without notice.*

(7.52-070606-D3)

36" Focused Audio Array: Model FA-501

Technical Documentation

- Best Sound Quality of any focused sound technology
- Not an ultrasonic solution—no safety concerns
- Greatest low frequency capability in the industry
- Excellent Sound & Pattern Control via onboard user interface
- Custom Configuration/Enclosure and Cover colors available
- Built in Amplifier with balanced, line level input

Specifications

Maximum Output Level:
85dBA (8' MOUNTING HEIGHT, TIGHT PATTERN).

Size:
36.25 x 36.25 x 3 INCHES

Weight:
37 POUNDS

Color-Finish:
NON REFLECTIVE BLACK POWDER COAT

Cover:
BLACK, WHITE, OR CREAM FLAME-RETARDING CLOTH—CUSTOM COVERS AVAILABLE

Input Level:
ADJUSTABLE -15DBV TO +4DBV

Input Impedance:
5,000 OHMS TRANSFORMER BALANCED

Focal Pattern:
ADJUSTABLE FROM TIGHT TO 10 FEET IN DIAMETER

Mounting:
FOUR 0.080 AIRCRAFT CABLES WITH QUICK RELEASE CLIPS OR FOUR THREADED INSERTS (1/4" OR 6MM)

Frequency Response:
SEE ATTACHED CHARTS

Frequency Compensation:
SWITCH SELECTABLE: MUSIC, VOICE WITH MUSIC, VOICE

Power:
16 TO 18 VAC OR 24VDC, 15 WATTS

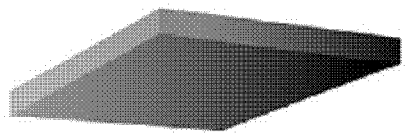
Connections:
SCREW TERMINALS ON TOP SIDE

1815 Michigan Avenue
Bismarck, ND 58504
www.dakotaaudio.com

Phone: 701-224-9331
Fax: 701-223-1296
Toll free: 800-428-3461

Dakota Audio FA-501 arrays are easily field adjustable for both mounting height and pattern width. There are two push buttons and two rows of LEDs on the top side of the array. One sets the mounting height above the floor in one foot increments from 8 to 14 feet. The other button controls the pattern width in seven steps from "tight" to a circle appropriately 10 feet in diameter.

A three position switch adjusts the frequency response for the program material. The "music" position provides full range sound. The "voice with music" position has a slight rise in the high frequency response to enhance voice intelligibility while maintaining good music reproduction. The "voice" position reduces low frequencies for maximum voice intelligibility.



Model FA-501

3"x36"x36" - with user control panel

Audio input is line level, transformer isolated. The array accepts any standard line level input, either balanced or unbalanced. A volume control and two position gain switch accommodate a wide range of audio input levels.

For installations where the audio level is set remotely, a switch disables the volume control.

The arrays are powered by either 16 to 18 Volts AC or 24 Volts DC. A plug-in 16 VAC transformer is supplied for installations where local 120 power is available. Where the array power and signal cables share the same conduit, we suggest powering them with 24VDC.

Generally, the arrays are suspended by four thin (0.080 inch) aircraft cables with easily adjustable clips (supplied). Optionally, four threaded inserts, either 1/4 - 20 American or 6 millimeter metric, are available.

The units are constructed of aluminum, with a non-reflective black powder coat finish. The snap-on fabric cover is provided, available in back, white, and cream with other colors available. Logos or designs can be printed on the face of the fabric.

Digital Signage	**Museum Exhibits**	**Supermarkets**
Trade Show Booths	**Waiting Areas**	**Retail**
Healthcare	**Education**	**Libraries**

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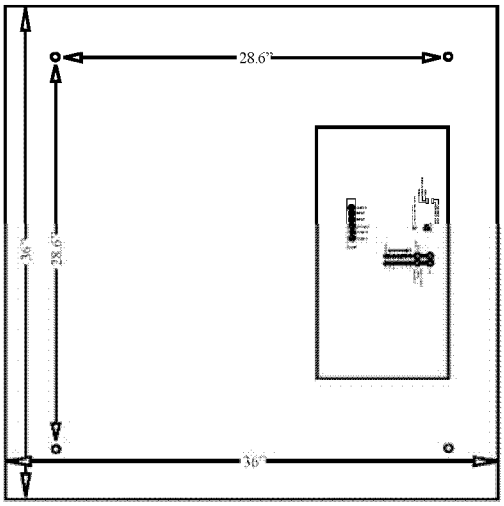
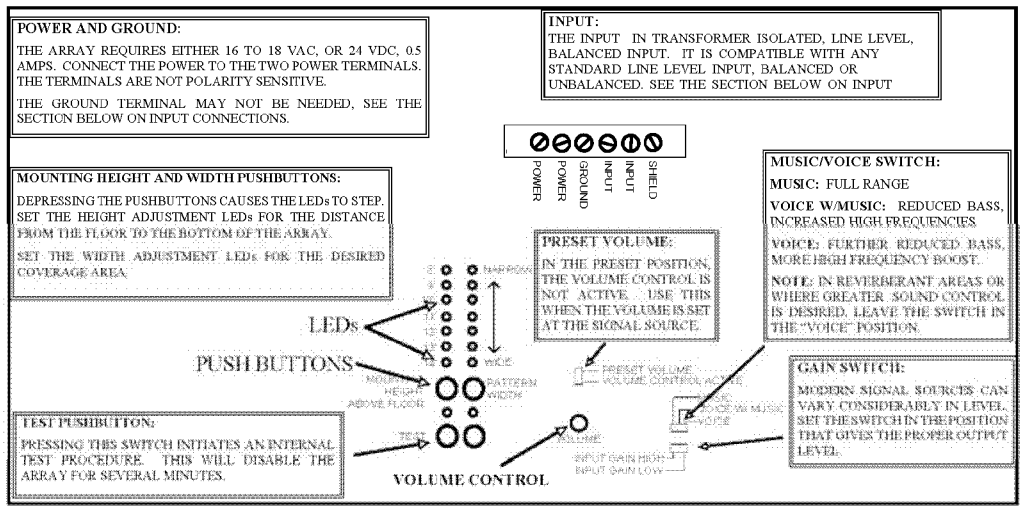
MECHANICAL DRAWING, OPERATION, & CONNECTIONS

BACK SIDE SHOWING
MOUNTING HOLES



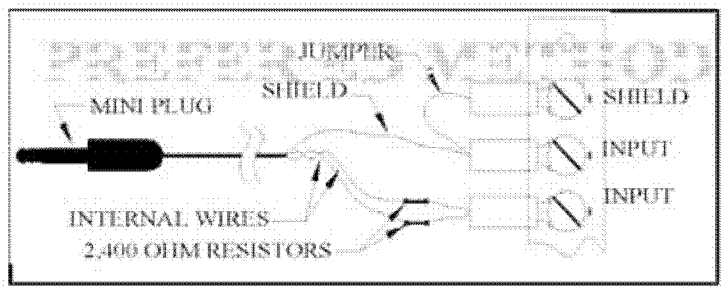
CONTROLS &C ONNECTIONS
PANEL ON THE BACK OF THE ARRAY

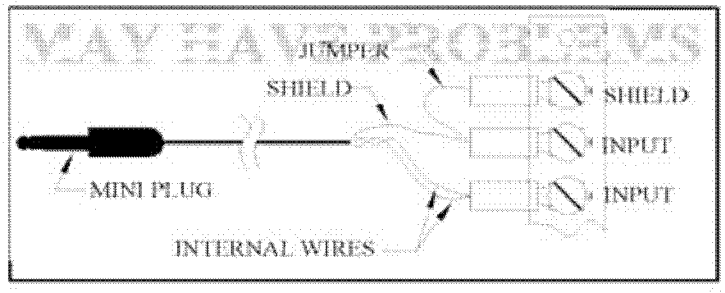


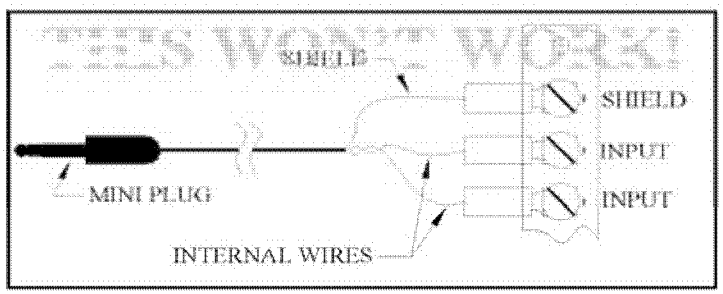
CONNECTING TO AUDIO SOURCES:

The input was designed to accept a wide range of audio sources, from balanced line-level professional boxes to unbalanced consumer equipment such as DVDs, CDs, AND MP3 players. Connecting unbalanced sources to the balanced input on the array can be a tricky. If you are in doubt, we have ready-made cord assemblies available at a reasonable price.

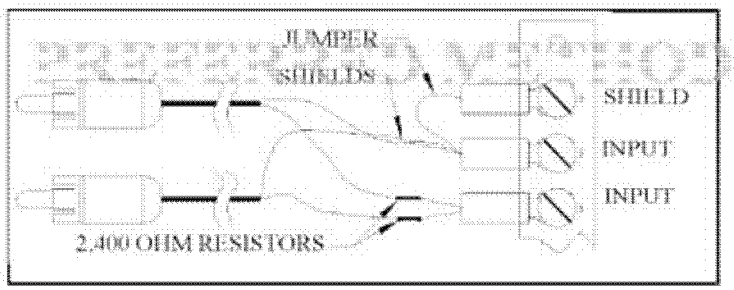
1/8" MINI-PLUG

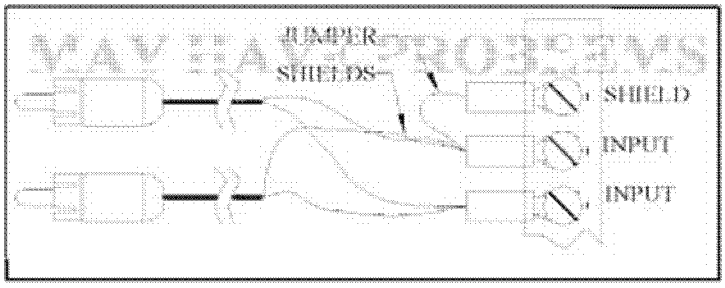


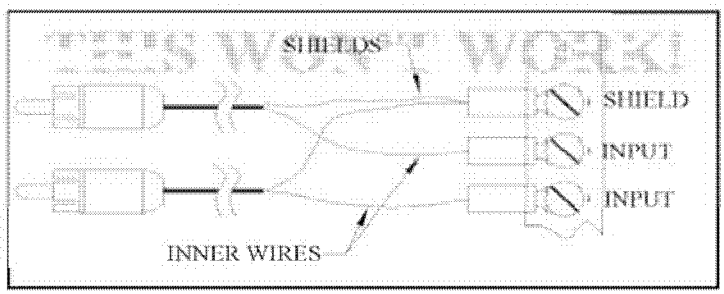




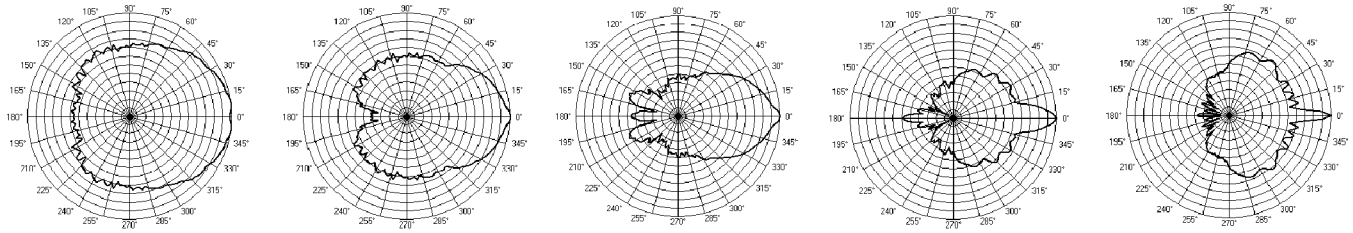
PHONO (RCA) PLUG





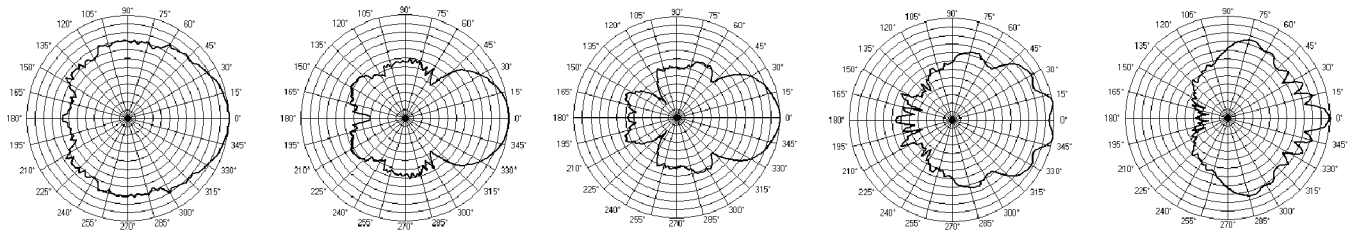


POLAR PATTERNS



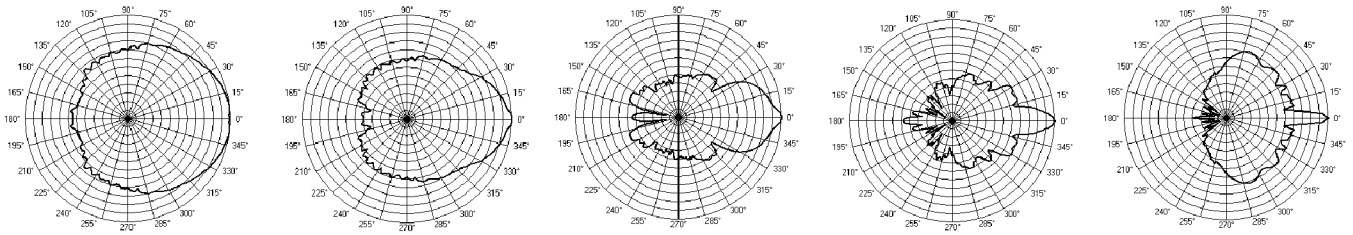
250 HZ 500 HZ 1 KHZ 2 KHZ 4 KHZ

SET AT 10' HEIGHT, NARROWEST PATTERN.



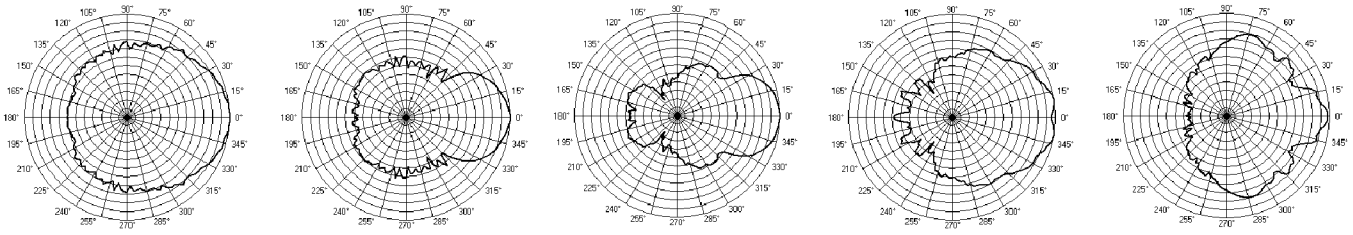
250 HZ 500 HZ 1 KHZ 2 KHZ 4 KHZ

SET AT 10' HEIGHT, WIDEST PATTERN.



250 HZ 500 HZ 1 KHZ 2 KHZ 4 KHZ

SET AT 14' HEIGHT, NARROWEST PATTERN.

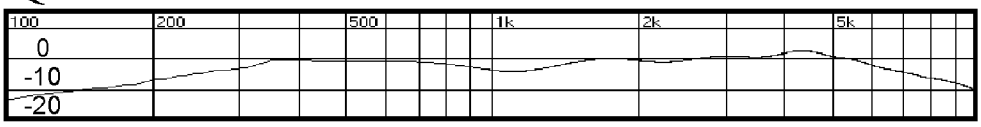


250 HZ 500 HZ 1 KHZ 2 KHZ 4 KHZ

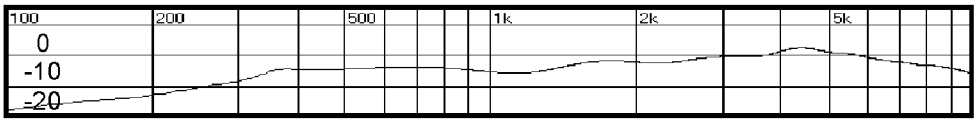
SET AT 14' HEIGHT, WIDEST PATTERN.

FREQUENCY RESPONSE

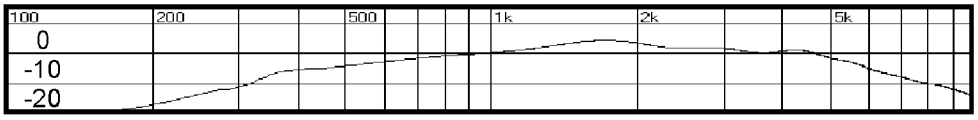
EQ SWITCH - MUSIC



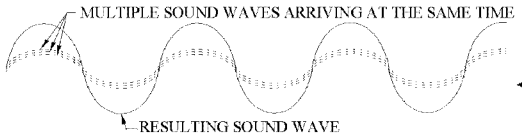
EQ SWITCH - VOICE W/MUSIC



EQ SWITCH - VOICE

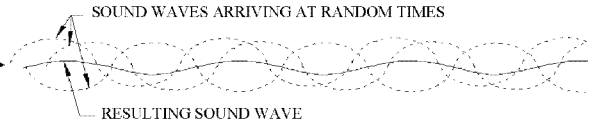


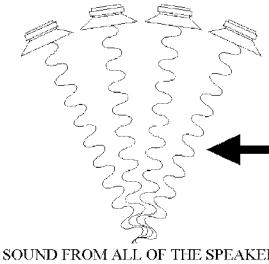
HOW DOES IT WORK?



If two or more sound waves arrive at the same place at the same time, they add and produce a sound wave that is the sum of all of the incoming sound waves.

When multiple sound waves arrive at random times, some waves cancel, producing a sound wave that is less than the sum of the incoming waves.

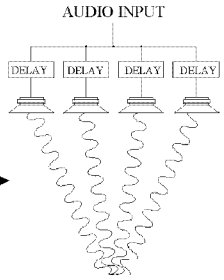




If several speakers are mounted equal distance from the listener, the sound from each of the speakers arrives at the listener's ears at the same time. The resulting sound is considerably louder than the sound from each individual speaker.

SOUND FROM ALL OF THE SPEAKERS ARRIVES AT THIS POINT SIMULTANEOUSLY

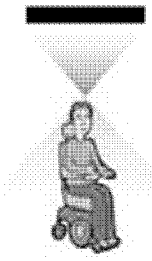
While it wouldn't be practical to mount the speakers in a spherical array (and the result would not be adjustable), we can achieve the same results by delaying the launch time from the speakers.



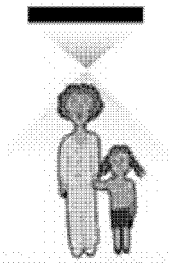
SOUND FROM ALL OF THE SPEAKERS ARRIVES AT THIS POINT SIMULTANEOUSLY

FOCUSED SOUND BY DAKOTA AUDIO

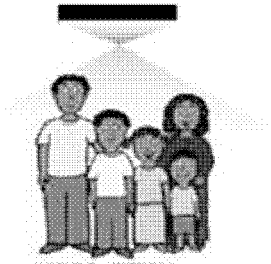
LOOKS BETTER, SOUNDS BETTER, WORKS BETTER
AND IT'S ADJUSTABLE.



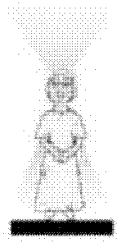
TIGHT PATTERN
FOR A SINGLE PERSON



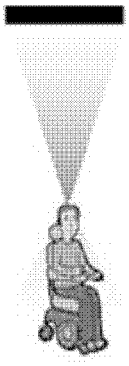
NORMAL PATTERN
FOR A PAIR OF LISTENERS



WIDE PATTERN
FOR A SMALL GROUP



IN THE FLOOR
UNDER THE LISTENER



THE ARRAY MOUNTING HEIGHT
IS ADJUSTABLE FROM
EIGHT TO 14 FEET

Dakota Audio Inc.
1815 Michigan Ave.
Bismarck, ND 58504

-Configurable- HP Compaq dc5800 Microtower

HP recommends Windows Vista® Business.

» Desktop specials
» Desktop accessories
» Support & Drivers
» Technical specs

Add To Cart »

Through October 31, 2008, purchase one or more select HP Smart Buy desktop options and receive up to $20 per option with Mail-in Rebate. (limit 5) » Learn More

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Product
HP Compaq dc5800 Microtower

Operating system
» Help me choose an operating system
Genuine Windows Vista® Business 32-bit

Application software
No Item Selected

Chipset
Intel® Q33 Express chipset

Power supply
» Help me choose a power supply
80PLUS Power Supply - dc5 MT Ch [Add $15.00]

Country kit
HP dc5800 Country Kit

Processor
» Help me choose an Intel processor
Intel® Core 2 Duo E8400 processor [Add $153.00]

Memory

» Help me choose memory

2GB PC2-6400 (DDR2-800) 1x2GB [Add $33.00]

Video/graphics

» Help me choose a graphics card

NVIDIA Quadro NVS 290 (256MB DH) PCIe x16 (De-selection of parallel port may be required to add this card)

2nd video/graphics card

No Item Selected

Hard drives

80 to 500-GB Serial ATA 3.0GB/s hard drives with SMART VI, helping alert users to predictable failure

80GB SATA 3.0Gb/s NCQ 10K (16MB) 1st HDD

Second hard drive

No Item Selected

Removable storage

No Item Selected

Optical drive

HP recommends a 48X/32X Combo Drive. Install your software, back-up your data and increase your

SATA 16X/48X DVD-ROM - 1st

Second optical drive

Cannot select 2nd Optical Drive if "No Optical Drive , Blank Bezel" is selected in OPT1. The only exce

No Item Selected

Network card

Integrated Intel 82566DM Gigabit Network Connection

Modem

No Item Selected

Mouse

» Help me choose a mouse

No Mouse [Subtract ($4.99)]

Keyboard

» Help me choose a keyboard

No Keyboard MT [Subtract ($7.99)]

Security accessories

HP ProtectTools™ security software suite delivers an assortment of hardware and software tools, he demands.

Integrated TPM 1.2

Additional accessories

GW286AV HP FireWire IEEE 1394 PCI Card (De-selection of parallel port may be required to add this

AJ406AV 2nd serial port adapter (This module is not allowed if all of the PCI and PCIe slots are full. De

GQ179AV#ABA Welcome Center SMB Offers (Available only w/Vista OS) [Add $2.00]

AJ407AV HP Parallel Port Adapter (This module is not allowed if all of the PCI and PCIe slots are full)

GH590AV HP Total Care Advisor (Available only if Vista Business 32 or Vista Home Basic OS is select

GW285AV 1GB Flash Module for ReadyBoost (Available only w/Vista OS; available only w/512MB or 1

KU660AV McAfee Total Protection - Small Business [Add $2.00]

KU901AV HP Thin USB Powered Speakers (Not available w/Symantec Anti-virus) [Add $12.00]

Restore CD

No Item Selected

Warranty

3-year (parts/labor/next business day on-site) limited warranty - MT

Recommended accessories, supplies and services

Warranty and Service Upgrades (for 3-year warranty selection)

No Item Selected

Warranty and Service Upgrades (for 4-year warranty selection)

No Item Selected

Warranty and Service Upgrades (for 5-year warranty selection)

No Item Selected

Basic installation services

No Item Selected

Software services

No Item Selected

Desktop Printers

CC567A#ABA HP Photosmart C7280 all-in-one [Add $269.99]
C8189A#ABA HP Officejet Pro L7680 color all-in-one [Add $279.00]

CB442A#ABA HP Color LaserJet CP3505n printer [Add $599.00]
Q7812A#ABA HP LaserJet P3005 printer [Add $549.00]
CB366A#ABA HP LaserJet P2015 printer [Add $249.00]

HP Business LCD Monitor Promotional Offer

» Need help choosing a monitor?

No Item Selected

HP Business LCD Monitor - Small Medium Business

Add the HP L1950 19-inch LCD Monitor

No Item Selected

More Info » Select »

HP Business LCD Monitor

Add the HP L1950 19-inch LCD Monitor

No Item Selected

More Info » Select »

Second HP Business LCD Monitor

Add the HP L1950 19-inch LCD Monitor

No Item Selected

More Info » Select »

Bundles (not factory installed)

RT174AT Bundle Promo, Connectivity Starter Kit - Surge Protector/LAN cable/Printer cable [Add $20.0

KF885AT Promo - USB Mouse/Keyboard Kit [Add $29.00]
KF886AT Promo - HP PS/2 Mouse/Keyboard Kit [Add $29.00]
RT174AA Bundle, Connectivity Starter Kit - Surge Protector/LAN cable/Printer cable [Add $29.00]

Adapters and Cables (not factory installed)

EM449AA Belkin USB to Serial Adapter [Add $20.00]

AH122AA Belkin 14 ft Cat5e Patch Cable [Add $5.50]

AH123AA Belkin 6 ft Firewire (1394) Cable [Add $10.00]

PA997A HP FireWire / IEEE 1394 PCI Card [Add $39.00]

Multimedia and Audio Devices (not factory installed)

KK912AA Thin USB Powered Speakers [Add $29.00]

Monitor Accessories (not factory installed)

Enhance the overall computing experience!

EE418AA HP Silver Flat Panel Speaker Bar [Add $35.00]

More Info » Select »

Networking and Networking Options (not factory installed)

EA118AA Wireless A+G PCI Adapter [Add $89.00]

EH352AA Intel Pro 1000 PT Gb Ethernet PCIe NIC [Add $49.00]

EK694AA Modem PCI High Speed 56K International SoftModem (includes low profile bracket) [Add $3

EA833AA NIC - Broadcom NetXtreme Gb Ethernet PCI-E Adapter [Add $49.00]

Chassis Accessories (not factory installed)

PA716A HP 2nd Serial Port Adapter [Add $25.00]

DC177B HP 5.25" Blank Bezel Kit (Carbonite 50/Bulk Pack) [Add $49.00]

KD061AA Parallel Port Adapter [Add $25.00]

Power Accessories and Batteries

AG290AA#ABA Belkin 7-outlet Surge Protector [Add $19.00]

AF403A HP T1000 5-15P NA USB Serial UPS [Add $395.00]

378439-D71 HP T750 Low Voltage NA/JP UPS [Add $289.00]

361475-001 HP T500 Uninterruptible Power System [Add $99.00]

Security Options (not factory installed)

EM717AA HP USB Biometric Fingerprint Reader [Add $39.00]

PV606AA HP Business PC Security Lock Kit [Add $39.00]

KN740AA HP Protect Tools (version 3.0) [Add $20.00]

BB731UT HP Smart Data Protection Service - Smart Buy Promotional Sku [Add $119.00]

Recycling service

ZU360AA Recycling service for Desktops/Workstations [Add $26.00]

ZU362AA Recycling service for Monitor Displays [Add $50.00]

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Control® 126W/WT Premium In-Wall Loudspeaker

Professional Series

Key Features:

Components:
- 165 mm (6½ in) polymer-coated aluminum-cone woofer with pure butyl rubber surround.
- 25 mm (1 in) pure-titanium dome low-diffraction swivel aimable titanium tweeter.

High-slope crossover for natural midrange sound.

Extended bandwidth performance of 38 Hz – 20 kHz.

50W continuous (100W program, 200W peak) power handling (126W).

The Control 126W is a premium in-wall speaker within the JBL Professional Control® Contractor line designed for applications such as foreground music, boardrooms, reception areas, airports, convention centers, cruise ships, retail outlets, restaurants, museums, surround locations, or any critical listening application where top performance from a loudspeaker with minimal visual impact is required.

The high-performance woofer features a polymer-coated aluminum cone for high performance down to the 38 Hz and pure butyl rubber surround for long-life and high reliability along with extended-polepiece magnet design for long excursion and tight, low bass. The pure titanium dome high frequency driver is loaded with a built-in EOS™ (Elliptical Oblate Spheroidal) waveguide for low distortion and a smooth frequency response. A low-diffraction swivel-mounting system enables the user to direct high frequencies where required without the diffraction distortion inherent in other aimable tweeter designs. A high-slope crossover network maintains natural midrange sound and produces more even coverage throughout the listening area. The optional Control 126WT version includes a multitap transformer for 70V/100V systems.

The Control 100 Series speakers are voiced similarly to other JBL Control Contractor models, allowing mixing with surface-mount and in-ceiling speakers within a single listening space. The premium sound quality makes these loudspeakers ideal for critical listening environments, yet they are high power and rugged enough to handle venues requiring high-SPL, heavy duty-cycle music.

The speaker fits into the wall space of ordinary stud-wall construction. An optional rough-in frame is available for installing the speakers into standard stud walls in new-construction projects. As is the case with all Control Contractor speakers, the baffles and grilles are paintable to match any décor.

Specifications:

System:	
Frequency Range (-10 dB)[1]:	38 Hz - 20 kHz
Continuous Power Capacity[2]:	200 Watts Peak 100 Watts Continuous Program 50 Watts Continuous Pink Noise
Sensitivity[3]:	88 dB SPL, 1W, 1 m (3.3 ft)
Nominal Impedance (126W):	8 ohms
Transformer Taps (126WT):	70V: 30W, 15W, 7.5W & 3.7W taps 100V: 30W, 15W & 7.5W taps
Transducers:	
Low-Frequency:	165 mm (6.5 in) polymer-coated aluminum cone, pure butyl rubber surround.
High-Frequency:	25 mm (1 in) pure-titanium dome with cloth suspension on low-diffraction swivel-mount with -10 degree aimability.
Physical:	
Termination:	Screw-down Euroblock-type connector. Max wire size 14 AWG (1.5 mm)[2]
Crossover Network:	3rd order (18 dB/oct) low-pass to the woofer and 3rd order (18 dB/oct) high-pass to the tweeter.
Optimum Air Cavity Behind Speaker:	20 to 40 liters (0.7 to 1.4 cu ft)
Outside Dimensions (H x W x D):	280 x 215 x 105 mm (11 x 8.5 x 4.1 in), 99 mm (3.8 in) front of wall to back of speaker.
Cutout Size (H x W):	246 x 181 mm (9.7 x 7.2 in), Cutout template included.
Maximum Wall Thickness:	32 mm (1.25 in)
Net Weight (ea):	126W: 2.1 kg (4.5 lb), 126WT: 2.7 kg (5.9 lb)
Shipping Weight (pair):	126W: 4.8 kg (10.5 lb), 126WT: 6.2 kg (13.5 lb)
Included Accessories:	Cutout template & paint shield
Optional Accessories:	MTC-126RIF Rough-In Frame for new construction installation to wallstuds.

[1]Half-space (mounted in-wall)
[2]Continuous Pink Noise rating is IEC-shaped pink noise with a 6 dB crest factor.
[3]Half-space (mounted in-wall), average 100 Hz to 10 kHz

JBL continually engages in research related to product improvement. Some materials, production methods and design refinements are introduced into existing products without notice as a routine expression of that philosophy. For this reason, any current JBL product may differ in some respect from its published description, but will always equal or exceed the original design specifications unless otherwise stated.

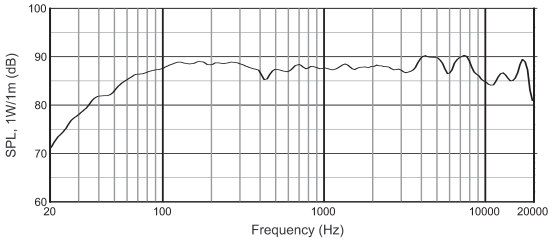
Rear Air Cavity Considerations

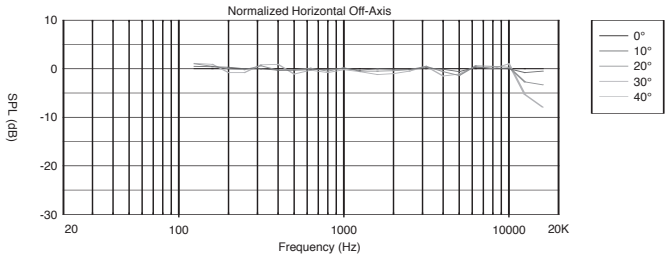
The Control 126W is designed to function over a wide span of rear air cavity sizes within the wall. The optimum air cavity (sometimes called "loading volume") for fullest low-frequency performance is between 20 to 40 liters (0.7 to 1.4 cu ft). In a wall with studs located 16-inches on-center, this approximately equals a 23-inch to 46-inch high space. It is recommended that the air cavity behind the speaker be sealed by the use of silicone sealant or similar material to help create an air-tight seal and minimize wall noise.

Control® 126W/WT Premium In-Wall Loudspeaker

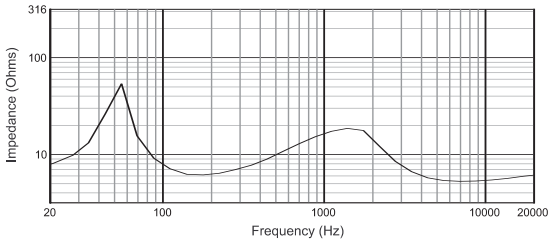
Frequency Response

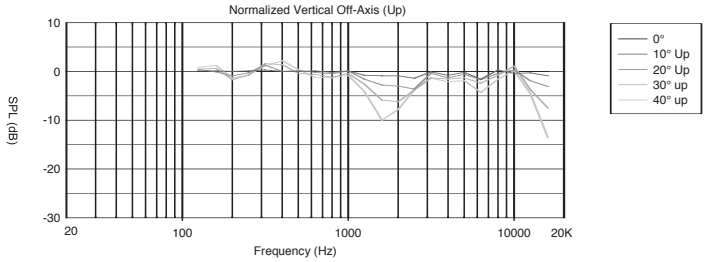
Measured on-axis with distance referenced to 1 meter at 1 watt, half-space (126W).



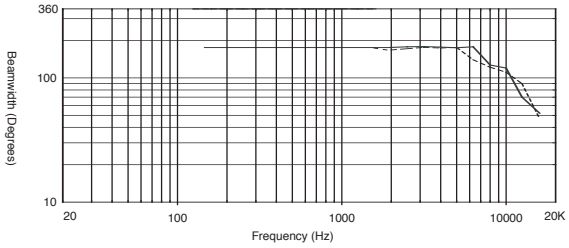


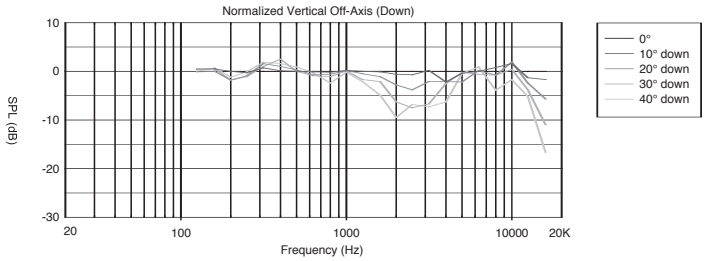
Impedance (126W)



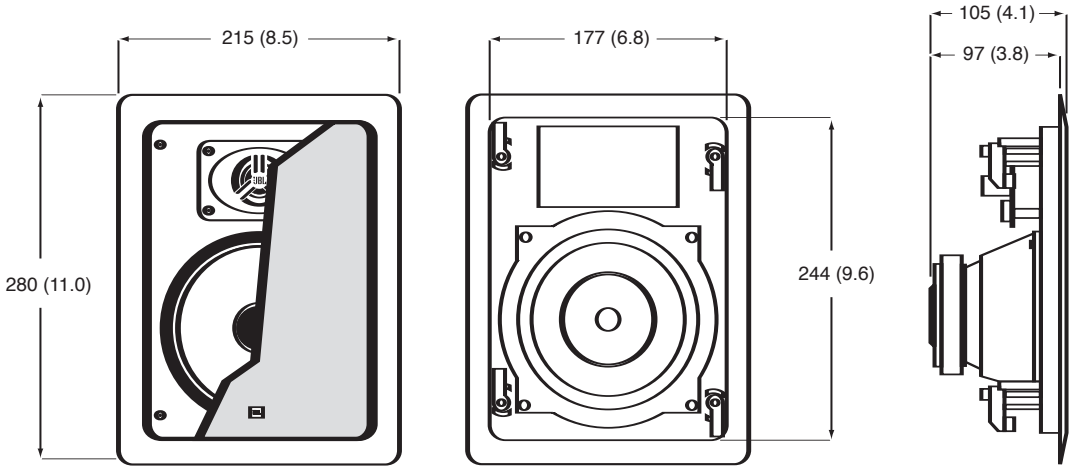


Beamwidth





Dimensional Drawing



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SS Control 126WT
CRP 5M
12/04

Control 25

Compact Indoor
Outdoor Background
Foreground Loudspeaker

Brochure

Spec Sheet

Owner's Manual

The Control 25 is perhaps the most versatile of JBL Professional's Control Contractor Series indoor/outdoor loudspeakers.

Features :

- Components: 5.25 in Polypropylene coated woofer, .75 in Titanium coated horn loaded tweeter.
- Built-in InvisiBall® mounting hardware*.
- Weather resistant enclosure and transducers.
- Readily paintable.
- 90° x 90° high frequency horn.
- Overload Protection Circuitry.
- Sensitivity: 88 dB SPL, 1W, 1m
- *Patents pending worldwide

Specifications :

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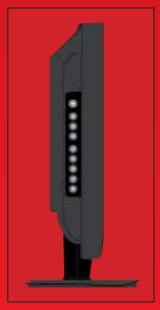
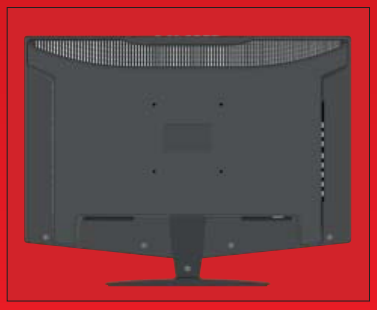
The Biggest Thing in Big LCD Monitors

LCD-2007HD
LCD-2007HDL





Active Matrix 20" Color LCD Monitor

• HD compatible (supports 480p/i, 576p/i, 720p, 1080i)

- Component input capability provides superior viewing pleasure
- Aspect ratio: 16:9
- Anti-glare hard coating covers glass surface
- Zoom function
- Wireless remote control
- Dual built-in front speakers for easy listening
- For color and B&W applications
- Low power consumption
- Case made of durable black ABS plastic
- Active matrix technology allows wide viewing angle
- Active matrix technology eliminates distortion
- Switching power supply (AC 90~240V, 50 ~ 60Hz) included
- Built-in removable desk stand included
- Built-in interface and proper cable exiting for wall or arm mounting VESA 100mm FPMPMI compliant
- Response Time: 8ms/8ms (rising/falling)

Resolution: 1366 (H) x 768 (V) dots
Brightness rating: 450 cd/m² (Nit)
Contrast Ratio: 700:1

Display:	20" TFT LCD active matrix
Back Light:	Built-in CCFTs
Input Signal:	Composite NTSC/PAL (auto sensing for video) S-Video, component, Analog RGB
Colors:	16.7 M
Number of Pixels:	480,000 dots
Viewing angle L/R/T/B:	80/80/70/70 degrees
Pixel Configuration:	Stripe
Video Input Level:	1.0V p-p at 75 Ohm
Audio Input:	400 ± 50mV (rms) at 1 KHz Stereo
Audio Output:	1V P-P
Built-in Speakers:	3 W/ channel x 2
Dimensions w/ desk stand (WHD):	554.8 x 433 x 160mm / 21.8" x 17" x 6.3"
Dimensions w/o desk stand (WHD):	554.8 x 401 x 80mm / 21.8" x 15" x 2.75"
Actual visible screen size (WH):	408 x 306mm / 16" x 12"
Operating temperature:	50 ~ 104°F or 10 ~ 40°C
Storage temperature:	-4 ~ 140°F or -20 ~ 60°C
Power Requirement:	100 ~ 240VAC, 50/60Hz, 12 VDC, 7A, negative ground
Power Consumption:	80 W (max)
Connectors:	RCA A/V IN jacks, S-Video RCA YPbPr inputs and RCA R/L audio inputs 15-pin D-sub , PC audio IN Threaded "F" connector for LCD-2007HDT 2.1mm DC IN jack
Net weight:	5 kg. / 11 lbs.
Gross weight:	6.4 kg. / 14 lbs.

Optional Accessories

HM-400	Under-cabinet hinge mount (shown below)
WM-31	Wall mount bracket (fixed)
WM-302	Wall mount with swing arm & 4-way (shown below)
WMC-1720	Ceiling mount

Specifications subject to change without notice *©2008 ToteVision* 60K

Available through:

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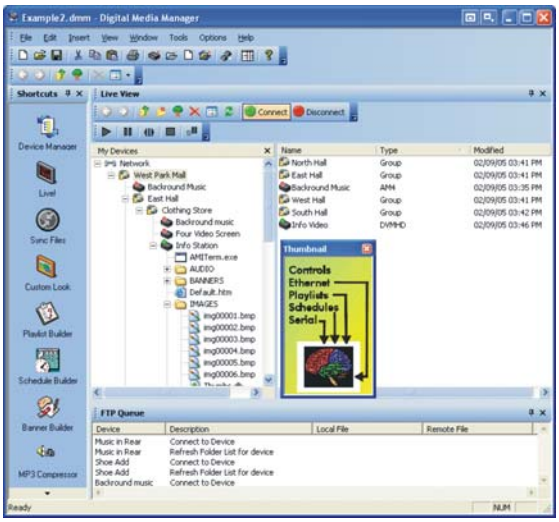
Compact Flash Video Player

The Digital Video Machine™ is a compact MPEG-2 player that's rugged enough for the most demanding applications. It also offers very flexible control capabilities and a wealth of interface options.

Clips are stored on CompactFlash; just copy them from your PC. You can trigger clips using contact closures, playlists, real-time schedules or RS-232. Connect a GPS "mouse" and video plays automatically as the unit moves through geographical zones you define!

The Digital Video Machine offers many exciting options: A stereo amplifier gives you two channels at 20 Watts each; the pro-audio module provides balanced, S/PDIF and Dolby 5.1; a SMPTE-259M SDI module provides digital video out. With the optional Ethernet module you can update clips, schedules and GPS coordinates remotely – even using wireless networking!



Digital Media Manager software lets you update one or a thousand units remotely — even across the Internet

The Digital Video Machine fits almost anywhere and is vibration resistant, so it's equally at home in equipment rooms or on-board vehicles.

Contact Alcorn McBride today for a demonstration.

Applications

Theme Parks
Museums
Kiosks
Cruise Ships
Transportation

Controls

Playlists
Schedules
Contact Closures
Serial RS-232
GPS Mouse Input
Optional Ethernet

Features

PAL or NTSC
Compact
Shock Resistant
Rack/Wall Mount
Amplifier Option
Ethernet Option
RGB/SDI Option

Alcorn McBride Inc.
3300 S. Hiawassee Rd.
Building 105
Orlando, FL 32835
Tel (407) 296-5800
Fax (407) 296-5801
info@alcorn.com
www.alcorn.com

Compact Flash Video Player

Digital Video Machine™

DVM-7400 Professional Digital Video Player

Model DVM-7400/A/E

Specifications

Model Number	Base Unit	DVM-7400
	Ethernet	/E
	Amplifier	/A
	Pro Audio	/B
	Component Video	/R
	Pro Video	/P
	Digital Video	/D
Video	Video Format	MPEG-2 (ISO 13818 MP@ML)
	Max Bit Rate	15 Mbps maximum
	Media	CompactFlash
	Playback Time	About 15 minutes per GB at 8Mbps (better than DVD quality)
	Video Output	NTSC at 30fps, or PAL at 25fps, Interlaced
	Video Connector	RCA phono jack
	Video Resolution	704x480 NTSC; 704x576 PAL
	Aspect Ratios	4:3 or 16:9
Audio	Audio Output	Stereo unbalanced RCA Phono connectors
	Frequency Response	10 to 20 Khz +/-0.1 dB
	Line Output Level Unbalanced,	4.07V P-P max (3.70 typical) into 20K
	Line Output Load	10K Ohm Minimum, 100pF Maximum
	Audio Format	MPEG1-Layer 2 or AC3 5.1 surround sound
Ethernet Option	Type	100 Base-T, RJ-45
Amplifier Option	Output Power	20 Watts into 8 Ohms, (15 Watts when operated from 12V power.)
Amp with Mic Option	Output Power	40 Watts into 8 Ohms, (15 Watts when operated from 12V power.)
	Mic Input	Signal +/- and shield on three screw terminals
	Push to Talk Input	Contacts duck audio and activate mic, screw terminals
	Remote Volume Control Inputs	Volume up and down contacts, three screw terminals
	Controls	Mic volume, Phantom power enable pushbutton
Pro Audio Option	S/PDIF Digital Audio Out	IEC958 (Stereo or AC3 audio), RCA phono jack
	Balanced Stereo Audio Out	+4dB, Dual Female XLR and 1/4 inch phone jack (combo)
Component Option	RGB Out	RGBHV(480p, 576p) or YUV(480p, 576p), HDB-15F
Pro Video Option	RGB Out	RGBHV(480p, 576p) or YUV(480p, 576p), HDB-15F
	Video Sync In	composite or black burst sync input, BNC
	S/PDIF Digital Audio Out	IEC958 (Stereo or AC3 audio), RCA phono jack
Digital Video Option	SDI Digital Video Out	SMPTE-259M, BNC
	S/PDIF Digital Audio Out	IEC958 (Stereo or AC3 audio), RCA phono jack
	Video Sync In	composite or black burst sync input, BNC
Control	Parallel	parallel inputs select 15 clips, play, stop, loop, mute, DB-37F
	Serial	RS-232, DB-9M
	Response Time	Less than 33 msec.
	Buttons	Front panel test button
	Display	Front panel bi-color LED
	Switches	Ground lift, contact/voltage control, GPS Enable, Write Protect
	Pots	Audio Volume Control
	GPS	NMEA 0183 compatible
Physical	Power	9 VDC to 26 VDC at 2 Amp
	Power Connector	Barrel connector (2.5 mm x 5.5 mm x 10 mm)
	Size	7"W x 7"D x 1.5"H (17.75 cm W x 17.75 cm D x 4.45cm H)
	Weight	4 lbs. (1.8 Kg)
	Operating Temperature	0°C (32°F) to 38°C (100°F), free air circulation
	Operating Environment	0-90% relative humidity, non-condensing
	Shock	20 g max Vibration (Compact Flash), 1g (hard drive)
	AC Adapter	Specify 120 VAC 60Hz or 240 VAC 50Hz
	Certification	CE
Mounting Kits	Wall Mount	Model DMW1
	Single 19" Rack Panel	Model DMRP1A
	Dual 19" Rack Panel	Model DMRP2A

In addition to Ethernet, the unit may be equipped with any one of six output options

Specifications Subject to Change Without Notice

Alcorn McBride Inc.

3300 S. Hiawassee Rd.
Building 105
Orlando, FL 32835
Tel (407) 296-5800
Fax (407) 296-5801
info@alcorn.com

Basic Listen FM System

www.ListenTech.com

If you are on a tight budget, the Basic Listen System is ideal to give you a great performance at a great price. This installed system includes basic components such as a telescoping antenna and LR-300 Digital Receivers with ear buds. Use this system for auditory assistance, in-ear cuing, visual descriptions, board meetings and training meetings. Great for outdoor events, corporations and theaters.

Specify Part Number

LS-02-072

Qty	Item
1	LT-800-072 Stationary Transmitter
1	LA-106 Telescoping 1/4 Wave Antenna
4	LR-300-072 Digital Receivers
4	LA-161 Single Ear Buds
1	LA-304 ADA Compliance Signage Kit

Charging Options

LA-321 8-Unit FM Products Charging/Carrying Case
Store and charge up to 8 portable FM units in this hard sided, locking case (NiMH batteries required). Features easy, drop-in automatic charging. Use to charge units with NiMH batteries.

LA-317 4-Unit FM Products Charging/Carrying Case
Store and charge up to 4 portable FM units in this hard sided, locking case (NiMH batteries required).

LA-202 FM Portable Products 120VAC Power/Charging Supply
Use to power individual portable units without batteries, or to charge units with NiMH batteries. 115VAC/7.5VDC.

Batteries

LA-361 High Capacity AA Alkaline Batteries (2)
Twice the life of typical alkalines. AA batteries, package of 2 (each portable unit requires two AA batteries).

LA-362 Rechargeable AA NiMH Batteries (2)
Longer life than NiCAD without the "memory effect." Required for use in charging cases. Package of 2 batteries.

Listen Technologies Corporation
8535 South 700 West, Suite A
Sandy, UT 84070-2515 U.S.A.
Phone: 1.801.233.8992 or 1.800.330.0891
Fax: 1.801.233.8995
Email: info@ListenTech.com

Don't miss a single sound.

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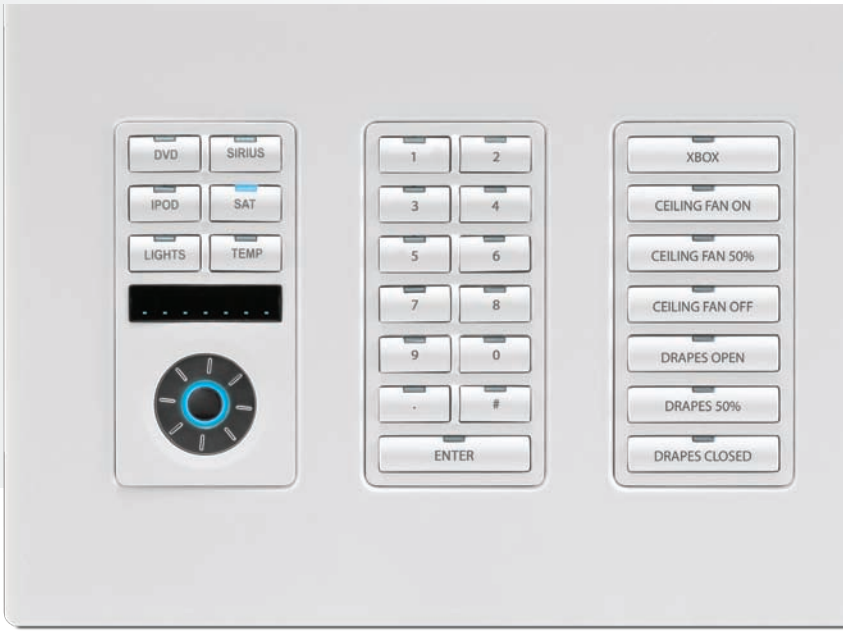
Keypads

Metreau Keypads



When it comes to stylish, sophisticated control of NetLinx Control Systems, look no further than Metreau Keypads. Their cost-effective design, with the ability to be installed in any Décora®-style wallplate offers many installation options and they come in three configurations to suit a variety of unique applications. Whether they are used in residences, condos and hotels or classrooms, meeting rooms or presentation facilities; cool looks, powerful features and flexible capabilities make Metreau an undeniable keypad choice.

COST-EFFECTIVE INSTALLATION OPTIONS

Metreau Keypads are suited for installation within other decora-style wallplates that can include additional keypad controls. This makes Metreau a cost-effective option for outfitting every room and zone.

FLEXIBLE CONFIGURATIONS

Metreau Keypads are available in 6-button navigation and 7-button and 13-button configurations. The 6-button navigation model gives you the ability to directly select and control any device in the system. It also includes an integrated navigation wheel and a lighting level feedback window.

government facility

for a unified presence within any residential or commercial setting

PRELIMINARY SPECS - SUBJECT TO CHANGE

MET-6N (FG5794-01)
MET-7 (FG5794-03)
MET-13 (FG5794-02)

12V CURRENT DRAW

MET-6N – 50mA
MET-7 – 30mA
MET-13 – 30mA

DIMENSIONS (HW)

2 3/5" x 1 3/10" (6.6 cm x 3.3 cm)

WEIGHT

TBD

FRONT PANEL COMPONENTS

Pushbuttons available in a variety of field replaceable pre-printed buttons
Blue LEDs indicate activity
Navigation wheel (6 button)
Light-level feedback (6 button)
Built-in IR Receiver

REAR PANEL COMPONENTS

DIP switch – 8 position mini dip switch used to set the device address for the keypad on the AxLink Bus
Wiring – 4-pin 3.5mm Phoenix AxLink connector

OPERATING ENVIRONMENT

Operating temperature - 0° to 50°C (32° to 122°F)
Storage temperature – -10° to 70°C (14° to 158°F)

MOUNTING

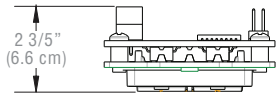
Mounts into standard Décora-style wall plates

AVAILABLE COLORS

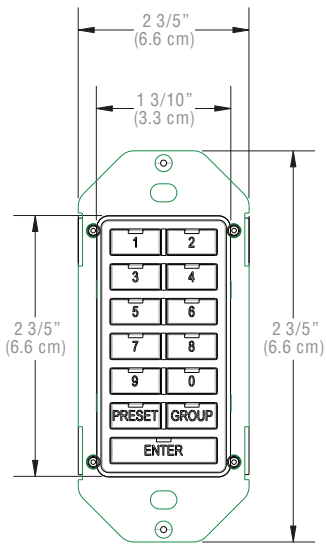
Black, White, Light Almond

OPTIONAL ACCESSORIES

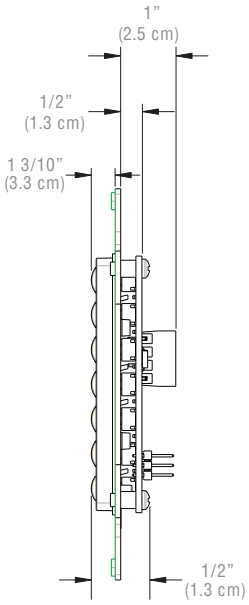
Audio button kits (TBD)
Blank button kits
International extension plates (for some larger wallboxes)



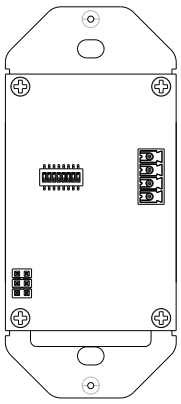
13-Button Navigation
(Top View)



13-Button Navigation
(Front View)



13-Button Navigation
(Right View)

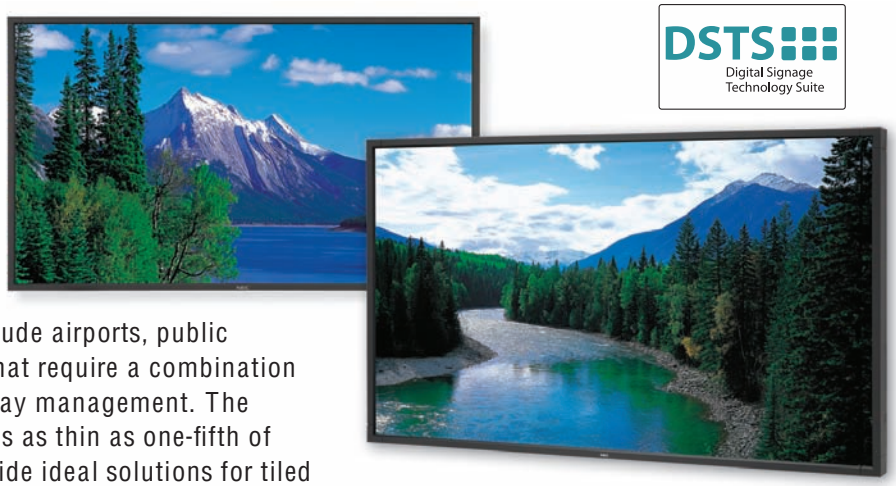


13-Button Navigation
(Back View)

IT'S YOUR WORLD. TAKE CONTROL.

NEC MultiSync® 20 Series

40” - 52” professional-grade LCD displays ideal for digital signage applications



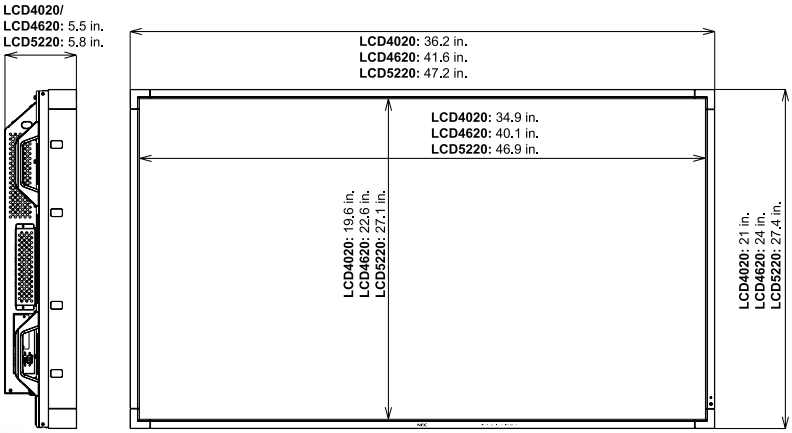
Expand your messaging options with superior screen performance. The NEC MultiSync 20 Series, featuring the 40” NEC LCD4020, 46” LCD4620 and 52” LCD5220, provides a first-class solution for your digital signage applications. Its industrial-strength design and Digital Signage Technology Suite (DSTS), which boasts nearly 30 advanced features, make these displays ideal for 24/7 operation in even the most harsh environments. These include airports, public information, healthcare, retail and other areas that require a combination of dazzling images and the highest level of display management. The MultiSync 20 Series’ ultra-thin bezels, with widths as thin as one-fifth of the industry norm for 40” and 46” displays, provide ideal solutions for tiled video walls.

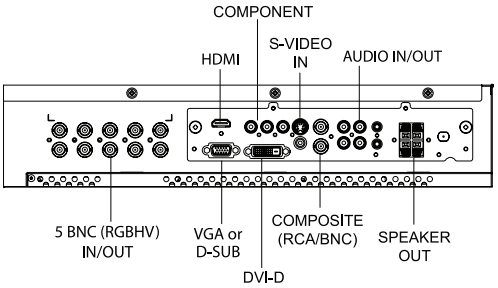
- **Thermal protection** starts with an extra thermal layer on the display panel to diffuse heat followed by fan-based technology specially designed to work in both landscape and portrait modes and be controlled locally or remotely. Internal temperature sensors control self-protective circuits, while special self-diagnostics communicate the status of the thermal characteristics.
- **Sealed panel design** provides protection in less than optimal environments, while protecting against particles like dust, grease, or steam from getting behind the glass and damaging the unit.
- **TileMatrix™** allows you to create video walls (up to 25 displays in a 5x5 matrix equalling 21 ft. diagonal)
- **TileComp™** works in tandem with TileMatrix to compensate for the bezel width and create a more seamless video wall
- **Multi-display control and daisy chain**, enabled through RS-232, allows for individually addressable display control, making setup and monitoring of the display simple and effective
- **Real-time clock/round-the-clock scheduling** allows for advanced scheduling of monitor powering up/down and input selection. These features also allow your messaging to be customized for time of day (e.g. breakfast in the morning, dinner specials in the evening) as well as improving energy savings and extending display life.
- **Advanced screen saver functions** include an array of features designed to reduce the risk of image persistence and extend display life. A gamma adjustment feature reduces the effect of high-contrast images, while a side color function allows adjustment of the color to minimize the contrast delta. Additional screen saver functions reduce the impact of static images by gently moving the image.
- **Built-in expansion slot** future-proofs your display investment, allowing for seamless integration of NEC and third-party components, including a tuner, HD-SDI card, single-board computer and DVI daisy chain capability.
- **CableComp + ™**, which is compatible with analog and/or digital inputs, corrects for input signal distortion caused by long cables and low output levels of video cards. This technology uses a digitized signal delay circuit to automatically compensate for each red, green and blue cable’s length and video signal delay, ensuring sharp image reproduction.
- **Color temperature adjustable** from 2600 - 10,000K, allowing for perfect whitepoint matching across screens as well as matching to source devices
- **NaViSet™** software offers an expanded and intuitive graphical interface, allowing for easy adjustment of display settings via mouse and keyboard. The Administrator version utilizes the monitor’s advanced control and diagnostics capabilities to provide IT professionals with remote configuration, scheduling and troubleshooting over their existing networks.
- **SpectraView$_{II}$™ Color Calibration Solution (optional)**, featuring state-of-the art calibrator and software, helps deliver accurate, consistent and repeatable color performance. The solution performs hardware monitor calibration and generates ICC profiles that can be used with graphics software. Multiple calibration settings can be stored and instantly recalled without the need to recalibrate the display.

Specifications for LCD4020/LCD4620/LCD5220

MODEL	LCD4020	LCD4620	LCD5220
LCD MODULE			
Viewable Size (Diagonal)	40"	46"	52"
Panel Technology	SPVA		
Native Resolution	1366 x 768		1920 x 1080
Pixel Pitch	0.648mm	0.746mm	0.60mm
Brightness	500 cd/m²		
Contrast Ratio (Typical)	2000:1		
Active Screen Area (W x H)	34.9 x 19.6 in. / 886.5 x 497.8mm	40.1 x 22.6 in. / 1018.5 x 574mm	46.9 x 27.1 in. / 1192 x 688mm
CONNECTIVITY			
Input Terminals			
RGB1 (Digital)	DVI-D		
RGB2 (Analog)	Analog D-sub		
RGB3 (Analog)	5 BNC (RGBHV)		
Video 1*	Composite (Shared RCA and BNC)		
Video 2*	S-Video		
Video 3*	HDMI		
Component Video 1 (DVD/HD)*	Component BNC		
Audio*	Audio 1 (MiniJack), Audio 2 and 3 Stereo (RCA), HDMI / Internal Speaker: None		
External Control	RS-232, DDC/CI		
Output Terminals			
RGB	Yes		
Video*	Yes		
Audio*	Yes		
External Control	RS-232 for multiple monitor control, IR, DDC/CI		
Audio Amplifier	15W Stereo		
FEATURES			
Additional Features	Ultra-thin bezel, advanced thermal capabilities, sealed professional panel, expansion slot, CableComp + , TileMatrix (5x5), TileComp, programmable lookup tables, Plug and Play (DDC/CI, DDC2B), PIP (remote), POP, 6-axis color adjustment, multi-level programmable zoom, video ready, scheduler (w/ RTC), sharpness/softness, off-timer (countdown), screen saver, vacation switch, 10-bit gamma, AutoBright (signal input), Windows Vista-certified, portrait-capable		
POWER			
Power Requirements	AC 100-120V / AC 220-240V@50/60 Hz		
Power Consumption (Typical)	175W	235W	270W
Power Consumption - Standby Mode	< 5W		
PHYSICAL SPECIFICATIONS			
Bezel Width (L/R, T/B)	0.61 in. / 0.61 in. , 15.5mm / 15.5mm	0.65 in. / 0.67 in. , 16.5mm / 17mm	0.75 in. / 0.75 in. , 19mm / 19mm
Dimensions (without stand; WxHxD)	36.2 x 21 x 5.5 in. / 919.5 x 533.4 x 140mm	41.6 x 24 x 5.5 in. / 1056.6 x 609.6 x 140mm	47.2 x 27.4 x 5.8 in. / 1200 x 696 x 147.5mm
Packaging Dimensions (WxHxD)	45.2 x 30 x 12.3 in. / 1147 x 761 x 312mm	50.3 x 33 x 12.3 in. / 1278 x 837 x 312mm	58.3 x 36.5 x 13.1 in. / 1481 x 926 x 334mm
Net Weight (without stand)	64.8 lbs. / 29.4 kg	79.6 lbs. / 36.1 kg	97.7 lbs. / 44.3 kg
Gross Weight (with box)	85.8 lbs. / 38.8 kg	103.8 lbs. / 47.1 kg	122.4 lbs. / 55.5 kg
VESA Hole Configuration	200 x 200mm (8 hole) / 200 x 100mm (6 hole)		
ENVIRONMENTAL CONDITIONS			
Operating Temperature	5-40°C / 41-104°F		
Operating Humidity	20-80%		
ACCESSORIES			
Included	Power cord, 15-pin D-sub cable, user manual, setup sheet, wireless remote control, batteries, main switch cover, CD-ROM		
Optional	External speakers (-AV only; SP4020-4620, SP-5220), digital tuner (-AV only), tilt wall mount kit (WMK3260-L), stand (ST-4020, ST-4620, ST-5220), internal HD-SDI card (SB-L007KK; -IT and -AV only), single board computer (MPD-SBC-8/16), SpectraView$_{II}$ Color Calibration Solution (SVII-KIT), Digital Signage Kit (DSK3260)		
WARRANTY/SERVICE			
On-Site Limited Warranty	3 years parts and labor, including backlight		

* not available on IT models





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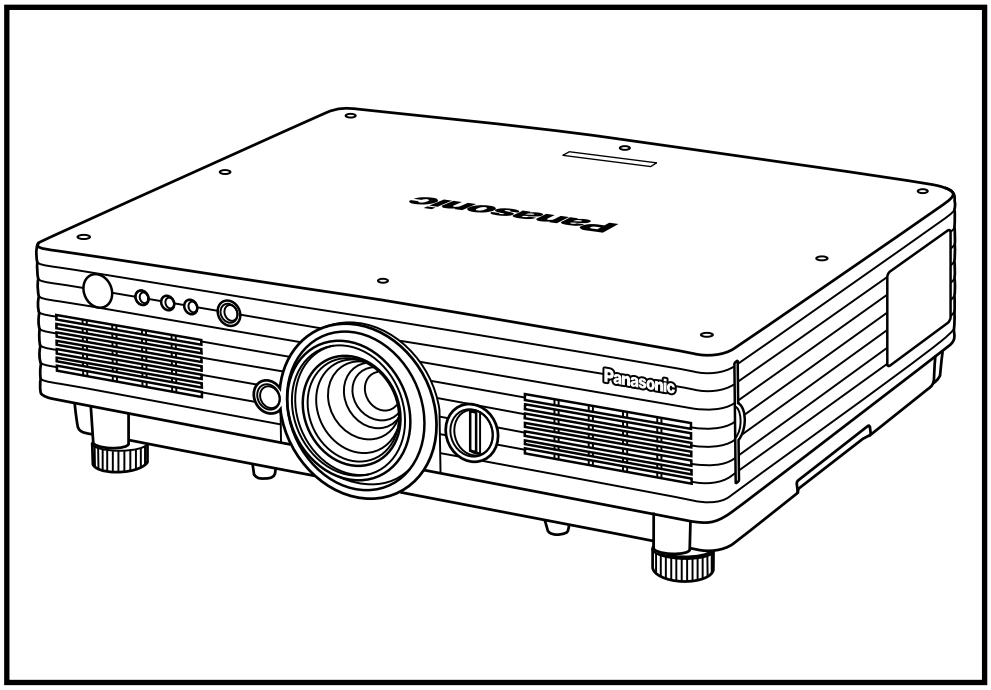
Panasonic ideas for life

SPEC FILE



The PT-D5700L is not equipped with a lens.

Product Number : PT-**D5700**/**D5700L**

Product Name : DLP™ Projectors

As of May 2007. Specifications subject to change without notice.

Specifications

Main Unit

Power supply:	North America:	120 V AC, 50/60 Hz
	Europe:	220–240 V AC, 50/60 Hz
Power consumption:	North America:	770 W (770 VA) (10 W during standby mode with fan stopped)
	Europe:	750 W (790 VA) (15 W during standby mode with fan stopped)
DLP™ chip:	Panel size:	0.7´ diagonal (4:3 aspect ratio)
	Display method:	DLP™ chip x 1, DLP™ system
	Pixels:	786,432 (1,024 x 768) x 1, total of 786,432 pixels
Lens:	PT-D5700:	Powered zoom/focus lenses (4:3 aspect ratio: 1.8–2.4:1), F 1.7–2.0, f 25.6–33.8 mm
	PT-D5700L:	Optional poweredzoom/focus lenses
Lamp:		300 W UHM™ lamps (x 2) (dual lamp system)
Screen size:		50–600 inches (50–200 inches with the ET-DLE050), 4:3 aspect ratio
Brightness*1:		6,000 lumens (dual lamp, high power mode)
Center-to-corner uniformity*1:		90%
Contrast*1:		2,000:1 (full on/full off, contrast mode: high, brightness: 3,000 lumens) 1,000:1 (full on/full off, contrast mode: normal)
Resolution:		1,024 x 768 pixels (1,600 x 1,200 pixels compatible, compression mode)
Scanning frequency:	RGB:	Horizontal: 15–91 kHz, Vertical: 50–85 Hz, Dot clock: 150 MHz or lower
	YP_BP_R (YC_BC_R):	480i: f_H 15.75 kHz; f_V 59.94 Hz, 576i: f_H 15.63 kHz; f_V 50 Hz, 480p: f_H 31.50 kHz; f_V 59.94 Hz, 576p: f_H 31.25 kHz; f_V 50 Hz, 720/60p: f_H 45 kHz; f_V 60 Hz, 720/50p: f_H 37.5 kHz; f_V 50 Hz, 1035/60i: f_H 33.75 kHz; f_V 60 Hz, 1080/60i: f_H 33.75 kHz; f_V 60 Hz, 1080/50i: f_H 28.13 kHz; f_V 50 Hz, 1080/60p: f_H 67.5 kHz; f_V 60 Hz, 1080/50p: f_H 56.25 kHz; f_V 50 Hz
	S-Video/Video:	Horizontal: 15.75/15.63 kHz, Vertical: 50/60 Hz, (NTSC, NTSC4.43, PAL, PAL60, PAL-N, PAL-M, SECAM)
Optical axis shift:		Horizontal (manual) and vertical (powered), Horizontal: ±10%, vertical: +50%
Keystone correction range:		Vertical: ±30°
Installation:		Ceiling/floor, front/rear
Terminals*2:	DVI-D IN:	DVI-D 24-pin x 1, DVI 1.0 compliant, HDCP compatible, for single link only 480p, 576p, 1080/60i, 1080/50i, 1080/60p, 1080/50p, 720/60p, 720/50p, VGA60, SVGA60, XGA50, XGA60, XGA70, XGA75, XGA85, SXGA50, SXGA60, SXGA+60, WXGA768/50, WXGA768/60
	RGB 1 IN:	BNC x 5
	R, G, B:	G: 0.7 Vp-p (G: 1.0 Vp-p for sync on G), 75Ω, B, R: 0.7 Vp-p, 75Ω HD/VD, SYNC: TTL (positive/negative)
	Y, P_B, P_R:	Y: 1.0 p-p, 75Ω (including sync signal), P_B/P_R: 0.7 Vp-p, 75Ω
	RGB 2 IN:	D-sub HD 15-pin x 1
	R, G, B:	G: 0.7 Vp-p (G: 1.0 Vp-p for sync on G), 75Ω, B, R: 0.7 Vp-p, 75Ω HD/VD, SYNC: TTL (positive/negative)
	Y, P_B, P_R:	Y: 1.0 p-p, 75Ω (including sync signal), P_B,/P_R: 0.7 Vp-p, 75Ω
	VIDEO IN:	BNC x 1, 1.0 Vp-p, 75Ω
	S-VIDEO IN:	Mini DIN 4-pin x 1, Y: 1.0 Vp-p, C: 0.286 Vp-p, 75Ω
	SERIAL IN:	D-sub 9-pin x 1 (RS-232C compliant) for external controller
	SERIAL OUT:	D-sub 9-pin x 1 (RS-232C compliant) for external controller
	REMOTE 1 IN:	M3 jack x 1 for wired remote control or link control
	REMOTE 1 OUT:	M3 jack x 1 for link control
	REMOTE 2 IN:	D-sub 9-pin x 1 for external control (parallel)
	LAN:	RJ-45 x 1, compliant with PJLink™, 10Base-T/100Base-TX
Power cord length:		3.0 m (9´10´)
Cabinet materials:		Molded plastic

On-screen menu:		9 languages: English, French, German, Spanish, Italian, Russian, Korean, Chinese, and Japanese
Dimensions (W x H x D):	PT-D5700	530 x 167 x 441 mm (20-7/8′ x 6-9/16′ x 17-3/8′) (with supplied lens)
	PT-D5700L	530 x 167 x 429 mm (20-7/8′ x 6-9/16′ x 16-7/8′) (without lens)
Weight:	PT-D5700	13.9 kg (30.6 lbs) (with supplied lens)
	PT-D5700L	13.1 kg (28.9 lbs) (without lens)
Operating temperature:		0°–45°C (32°–113°F)
Operating humidity:		20%–80% (no condensation)

Remote Control Unit

Power supply:		3 V DC (AA battery x 2)
Operation range*3:	Wireless:	Approx. 30 m (98.4 feet) when operated from directly in front of the signal receptor
Dimensions (W x H x D):		51 x 176 x 22.5 mm (2′ x 6-15/16′ x 7/8′)
Weight:		134 g (4.7 oz) (including batteries)

Supplied Accessories Power cord, Wireless/wired remote control unit, Batteries for remote control (x 2), Wire rope

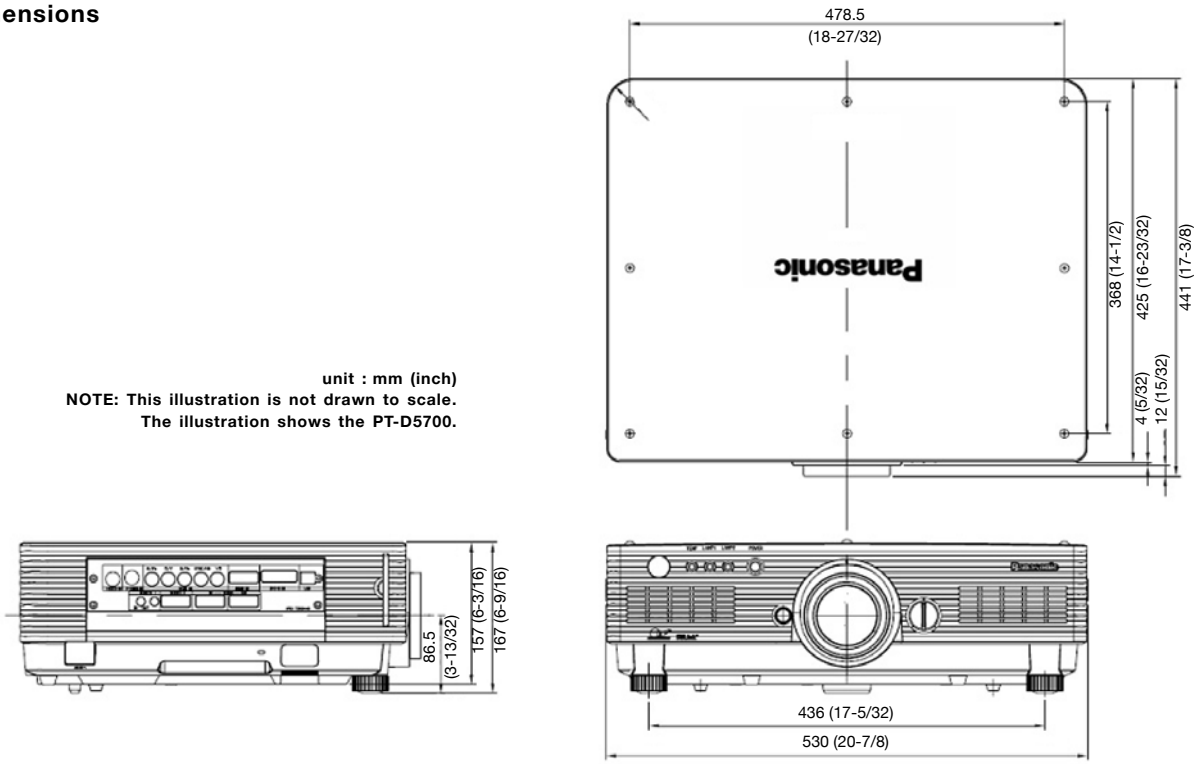
Optional Accessories

Replacement lamp unit:	ET-LAD57 (1 unit)
	ET-LAD57W (set of two lamps)
Ceiling mount bracket:	ET-PKD56H (for high ceilings)
	ET-PKD55S (for low ceilings)
Zoom lens (1.3-1.8:1)	ET-DLE100
Zoom lens (2.4-4.0:1)	ET-DLE200
Zoom lens (3.8-6.0:1)	ET-DLE300
Zoom lens (5.8-8.1:1)	ET-DLE400
Fixed-focus lens (0.8:1)	ET-DLE050

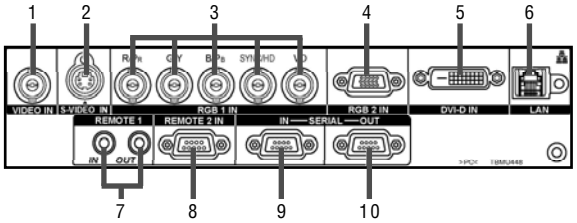
Weights and dimensions shown are approximate. Specifications subject to change without notice.
***1 Values indicate overall average values of the product at the time of shipment and are stated based on JIS X 6911:2003 Data Projector Specification Sheet Format. Measurement method and conditions are based on Appendix 2.**
***2 The HD/SYNC and VD inputs do not accept the tri-level sync signal.**
***3 Operation range differs depending on environments.**

Dimensions

unit : mm (inch)
NOTE: This illustration is not drawn to scale.
The illustration shows the PT-D5700.

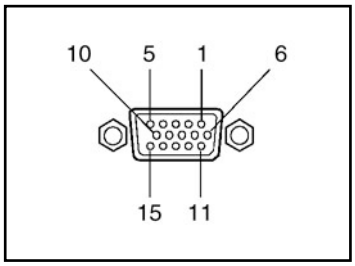


Terminals



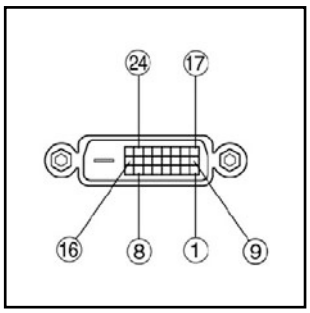
1 Video input
2 S-Video input
3 RGB 1 input
4 RGB 2 Input
5 DVI-D input
6 LAN connector
7 Remote 1 input and output
8 Remote 2 input
9 Serial input
10 Serial output

RGB IN connector pin assignment



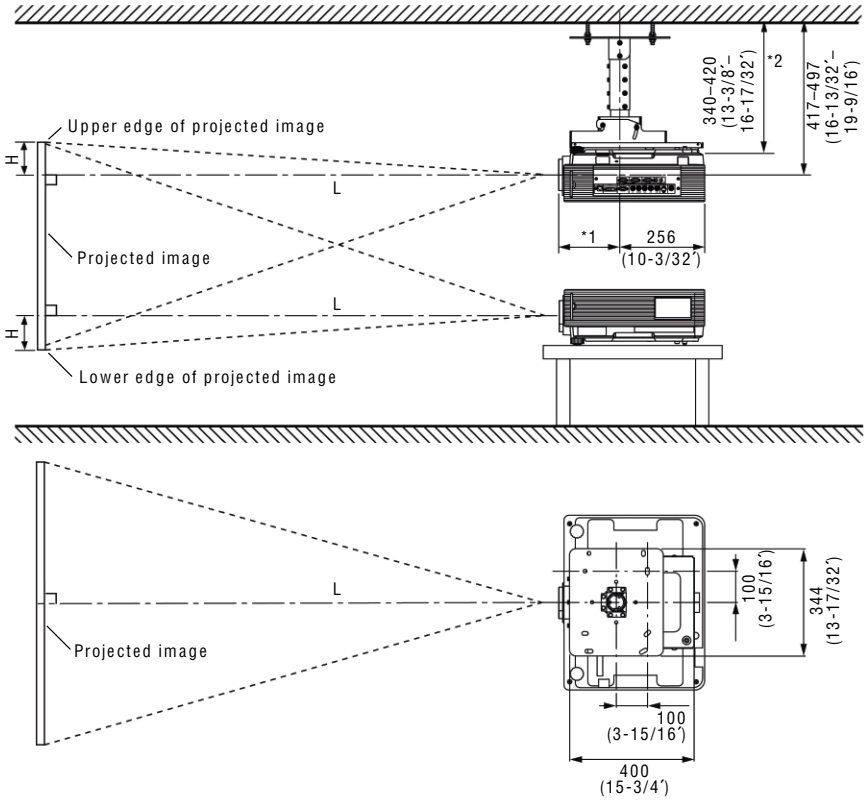
no.	signal	no.	signal	no.	signal
1	R/PR	6	GND	11	GND
2	G/Y	7	GND	12	NC
3	B/PB	8	GND	13	HD/SYNC
4	GND	9	NC	14	VD
5	GND	10	GND	15	NC

DVI-D output connector pin assignment



no.	signal	no.	signal	no.	signal
1	T, M, D, S data 2-	9	T, M, D, S data 1-	17	T, M, D, S data 0-
2	T, M, D, S data 2+	10	T, M, D, S data 1+	18	T, M, D, S data 0+
3	T, M, D, S data 2 shield	11	T, M, D, S data 1 shield	19	T, M, D, S data 0 shield
4	NC	12	NC	20	NC
5	NC	13	NC	21	NC
6	DDC clock	14	+5 V	22	T, M, D, S clock shield
7	DDC clock	15	GND	23	T, M, D, S clock +
8	NC	16	Hot plug detection	24	T, M, D, S clock -

Standard setting-up position (when installed using the ET-PKD56H)

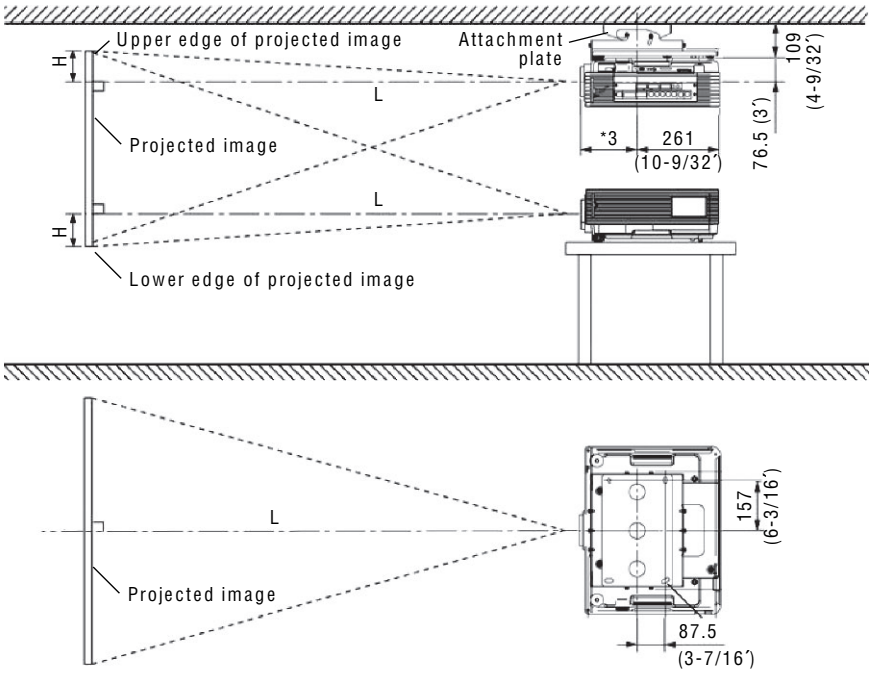


*3 When the lens protrudes to the maximum.
185 mm (7-9/32˝) with the supplied lens
177 mm (6-31/32˝) with the ET-DLE050
209 mm (8-7/32˝) with the ET-DLE100
208 mm (8˝-3/16˝) with the ET-DLE200
196 mm (7-23/32˝) with the ET-DLE300
196 mm (7-23/32˝) with the ET-DLE400

*4 Adjustable in 40 mm (1-9/16˝) steps.

unit : mm (inch)

Standard setting-up position (when installed using the ET-PKD55S)



*3 When the lens protrudes to the maximum.
180 mm (7-3/32˝) with the supplied lens
172 mm (6-25/32˝) with the ET-DLE050
204 mm (8-1/32˝) with the ET-DLE100
203 mm (8˝) with the ET-DLE200
191 mm (7˝-17/32˝) with the ET-DLE300
191 mm (7-17/32˝) with the ET-DLE400

unit : mm (inch)

NOTE:

Illustrations show the projector installed using optional ceiling bracket.

This illustration is not drawn to scale.

Values shown are approximate.

The value for L (distance to screen) varies slightly depending on the zoom lens characteristics. When the shortest projection distance (min.) is used, a small amount of distortion may occur in the image due to the zoom lens characteristics.

CAUTION

The ET-DLE050 has a fixed short-focus lens. Therefore, the lens shift function provided in the main unit cannot be used.

If the lens shift function is used, the corners of images may not be displayed or images may remain out of focus in some cases.

Projection distance for 4:3 aspect ratio screen

(meters)

Screen size (inch, diagonal)	Distance to screen (L)											Height from the edge of screen to center of lens (H)	
	Zoom										Fixed-focus		
	ET-DLE100 Zoom lens		Supplied lens		ET-DLE200 Zoom lens		ET-DLE300 Zoom lens		ET-DLE400 Zoom lens		ET-DLE050 Fixed-focus lens	Zoom lenses	Fixed-focus lens
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.			
50	1.4	1.8	1.8	2.3	2.5	4.0	3.9	6.0	6.0	8.2	0.794	0 – 0.38	0.381
60	1.7	2.1	2.2	2.8	3.0	4.8	4.7	7.2	7.1	9.9	0.960	0 – 0.46	0.457
70	1.9	2.5	2.6	3.3	3.5	5.6	5.5	8.4	8.3	11.5	1.126	0 – 0.53	0.533
80	2.2	2.9	2.9	3.8	4.0	6.5	6.3	9.7	9.5	13.2	1.292	0 – 0.61	0.610
90	2.5	3.3	3.3	4.3	4.5	7.3	7.1	10.9	10.7	14.8	1.458	0 – 0.69	0.686
100	2.8	3.6	3.7	4.8	5.0	8.1	7.9	12.1	11.8	16.5	1.624	0 – 0.76	0.762
120	3.3	4.4	4.4	5.7	6.0	9.8	9.5	14.6	14.2	19.8	1.956	0 – 0.91	0.914
150	4.1	5.5	5.5	7.2	7.5	12.2	11.8	18.3	17.7	24.7	2.454	0 – 1.14	1.143
200	5.5	7.3	7.4	9.6	10.1	16.4	15.8	24.5	23.6	32.9	3.284	0 – 1.52	1.524
250	6.9	9.2	9.2	12.1	12.6	20.5	19.8	30.6	29.5	41.2	–	0 – 1.91	–
300	8.3	11.1	11.1	14.5	15.1	24.6	23.8	36.8	35.4	49.4	–	0 – 2.29	–
400	11.0	14.8	14.8	19.4	20.1	32.8	31.7	49.1	47.1	65.9	–	0 – 3.05	–
500	13.8	18.5	18.5	24.3	25.2	41.1	39.7	61.4	58.9	82.3	–	0 – 3.81	–
600	16.6	22.2	22.2	29.2	30.2	49.3	47.6	73.7	70.6	98.8	–	0 – 4.57	–

Projection distance for 4:3 aspect ratio screen

(feet)

Screen size (inch, diagonal)	Distance to screen (L)											Height from the edge of screen to center of lens (H)	
	Zoom										Fixed-focus		
	ET-DLE100 Zoom lens		Supplied lens		ET-DLE200 Zoom lens		ET-DLE300 Zoom lens		ET-DLE400 Zoom lens		ET-DLE050 Fixed-focus lens	Zoom lenses	Fixed-focus lens
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.			
50	4.4	5.9	5.9	7.7	8.1	13.2	12.6	19.7	19.4	27.2	2.605	0 – 1.25	1.250
60	5.3	7.1	7.1	9.3	9.8	15.9	15.2	23.8	23.3	32.6	3.149	0 – 1.50	1.500
70	6.2	8.3	8.3	11.0	11.4	18.6	17.9	27.8	27.1	38.0	3.694	0 – 1.75	1.750
80	7.1	9.6	9.5	12.6	13.1	21.3	20.5	31.9	31.0	43.4	4.239	0 – 2.00	2.000
90	8.1	10.8	10.8	14.2	14.7	24.0	23.1	35.9	34.9	48.8	4.783	0 – 2.25	2.250
100	9.0	12.0	12.0	15.8	16.4	26.7	25.7	39.9	38.7	54.2	5.328	0 – 2.50	2.500
120	10.8	14.4	14.4	19.0	19.7	32.1	30.9	48.0	46.4	65.0	6.417	0 – 3.00	3.000
150	13.5	18.1	18.0	23.8	24.6	40.3	38.7	60.2	58.0	81.2	8.051	0 – 3.75	3.750
200	18.0	24.2	24.1	31.8	32.9	53.8	51.8	80.4	77.3	108.2	10.774	0 – 5.00	5.000
250	22.5	30.3	30.2	39.8	41.2	67.3	64.8	100.6	96.6	135.2	–	0 – 6.25	–
300	27.1	36.4	36.3	47.8	49.4	80.8	77.8	120.8	115.9	162.2	–	0 – 7.50	–
400	36.1	48.6	48.4	63.8	66.0	107.8	103.9	161.2	154.5	216.2	–	0 –10.00	–
500	45.2	60.8	60.5	79.8	82.5	134.9	130.0	201.6	193.0	270.2	–	0 –12.50	–
600	54.2	73.0	72.7	95.8	99.0	161.9	156.1	242.0	231.6	324.2	–	0 –15.00	–

- **The value for L (distance to screen) varies slightly depending on the zoom lens characteristics.**
- **At the shortest projection distance, the zoom lens characteristics may cause slight image distortion.**
- **When vertical keystone correction is used, the image is corrected in the direction that reduces its projected size.**
- **For the ET-DLE050, the height from the edge of the screen to the center of the lens (H) is 1/2 of the screen height.**
- **The brightness varies depending on the zoom setting.**

Calculation of the projection distance

For a screen size different from the above, use the equation below to calculate the projection distance.

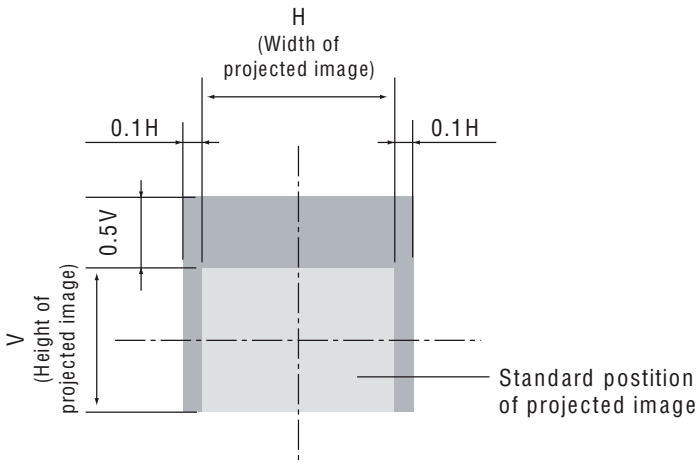
Aspect ratio 4:3

ET-DLE100	minimum	L (m) = (diagonal screen size in inches) x 0.0276 - 0.0452
	maximum	L (m) = (diagonal screen size in inches) x 0.0372 - 0.0478
Supplied lens	minimum	L (m) = (diagonal screen size in inches) x 0.0370 - 0.0650
	maximum	L (m) = (diagonal screen size in inches) x 0.0488 - 0.0638
ET-DLE200	minimum	L (m) = (diagonal screen size in inches) x 0.0504 - 0.0657
	maximum	L (m) = (diagonal screen size in inches) x 0.0824 - 0.0758
ET-DLE300	minimum	L (m) = (diagonal screen size in inches) x 0.0795 - 0.1380
	maximum	L (m) = (diagonal screen size in inches) x 0.1232 - 0.1310
ET-DLE400	minimum	L (m) = (diagonal screen size in inches) x 0.1176 + 0.0244
	maximum	L (m) = (diagonal screen size in inches) x 0.1646 + 0.0651
ET-DLE050	(fixed focus)	L (m) = (diagonal screen size in inches) x 0.0166 - 0.0361

- **Distances calculated with the above equations will include a slight error.**
- **When an SXGA signal is input, the left and right edges of the image are blanked, and the image is projected at a screen aspect ratio of 5:4.**
- **The brightness varies depending on the zoom setting.**

Shift range

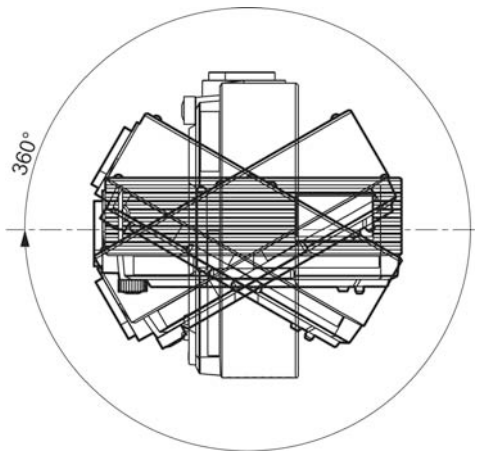
Optical axis shift function allows to shift the position of a projected image as shown.



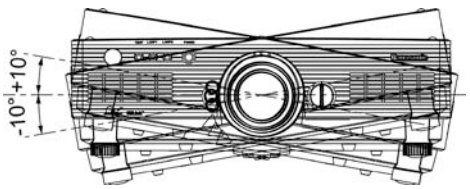
Installable angle

Install the projector at an angle within the range shown below.

• Vertical direction
The projector may be installed at a vertical angle of 360°.



• Horizontal direction
The projector may be installed at a horizontal angle of ±10°.



List of compatible signals

This projector supports RGB signals with horizontal frequencies of 15 to 91 kHz, vertical frequencies of 50 to 85 Hz and up to 150 MHz dot clock.

NOTE: The native resolution of this projector is 1,024 x 768 pixels. If the display resolution of the input signal is different from the native resolution, image compression or expansion will be used to convert the input signal to a level within the native resolution.

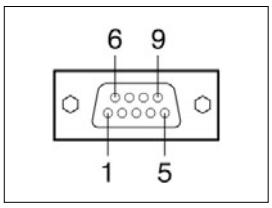
Display mode	Display resolution (dots)[1]	Scanning frequency H (kHz)	Scanning frequency V (kHz)	Dot clock frequency (MHz)	Picture quality[2]	Format
NTSC/NTSC4.43/PAL-M/PAL60	720 x 480i	15.7	59.9	-	A	VIDEO/S-VIDEO
PAL/PAL-N/SECAM	720 x 576i	15.6	50.0	-	A	
480i (525i)	720 x 480i	15.7	59.9	13.5	A	YPBPR /RGB
576i (625i)	720 x 576i	15.6	50.0	13.5	A	
480p (525p)	720 x 483	31.5	59.9	27.0	A	YPBPR /RGB/DVI
576p (625p)	720 x 576	31.3	50.0	27.0	A	
720/60p	1,280 x 720	45.0	60.0	74.3	A	
720/50p	1,280 x 720	37.5	50.0	74.3	A	
1080/60i	1,920 x 1,080i	33.8	60.0	74.3	A	
1080/50i	1,920 x 1,080i	28.1	50.0	74.3	A	
1080/60p	1,920 x 1,080	67.5	60.0	148.5	A	
1080/50p	1,920 x 1,080	56.3	50.0	148.5	A	
VGA400	640 x 400	31.5	70.1	25.2	A	RGB
		37.9	85.1	31.5	A	
VGA480	640 x 480	31.5	59.9	25.2	A	RGB/DVI
		35.0	66.7	30.2	A	RGB
		37.9	72.8	31.5	A	
		37.5	75.0	31.5	A	
		43.3	85.0	36.0	A	
SVGA	800 x 600	35.2	56.3	36.0	A	
		37.9	60.3	40.0	A	RGB/DVI
		48.1	72.2	50.0	A	RGB
		46.9	75.0	49.5	A	
		53.7	85.1	56.3	A	
MAC16	832 x 624	49.7	74.6	57.3	A	
XGA	1,024 x 768	39.6	50.0	51.9	AA	RGB/DVI
		48.4	60.0	65.0	AA	
		56.5	70.1	75.0	AA	
		60.0	75.0	78.8	AA	
		68.7	85.0	94.5	AA	
		35.5	87.0	44.9	AA	RGB
WXGA	1,280 x 768	39.6	50.0	65.2	A	RGB/DVI
		47.7	60.0	80.1	A	
	1,280 x 800	41.3	50.0	68.0	A	RGB
		49.7	59.8	83.5	A	
MXGA	1,152 x 864	64.0	71.2	94.2	A	
		67.5	74.9	108.0	A	
		76.7	85.0	121.5	A	
MAC21	1,152 x 870	68.7	75.1	100.0	A	
MSXGA	1,280 x 960	60.0	60.0	108.0	A	
SXGA	1,280 x 1,024	64.0	60.0	108.0	A	RGB/DVI
		80.0	75.0	135.0	A	RGB
		91.1	85.0	157.5	A	
SXGA+	1,400 x 1,050	64.0	60.0	108.0	A	RGB/DVI
UXGA	1,600 x 1,200	75.0	60.0	162.0	A	RGB

1. The "i" appearing after the resolution indicates an interlaced signal.
2. The following symbols are used to indicate picture quality.
AA Maximum picture quality can be obtained.
A Signals are converted by the image processing circuit before picture is projected.

Serial connector

The serial connector complies with RS-232C. To control the projector from a personal computer, commands must be input through communication software, based on the format and satisfying the communication conditions shown below.

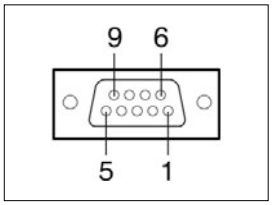
Pin assignments and signal names



D-sub 9-pin (female)
Serial input

No.	Signal name	Description	No.	Signal name	Description
1	–	NC	6	–	NC
2	TXD	Send data	7	CTS	Connected internally
3	RXD	Receive data	8	RTS	Connected internally
4	–	Connected internally	9	–	NC
5	GND	Ground			

Pin assignments and signal names



D-sub 9-pin (male)
Serial output

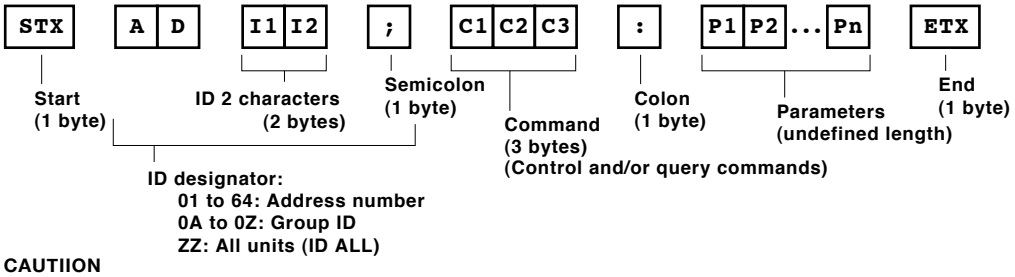
No.	Signal name	Description	No.	Signal name	Description
1	–	NC	6	–	NC
2	RXD	Receive data	7	RTS	Connected internally
3	TXD	Send data	8	CTS	Connected internally
4	–	Connected internally	9	–	NC
5	GND	Ground			

Communication conditions (factory setting)

Signal level	RS-232C-compliant
Synchronization method	Start-stop synchronization
Baud rate	9,600 bps
Parity	None
Character length	8 bits
Stop bit	1 bit
X parameter	None
S parameter	None

Basic format

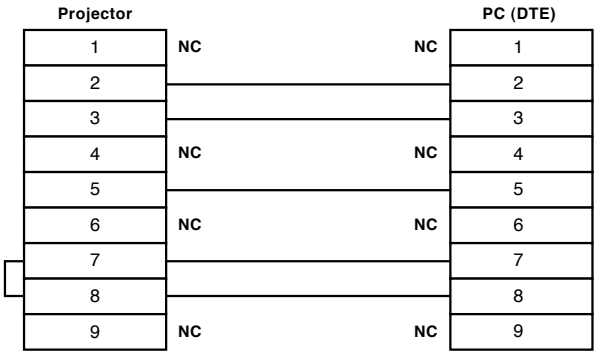
Transmission from the computer begins with STX, then the ID, command, parameter, and ETX are sent in this order. Add parameters according to the details of control.



CAUTIION

- **It may not be possible to send or receive commands for about 10 to 60 seconds when the lamp is first turned on. If this occurs, wait for 60 seconds, then try sending or receiving again.**
- **When sending multiple commands, be sure to wait for at least 0.5 second after receiving a response from the projector before sending the next command.**
- **Additional time is sometimes required for response due to processing inside the projector. Set the time-out period for command response to 10 seconds or more.**

Cable specifications



Control commands

Item	Command : Parameter	Function	Callback
POWER	PON*1	Power on	PON
	POF*1	Standby power off	POF
FREEZE	OFZ:0	Freeze off	OFZ:0
	OFZ:1	Freeze on	OFZ:1
AUTO SETUP	OAS	Auto setup	OAS
SHUTTER	OSH:0*1/*2	Shutter off	OSH:0
	OSH:1*1/*2	Shutter on	OSH:1
INPUT SELECT	IIS:RG1	RGB 1	IIS:RG1
	IIS:RG2	RGB 2	IIS:RG2
	IIS:VID	Video	IIS:VID
	IIS:SVD	S-Video	IIS:SVD
	IIS:DVI	DVI	IIS:DVI
TEST	OTS:00	Exit test pattern	OTS:00
	OTS:01	White (full on)	OTS:01
	OTS:02	Black (full off)	OTS:02
	OTS:03	Flag	OTS:03
	OTS:05	Window	OTS:05
	OTS:07	Focus	OTS:07
	OTS08	Color bar	OTS08
ON SCREEN	OOS:0	On-screen display off	OOS:0
	OOS:1	On-screen display on	OOS:1

*1 Do not send PON, POF, OSH, or OLP commands continuously in a short period of time. Doing so may burst the lamp or shorten the lamp replacement cycle.
*2 When a command that cannot be executed during standby mode is sent, the projector will send an ER401 command in reply.

Adjustment mode

Item	Command: Parameter	Description	Callback: Parameter	Parameter value Min.	Max.
PICTURE MODE	VPM:NAT	Natural	VPM:NAT	–	–
	VPM:STD	Standard	VPM:STD	–	–
	VPM:DYN	Dynamic	VPM:DYN	–	–
	VPM:CIN	Cinema	VPM:CIN	–	–
	VPM:GRA	Graphic	VPM:GRA	–	–
SYSTEM DAYLIGHT VIEW	VXX:DLVI0=+00000	Off	VXX:DLVI0=+00000	–	–
	VXX:DLVI0=+00001	1	VXX:DLVI0=+00001	–	–
	VXX:DLVI0=+00002	2	VXX:DLVI0=+00002	–	–
	VXX:DLVI0=+00003	3	VXX:DLVI0=+00003	–	–
COLOR	VCO:p1p2p3	Color	VCO:p1p2p3	1	63
TINT	VTN:p1p2p3	Tint	VTN:p1p2p3	1	63
COLOR TEMP.	OTE:1	Middle	OTE:1	–	–
	OTE:2	High	OTE:2	–	–
	OTE:4	User	OTE:4	–	–
	OTE:10	Default	OTE:10	–	–
CONTRAST	VCN:p1p2p3	Contrast	VCN:p1p2p3	1	63
BRIGHTNESS	VBR:p1p2p3	Brightness	VBR:p1p2p3	1	63
SHARPNESS	VSR:p1p2p3	Sharpness	VSR:p1p2p3	0	15
SET DATE	TSD:y1y2y3y4m1m2d1d2w	Date setting	TSD:y1y2y3y4m1m2d1d2w	200701011	203512317
SET TIME	TST:h1h2m1m2s1s2	Time setting	TST:h1h2m1m2s1s2	000000	235959

Status asking commands

Item	Command:Parameter	Function	Callback	Description
POWER CONDITION	QPW	Main power status	000	Standby (Off)
			001	On
FREEZE	QFZ	Freeze function status	0	Off
			1	On
SHUTTER	QSH	Shutter function status	0	Off
			1	On
INPUT SIGNAL	QIN	Input signal status	RG1	RGB 1
			RG2	RGB 2
			VID	Video
			SVD	S-Video
			DVI	DVI
TEST	QTS	Test pattern status	0	Exit test pattern
			1	White (full on)
			2	Black (full off)
			3	Flag
			5	Window
			7	Focus
			8	Color bar
ON SCREEN	QOS	On-screen display status	0	Off
			1	On
PICTURE MODE	QPM	Picture mode status	NAT	Natural
			STD	Standard
			DYN	dynamic
			CIN	Cinema
			GRA	Graphic
SYSTEM DAYLIGHT VIEW	QVX:DLVI0	System daylight view status	DLVI0=+00000	Off
			DLVI0=+00001	1
			DLVI0=+00002	2
			DLVI0=+00003	3
COLOR	QVC	Color adjustment value	p1p2p3	
TINT	QVT	Tint adjustent value	p1p2p3	
COLOR TEMP.	QTE	Color temperature adjustment status	1	Middle
			2	High
			4	User
			10	Default
CONTRAST	QVR	Contrast adjustment value	p1p2p3	
BRIGHTNESS	QVB	Brightness adjustment value	p1p2p3	
SHARPNESS	QVS	Sharpness adjustment value	p1p2p3	
SET RUNTIME	QST	Picture mode status	p1p2p3p4p5	00000h–99999h
LAMP ON TIME (LAMP TIMER)	Q$L:1	Lamp 1 run time	p1p2p3p4	0000h–9999h
	Q$L:2	Lamp 2 run time	p1p2p3p4	0000h–9999h
LAMP SELECT	QSL	Lamp operation mode status	0	Dual
			1	Single
			2	Lamp 1
			3	Lamp 2
LAMP POWER	QLP	Lamp power mode status	0	High
			1	Low
VPS SYSTEM	QVY	VPS system status	0	Slave
			1	Master
TMP CHECK	QTM:0	Temperature status	p1p2p3p4/p5p6p7p8 (*1)	p0 = Intake air
	QTM:1			p1 = Exhaust air
	QTM:2			p2 = DLP™ chip
GET DATE	QGD	Date setting status	y1y2y3y4m1m2d1d2w	yyyymmdd (day of week) (*2)
GET TIME	QGT	Time setting status	h1h2m1m2s1s2	hhmmss (*3)

*1 p1p2p3p4: Celsius (°C), p5p6p7p8: Fahrenheit (°F)
*2 Day of week: Monday = 1, Tuesday = 2, ... Sunday = 7
*3 Set the date and time to UTC (universal time coordinated).

Parameter format

Parameter format	Size (Byte)	Difinition
<pl>	3 (1 or 2 bytes also possible when under control)	Dicimal without signs: 0-999 (000, 001, 002...999) Dicimal with signs: -99 to +99 (-99...-01, +00, +01, +02...+99) Callback from the projector is 3 Byte.
<off on>	1	0 = off, 1 = on
<input signal>	3	RG1 = computer 1, RG2 = computer 2, VID = video, SVD = S-Video, DVI = DVI
<installation>	1	0 = front, 1 = rear, 2 = ceiling and front, 3 = ceiling and rear
<language>	3	ENG = English, DEU = German, FRA = French, ESP = Spanish, ITL = Italian, JPN = Japanese, CHI = Chinese, RUS = Russian, KOR = Korean
<power condition>	3	000 = standby power off, 001 = standby power on
<lamp on time>	4	Decimal without signs: 0000-9999 hours
<lamp select>	1	0 = dual, 1 = single, 2 = lamp 1, 3 = lamp 2
<lamp power>	1	0 = high, 1 = low
<acctch>	4	Decimal without signs: 0000-9999 hours
<color temp>	2	1 = mid, 2 = high, 4 = user, 10 = default
<date>	9	y1y2y3y4m1m2d1d2w = year (y) month (m) day (d) day of week (w) Day of week: Monday = 1, Tuesday = 2, ... Sunday = 7
<time>	6	h1h2m1m2s1s2 = hour (h) minute (m) second (s)

NOTE: If a wrong command is received, the projector will send an ER401 command to the computer.

Command example

To set the on-screen display off, send the command as shown below.

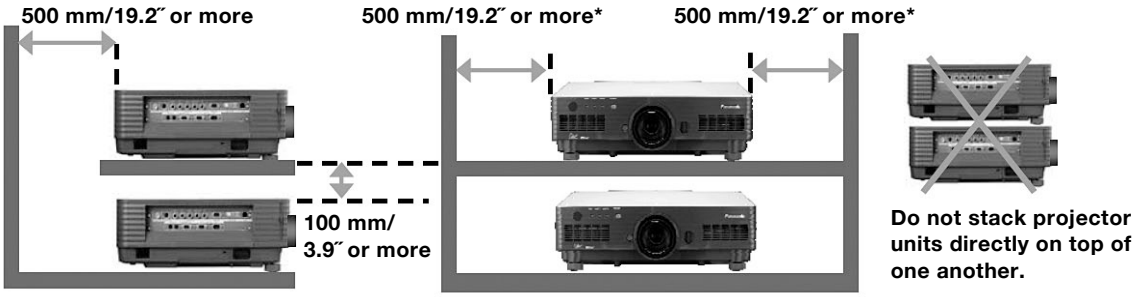
STX	ADZZ	;	OOS	:	30	ETX
Start	ID Address		Command		Parameter	End

NOTE: When sending commands without parameters, a colon (:) is not necessary.

Notes on Projector Placement and Operation:

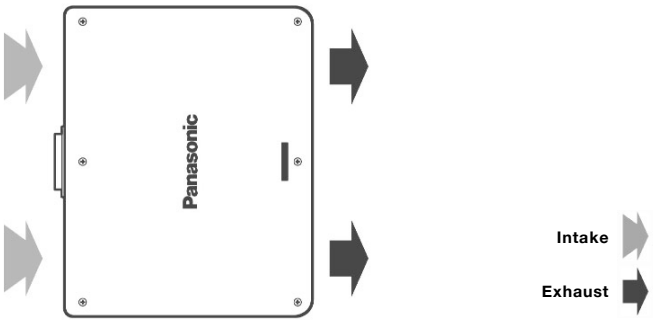
The projector uses a high-wattage lamp that becomes very hot during operation. Please observe the following precautions.

1. Never place objects on top of the projector while it is operating.
2. Make sure there is an unobstructed space of 500 mm or more around the projector's exhaust openings.
3. Do not stack projector units directly on top of one another. If two units must be stacked for back-up use in ordinary projection, use a method as shown below and provide ample space between the units to ensure that exhaust heat does not accumulate near the intake opening or around the units. Dual stacked projection of the PT-D5700/D5700L is not recommended.
4. If the projector is placed in a box or enclosure, ensure the temperature of the air surrounding the projector is between 0°C/32°F and 40°C/104°F*. Also make sure the projector's intake and exhaust openings are not blocked. Take particular care to ensure that hot air from the exhaust openings is not sucked into the intake openings.
   * **Even when the ambient temperature near the intake opening is 40°C/104°F or lower, an accumulation of hot air inside the cabinet may cause the protective circuit to activate and shut down the projector. Please give ample consideration to the design with regard to ambient temperature conditions.**



*** Minimum distance when two units are used together.**
Keep 300 mm/11.8˝ or more when a single unit is used.

Direction of Air Intake and Exhaust



Operating the Projector Continuously:

1. If the projector is to be operated continuously 24 hours a day, use the dual-lamp optical system's alternating lamp operation (lamp changer) function. The projector cannot be operated continuously 24 hours a day in dual-lamp mode.
   Allow a minimum of two hours per day of non-operation time.
2. The lamp replacement cycle duration becomes shorter if the projector is operated repeatedly for short periods.

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Panasonic
ideas for life

PT-D10000U
3-chip DLP® Projector

World's smallest* DLP® system projector with 10,000 lumens of brightness.

*As of December, 2006

10,000 lm

SXGA+

AUTO CLEANING ROBOT

PT-D10000U

Projection of bright, high-quality images in large spaces.

Classrooms

Conference rooms

Theaters

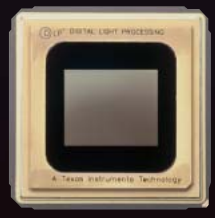
High brightness — 10,000-lumen

High contrast ratio — 5,000:1

High image quality — SXGA+

Outstanding 10,000-lumen brightness and superb image quality

Thanks to Panasonic's four lamp system, the new PT-D10000U delivers 10,000 lumens of brightness. And with Panasonic's dynamic iris technology, it achieves a super-high 5000:1 contrast ratio. Also featuring 3-chip DLP® technology that provides high resistance to deterioration due to aging, the PT-D10000U is a durable and reliable performer.



SXGA+

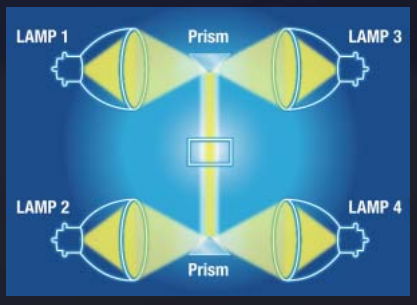
Panasonic's new technologies improve reliability and installation ease

Minimal downtime, high efficiency, and a bright picture.

MULTI-LAMP OPTICAL SYSTEM

Panasonic Original

With Panasonic's original four lamp system, the PT-D10000U generates 10,000-lumen brightness. If one lamp burns out during operation, the remaining lamps provide plenty of light to continue projecting. A lamp relay mode is also included. Extended, continuous operation is possible by lamp mode selection.



Lamp replacement cycle and brightness guidelines

Lamp mode	Light output (lumens)	Lamp replacement cycle (hours)
Four lamps	10,000	2,000
Three lamps	7,500	3,000
Two lamps	5,000	4,000
One lamp	2,500	8,000

*The values above are maximum values when replacing all four lamps simultaneously. The hours may vary depending on the usage conditions. See the back page for details.

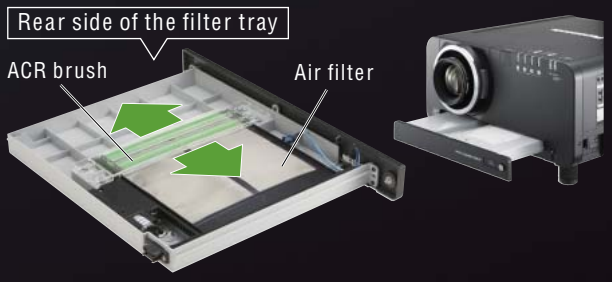
Provides 2,000 hours of use without filter maintenance.

AUTO CLEANING ROBOT (ACR)

AUTO CLEANING ROBOT

Panasonic Original

The PT-D10000U is the world's first*1 projector with an automatic filter cleaning system. When you switch on the projector*2, the air filter operates and the brush of the auto cleaning "robot" removes dust from the filter. This prevents the clogging results in malfunctions and other problems.



■ Micro cut filter

A new filter in the air intake section traps dust particles that are 10 microns*3 or larger. By capturing approximately 7 times as much dust as our previous filters, it guards against optical blocks and reduces the penetration of dust into to the interior to provide stable operation by, for example, preventing drops in brightness.

*1 As of Decemder, 2006. *2 When using the timer, you cannot set the filter to be cleaned more than once every 24 hours. Cleaning occurs either when the system is switched on or when it is cooling down when the specified cleaning time comes. The timer can be set to any time between 00:00 and 23:50 in 10-minute increments. You can also manually clean the filter using the menu on the on-screen display. *3 Individual lint particles and pollen are examples of dust with a size of 10 microns.

Dramatically reduced the size, and enabled 120-VAC operation.

1/2 CONCEPT

World's Smallest 10,000-Lumen DLP® Projector*

*As of December, 2006

This is the first*1 projector with a brightness of 10,000 lumens or more to operate on 120 VAC. And Panasonic's new liquid-cooling system made it possible to significantly downsize the PT-D10000U, making it one of the most compact in its class. The size is 30% smaller than our previous model*2, and the weight and volume are 70% less than our previous model.*2 The PT-D10000U also offers flexible installation and is easy to operate.

*1 As of December, 2006 *2 PT-D9510/PT-D9610

	PT-D9510/PT-D9610	PT-D10000U
Weight	220 lbs	70.5 lbs
Dimensions	W 29-41/64'' x H 16-55/64'' x D 41-3/8''	W 22-3/4'' x H 12-19/32'' x D 25-5/16''
Volume	0.33 m³	0.11 m³
Power supply	220-240 V	120 V
Power consumption	2,200 W	1,450 W

HIGH RELIABILITY

New cooling structure

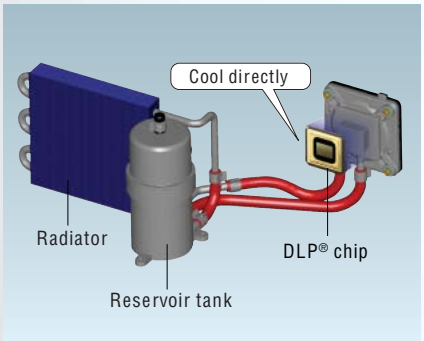
Panasonic Original

In order to further enhance the cooling efficiency, we completely revised the placement of various internal components and combined this with our popular cooling system to enable use in temperatures up to 45˚C. This allows use in a wider variety of environments, and keeps the operation more stable even in harsh conditions.

Liquid-cooling system

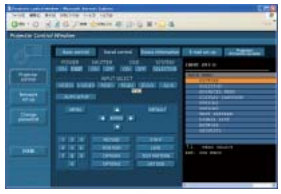
Panasonic Original

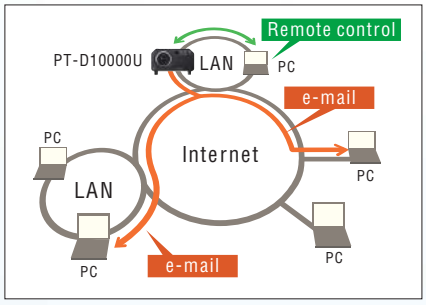
Panasonic's original liquid-cooling system directly cools the DLP® chips, which extends the PT-D10000U's performance and attains a high level of reliability.

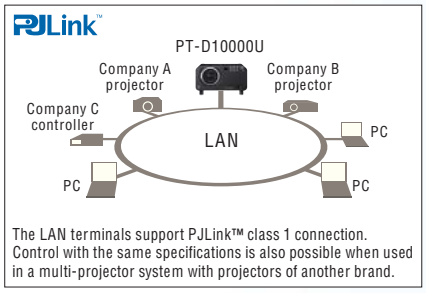


Web browser control/ monitoring and e-mail message alert

Anybody can operate the PT-D10000U by remote control or monitor its status over a LAN network, because it is all done using the computer's familiar web browser. Furthermore, the PT-D10000U sends an e-mail message to notify the operator when an error has occurred, or a lamp needs to be replaced.







The LAN terminals support PJLink™ class 1 connection. Control with the same specifications is also possible when used in a multi-projector system with projectors of another brand.

Lamp LED indicator and self-diagnosis function

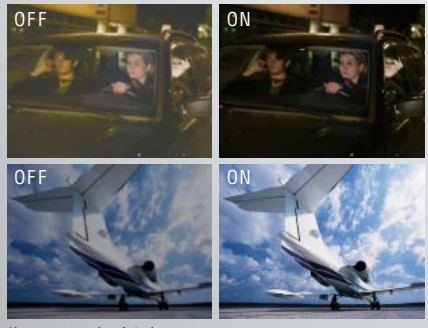
The projector body is equipped with a temperature alarm LED and a burnt-lamp alarm LED (for lamps 1 to 4). In previous models, the LED indicator was visible only from the front. In the PT-D10000U the LED is visible from both front and top, so you can see it easily even if the unit is hung from the ceiling. Information on the location of the error is also given in the on-screen display. A self-diagnosis function is also provided. Error codes displayed on the 3-digit, 7-segment LED on the side of the projector tell the operator where the problem is.

HIGH IMAGE QUALITY/FLEXIBLE INSTALLATION

Dynamic iris

Panasonic Original

Incorporating exclusive Panasonic technology, the dynamic iris opens and closes with exceptional speed and precision as the input signal changes, resulting in accurate, real-time control of the light striking the DLP® chips. The dynamic iris is positioned immediately after the light synthesizer and before the integrator, so it has minimal adverse effect on the overall light uniformity across the screen.



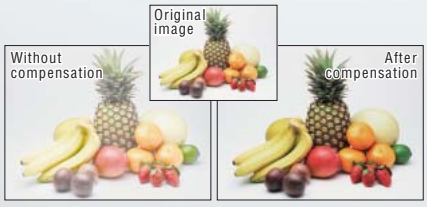
*Images are simulated.

Full 10-bit picture processing

The use of a full 10-bit image processing system provides smooth tonal expression. For example, skin tones appear natural and true to life.

3D color management system

Compensation provides optimal levels of color saturation, hue, and brightness that were not possible with conventional projectors. Colors approach those of the original image, even on large-screen displays.



*Images are simulated.

Progressive cinema scan

(3/2 pulldown)

This interlace/progressive conversion technology automatically detects when the input signal is derived from filmed material and selects the optimum progressive processing method to assure faithful reproduction of the original image.

Dynamic sharpness control

The dynamic sharpness control circuit adjusts the video signal waveforms based on the difference in brightness of adjacent pixels for a sharp, clear picture that is relatively unaffected by signal noise.

Horizontal/Vertical lens shift

A wide adjustment range for the horizontal/ vertical lens shift assures virtually distortion-free images and adds convenience and versatility. Fine adjustment is made within ±50 % from center in the vertical direction and within ±30 % from center in the horizontal direction. (Horizontal: powered, Vertical: powered)

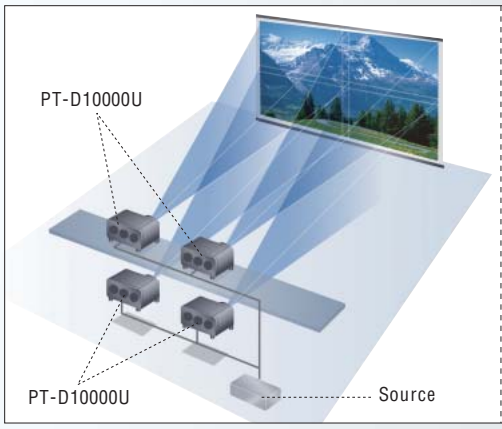
*For the ET-D75LE6, the adjustment is within ±40 % in the vertical direction and ±20 % in the horizontal direction.

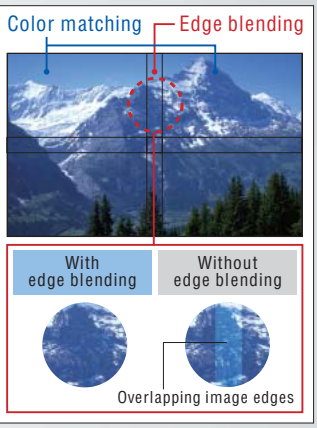
Optional lenses for various venues

Seven optional lenses with different throw distances are available. These powered zoom/focus lenses enable the projector to perform superbly in an array of projection environments. The lens cover opens in both front and top directions, making it easier to install the lens by viewing the mark on the top of the lens.

MULTIPLE SYSTEM APPLIANCE

Built-in multi-screen support system





*When edge blending and color matching are set, the brightness and color balance at the boundaries where screens are joined may lack uniformity due to differences in the uniformity of the screen gain directivity, the brightness of each lamp mode, etc.

Multi-screen processor

The PT-D10000U can project large, multi-screen images without any additional equipment. Up to 100 units (10 x 10) can be edge-blended at a time.

Color matching

When several units are used together, this function corrects for slight variations in the color reproduction range of individual projectors. The PC software assures easy, accurate control. Independent, 7-axis adjustment (red, green, blue, yellow, magenta, cyan, white) ensures high precision and minimizes color variations.

Edge blending

The edges of adjacent screens can be blended and their luminance controlled. For example, the adjoining edges in a 2x2 multi-screen system can be blended to create a smooth, seamless image.

Multiple terminals including DVI-D and LAN slots

The PT-D10000U comes equipped with DVI-D and LAN (PJ-Link™) slots. It also features an array of terminals, including two RGB inputs, a 5-BNC connector and D-sub HD 15-pin, serial in/out, S-video input, two remote inputs, and one remote out. In addition to offering DVI-D control, the PT-D10000U is HDCP*-compliant and thus meets a broad range of projection needs.

*High-Bandwidth Digital Content Protection

Other features

•Mechanical lens shutter •Picture in picture (main/sub input source combinations possible only when using computer and video) •Anti-theft features with chain opening •ID assignment for up to 64 units •Coordinated groups •Digital vertical keystone correction •Built-in test pattern •Selectable 9-language on-screen menu (English, German, French, Spanish, Italian, Russian, Japanese, Chinese, Korean)

UNIVERSAL DESIGN

Easy lamp replacement

You can remove the back cover by removing a single screw. This makes it easy to replace a lamp, even if the projector is suspended from the ceiling or tucked in a hard-to-reach space.

Grooved for easy handling

Grooves on all four sides of the projector's bottom let you get a firm, comfortable grip on the unit and move it safely.

Blind touch operation key/ New remote control

The keys have pits and projections that let you operate the projector by blind touch. A light can also be turned on to illuminate the control panel, for easy operation in a darkened room. The wireless operation range has been extended to 30 m, giving you control from a greater distance. Thanks to the backlight, you can check all the keys on the remote control even in the dark. The lens can also be adjusted using the lens adjustment direct key that was newly added to the remote control.

Ecological-conscious design

Panasonic works from every angle to minimize environmental impact in the product design, production and delivery processes, and in the performance of the product during its life cycle. The PT-D10000U reflects the following ecological considerations.

- Lead-free solder is used to mount components to the printed circuit boards.
- The non-coated cabinet enables easy recycling.
- Lamp power switching further reduces power consumption.
- Auto Power Save activates standby mode when no signal is input.
- The packing case and operating manual are made from recycled paper.

■Optional accessories

Lens

Zoom lens
ET-D75LE6 (1.0 - 1.2:1)
ET-D75LE1 (1.5 - 2.0:1)
ET-D75LE2 (2.0 - 3.0:1)
ET-D75LE3 (3.0 - 5.0:1)
ET-D75LE4 (5.0 - 8.0:1)
ET-D75LE8 (7.9 - 15.0:1)

Fixed focus lens
ET-D75LE5 (0.8:1)

ET-D75LE1

Lamp

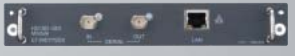
Replacement lamp unit
ET-LAD10000
ET-LAD10000F (four pack)

ET-LAD10000

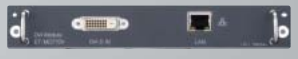
Input signal board*

SD-SDI Input signal board
ET-MD77SD1

HD/SD Input signal board
ET-MD77SD3



DVI-D Input signal board
ET-MD77DV



Frame

ET-PFD100

Carrying handle

ET-HAD100

Ceiling mount bracket

High-ceiling mount bracket
ET-PKD100H

Low-ceiling mount bracket
ET-PKD100S

*The LAN terminal on each board, when mounted, cannot be used because the LAN terminal on the main unit has priority.

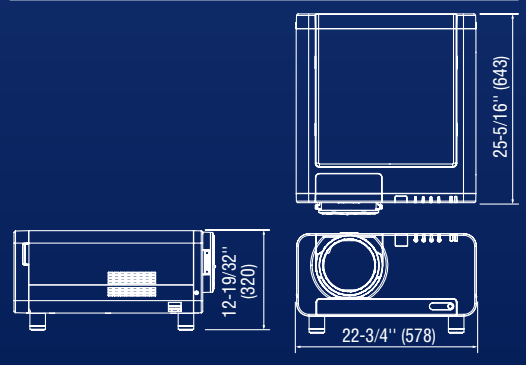
Specifications

DLP®chip	Panel size	0.95" diagonal (4:3 aspect ratio)
	Display method	DLP® chip x 3 (R, G, B), DLP® projection system
	Pixels	1,470,000 (1,400 x 1,050) x 3, total of 4,410,000 pixels
Lamp		250 W UHM™ lamp x 4 (four lamp system)
Brightness		10,000 lumens (four-lamp operation mode)
Contrast ratio		5,000:1 (full on/full off, in Dynamic iris 3 mode)
Resolution	RGB	1,400 x 1,050 pixels (1,600 x 1,200 pixels compatible, compression mode)
	Video	560 TV lines
Lens		Optional powered zoom/focus lenses
Screen size		70 - 600 inches, 4:3 aspect ratio (70-300 inches, 4:3 aspect ratio with the ET-D75LE5)
Lens shift		Vertical, Horizontal (powered)
RGB input scanning frequency		fH 15-100 kHz, fv 24-120 Hz Dot clock 20-162 MHz
Component signal		480i, 480p, 576i, 576p, 720/60p, 720/50p, 1035/60i, 1080/25p, 1080/24p, 1080/24sF, 1080/30p, 1080/60i, 1080/50i, 1080/50p, 1080/60p
Video signal		fH 15.75/15.63 kHz, fv 50/60Hz (NTSC,NTSC4.43,PAL,PAL60,PAL-N,PAL-M,SECAM)
Terminals	VIDEO IN	BNC x 1, 1.0 Vp-p
	VIDEO OUT	BNC x 1, 1.0 Vp-p
	S-VIDEO IN	Mini DIN 4-pin x 1
	RGB1/YPBPR IN	BNC x 5
	RGB2 IN	D-sub HD 15-pin x 1
	DVI-D IN	24-pin x1, DVI 1.0 compliant, HDCP compatible
	SERIAL IN	D-sub 9-pin female x 2 (RS232C x 1, RS422 x 1)
	SERIAL OUT	D-sub 9-pin male x 1 (RS422 x 1)
	REMOTE 1 IN	M3 jack x1 for wired remote control
	REMOTE 1 OUT	M3 jack x1 for link control
	REMOTE 2 IN	D-sub 9-pin female x 1 for external control (parallel)
	LAN	RJ-45 (10 Base-T/100 Base-TX) x 1, compatible with PJLink™
Keystone correction range		±40° (±22° with the ET-D75LE5, ±28° with the ET-D75LE6)

Installation	Front/rear, ceiling/floor
Power cord length	9.9'' (3.0 m)
Power supply	120 V AC, 20 A, 60 Hz
Power consumption	1,450 W (25 W in standby mode with fan stopped)
Dimensions (W x H x D)	22-3/4'' x 12-19/32'' x 25-5/16'' (578 x 320 x 643 mm) (without lens)
Weight	70.5 lbs (32 kg) without lens
Operating temperature	32 -113 °F (0 -45 °C) *The highland mode is for use at high altitudes. When using the unit at altitudes of 1,400 to 2,700 meters, the ambient temperature is 0 °C-40 °C.
Operating humidity	10-80% (no condensation)
Supplied accessories	Power cord, Wireless/wired remote control unit, Batteries for remote control (3V AA battery x2)

Dimensions

unit: inch [mm]



Shape of the plug receptacle

•AC120 V AC, 20 A

Projection distance

[feet/meters]

Diagonal image size (aspect raio: 4:3)	Throw distance												
	ET-D75LE1 1.5-2.0:1		ET-D75LE2 2.0-3.0:1		ET-D75LE3 3.0-5.0:1		ET-D75LE4 5.0-8.0:1		ET-D75LE8 7.9-15.0:1		ET-D75LE6 1.0-1.2:1		ET-D75LE5 0.8:1
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	fixed
70''	6.9 / 2.1 m	9.0 / 2.7 m	9.2 / 2.9 m	13.8 / 4.2 m	13.9 / 4.3 m	23.2 / 7.0 m	23.3 / 7.2 m	37.3 / 11.3 m	36.4 / 11.1 m	69.3 / 21.1 m	4.6 / 1.4 m	5.4 / 1.6 m	3.3 / 1.0 m
100''	9.9 / 3.0 m	13.1 / 3.9 m	13.3 / 4.1 m	19.9 / 6.0 m	20.0 / 6.1 m	33.4 / 10.1 m	33.5 / 10.2 m	53.4 / 16.2 m	52.6 / 16.1 m	99.5 / 30.3 m	6.7 / 2.1 m	7.8 / 2.4 m	4.9 / 1.4 m
200''	19.9 / 6.1 m	26.5 / 8.0 m	26.8 / 8.2 m	40.1 / 12.2 m	40.2 / 12.3 m	67.2 / 20.4 m	67.3 / 20.6 m	107.2 / 32.6 m	106.3 / 32.5 m	200.3 / 61.0 m	13.5 / 4.1 m	16.0 / 4.8 m	10.0 / 3.0 m
300''	30.0 / 9.2 m	40.0 / 12.1 m	40.3 / 12.3 m	60.3 / 18.4 m	60.5 / 18.5 m	101.0 / 30.8 m	101.1 / 30.9 m	160.9 / 49.0m	160.1 / 48.8 m	301.0 / 91.7 m	20.2 / 6.2 m	24.1 / 7.3 m	15.2 / 4.6 m
400''	40.1 / 12.2 m	53.4 / 16.2 m	53.8 / 16.4 m	80.6 / 24.5 m	80.7 / 24.6 m	134.8 / 41.1 m	134.9 / 41.2 m	214.7 / 65.4 m	213.9 / 65.2 m	401.8 / 122.5 m	27.0 / 8.3 m	32.2 / 9.8 m	—
600''	60.2 / 18.4 m	80.3 / 24.4 m	80.8 / 24.7 m	121.1 / 36.9 m	121.2 / 37.0 m	202.4 / 61.7 m	202.6 / 61.8 m	322.2 / 98.2 m	321.4 / 98.0 m	603.3 / 183.9 m	40.6 / 12.4 m	48.5 / 14.8 m	—

Diagonal image size (aspect raio: 16:9)	Throw distance												
	ET-D75LE1 1.5-2.0:1		ET-D75LE2 2.0-3.0:1		ET-D75LE3 3.0-5.0:1		ET-D75LE4 5.0-8.0:1		ET-D75LE8 7.9-15.0:1		ET-D75LE6 1.0-1.2:1		ET-D75LE5 0.8:1
	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	min.	max.	fixed
70''	7.4 / 2.3m	9.9 / 3.0 m	10.0 / 3.1 m	15.1 / 4.6 m	15.1 / 4.7 m	25.4 / 7.7 m	25.4 / 7.8 m	40.7 / 12.3 m	39.8 / 12.2 m	75.7 / 23.0 m	5.0 / 1.6 m	6.0 / 1.8 m	3.6 / 1.1 m
100''	10.7 / 3.3 m	14.3 / 4.3 m	14.4 / 4.5 m	21.7 / 6.6 m	21.7 / 6.9 m	36.4 / 11.1 m	36.5 / 11.2 m	58.3 / 17.7 m	57.3 / 17.5 m	108.6 / 33.1 m	7.2 / 2.2 m	8.6 / 2.6 m	5.3 / 1.6 m
200''	21.7 / 8.9 m	29.0 / 8.8 m	29.2 / 8.9 m	43.8 / 13.3 m	43.8 / 13.4 m	73.3 / 22.3 m	73.3 / 22.4 m	116.8 / 35.8 m	115.9 / 35.4 m	218.4 / 66.5 m	14.6 / 4.5 m	17.5 / 5.3 m	11.0 / 3.3 m
300''	32.6 / 10.0 m	43.6 / 13.2 m	43.9 / 13.4 m	65.8 / 20.0 m	65.9 / 20.1 m	110.1 / 33.5 m	110.2 / 33.6 m	175.4 / 53.4 m	174.5 / 53.2 m	328.2 / 100.0 m	22.0 / 6.7 m	26.3 / 8.0 m	16.6 / 5.0 m
400''	43.6 / 13.3 m	58.3 / 17.7 m	58.6 / 17.9 m	87.9 / 26.7 m	87.9 / 26.9 m	147.0 / 44.7 m	147.0 / 44.9 m	234.0 / 71.3 m	233.1 / 71.1 m	437.9 / 133.4 m	29.3 / 9.0 m	35.2 / 10.7 m	—
600''	65.5 / 20.0 m	87.5 / 26.6 m	88.0 / 26.9 m	132.0 / 40.2 m	132.0 / 40.3 m	220.7 / 67.2 m	220.7 / 67.3 m	351.2 / 107.0 m	350.3 / 106.8 m	657.5 / 200.4 m	44.1 / 13.5 m	52.9 / 16.1 m	—

NOTES ON USE

Notes on Projector Placement and Operation:

The projector uses a high-wattage lamp that becomes very hot during operation. Please observe the following precautions.

1. Never place objects on top of the projector while it is operating.
2. Make sure there is an unobstructed space of 500 mm or more around the projector's exhaust openings.
3. Do not stack projector units directly on top of one another for the purpose of multiple (stacked) projection. When stacking projector units, be sure to provide the amount of space indicated below between them. These space requirements also apply to installations where only one projector unit is operating at one time and the other unit is used as a backup.
4. If the projector is placed in a box or enclosure, ensure the temperature of the air surrounding the projector is between 0°C and 35°C. Also make sure the projector's intake and exhaust openings are not blocked. Take particular care to ensure that hot air from the exhaust openings is not sucked into the intake openings.
5. Because the ET-D75LE5 is a fixed short-throw lens, the lens shift function cannot be used with it.

Operating the Projector Continuously:

1. If the projector is to be operated continuously 24 hours a day, use the multi-lamp optical system's alternating lamp operation (lamp changer) function. The projector can be operated continuously 24 hours a day in four-lamp operation mode,but it will automatically operate with three lamps for 8 hours of the 24 hours.
2. The lamp replacement cycle duration becomes shorter if the projector is operated repeatedly for short periods.

- The projector uses a high-voltage mercury lamp that contains high internal pressure. This lamp may break, emitting a large sound, or fail to illuminate, due to impact or extended use. The length of time that it takes for the lamp to break or fail to illuminate varies greatly depending on individual lamp characteristics and usage conditions.
- The brightness of the lamp will gradually decrease with use.

Panasonic®

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Unit of Panasonic Corporation of North America
www.panasonic.com/projectors

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Please contact Panasonic or your dealer for a demonstration.

JQA-1617

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updated!

professional projector series

F30

- SXGA+ resolution
- up to 6500 ANSI lumens
- BrilliantColor™ technology
- Failsafe DuArch™ technology

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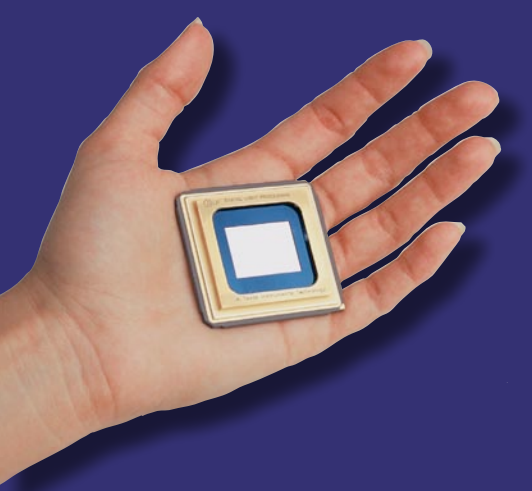
F30 professional grade DLP™ projector series

The F30 professional grade DLP™ projector series is our top-of-the line single chip DLP™ (Digital Light Processing™) projectors. With a wide and powerful range of configuration options such as projection lenses, application specific colour wheels, our unique RealColor colour management suite, and input- and image processing options, the F30 series has been designed for realistic, challenging high end imaging applications. Featuring full 10 bit per colour resolution, and high end video processoing, it is the world's most powerful single chip DLP™ projector series.



High performance projectors

The projectiondesign F30 has been designed to perform in a variety of environments and applications. projectiondesign has long and extensive experience in designing projectors for special requirements, and our products are used in applications as diverse as ship and car simulators, 2D and 3D visualisation and entertainment centres, as well as installations for medical imaging, post production and broadcast monitoring, and control rooms and public dynamic signage. Common to all is that requirements are stringent, and image quality demands are high.

DLP™ technology – chosen for reliability

The F30 features DLP™ technology from Texas Instruments®. It has been chosen for its unique combination of image quality – high brightness and contrast, and natural colours – and most importantly, its unmatched reliability. Independent testing has proven DLP™ technology to be the most reliable of all microdisplays; not degrading when subjected to UV light, inherent in all projectors. Unlike competing technologies, showing severe image quality degradation after only a few thousand hours, DLP™ technology remains constant over hundreds of thousands of hours.

RealColor realises seamless matching

REALCOLOR

Each F30 projector is uniquely characterised and calibrated during its manufacture. Unique optical performance values are recorded and matched to the electronics processing in order to secure perfect on-site calibration. With RealColor, it is possible to match any number of projectors, and ensure they all project the same primaries and grey scale, without going through a very complicated process.

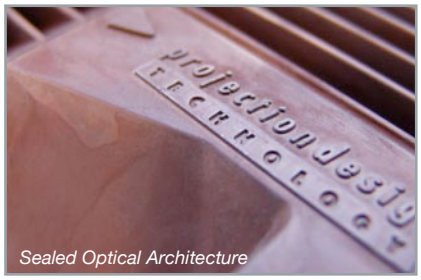
BrilliantColor™ changes what you see

BrilliantColor™ is revolutionary in the way colours are processed and displayed. While increasing brightness over competing technologies, BrilliantColor™ dramatically increases colour saturation and visible gamut, and really needs to be seen. With strong saturation in yellows, cyans and magentas, colours commonly found in natural

scenes, and very little contamination between them, image quality is dramatically increased over any other technology.

SOA – Sealed Optical Architecture

The F30's sealed optical architecture ensures trouble-free operation in unforgiving and harsh environments, such as process control environments and public places. Dust, smoke



and tiny particles are prevented from entering and contaminating the light engine, thus will not alter the displayed image or quality over time. In addition, it ensures the projector requires virtually no servicing or maintenance.

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High brightness – and configurable

Featuring up to 6500 ANSI lumens, the F30 packs enough brightness for most installations. With several configuration options, including three different BrilliantColor™ colour wheel

Range of colour wheels options

complements, it can be set to display any brightness desired, and for instance optimised for visualisation & simulation, or general graphics display. The different configurations also allow optimization for long life rather than high brightness. The configuraton options allow easy and seamless integration into applications as different as process control, and large screen auditoriums.

Precision projection lens optics

To ensure high quality imaging, the F30 series feature very high quality optics, with high resolution, but low dispersion and distortion. Aspherical lens elements are used throughout the range. A wide range of lenses cover almost all throw ratios from ultra wide 0.84 : 1, all through to 7.1 : 1, for superb flexibility.

24/7 operation guaranteed

All our professional projectors are offered with a limited 24/7 operation guarantee. Applicable to process control rooms and heavy duty applications where reliability is key, this is where projectiondesign makes a difference.

Multiple available product configurations

The F30 is available with a range of different colour wheels, each suited to different applications. The options tailor the F30 to specific properties, for instance photographic colour reproduction, high brightness, video performance, or maximised contrast.

Built-in digital equalizing circuitry

DVI and HDMI interfaces are normally used only for short runs. With our new digital re-clocking and digital equalizing circuitry, the F30 can use cables as long as 30m (100ft)[1] without special management, such as using optical cables.

Comprehensive asset management

Comprehensive asset management and precise control is available through the built-in network connectivity and through RS232 control. The network interface provides an easy-to-use interface to controlling all projector properties, specially designed for multiple projector installations. All status parameters are available, including incredibly comprehensive lamp monitoring.

1 Requires 24 avg copper cable for guaranteed functionality.

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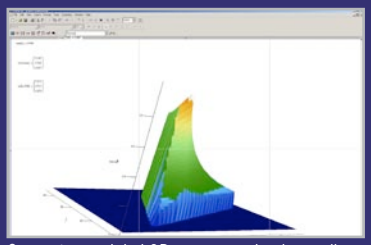
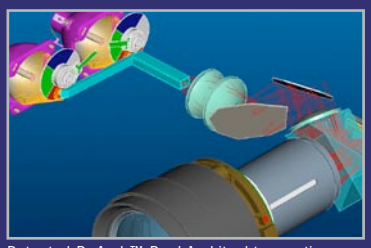
Key features

A wide range of lenses, from ultra wide 0.84 : 1 to 7.1 : 1 gives unique flexibility in installations and placement of product.

The comprehensible connectivity features dual digital and analogue inputs, as well as IP and RS232 control options.

Unique UniBoard™ video processing with Pixelworks dnx™ video processing, and fetures dual DMD™ drivers for optimum performance.


Computer modeled 3D gamma and colour calibration tools ensure proprietary RealColor colour management displays true colours.


Patented DuArch™ Dual Architechture optics create the highest performance single chip DLP™ projector avaialable.

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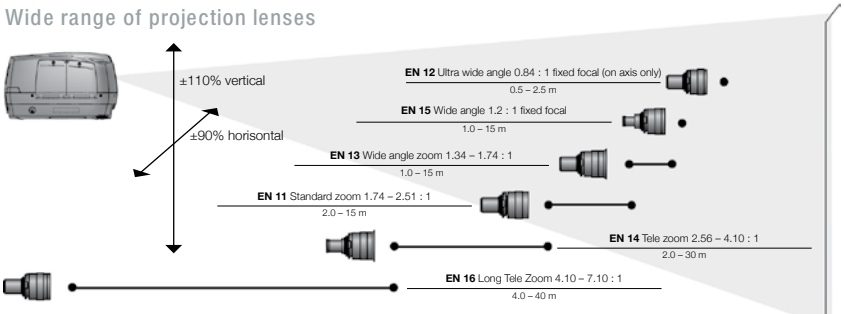
projectiondesign®
HIGH PERFORMANCE PROJECTORS

professional projector series

technical specifications		F30	
projector		high performance SXGA+	
		DLP™ digital projector	
display	technology	single chip LVDS DMD™ with DarkChip3™	
	concept	sealed, all-glass optical design with lens shift	
	resolution	1400 x 1050 native	
		up to 6500 ANSI lumens	
		colour wheel dependant	
	contrast ratio	up to 7500 : 1 (on/off)	
	colours	30 bit colours (>1 bn simultaneously displayable)	
	image processing latency	~ 1 input frame on graphics port	
input signal compatibility	computer	UXGA, SXGA+, SXGA, XGA, SVGA, VGA	
		1920 x 1080 - 640 x 480 pixel resolution	
		RGBHV, RGBS, RGsB	
	horizontal scan frequency	15 - 150 kHz	
	vertical scan frequency	48 - 190 Hz	
	video	HDTV (1080i, 720p, 576i/p, 480i/p)	
		NTSC 3.56/4.43, PAL BGHI, M, N, SECAM	
	bandwidth	205 MHz analog RGB	
		225 MHz digital RGB (DVI or HDMI)	
optics	ultra wide angle lens	0.84 : 1	EN12 (503-0057-00)
	wide angle lens	1.25 : 1	EN15 (503-0060-00)
	wide angle zoom lens	1.34 - 1.74 : 1	EN13 (503-0058-00)
	standard zoom lens	1.74 - 2.51 : 1	EN11 (503-0056-00)
	short tele zoom lens	2.56 - 4.10 : 1	EN14 (503-0059-00)
	long tele zoom lens	4.10 - 7.10 : 1	EN16 (503-0061-00)
	focusing distance	0.5 - 40m (see separate lens specifications)	
	optical lens shift	vertical: ± 110%, horisontal: ± 90%	
		EN12 on axis only	
	lens iris control	F/2.1 – 6.5 for all lenses, continuous	
	shutter	mechanical	
	colour wheel options	RGBCMY – visualization & simulation	
		RGBCYW – graphics display	
		RGBCYW – high brightness display	
	available lamp complements	2x 300W UHP™, 2000 hrs (5000 hrs in eco mode)	
		failsafe DuArch™ Dual Architechture	

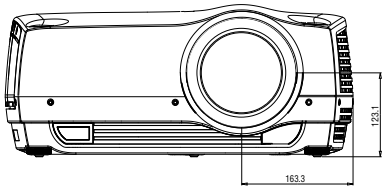
connectivity	computer	1x HDMI (v1.3) dgital RGB
		1x DVI-D digital RGB
		1x 15-pin HDDSUB analogue RGB
		1x BNC x5 analogue RGB / YUV
		1x 15-pin HDDSUB analogue RGB buffered redrive
	video	1x HDMI (v1.3) (HDCP) digital RGB or YUV
		1x DVI-D digital RGB (HDCP compatible)
		3x RCA component YUV
		1x 4-pin mini DIN S-video Y/C
		1x RCA composite video
	control and communication	1x RJ45 TCP/IP network port
		2x RS232 9-pin DSUB (in / out)
		1x USB – mouse control & firmware upgrade
		2x 12V (60mA) triggers (screen drop / aspect)
		1x RC repeater, 3.5mm mini jack
	other	2x configurable XPort™ (front- / back end)
supplied accessories	cables	standard cable kit
		4m power cord (country dependant)
	other	backlit IR remote control, ceiling mount cable cover
		product documentation
general	operating noise level (typ)	30 dB (A) at 20°C sea level
	dimensions (dwh)	376 x 510 x 223 mm (ex. lens)
	weight	about 12.6 kg (ex. lens)
	environmental	RoHS, WEEE
	security	4-digit PIN code, Kensington lock
	power requirements	100 – 240 VAC, 50/60 Hz, +/- 10%
		<1050W power consumption
	conformances	CE, CSA "C/US", FCC Class A, CCC
	operating temperature	0 – 40°C / 32 – 104°F, 0 – 1500 m
		0 – 35°C / 32 – 95°F, 1500 – 3000 m
	operating and storage	20 – 90% RH
	available colours	black metallic, silver metallic
	warranties	2 years, 500 hours or 90 days on lamp
		optional 3-year warranty, conditions apply

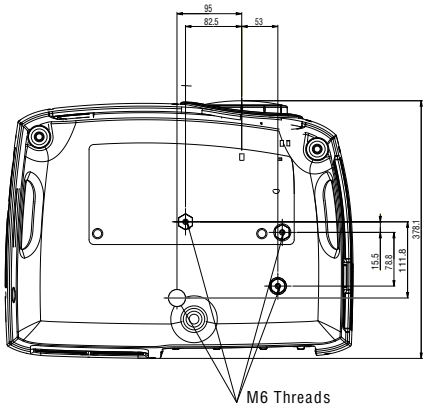
Wide range of projection lenses



Multiple lens options and very wide lens shift adjustment ranges allow for flexibility in installations.

Standardised bolt-on ceiling mount interface





Available versions

colour wheel	
visualization/simulation	101-1400-xx
graphics display	101-1402-xx
high brightness	101-1401-xx

Available colours: black metallic -08 (standard), silver -14 (option)
Lenses sold separately, see above.

Distributed by:

602-0010-02

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CX 8-channel

Professional Power Amplifiers

CX168 | CX108V

Designed for permanently installed sound systems where rackspace is at a premium, QSC's CX108V and CX168 provide unprecedented levels of channel density for multi-channel amplifiers. The CX108V and CX168 provide 100 watts per channel at 70 volts and 90 watts per channel at 8 ohms respectively. With both models, each pair of channels may be bridged to configure these amplifiers as 4, 5, 6 or 7 channel units. Like the entire CX Series, the 8 channel models feature DataPorts for remote amplifier management or signal processing, incorporate QSC's legendary PowerLight® technology, and deliver our unmatched reputation for quality and reliability.

QSC's PowerLight technology takes your audio to an entirely new level. Delivering tighter bass and clean, transparent highs, PowerLight also cuts waste heat, boosts reliability, and eliminates unwanted noise and hum. PowerLight is a revolutionary switching power supply technology that provides ample current to the audio power circuitry by charging the supply rails over 200,000 times per second through an ultra-low noise impedance circuit. Unlike amplifiers that use conventional supplies, the audio signal is never starved prematurely and remains crisp and clean.

CX 8-channel Amplifiers

	Watts per channel		
Model	70V*	8Ω	4Ω**
CX168	–	8 x 90	8 x 130
CX108V	8 x 100	–	–

20 Hz - 20 kHz, 0.05%THD
** 20 Hz - 20 kHz, 0.2%THD*
***20 Hz - 20 kHz, 0.1%THD*

PowerLight is a registered trademark of QSC Audio Products, Inc.

Features

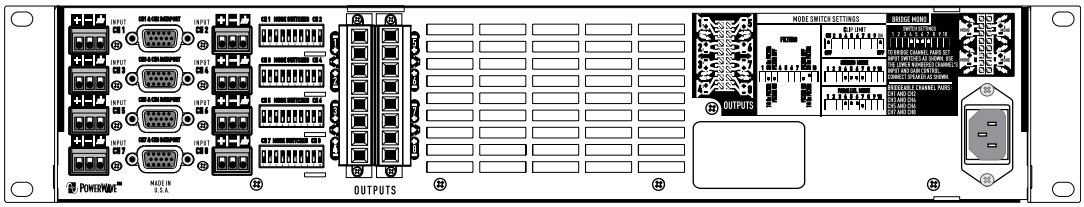
- 100 watts per channel at 70 volts (CX108V)
- 90 watts per channel at 8 ohms and 130 watts per channel at 4 ohms (CX168)
- Compact size — only two rack spaces and 14" deep for reduced rack space
- Channel pairs bridgeable for maximum flexibility
- Exclusive PowerLight switch-mode power supply technology for high performance and compact size
- Active inrush limiting eliminates AC inrush current, removing the need for expensive power sequencers
- Four HD15 DataPorts (one per channel pair) for QSControl computer control or QSC's signal processing accessories
- Custom integrated gain control security cover for tamper proof installations
- 1 dB recessed detented gain controls for fast and accurate settings
- Detachable euro style input and output connectors
- DIP switch control for clip limiters, high-pass filters, bridge mono and parallel operation
- Selectable high-pass filters protect speakers and prevent speaker transformer saturation with minimal effect on program material (50 Hz or 75 Hz; CX108V) (33 Hz or 70 Hz; CX168)
- Comprehensive front panel indicators including signal, clip, bridge mono and parallel-input LEDs
- Fully protected — including DC, infrasonic and ultrasonic, thermal overload and short circuit protection
- High-performance Class AB+B complementary bipolar output circuitry
- Lightweight — only 21 pounds (9.5 kg) for easier racking and shipping
- 3 year warranty plus optional 3 year extended service contract

CX 8-Channel

Specifications

		CX168		CX108V
Stereo Mode (all channels driven)		Continuous average output power per channel		
8Ω / 20 Hz - 20 kHz / 0.05% THD		90 W		–
4Ω / 20 Hz - 20 kHz / 0.1% THD		130 W		–
Midband Ratings		All channels driven	Single channel	
8Ω / 1 kHz / 0.1% THD		100 W	120 W	–
4Ω / 1 kHz / 0.1% THD		140 W	180 W	–
70V / 20 Hz - 20 kHz / 0.2% THD		–		100 W
Bridge Mono Mode		Bridge mono mode operation		
16Ω / 20 Hz - 20 kHz / 0.1% THD		180 W		–
8Ω / 20 Hz - 20 kHz / 0.1% THD		260 W		
140V / 20 Hz - 20 kHz / 0.2% THD		–		200 W
Signal to Noise (20 Hz - 20 kHz)		-107 dB		-100 dB
Input Sensitivity		1.35 Vrms at 8Ω		1.26 Vrms at 70V
Voltage Gain		20x (26 dB)		56x (35 dB)
Input Clipping		6 Vrms (+18 dBu)		6 Vrms (+18 dBu)
Output Circuitry		AB+B		AB+B
Frequency Response		20 Hz - 20 kHz, + 0.2 dB | 8 Hz - 50 kHz, +0/-3 dB		20 Hz - 20 kHz, + 0.4 dB | 8 Hz - 70 kHz, +0/-3 dB
Damping Factor		> 200 (5 kHz and below)		> 500 (5 kHz and below)
Input Impedance		6k ohms unbalanced, 22k ohms balanced		6k ohms unbalanced, 22k ohms balanced
Distortion (SMPTE-IM)		< 0.02%		
Distortion (typical)				
20 Hz - 20 kHz: 10 dB below rated power		< 0.1% THD		
1.0 kHz and below: full rated power		< 0.03% THD		
Cooling		Variable-speed fan / rear-to-front air flow through tunnel heat sink		
Connectors		Input: 3-pin euro-style detachable terminal blocks (one per channel) DataPort: HD-15 connector (Ch. 1+2, 3+4, 5+6, 7+8) Output: two 8-pin euro style detachable terminal blocks		
Controls		Front: AC switch, Ch. 1, 2, 3, 4, 5, 6, 7 & 8 gain knobs Rear: DIP switches for Ch. 1 - 8, clip limiter on/off, LF filter on/off, LF filter freq select 33 or 70 Hz for CX168 LF filter freq select 50 or 75 Hz for CX108V, inputs parallel or stereo; bridge mode		
Indicators		Power-On: Green LED / Parallel inputs: Orange LED (1 per channel pair) / Signal -35 dB: Green LED (1 per channel) Bridged: Yellow LED (1 per channel pair) / Clip: Red LED (1 per channel)		
Amplifier Protection		Full short circuit, open circuit, thermal, ultrasonic, and RF protection. Stable into reactive or mismatched loads		
Load Protection		On/off muting, individual channel DC fault blocking		
Dimensions (HWD)		3.5" (8.9 cm) 2 rack spaces x 19" (48.3 cm) rack mounting x 14" (35.6 cm) from front mounting rails		
Weight - Net / Shipping		21 lbs (9.5 kg) / 27 lbs (12.3 kg)		
Power Requirements		100, 120, 230 VAC, 50 - 60 Hz (configured at factory)		
120V Current Consumption*	Idle	0.6 A		0.6A
1/8 power pink noise (typical of program material at maximum unclipped power)	8Ω	6.2 A		–
	4Ω	9.2 A		–
	70V	–		6.3 A
1/3 power pink noise (typical of program material with severe clipping)	8Ω	9.2 A		–
	4Ω	14.2 A		–
	70V	–		9.4 A

** Multiply currents by 0.5 for 230V units*



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Products / Loudspeakers / AcousticDesign / Surface Mount

AcousticDesign™ Series
AD-S52

AcousticDesign AD-S52

The QSC AcousticDesign™ AD-S52 is a full range, surface mount loudspeaker with sleek, contemporary styling that fits perfectly into multiple environments and applications including hotels, restaurants, convention facilities, and multimedia environments. The loudspeaker's low frequency driver is magnetically shielded, making the AD-S52 perfect for use near video monitors. Available in black or white, these great sounding, weather resistant enclosures can be painted to match any specific decor.

The AD-S52 is a high output, 2-way design incorporating a 5.25" weatherproof, LF transducer and a 1" neodymium tweeter. This exceptional loudspeaker carries the added benefit of built-in dynamic power protection - thus ensuring system reliability in the event of overload conditions.

The AD-S52T models are equipped with a 70V/100V matching transformer for distributed audio systems. There is a transformer tap switch on the rear panel for setting the power level of the loudspeaker. This switch may also be set for 8-ohm operation, bypassing the transformer completely - providing greater system flexibility compared to most competing products.

The AD-S52 system package includes a ball mount assembly for convenient installation of the enclosure in a wide variety of orientations. If desired, the ball mount adapter's back plate can be removed, reducing the overall depth of the assembly and the footprint of the mount on the wall. Further, the assembly includes a weather resistant input connection cover to protect the 5-way binding post input terminals.

FEATURES

- **5.25 Inch, 2-way Design** - in a lightweight, contemporary styled multipurpose enclosure
- **Magnetically Shielded LF Transducer** - ideal for use near video monitors
- **Flexible Ball Mount Assembly Included** - for convenient installation
- **70V/100V Transformer Versions Available** - for use with distributed audio systems
- **Available Optional Yoke Mount Bracket**

SPECIFICATIONS	AD-S52	AD-S52T
Configuration	Compact two way, ported enclosure	Compact two way, ported enclosure
Transducers Low Frequency Transducer High Frequency Transducer	 5.25" shielded, weather-resistant 1" neodymium tweeter	 5.25" shielded, weather-resistant 1" neodymium tweeter
Frequency Range [1] Frequency Response (±3 dB) Useable Frequency Range (-10 dB)	 75 Hz - 19 kHz 60 Hz - 20 kHz	 75 Hz - 19 kHz 60 Hz - 20 kHz
Maximum Output [2] Continuous Peak	 104 dB SPL 110 dB SPL	 104 dB SPL 110 dB SPL
Nominal Impedance	8 ohms	Switchable 8 ohms

Power Rating [3]	60 W (IEC, 100 hours)	60 W (IEC, 100 hours)
Recommended Max Amp Power	120 W RMS	120 W RMS
Sensitivity [4]	86.5 dB, 2.83 V, 1 m, free field (4pi)	86 dB, 2.83 V, 1 m, free field (4pi)
Nominal Coverage	90° H x 90° V	90° H x 90° V
TRANSFORMERS		
Type	n/a	Custom low distortion laminated core, wide bandwidth desig
Taps	n/a	70V 30, 15, 7.5, 3.75 Watts 100V 30, 15, 7.5 Watts
ENCLOSURE		
Material	Injection molded, weather resistant, high impact polystyrene	
Finish	White or black (paintable)	
Weather Resistance	Yes	
Grille	Heavy duty powder coated aluminum	
Connectors	Pair of 5-way binding posts	
Mounting Hardware	Included ball mount assembly; available optional yoke mount	
Weight	15 lb. (6.8 kg) net 22 lb. (10 kg) shipping	18 lb (8.2 kg) net 25 lb (11.4 kg) shipping

[1] *All frequency ranges specified refer to measured free field response (full space, 4pi)*
[2] *Calculated using specified power capacity and system sensitivity. 6 dB peak-to-average signal ratio assumed.*
[3] *Continuous IEC specified test signal*
[4] *Based on nominal impedance, measured in full-space.*

Specifications subject to change without notice.

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TOP

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CX Series
Professional Power Amplifiers

CX 2-Channel Series

The CX 2-Channel Series is designed to meet the specialized needs of sound contractors. Five low impedance models and three 70 volt direct models have been designed from the ground up, combining QSC's exclusive PowerLight® technology with specific features to meet the requirements of fixed installations. With high output power, versatile loading options, high thermal capacity and reliability, the CX Series is the ideal solution to any permanently installed sound system.

The expanded eight model line now incorporates QSC's exclusive PowerLight technology. Three models, the CX302V, CX602V and CX1202V, add direct 70 volt capability ranging from 250 watts to 1000 watts per channel for distributed audio systems. The CX302, CX502, CX702, CX902 and CX1102 are low impedance versions ranging in power from 325 watts to 1100 watts per channel at 4 ohms (20 Hz -20 kHz, 0.05% THD).

The new CX amplifiers are equipped with many contractor specific features including 1 dB detented gain controls for easily repeatable settings and a custom security cover for tamper-proof installations. Active inrush limiting eliminates AC inrush current, cutting the need for power sequencers.

CX amplifiers also include an HD15 Data Port connector to interface with QSControl, QSC's computer-controlled audio system, that allowes remote amplifier monitoring and control via a standard Ethernet network.

FEATURES

- 8 models to meet your exact power requirements (five low impedance models, three 70 volt direct models)
- Exclusive PowerLight switch-mode power supply technology for high performance and compact size
- Custom integrated security cover for tamper proof installations
- Variable speed fan for low noise
- 1 dB detented gain controls for fast and accurate gain settings
- Active inrush limiting eliminates AC inrush current, removing the need for expensive power sequencers
- XLR and detachable Euro style input connectors
- HD15 DataPort connector for QSControl computer control or signal processing accessories
- Dip switch control for clip limiters, high pass filters, bridge mono and parallel operation
- Selectable high pass filters protect speakers and prevent speaker transformer saturation withminimal effect on program material (33 Hz or 75 Hz on non-V models, 50 Hz or 75 Hz on V models)
- Comprehensive front panel indicators including signal, clip, protect and QSC's exclusive bridge mono and parallel input LEDs
- Barrier strip output connector
- Comprehensive protection circuitry including DC, infrasonic, thermal overload and short circuit protection
- Class H complementary bipolar output circuitry for high efficiency (CX702, CX902, CX1102 & CX1202V)
- Optional external transformer accessory pack for isolated 70 and 100 -volt outputs (converts CX302 to 400 watts per channel isolated output)
- Compact size - all models are only 2 rack units high and 14" deep for reduced rack cost and floor space
- Light weight - all models weigh only 21 pounds (9.5 kg) for easier racking and shipping
- 3-year warranty plus optional 3-year extended service contract
- All CX Series amplifiers meet the European Union's, 2006 RoHS directive to restrict the use of hazardous materials used in electronic devices.

SPECIFICATIONS	CX302	CX502	CX702	CX902	CX1102	CX302V	CX602
				STEREO MODE, Both Channels Driven			
8 ohms, 20 Hz-20 kHz, 0.05% THD	200 W	300 W	425 W	550 W	700 W	-	550 W
4 ohms, 20 Hz-20 kHz, 0.05% THD	325 W	500 W	700 W	900 W	1100 W	-	-
2 ohms, 1 kHz, 1% THD	600 W	800 W	1200 W	1500 W	1700 W	-	-
70V, 20 Hz-20 kHz, 0.05% THD	400 W (with IT-42*)	-	-	-	-	200 W	400 W
70V, 1 kHz, 0.05% THD	-	-	-	-	-	250 W	440 W

70V, 1 kHz, 1% THD	-	-	-	-	-	300 W	600 W
				BRIDGED MONO MODE			
16 ohms, 20 Hz-20 kHz, 0.1% THD	400 W	600 W	850 W	1100 W	1400 W	-	1100 W
8 ohms, 20 Hz-20 kHz, 0.1% THD	700 W	1100 W	1500 W	2000 W	2200 W	-	-
4 ohms, 1 kHz, 1% THD	1200 W	1600 W	2400 W	3000 W	3400 W	-	-
140V, 20 Hz-20 kHz, 0.05% THD	-	-	-	-	-	400 W	800 W
140V, 1 kHz, 0.05% THD	-	-	-	-	-	500 W	880 W
140V, 1 kHz, 1% THD	-	-	-	-	-	600 W	1200 W
Noise, 20 Hz-20 kHz	>-107 dB	>-107 dB	>-106 dB	>-106 dB	>-106 dB	>-106 dB	>-106 dB
Input Sensitivity @ 8 ohms	1.26 Vrms	1.23 Vrms	1.16 Vrms	1.17 Vrms	1.35 Vrms	1.26 Vrms	1.26 Vrms
Voltage Gain @ 8 ohms	30 dB	32 dB	34 dB	35 dB	35 dB	35 dB	35 dB
Output Circuitry	AB+B	AB+B	H, 2-tier	H, 2-tier	H, 2-tier	AB+B	AB+B

	ALL MODELS
Distortion (SMPTE-IM)	Less than 0.02%
Distortion (Typical) 20 Hz-20 kHz: 10 dB below rated power 1.0 kHz and below: full rated power	 Less than 0.01% THD Less than 0.01% THD
Frequency Response	20 Hz-20 kHz, +/- 0.2 dB
Damping Factor	Greater than 500
Input Impedance	6k ohms unbalanced, 12k ohms balanced
Input Clipping	10 Vrms (+22 dB)
Cooling	Variable-speed fan, rear-to-front air flow
Connectors, each channel	Input: 3-pin XLR & 3-pin detachable terminal blocks (1 each per channel) Output: Safety-shrouded barrier strip
Amplifier Protection	Full short circuit, open circuit, thermal, ultrasonic, and RF protection. Stable into reactive or mismatched loads.
Load Protection	On/Off muting, DC-fault power supply shutdown
Dimensions	19" (48.3 cm) wide, 3.5" (8.9 cm) tall (2 RU), 14" (35.6 cm) deep (from front mounting rails)
Weight	21 lbs (9.5 kg) net 27 lbs (12.3 kg) shipping

* An isolation transformer (the IT-42) is available for the CX302, which converts its low-impedance outputs to isolated 400 W per channel constant-voltage outputs.

CURRENT CONSUMPTION (120V)		CX302	CX502	CX702	CX902	CX1102	CX302V	CX60
Idle current *(no audio program material)*		0.8A	0.9A	0.9A	0.9A	0.9A	0.8A	0.9A
1/8 Power pink noise *(typical of program material at maximum unclipped or rarely clipping power)*	8 ohms	3.8A	5.6A	5.0A	6.0A	7.6A	-	-
	4 ohms	6.0A	9.0A	7.9A	9.5A	11.6A	-	-
	2 ohms	9.6A	14.0A	11.8A	14.0A	16.6A	-	-
	70 volts	-	-	-	-	-	5.7A	8.7A
1/3 Power pink noise *(typical of program material with severe clipping)*	8 ohms	5.4A	8.0A	8.4A	11.0A	13.1A	-	-
	4 ohms	8.9A	13.3	13.5A	17.0A	20.0A	-	-
	2 ohms	14.3A	21.0A	22.0A	27.0A	30.4A	-	-
	70 volts	-	-	-	-	-	8.0A	13.0A

THERMAL LOSSES (ALL MODELS)

		Idle		1/8 Power pink noise		1/3 Power pink noise		Full Pow
Model	Load	BTU/hr	kcal/hr	BTU/hr	kcal/hr	BTU/hr	kcal/hr	BTU/hr
	8 ohms + 8 ohms	200	50	565	145	720	180	
CX302	4 ohms + 4 ohms	200	50	995	250	1245	315	1
	2 ohms + 2 ohms	200	50	1740	440	2255	570	2
	8 ohms + 8 ohms	165	40	910	230	1130	285	1
CX502	4 ohms + 4 ohms	165	40	1570	395	1945	490	1
	2 ohms + 2 ohms	165	40	2560	645	3470	875	3
	8 ohms + 8 ohms	200	50	790	200	1080	275	1
CX702	4 ohms + 4 ohms	200	50	1310	330	1910	480	2
	2 ohms + 2 ohms	200	50	2255	570	3190	805	4
	8 ohms + 8 ohms	220	55	900	225	1415	355	1
CX902	4 ohms + 4 ohms	220	55	1525	385	2560	645	3
	2 ohms + 2 ohms	220	55	2305	580	4265	1075	5
	8 ohms + 8 ohms	225	57	1195	300	1760	445	2
CX1102	4 ohms + 4 ohms	225	57	2135	540	2335	590	3
	2 ohms + 2 ohms	225	57	3975	1000	5210	1315	
CX302V	70 volts + 70 volts	200	50	1125	285	1295	325	1
CX602V	70 volts + 70 volts	165	40	1785	450	2260	570	2
CX1202V	70 volts + 70 volts	200	50	2175	550	2605	655	4

All Specification Subject to Change Without Notice.

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TOP

QSC Passionate Ab

CX Series

Company Profile
Mission Statement
Company History
Supplier Relationships
Employment
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plifiers

CX 4-Channel Series

The new 4-channel CX amplifiers give you four channels in only two rack spaces-without compromising on power. Choose from three models - a direct 70 volt model and two low impedance versions, each equipped with our exclusive PowerLight® switching power supply technology to virtually eliminate noise and hum. With high output power, versatile loading options, high thermal capacity and unmatched reliability, the CX Series is the perfect solution to any permanently installed sound system.

With PowerLight technology, CX amplifiers take your sound to a whole new level. Not only does it give you tighter bass and clean transparent highs, PowerLight also cuts waste heat, boosts reliability and gets rid of unwanted noise and hum. PowerLight is a revolutionary switching power supply technology that provides ample current to the audio power circuitry by charging the supply rails 230,000 times a second through an ultra-low impedance circuit. So unlike amplifiers that use conventional supplies, the audio signal is never starved prematurely and remains crisp and clean.

FEATURES

- Three models that range in power from 170 watts to 450 watts per channel
- Compact size-all models only 2 RU and 14" deep for reduced rack cost and floor space
- Channels 1&2 and 3&4 bridgeable for maximum flexibility
- Active Inrush Limiting eliminates AC inrush current, removing the need for expensive power sequencers
- HD15 DataPort connector for QSControl computer control
- Custom integrated security cover for tamper-proof installations
- Variable speed fan for low noise
- 1 dB detented gain controls for fast and accurate gain settings
- Detachable Euro style input connectors
- DIP switch control for clip limiters, high pass filters, bridge mono and parallel operation
- Exclusive PowerLight switch-mode power supply technology for high performance and compact size
- Selectable high-pass filters protect speakers and prevent speaker transformer saturation with minimal effect on program material (33 Hz or 75 Hz on non-V models, 50 Hz or 75 Hz on V models)
- Comprehensive front panel indicators including signal, clip, protect and QSC's exclusive bridge mono and parallel input LEDs
- Barrier strip output connector
- Comprehensive protection circuitry including DC, infrasonic, thermal overload and short circuit protection
- High-performance Class AB+B complementary bipolar output circuitry
- Light weight-all models only 21 pounds (9.5 kg) for easier racking and shipping
- 3-year warranty plus optional 3-year extended service contract
- All CX Series amplifiers meet the European Union's, 2006 RoHS directive to restrict the use of hazardous materials used in electronic devices.

SPECIFICATIONS	CX204V	CX254	CX404
		STEREO MODE (All Channels Driven)	
8 ohms 20 Hz-20 kHz 0.05% THD	-	170W	250W
4 ohms 20 Hz-20 kHz 0.05% THD	-	250W	400W*
2 ohms 1 kHz 1% THD	-	450W	not recommended
70V 20 Hz-20 kHz 0.05% THD	200W	-	-
70V 1 kHz 0.05% THD	220W	-	-
70V 1 kHz 1% THD	300W	-	-
		BRIDGED MONO MODE	
16 ohms 20 Hz-20 kHz 0.1% THD	-	340W	500W
8 ohms 20 Hz-20 kHz 0.1% THD	-	500W	800W*

4 ohms 1 kHz 1% THD	-	900W	not recommended
140V 20 Hz-20 kHz 0.1% THD	400W	-	-
140V 1 kHz 0.05% THD	440W	-	-
140V 1 kHz 1% THD	600W	-	-
Noise, 20Hz-20kHz	<-105 dB	<-106 dB	<-106 dB
Input Sensitivity	1.26Vrms	1.22Vrms	1.22Vrms
Gain (for full-rated output power)	35 dB @ 70.7V	29 dB @ 8 ohms	31 dB @ 8 ohms
Input Clipping	10 Vrms (+22 dB)	10 Vrms (+22 dB)	10 Vrms (+22 dB)
Output Circuitry	AB+B	AB+B	AB+B
Distortion (SMPTE-IM)	Less than 0.02%	Less than 0.01%	Less than 0.01%

ALL MODELS

Distortion (Typical) 20 Hz-20 kHz: 10 dB below rated power 1.0 kHz and below: full rated power	 Less than 0.01% THD Less than 0.01% THD	
Frequency Response (typical)	20 Hz-20 kHz, ± 0.2 dB 8 Hz-50 kHz, +0/-3 dB	
Damping Factor	Greater than 500 (1 kHz and below)	
Input Impedance	6k ohms unbalanced, 12k ohms balanced	
Cooling	Variable speed fan, rear to front airflow through tunnel heat sink	
Connectors, each channel	Input: 3 position Euro-style detachable barrier block, Ch 1,2,3 & 4 DataPort: HD-15 Connector, Ch 1+2, Ch 3+4 Output: Six-position barrier strip with monitor connections, Ch 1+2, Ch 3+4	
Amplifier Protection	Full short circuit, open circuit, thermal, ultrasonic, & protection. Stable into reactive or mismatched loads.	
Load Protection	On/off muting, DC-fault power supply protection	
Indicators	PARALLEL INPUTS: Red LED BRIDGED: Yellow LED PWR-ON: Green LED	CLIP/PROT: Red LED (1 per channel) LEVEL-10 dB: Yellow LED (1 per channel) LEVEL-20 dB: Yellow LED (1 per channel) SIGNAL -35 dB: Green LED (1 per channel)
Controls	Controls Front: AC switch, Ch.1 and Ch.2 gain knobs Rear: DIP switch for Ch.1 and Ch.2: clip limiter on/off, LF filter on/off, LF filter freq select 33 Hz or 75 Hz for non-V models; 50 Hz or 75 Hz for V models; inputs parallel or stereo; bridge mode	
Dimensions	19" (48.3 cm) rack mounting, 3.5" (8.9 cm) tall (2 rack spaces), 14" (35.6 cm) deep (from front mounting rails)	
Weight	21 lb (9.5 kg) net, 27 lbs (12.3 kg) Shipping	
Power Requirements	100, 120, 230 Vac, 50-60 Hz	

CURRENT CONSUMPTION		CX204V	CX254	CX404
Idle current (Multiply currents by 0.5 for 230V units.)		0.8A	0.7A	0.7A
1/8 Power (Pink Noise) (typical of program material at maximum unclipped power)	8 ohms 4 ohms 2 ohms 70 volts	- - - 8.3A	5.8A 9.2A 14.3 -	8.1A 12.4A not rated -
1/3 Power (Pink Noise) (typical of program material with severe clipping)	8 ohms 4 ohms 2 ohms 70 volts	- - - 12.7A	8.8A 14.2 21.7A -	12.2A 19.3A not rated -

**(0.1%THD, 1 kHz)*

All Specification Subject to Change Without Notice.

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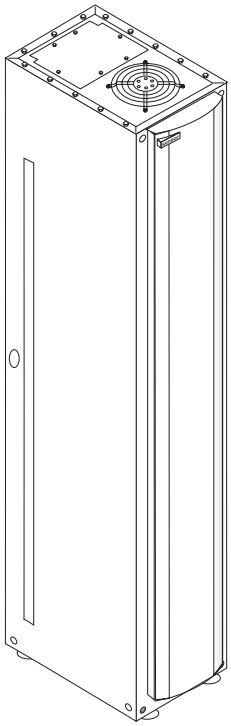
TOP

ETC

Sensor®+ Racks

Sensor+ Series

100V 120V



GENERAL INFORMATION

Sensor+ dimming systems provide high density, professional features and exceptional reliability for lighting applications that require the best the entertainment industry can offer.

APPLICATIONS

- Professional and educational theatre
- Production studios
- Concert and performance halls
- Themed retail and dining
- Multi-use Convention Centers
- Houses of Worship

FEATURES

- High dimmer density
- Up to two 2.4kW dimmers per module
- 6, 12, 24, and 48 module racks available
- Rugged industrial construction
- Installation flexibility
- Adaptable modular design
- 100,000A Short Circuit Current Rating (SCCR)
- Advanced configuration editing built into rack
- Stores up to 128 Presets in memory
- Direct Ethernet control signal input
- Two DMX512 inputs
- Standard system and rack monitoring with diagnostic reporting
- Supports ETC Dimmer Doubling™
- All racks UL and cUL LISTED

ACCESSORIES

- SmartLink Button Stations
- Dimmer Doubler
- Sound Suppression Hood
- Floor pedestal for 24-module rack
- Document holder

ORDERING INFORMATION

Installation Racks

MODEL	DESCRIPTION
SR48+	Sensor+ 48 Module Rack
SR24+	Sensor+ 24 Module Rack
SR12+	Sensor+ 12 Module Rack
SR6+	Sensor+ 6 Module Rack
SR24+1P	Sensor+ 24 Module Single Phase Rack
SR12+1P	Sensor+ 12 Module Single Phase Rack
SR6+1P	Sensor+ 6 Module Single Phase Rack

Rack Options*

MODEL	DESCRIPTION
AT48	Amp-Trap fuse option for 48-module rack
AT24	Amp-Trap fuse option for 24-module rack
AT12	Amp-Trap fuse option for 12-module rack
BK48	Bussing kit for 2 – 48-module racks
BK24	Bussing kit for 2 – 24-module racks
BK12	Bussing kit for 2 – 12-module racks
AUX30-48	30” Auxiliary Rack(s) for 48-module rack
AUX19-48	19” Auxiliary Rack(s) for 48-module rack
AUX12-48	12” Auxiliary Rack(s) for 48-module rack
AUX19-24	19” Auxiliary Rack(s) for 24-module rack
AUX19-12	19” Auxiliary Rack(s) for 12-module rack

*Vibration Reduction mounts available for all Sensor+ racks. Contact ETC for details

Rack Accessories

MODEL	DESCRIPTION
SSSh24-48	Sensor+ Sound Suppression Hood – large
SSSh6-12	Sensor+ Sound Suppression Hood – small
Pedestal	Floor pedestal for 24-module rack
DH	Document Holder

SmartLink Accessories

MODEL	DESCRIPTION
S-LPB	SmartLink Power Board for Sensor+ Racks*
S-10005	SmartLink 5-Button Station*
S-10010	SmartLink 10-Button Station*

* One SmartLink Power Board required for station support.
S-LPB supports up to four stations.
Only one S-LPB may be enabled in a system.

SPECIFICATIONS

GENERAL

- Racks available in four sizes
  - SR6+ 6 modules, 12 dimmers maximum
  - SR12+ 12 modules, 24 dimmers maximum
  - SR24+ 24 modules, 48 dimmers maximum
  - SR48+ 48 modules, 96 dimmers maximum
- Dual density (two dimmers per module), single density and half density dimmer modules available
- Operating temperature: 0-40°C / 32-104°F
  - Dimmer room HVAC systems must at all times maintain the specified ambient temperature at the dimmer rack. Dimming systems operating within 10 degrees F of the upper or lower temperature limits must strictly follow installation and operation guidelines to operate reliably.
- Relative humidity: 30-90% non-condensing
- All racks UL and cUL LISTED
- UL924 LISTED for Bypass operation

MECHANICAL

- Rugged 16-gauge steel construction
- Fine-textured, scratch-resistant, epoxy paint
- SR6+ and SR12+ uses wall mount installation
- SR24+ can be wall or pedestal mounted
- SR48+ is floor mounted
- Top and bottom conduit access through removable panels (SR48+) or knockouts (SR6+, SR12+, and SR24+)
- No tools required for module removal or installation
- Keyed module slots prevent insertion of inappropriate module types
- Front access to all wiring and terminations
- Full height locking door
- Electrostatic air filter easily removed from door for periodic cleaning
- High efficiency cooling system with airflow sensor
- High visibility LED status beacon

ELECTRICAL

- SR6+, SR12+ and SR24+ accept:
  - Three phase 120/208 VAC
  - Single phase 120/240 VAC
- SR48+ accepts
  - Three phase 120/208 VAC
- Line feed frequencies from 47-63Hz
- Line feed voltage range is 90-140 VAC
- Load terminals accept up to #4 AWG (16mm^2) wire (see chart)
- Short Circuit Current Rating: 100,000A RMS symmetrical @ 240VAC
- Auxiliary equipment racks and custom switchgear/distribution available (Call ETC for details)

CONTROL ELECTRONICS

- Sensor+ Control Electronics Module (CEM+)
- Single Ethernet control signal input
- Two DMX512 inputs
- Standard diagnostic reporting via browser-based interface or DimStat software
- Supports Dimmer Doubling™
- Supports SmartLink control of presets

OPTIONS

- Advanced Features™ dimmer-specific load and diagnostic reporting
- Amp-Trap® fuses to allow feeding individual racks from oversize mains
- Bus kits available
- Vibration reduction kits available for all racks
- SmartLink Power Board

ADDITIONAL INFORMATION

Compatible Dimmer Modules

SENSOR STANDARD MODULES	
MODEL	**DESCRIPTION**
D15/D20	Dual 15A/20A Dimmer Module – 350µS
D15E/D20E	Dual 15A/20A Dimmer Module – 500µS
D50AF	Single 50A Dimmer Module – 500µS – AF
D100AF*	Half 100A Dimmer Module – 500µS – AF
SENSOR SPECIAL PURPOSE MODULES	
L10	Dual 10A Low Wattage Dimmer Module
L10F	Single 10A Low Wattage Fluorescent Dimmer Module
D15F/D20F	Single 15A/20A Fluorescent Dimmer Module
R15/R20	Dual 15A/20A Relay Module
CC15/CC20	Dual 15A/20A Constant Circuit Breaker Module
AFM	Air Flow Module

*Half-density modules use two module slots

Control Modules

MODEL	DESCRIPTION
CEM+	Control Electronics Module +

Load Wiring Lug Capacity

CONNECTION	WIRE SIZE
10A, 15A, 20A, and 50A lugs	4 AWG Max. (16mm^2)
100A lugs	2/0 Max.

Primary Feed Lug Capacity

CONNECTION	WIRE SIZE
SR48+	Dual 600 kcmil – 2 AWG
SR24+	Dual 350 kcmil – 4 AWG
SR12+	Dual 250 kcmil – 6 AWG
SR6+	Single 2/0 – 14 AWG

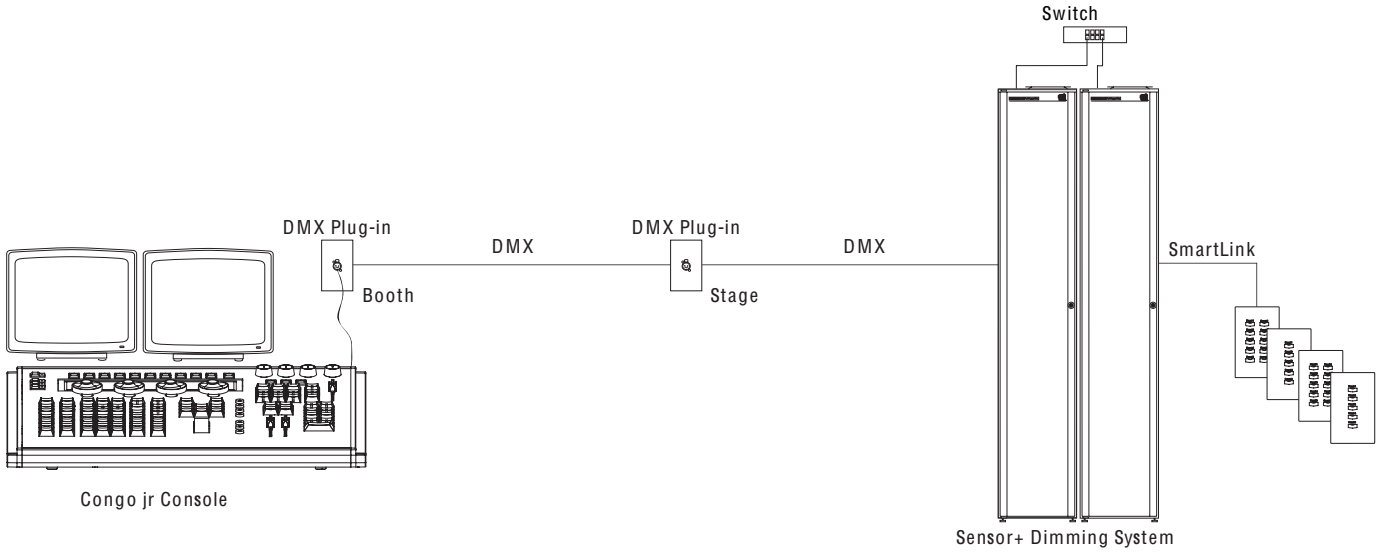
Sound Pressure Level (dBA)

MODEL	dBA @ 1000Hz (1kHz)*	
	WITHOUT	WITH SSSh**
SR48+	37.0	30.9
SR24+	40.2	34.0
SR12+	41.8	33.8
SR6+	26.0	21.4

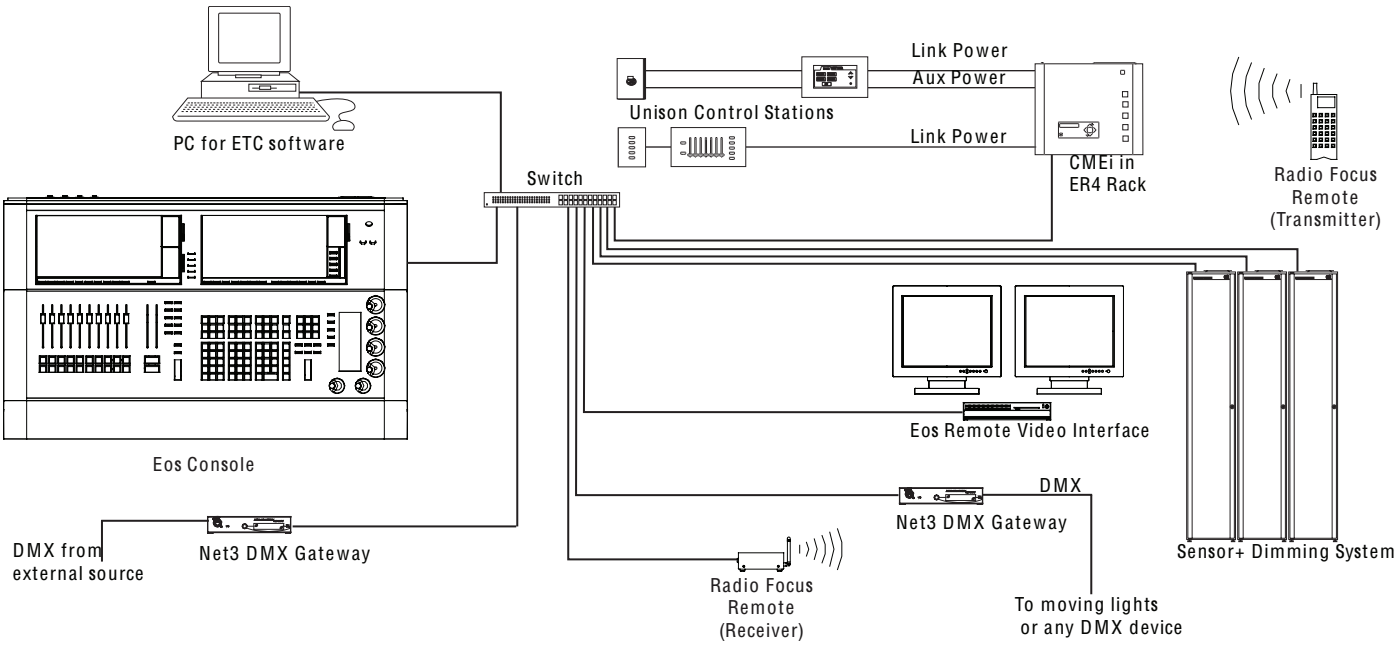
* dBA values for each Sensor rack measured at 1 meter. Visit www.etcconnect.com for full spectrum dBA ratings.

** Sensor Sound Supression Hood (SSSh)

TYPICAL SYSTEM RISER



TYPICAL NETWORK RISER



PHYSICAL

Empty Dimmer Rack Weights

MODEL	WEIGHT		SHIPPING WEIGHT	
	lbs	kgs	lbs	kgs
SR48+	188	86	198	90
SR48+ Door*	31	14	35	16
SR24+	107	49	115	53
SR24+ Door*	17	8	20	9
SR12+	45	21	50	23
SR12+ Door*	11	5	14	6.5
SR6+ with Door	36	16	45	21

*Rack doors ship separately

Full Dimmer Rack Weights

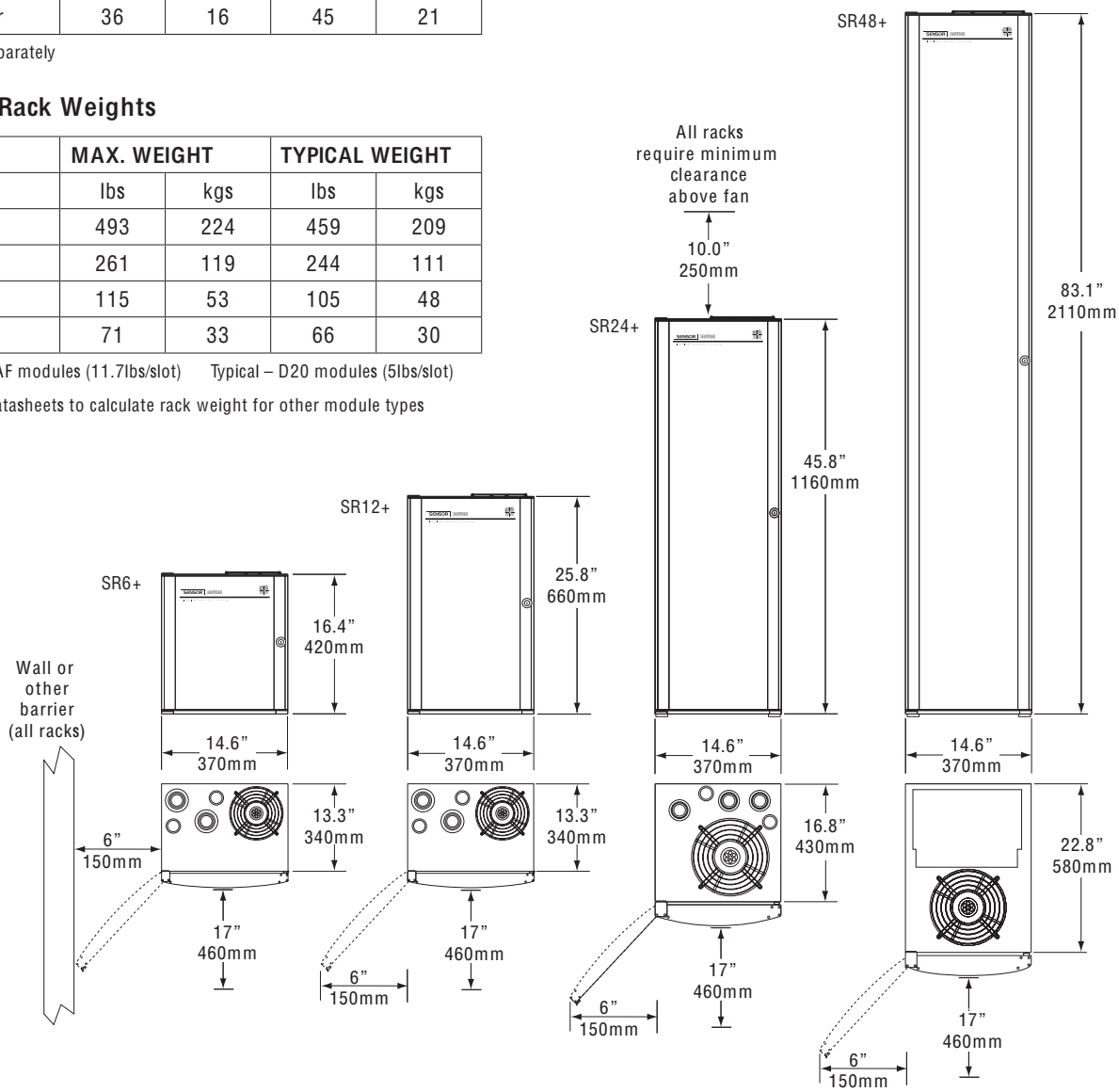
MODEL	MAX. WEIGHT		TYPICAL WEIGHT	
	lbs	kgs	lbs	kgs
SR48+	493	224	459	209
SR24+	261	119	244	111
SR12+	115	53	105	48
SR6+	71	33	66	30

*Maximum – D100AF modules (11.7lbs/slot) Typical – D20 modules (5lbs/slot)

Refer to module datasheets to calculate rack weight for other module types

Installation Rack Dimensions

MODEL	HEIGHT		WIDTH		DEPTH	
	inches	mm	inches	mm	inches	mm
SR48+	83.1	2110	14.6	370	22.8	580
SR24+	45.8	1160	14.6	370	16.8	430
SR12+	25.8	660	14.6	370	13.3	340
SR6+	16.4	420	14.6	370	13.3	340



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Sensor® products protected by one or more of the following U.S. Patent Numbers 5,323,088, 5,352,088, 7,233,112, 7,019,469, 6,849,943, and 6,002,563; European Number 0603333T2; German 69203609.

INNOVOX AUDIO LLC

Product Data Sheet for: SF-4042F display-mounted loudspeaker

Description: The SF-4042F loudspeaker is a custom-sized 2-channel horizontal loudspeaker designed to mount directly onto any flat-panel display, either above or below. The SF-4042F offers an extremely simple, compact solution for stereo sound accompanying video. Superior smoothness and voice clarity, combined with a minimal visual footprint make the SF-4042F well-suited for secondary residential systems, as well as conference rooms, classrooms and tradeshow applications.

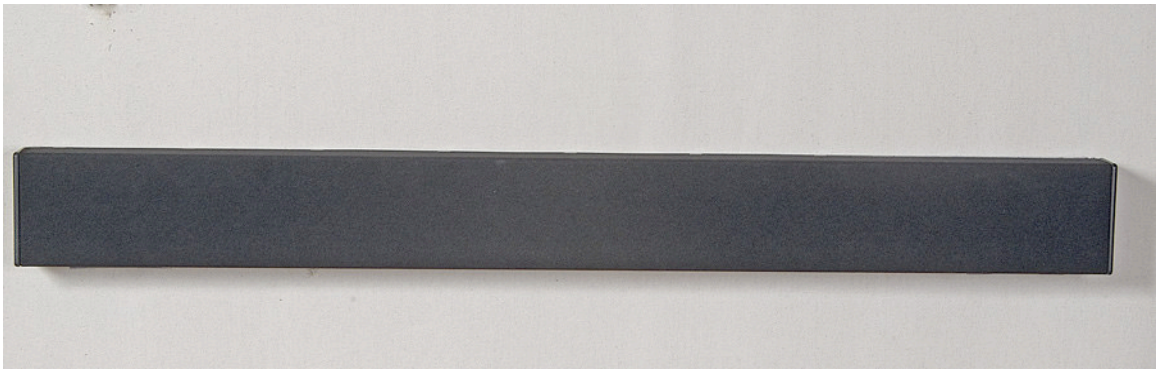
Applications: Conference rooms
Training suites
Classrooms
Rental stock / tradeshows
Secondary residential AV systems (den, bedroom, etc)

Dimensions: (customized, 38.0" – 49.0") x 4.50" x 2.12"
System type: 2-way, 2-channel system integrated into single sealed enclosure
Construction: Cold-rolled steel chassis with ABS endcaps
Mounting: Universal mounting kit included for attachment to top or bottom of flat-panel display.
Impedance: 8 ohms (70-volt version available)
Sensitivity: 89 dB @ 1watt / 1 meter (each channel)
Max power: 45 watts per channel
Max output: 107 dB peak, averaged from 300 – 3,000 Hz, each channel
Range: 130 – 20,000 Hz +/- 3 dB relative to nominal sensitivity
Dispersion: 120H x 120V (speaker mounts horizontally)

Standard finish: Black , White or Silver fabric, matching endcaps.

West Coast office 1125B Arnold Drive #231 Martinez CA 94553 tel (925) 372-8156

Product illustration / photo of: SF-4042F display-**mounted loudspeaker**



West Coast office 1125B Arnold Drive #231 Martinez CA 94553 tel (925) 372-8156

SHARP

print

LC-26SB24U | Televisions

Sharp's LC-26SB24U provides a convenient 26" Class (26" Diagonal) HDTV solution with a distinctive design. The LC-26SB24U features a high-performance LCD panel for high-brightness, a high contrast ratio, low-reflection glare protection and wide viewing angles.

Features

- **True 16:9 Aspect Ratio (1366 x 768) LCD Panel**
  displays 16:9 widescreen programs in their native aspect ratio without the need for scaling or other video processing.
- **Built-in ATSC/QAM/NTSC Tuners**
  for DTV and analog TV viewing.
- **High Brightness (500 cd/m^2)**
  Sharp's LCD TVs are very bright, so you can put them virtually anywhere – even near windows, doors or other light sources – and their picture is still vivid.
- **Dual HDMI™ Inputs**
  for convenient connection to digital devices.
- **160º H x 150º V Viewing Angles**
  are so wide you can view Sharp LCD TVs from virtually anywhere in the room.
- **60,000 Hour Lamp Life[1]**
  Sharp's LCD backlight life is long enough to give you viewing pleasure for many years.
- **8ms Response Time**
  ensures your will enjoy fast-motion video with minimal blur.
- **PC Input**
  easily turns your TV into a PC monitor.

Specifications

Screen Size	26" Class (26" Diagonal)
Panel Type	Active Matrix (a-si TFT) LCD
Pixel Resolution	WXGA (1366 x 768)
Tuning System	ATSC/QAM/NTSC
Brightness	500 cd/m^2
Lamp Life	60,000 Hours[1]
Viewing Angles	160º H x 150º V
Audio System	5W x 2
Native Contrast Ratio	800:1
Aspect Ratio	16:9
Response Time	8ms
PC Input	15-pin RGB x 1
HDMI™ Input	HDMI x 2
Component Input	Y/Pr/Pb x 1
S-Video Input	4-pin DIN x 1
Composite Video Input	RCA x 2
Audio Input	RCA L/R x 2, Mini Jack x 1
Speakers Location / Type	Bottom/Fixed
Power Consumption AC	115W
Power Source	120V
Limited Warranty	1 year parts, 90 days labor from date of purchase
Cabinet Color	Black
Dimensions (w x h x d)	TV and Stand: 26-5/16" x 19-11/16" x 9-9/16" TV Only: 26-5/16" x 17-3/4" x 4-9/16"

Weight	TV and Stand: 24.3 lbs. TV Only: 20.9 lbs.
UPC	074000371101

[1]The typical period of time after which the lamp's power output will have decreased by about half, given that the LCD TV is used continuously in a 77 degree F room under standard lighting and brightness conditions.

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- 322 DSP Engine
- 371 SPL Computer
- 528E Voice Processor
- 581E Distribution Amplifier (4x4)
- Deuce 722
- Zone Mix 760
- Automix Matrix 780
- Wall Panels
- Accessories
- SymNet
- AirTools
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528E Voice Processor

Complete analog channel strip with six (6) key functions: microphone preamplification, de-essing (sibilance removal), compression/limiting, downward expansion, parametric EQ, and voice symmetry alignment.

This complete analog channel strip performs six separate functions: microphone preamplification, de-essing (sibilance removal), compression/limiting, downward expansion, parametric EQ, and voice symmetry alignment. All six processes may be used simultaneously. Although we call the 528E a "Voice Processor", it is perfectly suitable for any mic- or line-level source. Revered as the choice for broadcast voices and known as the classic "one channel console" by recording studios, the 528E delivers all the control you need, without the cost or complication of separate units. Each function has a full complement of controls in an easy-to-use layout. The 528E works with any professional microphone. Mic preamp gain is variable up to 60 dB, and 48 volt phantom power is provided for condenser mics. A switchable 15 dB pad reduces gain in front of the mic preamp to prevent distortion in super-close micing situations. A front panel switch selects between microphone or line input. Both inputs are transformerless and are equipped with filters to prevent radio frequency interference (RFI). The de-esser senses and regulates selectable high frequencies to reduce or eliminate annoying sibilance and "lip smacking." Symetrix' program-controlled Integrated Dynamics Processing (IDP) techniques combine the best attributes of compressor/limiters and downward expanders. The compressor/limiter maintains uniform levels while the downward expander eliminates "pumping," "breathing," and noise build up. Because it's program controlled, the 528E's dynamic range processor responds quickly to transients, and gently to smaller level changes. Separate LED meters display mic/input gain and gain reduction, for quick and accurate adjustment of dynamics functions. The three band parametric EQ performs both creative enhancement and corrective (eliminating resonances and interference) operations, with bandwidth variable from 0.3 octave to 4 octaves, 15 dB boost/cut, and overlapping frequency ranges. A unique "leap frog" topology minimizes the number of amplifiers in the signal path while ensuring that each frequency band interacts with its neighbor in a desirable and musical fashion. The Voice Symmetry switch corrects for excessive positive or negative signal peaks of the human voice. Get the same processing power found in an entire recording studio signal chain with the 528E Voice Processor from Symetrix, the engineering-driven company of signal processing specialists.

FEATURES:

- Single rack space classic analog channel strip. Applications: Broadcast, Studio, Podcasting, Installed Sound.
- Add warmth and color to your digital broadcasts & recordings.
- World renowned Symetrix sound quality, reliability and performance.
- Six (6) processes in one box: Mic Preamp, De-esser, Downward Expander, Compressor, 3-band EQ, and Voice Symmetry.
- Rear panel patch points allow re-ordering of processes or external effects inserts.

PDF Files:
- Symetrix Full Line Pamphlet (EN)
- 528E Data Sheet (EN)
- 528E Flow Chart (EN)
- 528E User's Guide (EN)
- 528E Settings Worksheet (EN)

Graphics:
- 528E Front
- 528E Rear

Support:
- Tech Support

Where to Buy:
- US Dealer
- International Distributor

Representation:
- USA
- International

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PERFORMANCE™

ULX® Wireless Systems

SOPHISTICATED, SCALABLE WIRELESS SOLUTIONS

ULX® Wireless Systems

TAKE CONTROL.

Wireless applications of increased complexity and scale require powerful solutions. Experienced audio engineers and sound contractors rely on Shure ULX® wireless systems to achieve clear, hassle-free wireless sound. An ultra-wide tuning range with up to 40 compatible systems* guarantees confident command of demanding installations and live sound productions.

Bulletproof wireless performance.
Ultra-wide 36 MHz bandwidth and automatic frequency selection ensures consistent operation across multiple TV channels with no setup hassles.

Superior sound quality.
Shure's patented Audio Reference Companding delivers crystal-clear audio transmission.

Intuitive operation.
Advanced front panel controls and the large multi-function LCD allow for quick monitoring of system status.

ULXP4 Wireless Diversity Receiver
Up to 1400 selectable frequencies
Automatic Frequency Selection with group scan function
Predictive Diversity
5-segment audio meter
5-segment RF meter
Advanced multi-function LCD
3-segment transmitter battery fuel gauge
Squelch adjustment
½ rack design
Remotable ½ wave antennas
Frequency and volume lockout
Rugged metal chassis
Furnished rack hardware
Locking DC connector
XLR and ¼" outputs

Handheld or Bodypack Transmitter
3-segment battery fuel gauge
Backlit LCD shows group and channel
Frequency and power lockout
8 hour battery life
100m (300 ft.) operating range
-20dB pad switch on ULX1

* Location dependent

ULX® Wireless Systems

Systems include: ULXP4 Diversity Receiver and a choice of Handheld Microphone Transmitter.

HANDHELD

SM58®
The legendary choice of vocal performers around the globe.
ULXP24/58

SM86
Tailored frequency response for clear reproduction of vocals.
ULXP24/SM86

SM87A
Smooth sound tailored for warm, accurate reproduction.
ULXP24/87

Beta 58A®
Preferred by touring vocalists and sound professionals.
ULXP24/BETA58

Beta 87A
Brings exceptional clarity to live vocals.
ULXP24/BETA87A

Beta 87C
Adds warmth to the frequency response preferred by in-ear users.
ULXP24/BETA87C

Systems include: ULXP4 Diversity Receiver, ULX1 Bodypack Transmitter and a choice of Microphone or Guitar/Bass Cable.

LAVALIER

WL183
Premium condenser lavalier mic for speech applications. Omnidirectional
ULXP14/83

WL184
Premium condenser lavalier mic for speech applications. Supercardioid
ULXP14/84

WL185
Premium condenser lavalier mic for speech applications. Cardioid
ULXP14/85

WL50
Subminiature Omnidirectional lavalier mic provides low visibility with professional audio quality.
ULXP14/50

WL51
Subminiature Cardioid lavalier mic provides low visibility with professional audio quality. Less susceptible to feedback.
ULXP14/51

HEADWORN

WH30TQG
Rugged, comfortable headset that provides high-quality voice pickup for active vocalists.
ULXP14/30

WBH53
Beta quality, sensitivity and consistency in a comfortable ultra-thin design. Black or Tan. Omnidirectional
Sold separately as components

WBH54
This Beta microphone features a smooth, tailored response for a warm, natural sound. Black or Tan. Supercardioid
Sold separately as components

GUITAR

WA302
Links a Bodypack Transmitter to a guitar or bass.
ULXP14

INSTRUMENT

WB98H/C
A versatile solution for high volume wind, brass or percussion.
ULXP14/98H

COMBO
Systems include: ULXP4 Diversity Receiver, ULX1 Bodypack Transmitter and ULX2 Handheld Transmitter.

SM58®
Handheld Transmitter
&
WL185
Lavalier microphone
ULXP124/85

DUAL
Systems include: (2) ULXP4 Diversity Receivers and (2) Transmitters.

SM58®	SM87	Beta 58A®	Beta 87A	Beta 87C	WA302
Handheld Transmitter (2)	Handheld Transmitter (2)	Handheld Transmitter (2)	Handheld Transmitter (2)	Handheld Transmitter (2)	Guitar Cable (2)
ULXP24D/58	ULXP24D/87	ULXP24D/BETA58	ULXP24D/BETA87A	ULXP24D/BETA87C	ULXP14D

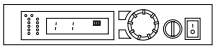
DUAL COMBO
Systems include: (2) ULXP4 Diversity Receivers, a ULX1 Bodypack Transmitter and a choice of Handheld Transmitter(s).

SM58®	SM87	Beta 58A®	Beta 87A	Beta 87C
Handheld Transmitter (2)	Handheld Transmitter (2)	Handheld Transmitter (2)	Handheld Transmitter (2)	Handheld Transmitter (2)
ULXP124D/58	ULXP124D/87	ULXP124D/BETA58	ULXP124D/BETA87A	ULXP124D/BETA87C

OPTIONAL ACCESSORIES

PA805	UHF Passive Directional Antenna	**UA505**	Remote Antenna Bracket and BNC Adapter	**UA860**	UHF Passive Omni Directional Antenna
RK323G	Black grill replacement option for Beta 58A	**UA506**	Rack Mount Kit for one ULX Receiver	**UA870**	UHF Active Directional Antenna
RK324G	Black grill replacement option for Beta 87	**UA507**	Rack Mount Kit for two ULX Receivers	**UAPF-X1**	In-Line RF Filter
UA221	Passive Antenna Splitter	**UA830**	UHF Active Remote Antenna Amplifier	**WA610**	Universal Hard Carrying Case
UA440	Front Mount Antenna Cable Kit	**UA844**	Antenna/Power Distribution System	**WA615M**	Handheld transmitter ID rings (5 assorted colors)

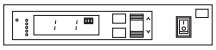
ULXP4
Professional Diversity Receiver



front panel

back panel

ULXS4
Standard Diversity Receiver



front panel

back panel

RF Carrier Frequency Range	470-952 MHz (available frequencies depend on applicable country regulations)
Working Range	100 m (300 ft) under typical conditions (NOTE: Operating range depends on many variables, including RF signal absorption, reflection and interference)
Audio Frequency Range	25-15,000 Hz, ±2 dB (NOTE: Overall system frequency response depends on microphone element)
Audio Output Level (ref. ±38 kHz deviation, 1 kHz tone)	
Impedance	
Modulation	±38 kHz deviation compressor-expander system with pre- and de-emphasis
Dynamic Range	>105 dB, A-weighted
RF Sensitivity	1.26 mV for 12 dB SINAD (typical)
Image Rejection	65 dB typical
Spurious Rejection	75 dB typical
System Distortion (ref. ±15 kHz deviation, 1 kHz modulation)	0.3% (<1%) THD typical
Power Requirements	ULXS4 and ULXP4: 14-18 Vdc (negative ground), 600 mA; external ac adapter supplied.
Operating Temperature Range	-20 to 50 C (-4 to 122 F) (NOTE: Battery characteristics may limit this range)
Overall Dimensions	ULXS4: 41 mm H x 219 mm W x 152 mm D (1 5/8 x 8 5/8 x 6 in.) ULXP4: 44 mm H x 219 mm W x 154 mm D (1 3/4 x 8 5/8 x 6 1/16 in.)
Net Weight	ULXS4: 0.6 kg (1 lbs 4 oz) ULXP4: 1.02 kg (2 lbs 4 oz)

ULX1
Bodypack Transmitter

top panel

Gain Adjustment Range	40 dB (continuously adjustable)
Impedance	
RF Power Output	30 mW maximum (dependent on applicable country regulations)
Power Requirements	9 V alkaline battery (DURACELL® MN1604 recommended); 8.4 V optional
Battery Life	Up to 8 hours
Overall Dimensions	95.2 mm H x 63.5 mm W x 33.3 mm D (3 3/16 x 2 5/8 x 1 1/16 in.)
Net Weight (without battery)	90.7 g (3.2 oz)

ULX2
Handheld Transmitter

Gain Adjustment Range	25 dB (continuously adjustable)
RF Power Output	30 mW maximum (dependent on applicable country regulations)
Power Requirements	9 V alkaline battery (DURACELL® MN1604 recommended); 8.4 V optional
Battery Life	Up to 8 hours
Overall Dimensions	ULX2/58, ULX2/BETA 58: 241 mm L x 50.8 mm Dia. (9 1/2 x 2 in.) ULX2/87, ULX2/BETA 87: 216 mm L x 50.8 mm Dia. (8 1/2 x 2 in.)
Net Weight (without battery)	ULX2/58, ULX2/BETA 58: 298 g (10.4 oz) ULX2/86, ULX2/87, ULX2/BETA 87: 195 g (6.8 oz)

SHURE®
LEGENDARY PERFORMANCE™

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AL1471F 5K 4/08

SECTION 12353 - EXHIBIT CASEWORK

PART 1 GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this section shall be governed by the Contract Documents. Provide materials, labor, equipment, and services necessary to furnish, deliver, and install all work of this section as shown on the drawings, as specified herein, and/or as required by job conditions.

B. The Work of this Section includes all labor, materials, equipment and services necessary to complete the exhibition Caseworks as shown on the drawings and/or specified herein:

1. Structural engineering of the exhibit Casework metal frame, supported glazing, object support systems, and graphic panel supports by Exhibit Contractor!s Professional Engineer, including Building Department filing and testing and acceptance review as per local code requirements.

C. RELATED SECTIONS

Section 05500 Metal Fabrication
Section 06430 Exhibit Woodwork
Section 19920 Painting
Section 10200 Digital Output
Section 10300 Photomurals
Section 16500 Exhibit Lighting

1.4 QUALITY ASSURANCES

A. The fabricator and the installer shall be one of the same firm who can substantiate that the firm has been continuously engaged in the fabrication and installation of Exhibit Casework similar to that described herein for not less than seven (7) years.

B. Technical design, engineering and prototyping of Exhibit Casework is the Exhibit Contractor's responsibility.

1. The Design Documents are intended to provide performance and aesthetic and functional specifications for the design, fabrication and installation of the Exhibit Casework. This Exhibit Contractor is responsible for the engineering and design of the components and materials as well as fabrication, installation, and performance of the fabrications.

2. Exhibit Design Drawings shown are intended to establish the basic dimensions, finishes, motion, location, connections, and profiles of the Exhibit Caseworks. The Exhibit Contractor is responsible for the design and engineering of the fabrication within these parameters. The drawings are design requirements, unless specifically noted as completely engineered and designed on the drawings.

3. Exhibit design control drawings do not cover some conditions or modifications, which may be required. The Exhibit Contractor, by accepting this Work, acknowledges this and agrees that the Exhibit Designer shall have final acceptance of all matters whether detailed or not for the exhibit design details.

C. Casework Engineer qualifications: Professional engineers experienced in providing engineering services of the kind required that have resulted in the successful installation of Exhibit Caseworks as similar as possible in material, design and extent to that indicated for this Project.

D. All work shall comply with all building and applicable life safety codes and is subject to the Owner!s code consultant!s review.

E. All Exhibit Caseworks shall be engineered to withstand normal wear and tear of routine installation and operation. Exhibit Contractor shall warrantee in writing all Exhibit Caseworks are free of defects. The period of the warrantee shall be one year. Exhibit Caseworks failing to function as specified during this period shall be repaired at the Exhibit Contractor!s expense.

F. Exhibit Contractor shall provide written instructions on the maintenance of all Exhibit Caseworks – See Section 01782 Operations Demonstration and Training. Owner shall be responsible for providing proper maintenance under the terms of the warrantee.

1.3 SUBMITTALS

A. SAMPLES & PRODUCT LITERATURE

1. Product Literature: For all manufactured parts and hardware, submit catalog cuts, literature, color charts, and data sheets along with other required submittals.

2. Fire Rating: Submit fire retardant test data for partitions and panel cores.

3. Samples: Prior to purchasing bulk materials, and in advance of fabrication, the Exhibit Contractor shall submit the following samples to the Exhibit Designer for approval:

a. Three (3) pieces each of all fasteners, hinges, spring washers, threaded inserts, locks, levelers, gaskets, etc. which will be incorporated into the finished Casework.

b. Three (3) one-foot-square (12" x 12") sample of glass with finished edges and seals.

c. Three (3) each (12” long) section of Steel Framing Section including typical weld and with specified finish.

d. Three (3) one-foot-square (12" x 12") sample of base and partition panel with specified finish.

e. Three (3) each of all object support brackets and graphic panel support brackets with specified finish.

4. Conservation: Prior to purchase and fabrication, all construction and finish materials must be approved by the Owner!s conservator.

B. SHOP DRAWINGS

1. For each typical Exhibit Casework and each unique Exhibit Casework, submit shop drawings to the Exhibit Designer for review in accordance with the requirements of the Contract Documents.

2. For each typical Exhibit Casework and each unique Exhibit Casework, provide large scale plans elevations, sections and details clearly showing the materials, thicknesses, dimensions and method of attachment to each other and to the encountered conditions. Fastening devices whether concealed or exposed shall be noted as to size, type and spacing. Clearly indicate scale.

    a. Note and describe the various materials and finishes including but not limited to structural materials, fire retardants, adhesives, paints, caulks, gasket material, graphic panels, shelves and decorative elements. Provide manufacturer name, address and complete product information including product name, color, and identifying number. Note how materials will be fastened to one another.

    b. Lighting details and layouts are to be provided to Exhibit Designer and the Exhibit Designer!s Lighting Consultant for review and approval prior to fabrication.

    b. Joints which occur in the finished work shall be clearly identified and shall be subject to the Exhibit Designer's review and approval.

    c. Submit complete schedule of Casework hardware, noting numbers, types, manufactures and finish.

    d. Provide isometric drawings showing access into the Casework structure for all required maintenance including access into the display chamber and the lighting power chamber. Clearly indicate access for graphic panels in each Casework as well as for the re-lamping of each fixture.

3. Provide final drawings that incorporate any required revisions. Fabrication to be based on the Exhibit Designer!s approval of final Shop Drawings.

4. Provide two copies of as-built package that includes as-built drawings and specifications for final construction and finish materials.

5. Indicate in all drawings those items which will be Not In Contract.

6. As a part of the preparation of Shop Drawings, Contractor shall retain a Professional Engineer, licensed in the State of Utah, to review and design the exhibit Casework metal frames, supported glazing, object support systems, and graphic panel supports all as described in the Contract Documents.

    a. Structural Metal Framing drawings are to be submitted to Exhibit Designer and Exhibit Designer!s Consulting Structural Engineer for review and approval prior to fabrication.

    b. Contractor!s Engineer shall supervise the design, review and sign and seal Shop Drawings, visit points of manufacture and construction, and submit all calculations and drawings to the Building Department as required. The Exhibit Contractor!s Engineer shall arrange and supervise all required testing needed for Building Department.

    c. Casework systems shall conform to the Building Code, which references the International Building Code 2006 edition. IBC 2006 requires compliance with reference standard ASCE 7-05 with respect to seismic criteria for architectural components.

    d. The Exhibit Casework Steel Framing Systems are to accommodate the weight of

artifacts and exhibit displays in addition to its own self weight and the weight of supported glazing and lighting systems. The Casework glazing is to accommodate the seismic deflections of its supporting frame and continue to be supported and retained by its frame during a code specified seismic event.

7. Approved Utah-Licensed Structural Engineers;

   a. Dunn Associates, Inc
      Consulting Structural Engineers
      Mr. Youra Zivait
      380 West 800 South
      Salt Lake City, UT 84101
      Tel. 801-575-8877
      www.dunn-se.com

   b. Or equal as approved by the Exhibit Designer.

C. PROTOTYPES

1. Fabricate one (1) prototype for complete 8! wide x 10! tall Exhibit Casework (two bays of a typical Casework) assembly showing Casework access, finish, hardware including object support system with mock objects, assembly and integration of all graphic panel types with all components for display area, as well and lighting.

2. In order to test the Casework performance and review all design details, the prototype must be built to the dimensions of the Casework-type in the exhibit; if such a prototype is approved, it may be incorporated into the final exhibit as long as it is indistinguishable from the remaining production run of Exhibit Caseworks.

3. Contractor shall not proceed with fabrication of the component in question until the prototype is accepted based on its overall quality, function and appearance by the Owner and Exhibit Designer. Casework must pass performance testing to assure;

   a) proper functioning of Casework hardware including doors
   b) integration of object support system and Owner provided mounts
   c) removable graphic panels
   d) functionality of lighting

4. Contractor shall devise a timetable for fabrication and submittal of prototype so that a submittal and review process of reasonable duration shall have no adverse effect on project schedule. A four-month schedule from submittal of preliminary drawings to review of Casework prototypes is recommended.

5. Qualification data for firms and persons specified in "Quality Assurance" article to demonstrate their capabilities and experience. Include list of completed projects with project names, addresses, names of Exhibit Designers and Owners, and other information specified.

1.4 DELIVERY, STORAGE AND HANDLING

A. Conditioning: Installer shall advise Exhibit Contractor of temperature and humidity requirements for Casework installation areas. Do not install work until required temperature and relative

humidity have been stabilized and will be maintained in installation areas. Fabrication and installation schedule must allow four weeks between the application of the last paint, sealant, or adhesive and the installation of any artifact or item.

B. Fully protect each item from the weather and from extremes in temperature and relative humidity while in transit from point of origin or fabrication to the job site. When delivered immediately place under cover and adequately protect from damage. Keep clean, and store and handle in such a manner as to avoid injury. Casework must be clean and free of all insects and mold.

B. Deliver items from the point of origin with the original, approved manufacturers packing and wrapping. Removing of wrapping and packing materials shall occur in the final room or space only.

C. Remove delivered materials which do not conform to the reviewed samples or are damaged, marred or otherwise not suitable for installation from the job site and replace with acceptable materials.

D. Finished items shall be delivered to the job site ready for installation. Storage of finished items at the job site awaiting installation will not be permitted.

E. Only limited repair of damaged materials can occur on site. Repair work especially that requiring painting, sanding, sawing or other dust or volatile producing work must be approved and may be restricted to a work area outside of the exhibit space.

1.5 WARRANTY

A. Exhibit Contractor guarantees and warrants the completed work and components for one year from acceptance for any defects in materials or workmanship. Contractor shall promptly correct, at its expense, any portion of the work not meeting industry standards or local building code requirements, or which fails or proves defective in whole or in part during the warranty period.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All construction and finish materials must be approved by the Exhibit Designer and Owner for Conservation.

B. Metal: All exposed metal finishes for Casework shall be typical per Section 09920 Painting.

C. Glazing: All glazing to be 17.5 mm, low-iron laminated safety glass with ultraviolet radiation filtering laminate. Glass thickness to be reviewed by engineer to assure that glass will not bend or bow. Edges to be precision ground and polished.

1. Provide alternate pricing for 17.5 mm low-iron, tempered glass with ultraviolet radiation filtering laminate.

D. Plywood used within Caseworks for exhibit partitions to be 3/4” Appleply free from urea-formaldehyde based adhesives and cold treated for pest control. All plywood products are to be certified by Forest Stewardship Council.

1. Approved Manufacturers;

a. States Industries
Eugene OR
Tel. 800-626-1981
www.statesind.com

b. Or equal as approved by Exhibit Designer.

E. Epoxy Sealant: All wood used within Casework environments shall be sealed before covering with paint or fabric with two (2) coats of a paintable sealant such as Sancure by Lubrizol or approved equal applied per Manufacturer's specifications.

F. Paint: Casework interiors shall only be painted with Conservation-approved paint. No oil-based paints nor any other substances emitting formaldehyde, volatile acids, or other corrosive volatile organic compounds shall be used inside Casework environments. See Section 09920 Painting

G. Caulking: Select a neutral cure silicone caulk that does not emit acetic acid during cure. DowCorning neutral curing RTV silicone or equal, installed per Manufacturer's specifications.

H. Gaskets: Caseworks are not sealed but designed for heat and air to escape through the top.

I. Glue: Any adhesive used inside the Casework either in construction or application of finishes including graphic panels and photomurals must be approved by the Exhibit Designer and the Owner!s Conservator.

1. Approved Materials;

a. Fabric: Adhere using mechanical fastening methods, 3M#465 acrylic adhesive transfer tape, or approved equivalent.

b. Instabond C by Quality Mounting and Laminating Systems, Inc. is pre-approved as an interior Casework adhesive. This can be used for prints, graphics or text panels.

J. Concealed fastening clips in conjunction with Casework interiors shall be extruded aluminum interlocking type and not less than 2 inches wide x .125 inches thick.

K. Finish Hardware (visible)

1. 1/4” diam, countersunk, flat-head, allen-socket type bolts or machine screws. Finish to match adjacent finishes.

L. Rough Hardware (concealed from view)

1. Nails shall be common steel wire, untreated for interlock work as per FS FF-N-1 05. Finishing type at countersunk face locations for concealment.

2. Bolts shall be standard mild steel, Hex head bolts with square nuts and malleable iron and steel plate washers conforming to the following:

a. Bolts FS FF-B-575 and 584
b. Nuts ASTM A-563
c. Expansion shields FS FF-B-561
d. Toggle bolts FS FF-B-588

e. Lag screws and bolts ANSI B18.2.1

3. Wood screws as per ANSI B18.6.1.

4. All concealed wood must be coated with two applications of a Owner!s Conservator approved coating.

2.4 CONSERVATION REQUIREMENTS

A. CONSTRUCTION:

2. Physical stability: provide structural stability to withstand shock and vibration (from visitor movement, HVAC system, and other equipment) and to comply with all local seismic requirements.

3. All Exhibit Caseworks should protect their content from fire exposure for at least 30 minutes and the force from overhead sprinklers and fire department hoses.

4. All Exhibit Caseworks shall be constructed to allow only inert or acid-free materials to come in contact with historic textiles, documents, specimens and other sensitive organic materials and artifacts.

5. All Exhibit Casework elements to be allowed a minimum of 2 weeks off-gas time prior to scheduled object install.

6. Provide easy access to objects in display chamber for rotation of objects.

7. Provide easy access to lighting equipment for maintenance.

B. TEMPERATURE AND HUMIDITY CONTROL

1. Exhibit Casework is not sealed. The building!s HVAC system for exhibit areas is designed to maintain a temperature of 68 - 72 Degrees Fahrenheit +/- 1 degree variation over 1 hour and a Relative Humidity of 25 - 30 % +/- 1% variation over 1 hour supplied by ceiling mounted ducts. Design and construct exhibit Caseworks to ventilate and maintain a target relative humidity with no more than a total of 1% variation in relative humidity per hour and a rise in temperature of no more than 1°F per hour even when the Casework is lit or any equipment is operational.

2. Contractor to provide one (1) "Arten Thermo/Hygrometer" or approved equal per Exhibit Casework to measure and monitor relative humidity.

3. Low voltage lighting power supply chamber at Casework deck must be physically accessible from within the display chamber. Heat from any equipment including lamps must not rise the Casework temperature more than 2°F. Mechanical fans or other system may be required to dissipate heat.

C. SECURITY

1. Casework closure system to include manual key lock for individual doors at the door location. Provide Owner with (1) master key for all Exhibit Caseworks and (3) duplicates.

2. Use shatterproof laminated glazing, or safety laminate on tempered glass.

3. Use tamper -resistant hardware for all concealed Casework screws and entry hardware.

4. Conceal all entry hardware.

PART 3 PART - EXECUTION

3.1 EXAMINATION

A. Study the Contract drawings and specifications with regard to the work as shown and required under this Section so as to insure its completeness.

B. Examine surfaces and conditions to which this work is to be attached or applied and notify the Exhibit if conditions exist which are detrimental to the proper and expeditious installation of the work. Starting on the work shall imply acceptance of the surfaces and conditions to perform the work as specified.

C. Verify dimensions taken at the job site those affecting the work. Bring field dimensions which are at variance to the attention of the Exhibit. Obtain decision regarding corrective measures before the start of installation.

D. Cooperate in the coordination and scheduling of the work of this Section with the work of other Sections so as not to delay job progress.

E. Consult with Exhibit Designer on Casework design, materials selection and testing, and Casework performance testing.

3.2 INSTALLATION

F. Perform installation using skilled workers who are familiar with this type of work. The manufacturer shall provide the services of a direct manufacturers representative in the field to assure that the work is being performed in a manner recommended.

G. Install the work plumb, level, true and straight with no distortions. Shim as required using concealed shims in a manner that will prevent any future warping, cracking, settling or other distortion. Install to a tolerance of 1/8" in 8'-0" for plumb and level (including shelves); and with 1/16" maximum offset in flush adjoining surface, 1/8" maximum offsets in revealed adjoining surfaces.

H. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.

I. Accurately locate each item at its designated location and anchored in place in a secure and plumb manner, using the methods and means noted on the reviewed submittals.

J. The climatological conditions at the job site shall be equal to the conditions under which the work was fabricated. Do not store or install the work when the temperature and humidity are above or below accepted limits, as determined by the manufacturer and/or the Exhibit Designer.

1. Defects which occur as a result of the above shall be repaired and/or replaced, as

determined by the Exhibit Designer, and at no additional cost.

K. Installation: Carefully unpack each item near its point of installation. Loose parts and accessory items shall be set within the Exhibit Casework at their designated locations.

1. Install without distortion so that doors and panels will fit openings properly and be securely aligned. Adjust hardware to center doors and drawers in openings and provide unencumbered operation. Complete the installation of hardware and accessory items as indicated.

2. As each item is set the leveling devices shall be adjusted so that its top is plumb and level, and tested so it does not sway, rock or shake.

3. Ceiling hung Casework shall be anchored to the underside of supporting components in a rigid, plumb and secure manner. Method of attachment must not compromise seal of Casework display and maintenance chambers. Adjacent hung ceiling provided by General Contractor should be protected from damage during install. Coordinate Casework details with hung ceiling transitional elements.

4. Prior to acceptance, operating hardware shall be checked and adjusted. Hardware shall operate smoothly for use intended. In the closed position the space between the moving portion and the fixed shall be uniform, even and plumb, and flush with the abutting surface. Doors in their open position should allow Casework access of no less than 60% of the doors width.

5. Provide a closeout package including as-built drawings, tools and keys for Casework entry, manual for AV controlled door access, extra material, touch up kit with paint, fabric and other finish materials.

3.3 PROTECTION AND CLEANING

A. Protect installed Casework work at all times, by adequate and suitable means, during and after installation and until accepted. The site must be dust free and clear of other trades prior to and during Casework installation. Once Caseworks are installed the area should be secured and Permission to Work permits should be issued to prevent damage to Caseworks by following trades.

B. Surfaces which become damaged, marred, scratched, abraded or are not sound and are defective functionally or visually shall be repaired and/or removed and replaced, as determined at no additional cost.

C. Clean all surfaces of grime, dust and general construction dirt. Touch-up shop-applied finishes to restore damaged or soiled areas.

D. Clean hardware, lubricate and make final adjustments for proper operation.

END OF SECTION 12353

SECTION 16500 – EXHIBIT LIGHTING

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Applicable requirements of the Contract Documents and of Division I General Requirements of the Specifications apply to the work of this Section

B. Division 10 – Dioramas, Interactives, and Live Displays

C. Division 12 – Exhibit Casework

1.2 SCOPE

A. Included in the work of this Section are labor, materials and appurtenances required to complete the work of this Section, as specified herein, as required by job conditions, or as indicated on drawings, including but not limited to general requirements for lighting fixtures including coordination, definitions, quality assurances, submittals, mockup, samples and general responsibility for a complete job.

1.3 DEFINITIONS

A. In this specification, the term “Exhibit Designer” includes the Exhibit Designer, Owner's representative and/or the Lighting Consultant, together or individually as they shall decide. The term “fixtures” refers to exhibit lighting fixtures and luminaires.

1.4 GENERAL REQUIREMENTS

A. Provide labor, materials, and equipment for the installation of indoor exhibit lighting fixtures, lighting equipment, and lamps as shown on the drawings and specified here.

B. Refer to drawings for dimensions and details. Check and verify dimensions and details on drawings before proceeding with the work. Report any discrepancies at once to the Exhibit Designer. Should it appear that the work intended is not sufficiently detailed or explained on the drawings or in the specifications, apply to the Exhibit Designer for further drawings or explanations, as may be necessary. Conform to these explanations in the work. If any question arises about the true meaning of the drawings or specifications, refer the matter to the Exhibit Designer whose decision is final and conclusive. In no case submit a bid, or proceed on any work with uncertainty. The intention of this specification and the accompanying or applicable drawings is to provide a job complete in every respect. Contractor is responsible for this result.

1.5 COORDINATION

A. Clearly indicate the Work to be performed by other trades contractors, and the materials that are adjacent to or abutting the Work of this Section. Coordinate as required.

B. Fixture locations as indicated on the electrical drawings are generalized and approximate. Carefully verify locations with Exhibit Designer's plans, reflected ceiling plans and other reference data prior to installation. Check for adequacy of headroom and non-interference with other

equipment, such as ducts, pipes or openings. Bring conflicts to the Exhibit Designer's attention before proceeding with the work.

C. Give ample notice of special openings required for placing equipment in the building, in order to avoid cutting of completed work.

D. Furnish the materials and labor for Work included under this Section in ample time, and in sufficient quantities so that all of the Work may be installed in proper sequence to avoid unnecessary cutting of the floors and walls.

E. Co-ordinate and schedule the Work of this Section with the Work of other Sections, Utility Companies and the Telephone Company so that there shall be no delay in the proper installation and completion of any part of each respective Work. Construction Work shall proceed in its natural sequence without unnecessary delay caused by the Work of this Section.

F. Schedule the Work to prevent Work of this Section being damaged by other construction operations. Remove and replace Work so damaged at no cost to Owner.

G. Where Work of this Section is to be flush or concealed, install it to assure that it does not project beyond the finished lines of floors, ceilings or walls.

H. Although the location of equipment included in the Work of this Section may be shown on the Contract Drawings in a certain place, actual construction may disclose that the location for the Work does not make its position easily and quickly accessible. In such cases, call the Exhibit Designer's attention to this situation before installing this Work, and comply with his installation instructions.

I. Verify mounting conditions for all fixtures, and furnish appropriate mounting details upon request. Such mounting details shall be approved by Exhibit Designer.

1.6 QUALITY ASSURANCES

A. Acceptable manufacturers are listed in the fixture descriptions. Acceptable manufacturers shall be prepared to provide, upon request, proof of satisfactory production of equal or similar fixtures for a period of at least five years prior to bidding.

B. Statement of Application

1. The Contractor, by commencing the Work of this Section, assumes overall responsibility, as a part of the warranty of the Work, to assure that assemblies, components and parts shown or required by the Work of this Section comply with the Contract Documents.

2. Required Warranty

a. For a period of one year after Owner's initial acceptance and establishment of the beginning date of the warranty period, and at no additional cost, the Contractor shall promptly provide and install replacements for fixtures or components (except for lamps) which, in the opinion of the Owner, are defective in materials or workmanship under normal operating conditions. If approved to do so by the Owner, the Contractor may repair installed equipment at the job site to Owner's satisfaction, provided that the Contractor repairs any damage to adjacent Work. For any time during the warranty

period that fixtures are not fully functional due to defects in materials or workmanship, the Contractor shall provide or pay for and install and remove suitable and adequate temporary lighting fixtures. The Contractor also warrants replacement fixtures or components to be free of defects in workmanship or materials for a period of one year following replacement, and shall replace any defective replacements during their warranty period.

b. The Contractor shall not be held responsible for acts of vandalism or for abnormal or accidental abuse of the fixtures or their components occurring during the warranty period, nor shall the Contractor be held responsible for deleterious effects caused by maintenance procedures performed without the concurrence of Contractor.

C. Substitutions

1. Fixtures included under this Section are specified by approved manufacturer and type. Furnish equipment as specified, unless substitutions are mutually agreed upon, as follows.

2. During the construction period, no substitutions shall be considered unless compelling reasons are given, such as inability to meet delivery schedule. This reason shall not be acceptable if delay is caused by Contractor's failure to order fixture in accordance with the schedule presented under “SUBMITTALS” below. In such cases, it is Contractor's responsibility to provide fixtures as specified without delay to the project and without additional cost to Owner.

3. Substitutions shall be named, samples, catalogue cuts and complete photometric reports submitted, and cost savings documented. Each substitution requested shall be submitted in the form of an alternate, separate proposal, accompanied by complete descriptive and technical data, indicating addition or deduction from the base bid. Submit a written request for proposed fixtures to be substituted to Exhibit Designer at least two weeks prior to the bid period. Substitutions proposed less than two weeks prior to the bid submittal date, and/or not including proper documentation, shall not be considered. The Owner shall accept or reject proposed substitutions.

4. The Exhibit Designer may request samples of fixtures proposed as substitutions by the Contractor. Samples shall be submitted in accordance with Section 1.08. Submit complete and operable sample fixtures for any proposed substitution as indicated in 1.06.C. above. Substitution samples provided to the Exhibit Designer less than one week prior to the bid submittal date, and/or not including proper documentation, shall not be considered.

5. Where proposed substitutions alter the function or appearance, or change space requirements or mounting details indicated in the Contract Documents, the Contractor shall detail such changes in the proposal and include costs for revised design and construction for trades involved.

6. In the case of "package" substitutions exceeding 10% of the fixture types included in this Specification, the Contractor shall reimburse the Exhibit Designer and consultants for the cost of evaluating proposed substitutions, whether or not such substitutions are accepted.

D. Equipment Compatibility: For each group of similar fixture types provide fixtures and components fabricated by one manufacturer, to simplify maintenance and replacement of equipment.

E. Regulatory Agencies

1. Provide fixtures constructed, wired and installed in compliance with the current edition of applicable city, state and national codes. Provide fixtures conforming to Underwriters Laboratories Standards, and to provisions of applicable codes which exceed those standards. In addition, provide fixtures which conform to additional regulations necessary to obtain approval for use of specified fixtures in locations shown. Use only electrical components listed by Underwriters Laboratories.

2. Particular attention is called to Article 410 (Lighting Fixtures) of the National Electric Code. Provide only fixtures that meet these requirements, as interpreted by local agencies. As manufacturers' catalogue numbers may not include thermal protection devices, it is Contractor's responsibility to co-ordinate the fixture provided with the ceiling construction in accordance with local code enforcement practice.

F. Recognized Standards

1. Underwriters Laboratories (UL)
2. National Electrical Code (NEC)
3. Certified Ballast Manufacturers Association (CBM)
4. Illuminating Engineering Society (IES)
5. American Society for Testing and Materials (ASTM)
6. American National Standards Institute (ANSI)

1.7 SUBMITTALS

A. Shop drawings, samples, test data and certificates shall be submitted for approval in accordance with the requirements of the Contract Documents. Fixtures or other materials shall not be shipped, stored or installed into the work unless prior approval has been received, based upon the submittal of shop drawings, samples, catalogue cuts, test data, certificates or other material submitted for approval. Make modifications to fixtures in accordance with Exhibit Designer's comments concerning submittals, as a part of the work of this Section.

B. Submittal Schedule

1. Within 90 calendar days after award of General Contract, a List of Intended Manufacturers and estimated fabrication lead times shall be submitted to Exhibit Designer. Lead times shal lbe measured in weeks, beginning from the manufacturer's receipt of approved shop drawings and release, and ending at shipment. Exhibit Designer shall approve or disapprov eeach manufacturer.

2. Within 30 days after Contractor's receipt of Exhibit Designer's response to the List of Intended Manufacturers, copies of purchase orders and manufacturers' acknowledgments for all fixtures specified, conforming to Exhibit Designer's responses, shall be forwarded to Exhibit Designer. The purchase orders and the manufacture acknowledgments need not list prices, but shall contain a warranted fabrication lead time, in weeks, as defined above. These fabrication times shall be adequate for the timely completion of the job.

3. Within 30 days after date of manufacturer's acknowledgment of order, Contractor shall forward to Exhibit Designer complete shop drawings, and/or catalogue cuts for all specified fixtures.

4. Within 15 days after Contractor's receipt of disapproved shop drawings, revised shop drawings shall be resubmitted to Exhibit Designer.

5. Within 15 days after receipt of “approved” or “approved as noted” shop drawings, Contractor shall forward to Exhibit Designer a warranted shipment date for each specified fixture, as well as forwarding samples, texts, or any outstanding data required for approval.

6. The Contractor shall call to the attention of the Exhibit Designer any submittals that have not been returned to him in a timely manner and that might affect the appropriate delivery of fixtures.

C. Shop Drawings

1. Submit shop drawings for each type of fixture, except where specified fixtures are standard, unmodified, off-the-shelf units, fully described by catalogue cuts. If allowed by Exhibit Designer, such catalogue cuts may be substituted for shop drawings. Submit shop drawings in the form of one (1) reproducible and four (4) prints, or catalogue sheets in nine (9) copies

2. Indicate on shop drawings, materials, finishes, metal gauges, overall and detail dimensions, sizes, electrical and mechanical connections, fasteners, welds, joints, end conditions, provisions for the work of others, and similar information. Include pertinent mounting details including hung ceiling construction. Indicate complete details of the fixture, including manufacturer's catalogue numbers for sockets, ballasts, light shields, switches and type of wiring, and targeting and locking devices for adjustable fixtures. Indicate type and extent of approved inert insulating materials to prevent electrolytic corrosion at junctions of dissimilar metals shall be supplemented by additional drawings if information or descriptions listed above are not included in the sheets.

D. Submit independent laboratory photometric data in the directed number of copies and in format as directed by the Exhibit Designer. Photometric data shall be submitted for standard, off-the-shelf units, at the time the manufacturer's cuts are submitted. Photometric testing and reporting shall conform to IES procedures.

E. Manufacturer's catalogue sheets shall indicate input and load electrical characteristics, ambient temperature rating, noise level rating, mounting methods and UL listing for use with required lamp.

F. Fluorescent fixture manufacturer shall submit, when requested to do so, (with fixture shop drawing or Catalogue Sheet) thermal test data for the fixture to prove that nuisance tripping of the Class P ballast shall not occur when fixture is operating under the following conditions:

1. Voltage not exceeding 5% above nominal line voltage.
2. Room ambient of 77 degrees Fahrenheit (25 degrees Celsius).
3. Maximum ceiling cavity ambient temperature for recessed installation not exceeding 113 degrees Fahrenheit (45 degrees Celsius).

1.8 SAMPLES

A. When samples are specifically called for in the Fixture Descriptions in this Section, submit (1) sample unless otherwise indicated. If fixture samples are requested, supply a completely operable fixture with a plug for standard 120 Volt service. Otherwise provide component parts as specifically requested.

B. In addition to the above, after shop drawings, data and any other required submissions have been approved, submit to Exhibit Designer a sample of one of the following components.

1. Finish samples of any custom color or finish requested by Exhibit Designer.

C. Where a sample is submitted or requested, do not fabricate that fixture type until the sample is approved. Submit and resubmit a sample as specified in the Fixture Descriptions, as required, until samples are approved.

D. Tag samples with the name of the project, referenced specification, paragraph or drawing number, the fixture type number and any other identifying data. Ship the sample to the address specified by Exhibit Designer. After review, the sample shall be shipped to the Exhibit Designer at the project site for use as a comparison standard. All transportation charges for samples shall be paid by the Contractor. Make fixtures supplied under the work of this Section identical with approved samples. Do not install any sample fixtures in the project.

1.9 MOCK-UP

A. As a part of the work of this Section and at no additional cost to Owner, temporarily install, connect and adjust a reasonable number of fixtures of for mock-up listed below to verify specified requirements. Place the mock-up fixtures where and when directed by Exhibit Designer. Removal and storage of mock-up fixtures, when approved, shall be accomplished by the Contractor.

B. Contractor shall coordinate with General Contractor to provide fixtures not part of Exhibit Lighting scope but required for mock up.

C. Mock-up review required for the following areas:

1. Typical Exhibit Casework - 8’ long
2. Typical Insert Casework
3. Typical Table Casework
4. Past World
   a. EOCENE Diorama
5. Mineral Hall
   a. Interactive Lighting
6. First People
   a. Median Village Grid
7. Life
   a. Intro Wall
   b. Exhibit Partition
   c. Forest Diorama
   d. Life DNA Model

1.10 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Lighting fixtures and their component elements shall be delivered to the job site factory-assembled and wired to the greatest extent practical, in strict accordance with the approved shop drawings, samples, certificates and catalogue cuts, and shall be handled in a careful manner to avoid damage.

B. Exposed finishes shall be protected during manufacture, transport, storage and handling. Delivered materials shall be identical to the approved samples. Materials which become damaged shall be repaired and/or replaced as directed.

C. Fixtures shall be stored under cover, above the ground, in clean, dry areas, and shall be tagged and/or marked as to type and location.

D. Delivered fixtures shall include wiring, sockets, ballasts, shielding, channels, lenses and other parts and appurtenances necessary for fixture installation of each fixture type.

PART 2 PRODUCTS

2.1 GENERAL

A. Provide materials, equipment, appurtenances and workmanship for the work of this Section conforming to the highest commercial standards, as specified and indicated on the drawings. Make fixture parts and components not specifically identified or indicated on the drawings, of materials most appropriate to their use or function, and resistant to corrosion and to thermal and mechanical stresses encountered in the normal application and function of the fixtures.

B. Provide fixtures that are constructed to be suitable for and compatible with the surface materials and construction in which they will be installed.

2.2 MARKING OF FIXTURES

A. Plainly mark fixtures equipped with ballasts for operation of rapid start lamps “Use Rapid Start Lamps Only”. Similarly, mark other fixtures according to proper lamp type. Clearly mark ballasts that have multi-level outputs as such, and indicate proper terminals for the various outputs. Provide markings that are clear and that are located to be readily visible to service personnel, but invisible from normal viewing angles when lamps are in place.

2.3 MATERIALS AND FABRICATION

A. Unless otherwise noted, use only completely concealed hardware. Weld exposed metal at joints, fill with weld material, grind smooth, and make free from light leaks by the inherent design of the fixture body and frame. Bond gaskets, when used, to the fixture metal. Gasket incandescent fixtures with overlapping trim. Weld ballast support studs, socket saddle studs and reflector support studs to fixture body. Self-threading screws are not approved. Make flexible leads enter fixtures at sides, unless otherwise noted. Ventilate ballast compartments and fixtures using bottom relamping, unless otherwise noted.

B. Fixture components shall be constructed of minimum 20 gauge sheet steel unless otherwise specified.

C. Construct fixtures with the minimum number of joints. Make unexposed joints by approved method such as welding, brazing, screwing or bolting. Soldered joints are not acceptable. Do not use self-tapping methods or rivets for fastening parts which shall be removed to gain access to electrical components requiring service or replacement, or for fastening any electrical components or their supports.

D. Provide metallic cast or extruded parts of fixtures that are close grained, sound, and free from imperfections or discoloration. Provide cast or extruded parts that are rigid, true to pattern, and of ample weight and thickness. Provide cast or extruded parts that are properly fitted, filed, ground, buffed and chased to provide finished surfaces and joints free of imperfections. Make thickness on cast parts not less than 1/8 inch.

E. Provide housings for discharge lamps (fluorescent, HID) fixtures that make electrical components easily accessible and replaceable, without removing the fixture body from its mounting.

2.4 FINISHES

A. Apply fixture finishes after fabrication in a manner that assures a durable wear-resistant surfacing. Prior to finishing, hot clean the surfaces by accepted chemical means, and treat them with corrosion inhibiting (phosphating) treatment to assure positive paint-adhesion. Give exposed metal surfaces (brass, bronze, aluminum and others) and finished castings except chromium-plated or stainless steel parts an even coat of high grade methacrylate lacquer, or transparent epoxy. Anodize exposed aluminum surfaces for corrosion resistance. Make sheet steel fixture housing, and iron and steel parts which have not received phosphating treatment, or which are to be utilized in exterior applications corrosion resistant by zinc or cadmium plating or hot-dip zinc galvanizing after completion of all forming, welding, or drilling operations. Provide minimum thickness of protective coatings:

1. Hot galvanized zinc coating .0005 inch

2. Cadmium plating.00015 inch

B. Electroplate parts operated under temperatures injurious to hot-dipped galvanizing.

C. Cadmium plate screws, bolts, nuts and other fastening or latching hardware.

D. Except where otherwise indicated provide fixtures with a final synthetic, high-temperature baked enamel coating of color and finish as specified or directed. Unless otherwise specified, provide white baked enamel reflective surfaces, with a minimum reflectance of 86%. Unless otherwise specified, provide matte black non-reflective surfaces. Prior to painting give all parts proper etched surface preparation to assure paint adherence and durability. See paragraphs above.

2.5 FIXTURE WIRING

A. Provide wiring between fluorescent lamp holders and associated operating and starting equipment of similar or heavier gauge than the leads furnished with the approved types of ballasts and having equal or better insulating and heat resisting characteristics. Provide internal wiring of fixtures containing a minimum number of splices. Make splices with approved mechanical insulated steel spring type connectors, suitable for the temperature and voltage conditions to which the splices are to be subjected.

B. Make connections of wires to terminals of lamp holders and other accessories in a neat and workmanlike manner and which are electrically and mechanically secure, with no loose strands protruding. Provide a number of wires extending to or from the terminals of a lamp holder or other accessory that does not exceed the number which the accessory is designed to accommodate.

C. Provide wiring channels and wireways free from projections and rough or sharp edges throughout. At points or edges over which conductors shall pass and may be subject to injury or wear, round bush to make a smooth contact surface with the conductors.

D. Install insulated bushings at points of entrances and exit of flexible wiring.

2.6 BALLASTS

A. Provide ballasts for fluorescent lamps that are suitable for the electrical characteristics of the supply circuits to which they are to be connected, and which are suitable for operating the specified lamps. Provide ballasts which, unless specifically indicated to the contrary, have the following characteristics:

1. Electronic rapid start
2. power factor .90
3. ballast factor .90
4. total harmonic distortion 10%
5. lamp current crest factor 1.7
6. UL Class P
7. Sound Rating A.
8. Multi-lamp rapid start ballasts shall be of the series sequence type.

B. Provide ballasts conforming to UL, and ANSI specifications and displaying labels or symbols of approval by the UL, and of certification by the CBM. Design, fabricate and assemble component parts of ballasts in accordance with the latest requirements of the NEC. Mark ballasts “Class P” indicating approved integral ballast protection. This ballast protection is provided by a built-in self-resetting thermally actuated device that will remove the ballast from line when excessive ballast temperature is reached. See 1.07.F regarding nuisance tripping test data.

C. Rigidly mount ballasts, unless specifically indicated to the contrary, to the inside of the top of the fixture housing, with ballast surfaces and housing in complete contact for efficient conduction of ballast heat. Permanently affix ballast mounting screws to the fixture housing. Provide only fixtures whose design, fabrication, and assembly prevent overheating or cycling of lamps and ballasts under any condition of use.

D. Provide identical ballasts within each fixture type.

E. Provide ballasts having the lowest sound-rating available for the lamps specified and clearly showing their respective sound ratings. Replace ballasts found by Exhibit Designer or Engineer to be unduly noisy, without charge, prior to acceptance of the job. Inform Exhibit Designer in writing if ballasts with a sound rating other than A are to be provided.

F. Approved Ballast Manufacturers

1. Magnetic:
   Advance
   General Electric
   Universal

2. Electronic:
   Advance
   Aromat
   Universal
   Osram Sylvania

G. Ballasts shall have a 5-year warranty from date of acceptance of the completed installation.

2.7 Lamp holders

A. Provide fluorescent fixture sockets that are white, of heat resistant plastic and rated at 660W. Fluorescent lamp sockets operating with an open circuit voltage in excess of 300 volts shall be of the safety type which open the supply circuit when the lamp is removed from the sockets.

B. Rigidly and securely attach lamp holding sockets to the fixture enclosure or husk.

C. Where pull-chains are included, provide an insulating joint.

D. Provide sockets suitable for specified lamps, and set to position the lamps in optically correct spacing and relationship to lenses, reflectors, filters, and baffles.

2.8 LAMPS

A. Provide electric lamps as required, during construction, including lamps for fixtures furnished by others.

B. Provide a complete set of new lamps, as specified in Fixture Descriptions below, in each fixture, at the completion of the Work, leaving fixtures and lighting equipment completely lamped and/or in normal operating condition.

C. The following lamp manufacturers are approved:

1. General Electric
2. Philips
3. Osram Sylvania

2.9 LED (LIGHT EMITTING DIODE)

A. The Contractor shall furnish the complete LED-based lighting system as described in Contract Document.

B. LED fixture shall be UL listed. Power/data supply shall be UL listed for Class 1 or Class 2 wiring and with housing that meets a minimum IP20 rating for dry location installation.

C. The LED module and all of its components must not be subject to mechanical stress. Assembly must not damage or destroy the conducting paths on the circiut board.

D. The LED fixture shall be operated at constant and carefully regulated current levels. LEDs shall not be overdriven beyond their specified nominal voltage and current.

E. LED fixture shall be thermally protected using thermal management techniques and housing shall be designed to transfer heat from the LED board to the outside environment.

F. Operating temperature not to exceed range set by Manufacturer to avoid premature failure and to obtain expected life. LED occupied space to be conditioned if necessary.

G. All LED fixtures and power/data supplies shall be provided by a single manufacturer to ensure compatibility.

H. All LEDs used in the LED fixture shall be high brightness and proven quality from the same manufacturer, the same bin and shipped at the same time. Manufacturer of LED systems shall utilize an advanced production LED binning process to maintain color consistency.

I. Manufacturer shall provide installation guides and system power and control wiring diagrams.

2.10 LENSES

A. Where plastic lenses are indicated, provide lenses of virgin methyl methacrylate, unless otherwise indicated.

B. Make lenses, louvers, or other light diffusing elements contained in frames removable, but positively held within the frames so that hinging or other motion of the frame will not cause the diffusing element to drop out.

2.11 FIXTURE DESCRIPTIONS

A. Provide fixtures which conform to the above standards and criteria, as indicated on the drawings, and as indicated below. Contractor to verify ceiling conditions for all fixture types.

B. Catalogue or series numbers, when shown, are intended to provide assistance in establishing general type or category of lighting fixtures. These are not part of specification nor are they to be used to order fixtures. Contractor shall provide a fixture that meets the complete fixture description.

C. Allowances, when given, cover the cost to the Electrical Contractor, in U.S. dollars, of the lighting fixture only. Allowances do not include lamps, taxes, delivery, handling, installation or Contractor's overhead or profit.

D. Standard fixture catalogue cuts included with this specification section are for general information only, and are not a part of the specification.

E. Custom fixture design drawings and/or modification drawings for standard fixtures provided with the specification are an integral part of the specification and are to be used in conjunction with the fixture descriptions as the full specification for the affected fixture types.

F. Bring any discrepancies between drawing and specifications to the attention of the Exhibit Designer before submitting bids.

G. Provide “attic stock” of replacement lenses and diffusers. Quantity shall be equivalent to either 5% of fixture type count or (2), whichever is greater. Attic stock is to be suitably boxed and marked and turned over to the owner as directed.

H. Fixture Schedule:

See Appendix 1 for exhibit lighting fixture schedule and cutsheets

PART 3 EXECUTION

3.1 GENERAL

A. Install fixtures complete with lamps, as indicated, and with equipment, materials, parts, attachments, devices, hardware, hangers, cables, supports, channels, frames and brackets necessary to make a safe, complete, and fully operative installation.

B. Verify and provide fixtures that are appropriate for the mounting conditions of the project.

C. Reject and do not install blemished damaged or unsatisfactory fixtures. Replace imperfect or unsatisfactory fixtures, if installed, as directed by Exhibit Designer or Lighting Consultant.

D. Set fixtures, when installed, to be true, and free of light leaks, warps, dents, or other irregularities.

E. Provide finish for exposed parts as specified so indicated, provide a finish as directed by Exhibit Designer.

F. Mount fixtures at heights and locations indicated on the Contract Drawings, or as required by Exhibit Designer.

G. Upon completion of the installation, the lighting fixtures and lighting equipment shall be in first class operating order and free from defects in condition and finish. At time of final inspection, all fixtures and equipment shall be clean, fully lamped, and be complete with required lenses or diffusers, reflectors, side panels, louvers, or other components necessary for the function of the fixtures. Any reflectors, lenses, diffusers, side panels or other parts damaged prior to the final inspection shall be replaced by Contractor prior to inspection.

3.2 ACCESSIBILITY

A. Install equipment such as junction and pull boxes, fixture housings, transformers, ballasts, switches and controls, and other apparatus that shall be reached from time to time for operation and maintenance, to be easily accessible and appropriate for mounting and ceiling conditions.

3.3 SUPPORTS

A. Provide necessary hardware supports for fixtures that are adequate and safe to support the weight of the fixtures.

B. Provide visible hanging devices that are finished to match the fixture finish, unless indicated otherwise.

C. Provide attachment devices including brackets, cast metal shapes with the requisite rigidity and strength to maintain continuous alignment of installed fixtures.

D. Provide supporting members that are surface passivated, and which are primed or paint-dipped to resist corrosion.

E. Provide fastening devices of a positive locking type, which do not require special tools to apply or remove them. Do not use tie wires in place of fastening devices.

F. Contractor is responsible for the necessary suspension system; Contractor shall ascertain the structural reliability of supports provided under other Sections of the specification.

G. Provide surface mounted fixtures with required mounting devices and accessories. Uniformly maintain the fixture heights shown on the Contract Drawings or established in the field. The allowable tolerances in individual fixture mounting shall not exceed 1/4 inch and may not vary more than 1/2 inch from mounting height shown on the drawings. Install fixtures in continuous runs absolutely level, and in line with each other. Hanging devices shall comply with code requirements.

H. Provide at least two supports for individually mounted fluorescent fixtures.

3.4 FOCUSING

A. All adjustable lighting fixtures shall be aimed, focused, and locked by the Contractor under supervision of Exhibit Designer or Museum Staff.

B The Contractor is responsible to make provisions as required to have sufficient time allowed, manpower and equipment available for focusing. The Contractor shall ensure focusing to be carried out efficiently without delay and to satisfactory of Exhibit Designer, and Museum Staff.

C Ladders, tools, and other necessary equipment required for focusing are the responsibility of the Contractor.

D. Focusing of exhibition lighting shall occur after the completion of exhibit installation and the lighting system is confirmed operational. At the time of exhibition lighting focusing, the Contractor shall assure all fixtures, lamps, and accessories (including optical lens and shields) specified are available.

E. Where possible, fixtures shall be focused during normal working hours. However, where daylight interferes, focusing shall be performed during hours after dark.

F. If possible, pre-focus aiming diagram for specific areas and exhibits will be issued by Exhibit Designer to the Contractor for advance aiming of fixtures. However, adjustment in aiming, lamping and accessories will still be required when reviewed by Exhibit Designer on site.

3.5 CLEANING

A. Upon completion of the fixture installation and at the time of final inspection, fixtures shall be clean, and free from marks, dust, spotting or other defects. Replace any broken or defective parts prior to final inspection. Replace or make good all defects revealed by final inspection.

Appendix 1 – Exhibit Lighting Fixture Schedule and Cutsheets

UMNH – EXHIBIT LIGHTING

Light Fixture Schedule – 100% Final Design

PART 1 - EXHIBIT LIGHTING FIXTURES TO BE PROVDED, INSTALLED AND FOCUSED BY EXHIBIT CONTRACTOR (XC)

Type	Location	Description	Manufacturer	Lamp	Remarks
C-CF-1	Deleted from XC scope				
C-CF-2	Level 3 Mineral Hall - Fluorescent Cases	Surface mounted two-lamp fluorescent striplight	Legion 1510 series Bartco Lighting BFL257 series CJ Lighting Estimated Quantity: 8 ft.	(2) blacklight T8 lamps with UVA General Electric - F115T8/BL NOTE: Exhibit Contractor to verify exact lamp specifications per case requirement	▪ Integral electronic ballast, 120V ▪ 20 gauge steel housing with standard white finish ▪ Refer to Exhibit Drawings for fixture layout and mounting details ▪ Fixture shall be tandem mounted with through wiring for continuous run ▪ Exhibit Contractor to coordinate fixture length and quantity as required to maximize length of light within case (overall length of light shall not be less than length of case glass) ▪ Provide all necessary mounting and power components as required ▪ Submit drawings showing complete case details with fixture layout and mounting in all cases for approval
C-CF-3	Level 3 First People - Homestead and Human Interaction Table Cases Level 3 Land - Pack Rat Table Case Level 4 Life - Ant Colony	Surface mounted single lamp compact fluorescent module	Belfer Lighting 2880 NX2 series Celestial Lighting Channelite series Starfire Lighting Estimated Quantity: 9 units	(1) 26W Quad-tube CFL, 3000K, 80+ CRI	▪ Integral electronic ballast, 120V ▪ Aluminum housing with white finish ▪ Refer to Exhibit Drawings for fixture layout and mounting details ▪ Provide all necessary mounting and power components as required ▪ Submit drawings showing complete case details with fixture layout and mounting in all cases for approval

UMNH – EXHIBIT LIGHTING

Light Fixture Schedule – 100% Final Design

Type	Location	Description	Manufacturer	Lamp	Remarks
C-CF-4	Level 2 Our Backyard - Terrariums and Live Display Cases NOTE: Exhibit Contractor to verify if Terrariums include integrated lighting system	Surface mounted single lamp fluorescent striplight	Legion 1500 series Bartco Lighting MIT8 series CJ Lighting NOTE: Exact fixture specifications to be confirmed by Live Display Consultant Estimated Quantity: 30 ft.	(1) full spectrum T8 lamp (lamp shall be specifically listed for Terrarium application) General Electric - F14T8/SR or F115T8/SR NOTE: Exact lamp specifications to be confirmed by Live Display Consultant	▪ Integral electronic ballast, 120V ▪ 20 gauge steel housing with standard white finish ▪ Refer to Exhibit Drawings for fixture layout and mounting details ▪ Exhibit Contractor to coordinate fixture length and quantity as required to maximize length of light in all locations ▪ Exhibit Contractor to coordinate fixture mounting details in Crawl Space structuure ▪ Provide all necessary mounting and power components as required ▪ Submit drawings showing complete case details with fixture layout and mounting in all cases for approval

UMNH – EXHIBIT LIGHTING

Light Fixture Schedule – 100% Final Design

Type	Location	Description	Manufacturer	Lamp	Remarks
C-LE-1	Typical Wall Inset Case	Surface mounted linear high output white LED channel	IO Lighting Line 0.75 Series-high output white LEDs Winona Lighting V-Line series Electrix Illumination L series Estimated Quantity: 100 ft.	Proprietary white LED Color Temperature: 3000K Power Consumption: 7.6W per ft Lumen Output: For 3000K LEDs - 170 lumen per watt CRI: 80+	▪ Remote power supply (100W max.), 120V/24V ▪ Extruded aluminum housing with standard matte finish ▪ Nominal 3/4” x 3/4” housing profile x lengths as required ▪ 60 degree beam distribution ▪ Refer to Exhibit Drawings for fixture layout and mounting details ▪ Fixtures shall be tandem mounted for continuous run with no gap between ▪ Exhibit Contractor to coordinate fixture length and quantity as required to maximize length of light within case (overall length of light shall not be less than length of case glass) ▪ Provide all necessary mounting and power components as required ▪ Coordinate remote power supply location with Exhibit Designer and field conditions and verify requirement with fixture manufacturer ▪ Submit the following for approval: o drawings showing complete case detail with fixture layout and mounting in all cases o sample of working fixture and typical mounting and power feed components

UMNH – EXHIBIT LIGHTING

Light Fixture Schedule – 100% Final Design

Type	Location	Description	Manufacturer	Lamp	Remarks
C-LE-2	Level 3 Mineral Hall (Wall Case)	Surface mounted linear high output white LED channel	IO Lighting Line 0.75 Series-high output white LEDs Winona Lighting V-Line series Electrix Illumination L series Estimated Quantity: 50 ft.	Proprietary white LED Color Temperature: 3000K Power Consumption: 7.6W per ft Lumen Output: For 3000K LEDs - 170 lumen per watt CRI: 80+	▪ Remote power supply (100W max.), 120V/24V ▪ Extruded aluminum housing with standard matte finish ▪ Nominal 3/4” x 3/4” housing profile x lengths as required ▪ 10 degree beam distribution ▪ Refer to Exhibit Drawings for fixture layout and mounting details ▪ Fixtures shall be tandem mounted for continuous run with no gap between ▪ Exhibit Contractor to coordinate fixture length and quantity as required to maximize length of light within case (overall length of light shall not be less than length of case glass) ▪ Provide all necessary mounting and power components as required ▪ Coordinate remote power supply location with Exhibit Designer and field conditions and verify requirement with fixture manufacturer ▪ Submit the following for approval: o drawings showing complete case detail with fixture layout and mounting in all cases o sample of working fixture and typical mounting and power feed components

Light Fixture Schedule – 100% Final Design

Type	Location	Description	Manufacturer	Lamp	Remarks
C-LE-3	Typical Wall Inset Case Level 3 First People - Homestead and Human Interaction Table Cases Level 3 First People - Exhibit Cases	Surface mounted linear standard output white LED channel	IO Lighting Line 0.75 Series- standard output white LEDs Winona Lighting V-Line series Electrix Illumination L series Estimated Quantity: 60 ft.	Proprietary white LED Color Temperature: 3000K Power Consumption: 2.1W per ft Lumen Output: For 3000K LEDs - 34 lumen per watt CRI: 80+	▪ Remote power supply (100W max.), 120V/24V ▪ Extruded aluminum housing with standard matte finish ▪ Nominal 3/4” x 3/4” housing profile x lengths as required ▪ 60 degree beam distribution ▪ Refer to Exhibit Drawings for fixture layout and mounting details ▪ Fixtures shall be tandem mounted for continuous run with no gap between ▪ Exhibit Contractor to coordinate fixture length and quantity as required to maximize length of light within case (overall length of light shall not be less than length of case glass) ▪ Provide all necessary mounting and power components as required ▪ Coordinate remote power supply location with Exhibit Designer and field conditions and verify requirement with fixture manufacturer ▪ Submit the following for approval: o drawings showing complete case detail with fixture layout and mounting in all cases o sample of working fixture and typical mounting and power feed components
C-LE-4 to C-LE-8	Deleted from project				

Light Fixture Schedule – 100% Final Design

Type	Location	Description	Manufacturer	Lamp	Remarks
C-LV	Typical Exhibit Case	Integrated in casework single-circuit low voltage track system with dimmable LED track fixtures	Bruck Lighting VA Track Series + Ledra Series LED track fixtures MOD with shorter stem with compartible track mounting clip Estimated Quantity: Track - 1750 ft. Track Heads - 1040 units	Proprietary 1W/3W white LED Color Temperature: 3000K Power Consumption: 4.0W for 1W LED 6.5W for 3W LED CRI: 80+	▪ Remote magnetic transformers, 120V/12V ▪ Integral dimmer with dimming range from 100% to 15% at LED track fixture ▪ Track shall be rigid extruded cooper and not bendable in field ▪ Standard track finish as per Exhibit Designer ▪ Refer to Exhibit Drawings for track layouts and mounting details ▪ Track system shall include tracks, mounting brackets/supports, and power feed/connectors for all runs and configurations as shown in Exhibit Drawings for a complete operable low voltage track system ▪ Provide track fixtures with 1W and 3W LED (exact quantity TBD) ▪ Provide (5) types of exchangeable front lens assembly with various beam distribution (exact beam angle and quantity TBD) and removable snoot glare shield (exact quantity TBD) ▪ Submit the following for approval: o drawings showing complete case detail with fixture layout and mounting in all cases o sample of working fixture and typical mounting and power feed components o sample of all lens and snoot shield ▪ Focusing required after installation is completed

UMNH – EXHIBIT LIGHTING

Light Fixture Schedule – 100% Final Design

Type	Location	Description	Manufacturer	Lamp	Remarks
C-TQ-1 to C-TQ-3	Deleted from XC scope				
C-YS-1	Deleted from XC scope				

PART 2 - EXHIBIT LIGHTING FIXTURES TO BE PROVDED, INSTALLED AND FOCUSED BY GENERAL CONTRACTOR (GC) AND COORDINATED WITH EXHIBIT CONTRACTOR (XC)

YP-3A	Level 3 Past World	C-clamp mounted gobo projector	ETC Source Four series with gobo rotating machine	(1) 575W HPL lamp	▪ Exhibit Contractor to coordinate gobo patterns and requirement with General Contractor
YP-3B	Level 3 First People	C-clamp mounted gobo projector	ETC Source Four series	(1) 575W HPL lamp	▪ Exhibit Contractor to coordinate gobo patterns and requirement with General Contractor
YZ-1	Level 4 Life Lab	C-clamp mounted gobo projector	ETC Source Four series	(1) 575W HPL lamp	▪ Exhibit Contractor to coordinate gobo patterns and requirement with General Contractor

REMARK:

1. Except for C-LV track head, all estimated quantities listed are based on 100% FD layout. Exhibit Contractor is responsible to verify exact quantities with exhibit case design and details.

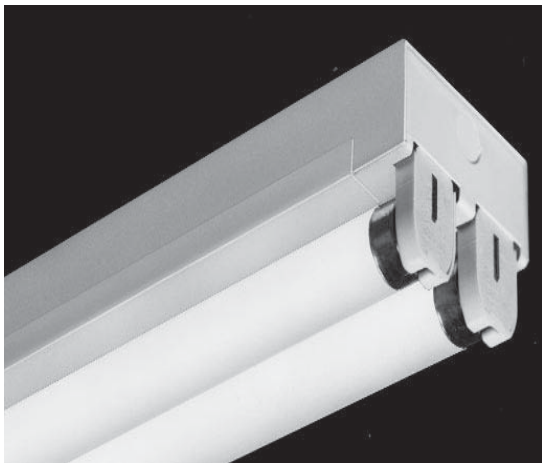
2. Estimated quantity for C-LV track head is for estimation purpose only. Actual quantity required shall be determined at focusing after installation of all displays is completed.

MINI-CHANNEL®

Series 1510

APPLICATIONS

MINI-CHANNEL® offers the specifier for the first time, the smallest electronic octic ballasted channel. This Low Profile design opens new vistas and allows greater flexibility for the designer heretofore only accomplished with channels with remote ballast. The compact design occupies minimum space providing high lumen output, energy and installation saving, and impressive color rendering availability. Quality components, welded construction, post powder coated finish, assuring a long trouble free life.



SPECIFICATIONS

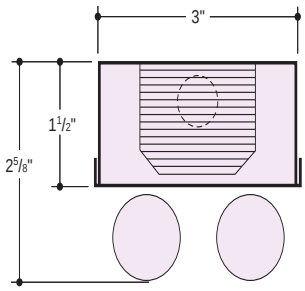
CONSTRUCTION: Die formed of 20 gauge cold rolled prime steel, rigidly fabricated, and electrically welded to insure true and perfect alignment.

MOUNTING: Installed flush with ceiling surface or stem mounted, singly or in continuous rows. For continuous mounting, *5/8" dia. end knockouts may be removed and units joined together. Adequate knockouts and holes are provided for mounting and feeds. *Optional 3/8" greenfield conduit connection fitting available, see OPTIONS.

ELECTRICAL: 2 and/or *4 lamp octic T8, 265MA Electronic High Power Factor, class A sound rated, <10% THD (less than 10% Total Harmonic Distortion) U.L. listed Type 1 for 118 volt 60 Hz operation. Other voltages and frequencies available. CONSULT FACTORY. *(Subject to manufacturers availability).

FINISH: All steel component parts are completely protected against rust and discoloration after fabrication through an automated conveyorized multi-stage phosphate bonding process. Finished with an electrostatic baked white polyester thermosetting powder coating. This electronic computer controlled integrated system assures consistent high reflectance efficiency and maximum durability.

CERTIFICATION: The MINI-CHANNEL® Series 1510 is U.L. and C.U.L. listed and bears the label of the I.B.E.W./AFL-CIO, Local #3. Optionally U.L. and C.U.L. listed for damp locations "DL".



Due to the very nature of coves and enclosed areas, the heat ambiance temperature must be considered when designing and installing in confined spaces, so that the spaces are adequately ventilated to provide heat dissipation and air circulation to prevent ballast cycling, failure, or reduced ballast and lamp life.

01/01

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C-CF-2

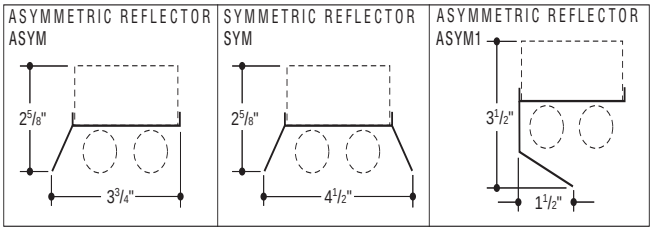
ORDERING DATA

Catalog No.	No. and Type Lamps	Nominal Dimensions	Wt.
1510-217-2 EBO	2-FO17-OCT	3" x 24"	5
1510-225-3 EBO	2-FO25-OCT	3" x 36"	11
1510-232-4 EBO	2-FO32-OCT	3" x 48"	13
1510-240-5 EBO	2-FO40-OCT	3" x 60"	21
1510-225-6T EBO	4-FO25-OCT	3" x 72"	22
1510-232-8T EBO	4-FO32-OCT	3" x 96"	26

OPTIONS

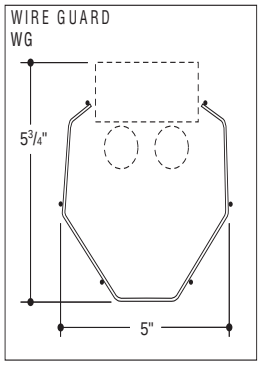
Suffix "DIM" after catalog no. for dimming ballast.
Suffix "LT" after catalog no. for cold weather ballast.
Suffix "DL" after catalog no. for damp location.
Suffix "EM" after catalog no. for emergency battery packs and see price list for types.
Suffix "XTA" after catalog no. for XTRALUME® reflector standard with 85% reflectance, for 95% reflectance specify your requirements.
Suffix "SYM" after catalog no. for post powder coated white SYMMETRIC reflector.
Suffix "ASYM" after catalog no. for post powder coated white ASYMMETRIC reflector.
Suffix "ASYM1" after catalog no. for post powder coated white ASYMMETRIC reflector.
Suffix "WG" after catalog no. for wire guard.
Suffix "GCC" after catalog no. for 3/8" greenfield/conduit connector.

REFLECTOR OPTIONS

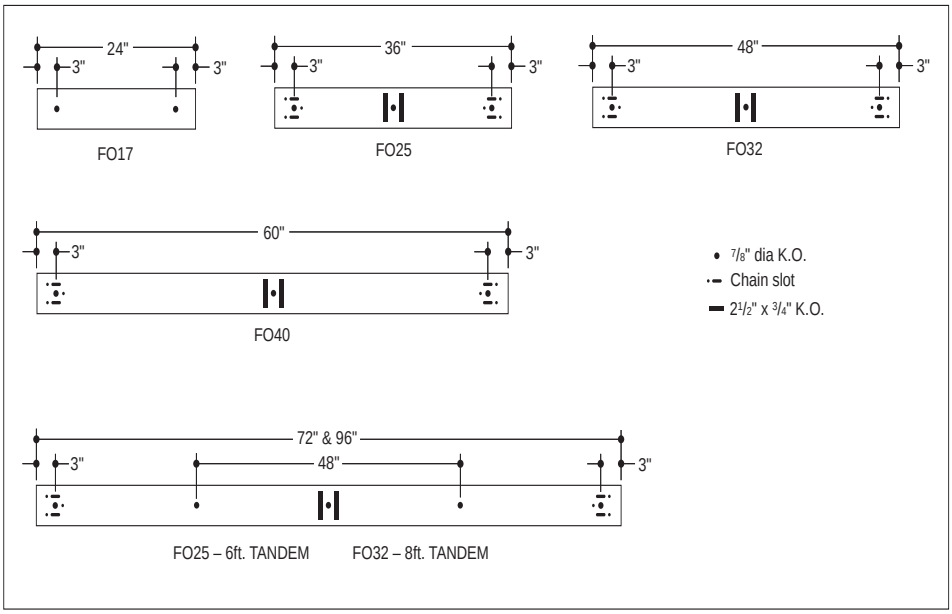


Reflector configurations shown can be modified to specification. Consult factory for minimum quantity order.

WIRE GUARD OPTION



BACK PLANS



FOR PHOTOMETRIC DATA CONSULT FACTORY
Information supplied primarily for illustrative purposes, subject to change.
Consult factory for verification and minimum quantity orders.

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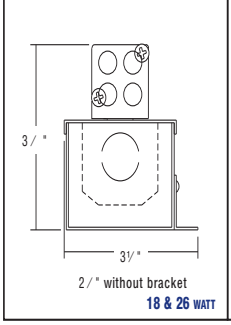
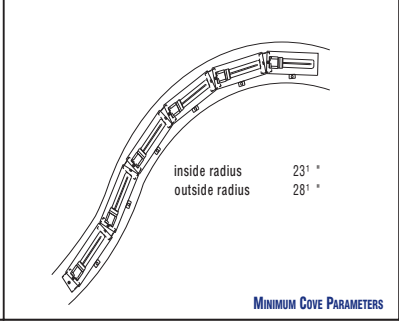
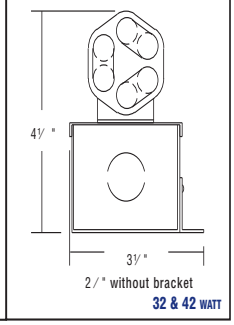
C-CF-2







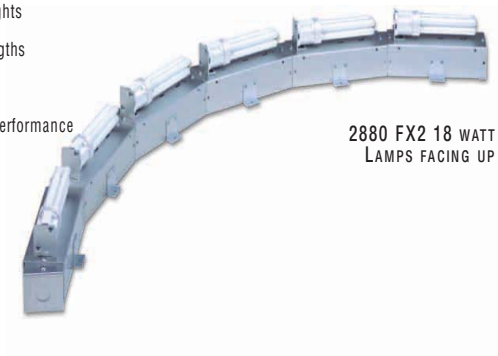
2880 NX2™ & FX2™

QUAD AND TRIPLE TUBE SEAMLESS STRAIGHT AND FIELD CURVABLE SYSTEM

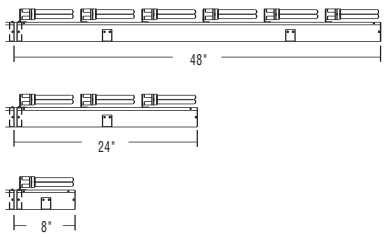
- Lamp Compatible with Specification Grade Downlights
- Linkable Seamless Straight and Field Curvable Lengths
- Constructed of Formed Satin Anodized Aluminum
- 18 or 26 watt Quad and 32 or 42 watt Triple High Performance Compact Fluorescent Lamps *(refer to page 8-33)*
- Voltage Options:
  - 120 volt
  - 277 volt
- Ballasts Options *(refer to page III)*
  - Electronic
  - Dimming*

  ** Dimming applications require an alternate configuration. Please consult factory.*

  Emergency Ballasts are available. Please consult factory.
- 8" On Center Spacing
- Lengths Through Wired for Easy Installation
- Exterior Mounting Clips for Quick, Easy Anchoring
- Custom Reflectors can be manufactured to your specifications. *(refer to page 8-34)*
- UL and CUL Listed Damp Location



2880 FX2 18 WATT LAMPS FACING UP



Ordering Format for 2880 NX2 & FX2

Choose one from each category

SERIES	LAMP CONFIGURATION	LAMP	VOLTAGE	BALLAST	LENGTH
2880 linear fixture	**NX2** seamless straight lamp up or down	**18 watt Quad** *(G24q-2)*	**1** 120 volt	**E** electronic	**48** 48" length *(6 lamps)*
	FX2 field curvable lamp up or down	**26 watt Quad** (G24q-3)	**2** 277 volt	**D** dimming* (18, 26 & 32 watt only)	**24** 24" length *(3 lamps)*
		32 watt Triple (G24q-3)			**8** 8" length *(1 lamp)*
		42 watt Triple (G24q-4)			

c UL US LISTED
DAMP LOCATION

NOTE:
* Dimming applications require an alternate configuration. Please consult factory.

These products protected by one or more of the following U.S. Patent Numbers 5,448,460, 5,221,139 & 5,452,187. Other patents pending. Modifications and custom configurations are available. Please contact our Sales Department.

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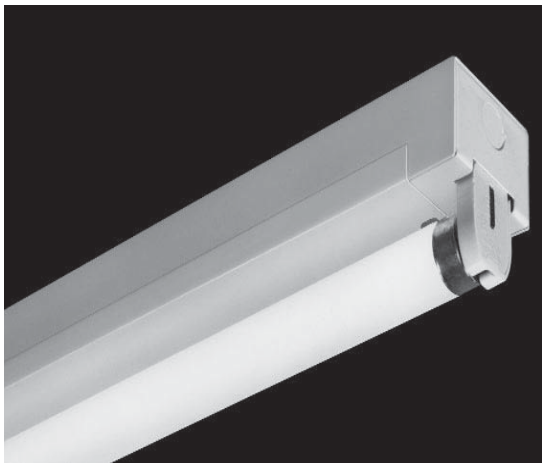
C-CF-3

MINI-STRIP®

Series 1500

APPLICATIONS

MINI-STRIP® offers the specifier for the first time, the smallest electronic octic ballasted strip. This Low Profile design opens new vistas and allows greater flexibility for the designer heretofore only accomplished with strips with remote ballast. The compact design occupies minimum space providing high lumen output, energy and installation saving, and impressive color rendering availability. Quality components, welded construction, post powder coated finish, assuring a long trouble free life.



SPECIFICATIONS

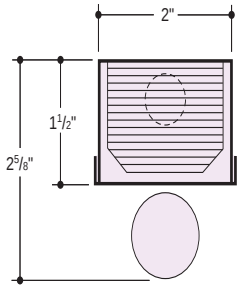
CONSTRUCTION: Die formed of 20 gauge cold rolled prime steel, rigidly fabricated, and electrically welded to insure true and perfect alignment.

MOUNTING: Installed flush with ceiling surface or stem mounted, singly or in continuous rows. For continuous mounting, *5/8" dia. end knockouts may be removed and units joined together. Adequate knockouts and holes are provided for mounting and feeds. *Optional 3/8" greenfield conduit connection fitting available, see OPTIONS.

ELECTRICAL: 1 and 2 lamp octic T8, 265MA Electronic High Power Factor, class A sound rated, <10% THD (less than 10% Total Harmonic Distortion) U.L. listed Type 1 for 118 volt 60 Hz operation. Other voltages and frequencies available. CONSULT FACTORY.

FINISH: All steel component parts are completely protected against rust and discoloration after fabrication through an automated conveyorized multi-stage phosphate bonding process. Finished with an electrostatic baked white polyester thermosetting powder coating. This electronic computer controlled integrated system assures consistent high reflectance efficiency and maximum durability.

CERTIFICATION: The MINI-STRIP® Series 1500 is U.L. and C.U.L. listed and bears the label of the I.B.E.W./AFL-CIO, Local #3. Optionally U.L. and C.U.L. listed for damp locations "DL".



Due to the very nature of coves and enclosed areas, the heat ambiance temperature must be considered when designing and installing in confined spaces, so that the spaces are adequately ventilated to provide heat dissipation and air circulation to prevent ballast cycling, failure, or reduced ballast and lamp life.

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C-CF-4

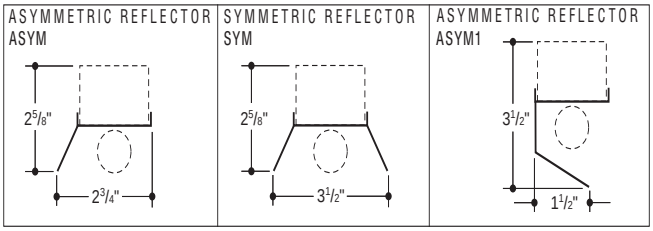
ORDERING DATA

Catalog No.	No. and Type Lamps	Nominal Dimensions	Wt.
1500-117-2 EBO	1-FO17-OCT	2" x 24"	4
1500-125-3 EBO	1-FO25-OCT	2" x 36"	7
1500-132-4 EBO	1-FO32-OCT	2" x 48"	8
1500-140-5 EBO	1-FO40-OCT	2" x 60"	11
1500-125-6T EBO	2-FO25-OCT	2" x 72"	14
1500-132-8T EBO	2-FO32-OCT	2" x 96"	16

OPTIONS

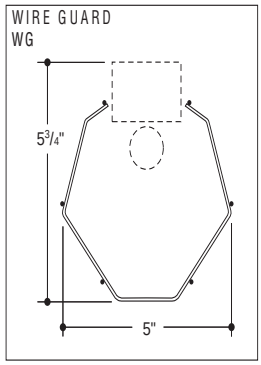
Suffix "DIM" after catalog no. for dimming ballast.
Suffix "LT" after catalog no. for cold weather ballast.
Suffix "DL" after catalog no. for damp location.
Suffix "EM" after catalog no. for emergency battery packs and see price list for types.
Suffix "XTA" after catalog no. for XTRALUME® reflector standard with 85% reflectance, for 95% reflectance specify your requirements.
Suffix "SYM" after catalog no. for post powder coated white SYMMETRIC reflector.
Suffix "ASYM" after catalog no. for post powder coated white ASYMMETRIC reflector.
Suffix "ASYM1" after catalog no. for post powder coated white ASYMMETRIC reflector.
Suffix "WG" after catalog no. for wire guard.
Suffix "GCC" after catalog no. for 3/8" greenfield/conduit connector.

REFLECTOR OPTIONS

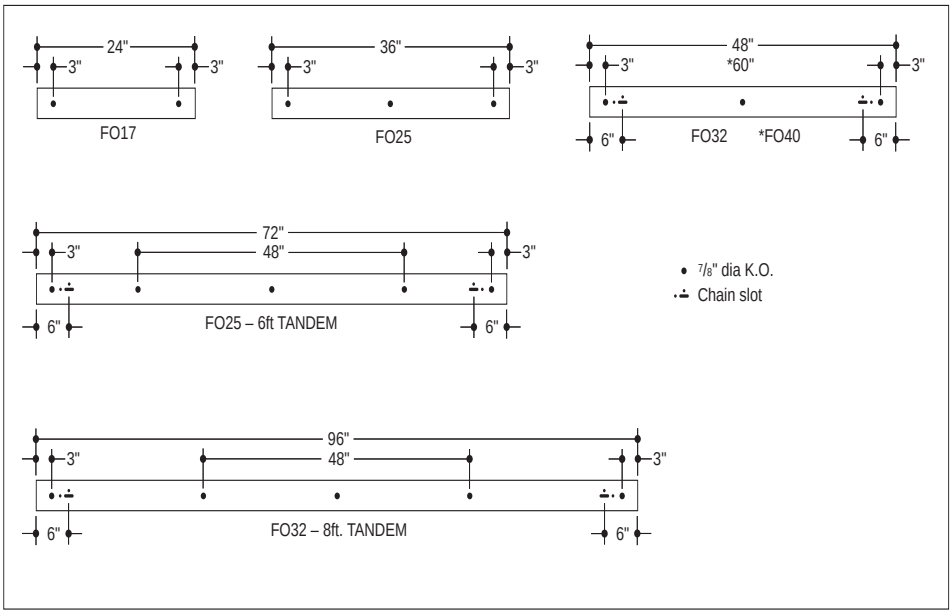


Reflector configurations shown can be modified to specification. Consult factory for minimum quantity order.

WIRE GUARD OPTION



BACK PLANS



FOR PHOTOMETRIC DATA CONSULT FACTORY
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C-CF-4

line™ .75

SYMMETRIC

Application

io Lighting's **line series .75** is approximately .75" x .75" in cross section. UL Listed for damp locations, its low profile housing enables functional luminous intensities from "tight" architectural details such as niches, coves & casework. Similar to halogen light sources, LEDs are point sources that offer superior definition to three dimensional objects and sparkle to reflective surfaces.

series .75 is a low voltage linear accent luminaire that may be ordered in incremental nominal lengths that range from 6" to 96". Optional beam spreads along the perpendicular axis of the fixture include 10°, 45°, and 65°. For details on the asymmetric beam spread, see dedicated specification sheet. **io** ensures that each LED is driven with the proper current and voltage which enables the average rated life to be 50,000 hours at 70% of the lamp lumen output. To ensure proper performance, architectural details should allow for ventilation and air flow around the fixture. Ambient temperature surrounding the fixture shall not exceed 120˚F.

Light Output

line series .75 is available with two lumen outputs for white light only. Red, green and blue are available in high output only. IES format files may be obtained from the factory or downloaded from **www.iolighting.com.**

Standard Output	High Output
3000K White: 34 lms/ft	3000K White: 170 lms/ft
5000K White: 40 lms/ft	5000K White: 230 lms/ft

Construction

The light weight, yet durable, extruded aluminum housing provides recommended heat sink requirements for LEDs. Patented optical assembly is composed of a customized acrylic material that offers very high transmisivity, UV stability, and excellent longevity. **series .75** is UL Listed for damp locations only.

Electrical

4'-0" 22 AWG, 600 volt TFFN rated power cords are supplied with strain reliefs. 24 volt 100 watt power supply will be provided as a standard. See daisy chain and remote distance requirements in chart on the lower left hand corner of this specification sheet. Alternate power supply options are available. Consult **io** website or **io** representative for **io** driver specification sheets.

Power supply and dimming module must be specified separately. For detailed information, see the **LED Linear** brochure or download the Power Supply specification sheet from **www.iolighting.com**.

Power Consumption

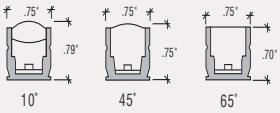
Standard Output: 2.1 w/ft **High Output: 7.6 w/ft**

Power consumption does not include power supply losses. Consult **io** driver specification sheets for losses associated with each driver option.

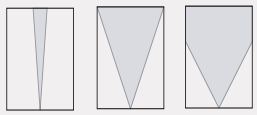
Finish

Anodized aluminum finish is standard. Custom finishes may be available upon request.

Dimensions



Beam Spreads



Power Supply

Standard Output

TYPE	SUPPLIES	REMOTE DISTANCE
24v100w	up to 35'-0"	7'-0" (w/22AWG)
	(2) RUNS UP TO	18'-0" (w/18AWG)
	49' WITH (1) RUN	46'-0" (w/14AWG)
	NTE 35'-0"	71'-0" (w/12AWG)

High Output

TYPE	SUPPLIES	REMOTE DISTANCE
24v100w	up to 12'-0"	7'-0" (w/22AWG)
		18'-0" (w/18AWG)
		46'-0" (w/14AWG)
		71'-0" (w/12AWG)

io Lighting
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2007 - io Lighting reserves the right to change specifications for product improvement without notification.

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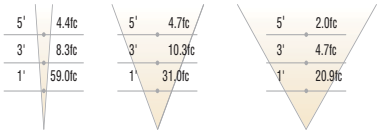
C-LE-1

io line™ .75

SYMMETRIC

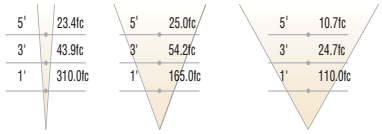
Light Output / Distributions / Electrical Feed Options

STANDARD OUTPUT



10°	45°	65°
3000K	3000K	3000K
8'-0"	8'-0"	8'-0"

HIGH OUTPUT



10°	45°	65°
3000K	3000K	3000K
8'-0"	8'-0"	8'-0"

ELECTRICAL END FEED OPTIONS

2 End feed

3 Right side feed

4 Left side feed

5 Bottom feed

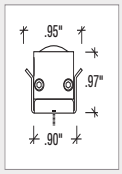
LIGHT OUTPUT CONVERSION TABLE

White Light Output	3000K S.O.	5000K S.O.	3000K H.O.	5000K H.O.
Light Output Multiplier	0.2(2)	0.24(2)	1.0(2)	1.35(2)

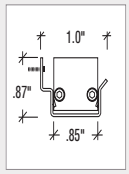
Color Light Output	RED	GREEN	BLUE
Light Output Multiplier	0.47(1)	0.71 (1)	0.24 (1)

IES format photometrics may be downloaded from **www.iolighting.com**

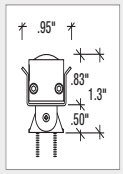
Mounting Options



100 Surface (**io** part #: SA.BK.SURF)



101 Side surface (**io** part #: SA.BK.WALL)



102 Field adjustable (**io** part #: SA.BK.ADJUST)

Order Code

0	.	03	.		.		.		.		.		.		.		.		.
io		1		2		3		4		5		6		7		8		9		10

1. LINE SERIES

03 .75 S.O. or H.O.

2. LOCATION

I Interior
E Exterior (Note: Rated for damp locations face down only)

3. COLOR

3K White 3000K (Standard)(2)
3KHO White 3000K (High Output)(2)
5K White 5000K (Standard)(2)
5KHO White 5000K (High Output)(2)
R Red(1)
G Green(1)
B Blue(1)

4. DISTRIBUTION

10 10 degree
45 45 degree
65 65 degree

5. MOUNTING

100 Surface
101 Side surface
102 Field adjustable

6. FINISH

1 Anodized Aluminum
2 Anodized Custom Color

7. LENGTH

	UNITS	(ACTUAL)
01	6"	(6.26")(3)
02	12"	(11.95")(3)
03	18"	(17.7")(3)
04	24"	(23.26")(3)
05	30"	(28.95")(3)
06	36"	(34.7")(3)
07	42"	(40.26")(3)
08	48"	(45.95")(3)
09	54"	(51.7")(3)
10	60"	(57.26")(3)
11	66"	(62.95")(3)
12	72"	(68.7")(3)
13	78"	(79.95")(3)
14	84"	(85.7")(3)
15	90"	(91.26")(3)
16	96"	(96.95")(3)

8. ELECTRICAL FEED

2 End feed
3 Right side feed
4 Left side feed
5 Bottom feed

FOR CONTINUOUS ROW

2-2 Right end feed
Left end feed
3-4 Right side feed
Left side feed
5-5 Right bottom feed
Left bottom feed

9. VOLTAGE / DIMMING

1 120v
2 277v
3 120v w/dim
4 277v w/dim
5 Other

10. SPECIFY DRIVER / DIMMING

Note: Reference **io** power supply specification sheet for driver and dimming options. If left blank, **io** will supply 100 watt drivers. Download Power Supply specification sheet from **www.iolighting.com**

Footnotes

Footnotes

1. Refer to conversion table for output.
2. White light variance between LED's within a single fixture will not exceed +/- 200k.
3. "Actual" length provided includes end feed and non-feed endcaps. Add .27 to each length when electrical feeds occur on both endcaps (for continuous row mounting).

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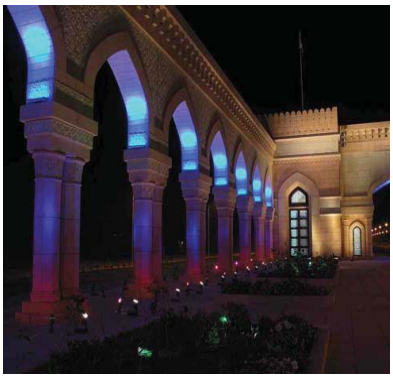
ADVANCE

XITANIUM
LED Drivers

Universal Outdoor Drivers for 12V and 24V LED systems



Applications

Orientation/Step Lighting

Architectural Lighting

Channel Letters

Contour Lighting

Edge Lighting

LEDs have evolved into a practical, flexible light source for a wide variety of illumination applications. Common LED products available in the market today are configured in a series-parallel array – designed to be powered by a suitable 24vdc driver – which allows flexibility to connect variable load levels. These operating voltages have become the standard in the industry.

The Brain Behind the Bright Idea

Xitanium LED drivers from Advance are designed specifically for 24V LED systems and incorporate features that enable broad commercialization of end-use solid-state lighting products.

Features	Benefits
UL Class 2	Limited output voltage and current plus isolation for safe operation
UL Outdoor Damp location rated - IP 66	Fully potted for moisture resistance and thermal benefits
Ultra small, compact size	Facilitates new, low-profile fixture design
Extreme low temperature Performance (-40°C)	Allows use in any outdoor application
Generous high temperature capability (+60°C)	Margin flexibility to facilitate fixture design
Tightly regulated output (1% line, 5% load)	Consistent light output across line and load levels
5 year warranty	Peace of mind for your new products and for end users...from the industry's most trusted component maker
Powered by Advance	Advance is preferred by end users – Enhance the value of your product

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Quick Selection Table

Catalog Number	Description	Application
LEDINTA0024V41FO	Intellivolt 100 Watt 24Vdc Outdoor	24Vdc LED Systems

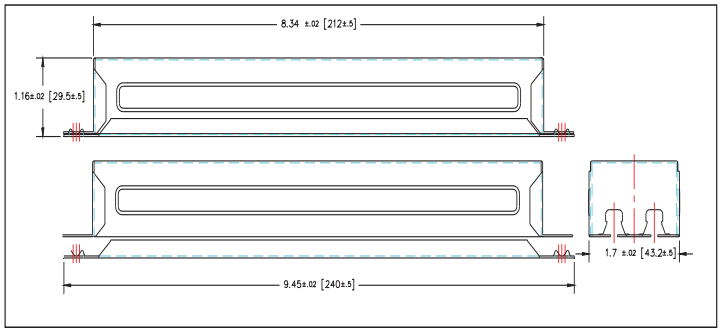
LED Driver Specifications

Description	Catalog Number	Input			Output			Case Temp Max (°C)	Figure	Weight (Grams)
		Volts (V)	Power Max (W)	Current Max (A)	Power Max (W)	Voltage Nom (V)	Current Max (A)			
100 Watt	LEDINTA0024V41FO	120	117.0	0.98	100.0	24.0	4.1	90	A	640
		230		0.51						
		277		.042						

Total Harmonic Distortion: 20% max
Power Factor: 90% min
Line Regulation: 1% output variation across input voltage range
Load Regulation: 5% output variation across input voltage range
Current Crest Factor: 1.5 max
Environmental Protection: IP66 outdoor rated
EMI: FCC47 SubPart15, CISPR15 and CISPR22 Class A
Protection: Meet UL1310 for Class 2; Inherent short-circuit protection, self-limited; overload protected; 3.2KV output insulation
AC Input and DC Output: 2 (0.78mm²) Solid Copper Wires, 15cm long

Dimensions

Fig. A

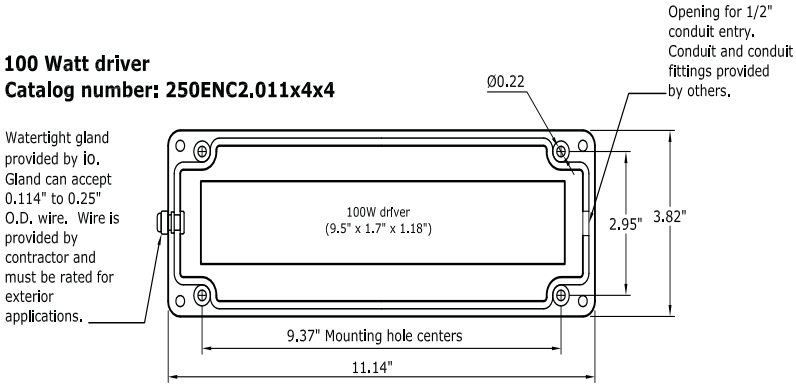


Advance, A Division of Philips Electronics North America · 10275 W Higgins Road · Rosemont, IL 60018 · USA
Tel: + 1 847 390-5205 · Fax: + 1 847 390-5264 · Revised 09/05PJJ

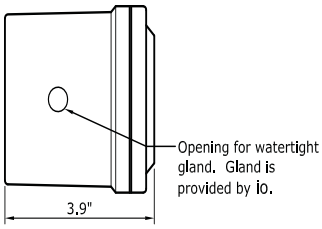
line

100W driver enclosure

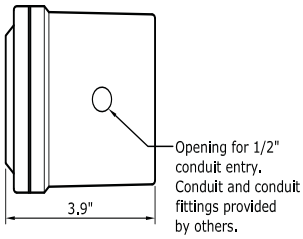
100 Watt driver
Catalog number: 250ENC2.011x4x4



Front view without cover



Left end view with cover



Right end view with cover

Enclosure Construction

Enclosure material is a molded fiberglass reinforced polyester (thermoset). The gasket is poured polyurethane seamless gasket that provides watertight, dust-tight environmental seal. The cover screws are recessed, captive and stainless steel.

Enclosure Industry Standards

UL/cUL 50	File E64358 type 1, 3, 4X, 6P, 12
NEMA 250	Type 1, 3, 4X, 6P, 12
CSA Std 22.2	File LR069014 type 1, 3, 4X, 6P, 12
Temp rating	(-40°C to +120°C)
Flammability rating	UL94-5V

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T: 847 735 7000 F: 847 735 7001 info@iolighting.com www.iolighting.com

line™ .75

SYMMETRIC

Application

io Lighting's **line series .75** is approximately .75" x .75" in cross section. UL Listed for damp locations, its low profile housing enables functional luminous intensities from "tight" architectural details such as niches, coves & casework. Similar to halogen light sources, LEDs are point sources that offer superior definition to three dimensional objects and sparkle to reflective surfaces.

series .75 is a low voltage linear accent luminaire that may be ordered in incremental nominal lengths that range from 6" to 96". Optional beam spreads along the perpendicular axis of the fixture include 10°, 45°, and 65°. For details on the asymmetric beam spread, see dedicated specification sheet. **io** ensures that each LED is driven with the proper current and voltage which enables the average rated life to be 50,000 hours at 70% of the lamp lumen output. To ensure proper performance, architectural details should allow for ventilation and air flow around the fixture. Ambient temperature surrounding the fixture shall not exceed 120˚F.

Light Output

line series .75 is available with two lumen outputs for white light only. Red, green and blue are available in high output only. IES format files may be obtained from the factory or downloaded from **www.iolighting.com.**

Standard Output	High Output
3000K White: 34 lms/ft	3000K White: 170 lms/ft
5000K White: 40 lms/ft	5000K White: 230 lms/ft

Construction

The light weight, yet durable, extruded aluminum housing provides recommended heat sink requirements for LEDs. Patented optical assembly is composed of a customized acrylic material that offers very high transmisivity, UV stability, and excellent longevity. **series .75** is UL Listed for damp locations only.

Electrical

4'-0" 22 AWG, 600 volt TFFN rated power cords are supplied with strain reliefs. 24 volt 100 watt power supply will be provided as a standard. See daisy chain and remote distance requirements in chart on the lower left hand corner of this specification sheet. Alternate power supply options are available. Consult **io** website or **io** representative for **io** driver specification sheets.

Power supply and dimming module must be specified separately. For detailed information, see the **LED Linear** brochure or download the Power Supply specification sheet from **www.iolighting.com**.

Power Consumption

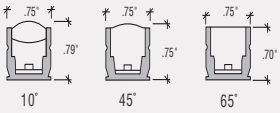
Standard Output: 2.1 w/ft **High Output: 7.6 w/ft**

Power consumption does not include power supply losses. Consult **io** driver specification sheets for losses associated with each driver option.

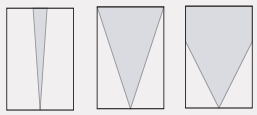
Finish

Anodized aluminum finish is standard. Custom finishes may be available upon request.

Dimensions



Beam Spreads



Power Supply

Standard Output

TYPE	SUPPLIES	REMOTE DISTANCE
24v100w	up to 35'-0"	7'-0" (w/22AWG)
	(2) RUNS UP TO	18'-0" (w/18AWG)
	49' WITH (1) RUN	46'-0" (w/14AWG)
	NTE 35'-0"	71'-0" (w/12AWG)

High Output

TYPE	SUPPLIES	REMOTE DISTANCE
24v100w	up to 12'-0"	7'-0" (w/22AWG)
		18'-0" (w/18AWG)
		46'-0" (w/14AWG)
		71'-0" (w/12AWG)

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370 Corporate Woods Pkwy Vernon Hills, IL 60061-3107
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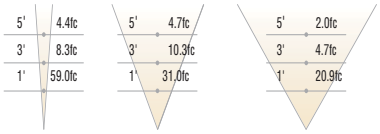
io line™ .75

SYMMETRIC

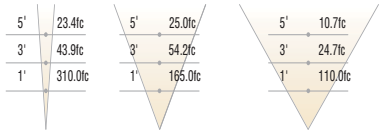
Light Output / Distributions / Electrical Feed Options

STANDARD OUTPUT



10°	45°	65°
3000K	3000K	3000K
8'-0"	8'-0"	8'-0"

HIGH OUTPUT



10°	45°	65°
3000K	3000K	3000K
8'-0"	8'-0"	8'-0"

ELECTRICAL END FEED OPTIONS

2 End feed

3 Right side feed

4 Left side feed

5 Bottom feed

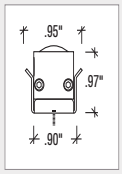
LIGHT OUTPUT CONVERSION TABLE

White Light Output	3000K S.O.	5000K S.O.	3000K H.O.	5000K H.O.
Light Output Multiplier	0.2(2)	0.24(2)	1.0(2)	1.35(2)

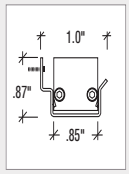
Color Light Output	RED	GREEN	BLUE
Light Output Multiplier	0.47(1)	0.71 (1)	0.24 (1)

IES format photometrics may be downloaded from **www.iolighting.com**

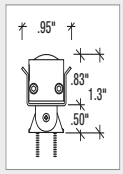
Mounting Options



100 Surface (**io** part #: SA.BK.SURF)



101 Side surface (**io** part #: SA.BK.WALL)



102 Field adjustable (**io** part #: SA.BK.ADJUST)

Order Code

0	.	03	.		.		.		.		.		.		.		.	
io		1		2		3		4		5		6		7		8		9		10

1. LINE SERIES

03 .75 S.O. or H.O.

2. LOCATION

I Interior
E Exterior (Note: Rated for damp locations face down only)

3. COLOR

3K White 3000K (Standard)(2)
3KHO White 3000K (High Output)(2)
5K White 5000K (Standard)(2)
5KHO White 5000K (High Output)(2)
R Red(1)
G Green(1)
B Blue(1)

4. DISTRIBUTION

10 10 degree
45 45 degree
65 65 degree

5. MOUNTING

100 Surface
101 Side surface
102 Field adjustable

6. FINISH

1 Anodized Aluminum
2 Anodized Custom Color

7. LENGTH

	UNITS	(ACTUAL)
01	6"	(6.26")(3)
02	12"	(11.95")(3)
03	18"	(17.7")(3)
04	24"	(23.26")(3)
05	30"	(28.95")(3)
06	36"	(34.7")(3)
07	42"	(40.26")(3)
08	48"	(45.95")(3)
09	54"	(51.7")(3)
10	60"	(57.26")(3)
11	66"	(62.95")(3)
12	72"	(68.7")(3)
13	78"	(79.95")(3)
14	84"	(85.7")(3)
15	90"	(91.26")(3)
16	96"	(96.95")(3)

8. ELECTRICAL FEED

2 End feed
3 Right side feed
4 Left side feed
5 Bottom feed

FOR CONTINUOUS ROW

2-2 Right end feed
Left end feed
3-4 Right side feed
Left side feed
5-5 Right bottom feed
Left bottom feed

9. VOLTAGE / DIMMING

1 120v
2 277v
3 120v w/dim
4 277v w/dim
5 Other

10. SPECIFY DRIVER / DIMMING

Note: Reference **io** power supply specification sheet for driver and dimming options. If left blank, **io** will supply 100 watt drivers. Download Power Supply specification sheet from **www.iolighting.com**

Footnotes

Footnotes

1. Refer to conversion table for output.
2. White light variance between LED's within a single fixture will not exceed +/- 200k.
3. "Actual" length provided includes end feed and non-feed endcaps. Add .27 to each length when electrical feeds occur on both endcaps (for continuous row mounting).

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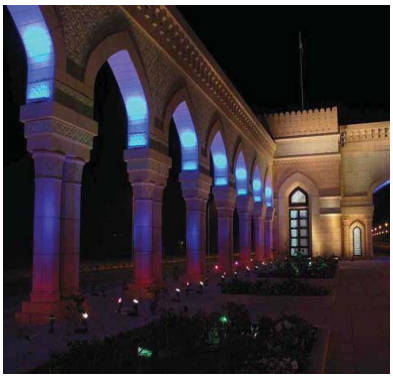
ADVANCE

XITANIUM
LED Drivers

Universal Outdoor Drivers for 12V and 24V LED systems



Applications

Orientation/Step Lighting

Architectural Lighting

Channel Letters

Contour Lighting

Edge Lighting

LEDs have evolved into a practical, flexible light source for a wide variety of illumination applications. Common LED products available in the market today are configured in a series-parallel array – designed to be powered by a suitable 24vdc driver – which allows flexibility to connect variable load levels. These operating voltages have become the standard in the industry.

The Brain Behind the Bright Idea

Xitanium LED drivers from Advance are designed specifically for 24V LED systems and incorporate features that enable broad commercialization of end-use solid-state lighting products.

Features	Benefits
UL Class 2	Limited output voltage and current plus isolation for safe operation
UL Outdoor Damp location rated - IP 66	Fully potted for moisture resistance and thermal benefits
Ultra small, compact size	Facilitates new, low-profile fixture design
Extreme low temperature Performance (-40°C)	Allows use in any outdoor application
Generous high temperature capability (+60°C)	Margin flexibility to facilitate fixture design
Tightly regulated output (1% line, 5% load)	Consistent light output across line and load levels
5 year warranty	Peace of mind for your new products and for end users...from the industry's most trusted component maker
Powered by Advance	Advance is preferred by end users – Enhance the value of your product

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Quick Selection Table

Catalog Number	Description	Application
LEDINTA0024V41FO	Intellivolt 100 Watt 24Vdc Outdoor	24Vdc LED Systems

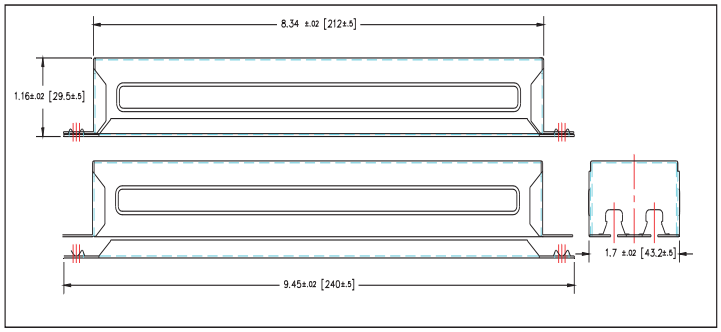
LED Driver Specifications

Description	Catalog Number	Input			Output			Case Temp Max (°C)	Figure	Weight (Grams)
		Volts (V)	Power Max (W)	Current Max (A)	Power Max (W)	Voltage Nom (V)	Current Max (A)			
100 Watt	LEDINTA0024V41FO	120	117.0	0.98	100.0	24.0	4.1	90	A	640
		230		0.51						
		277		.042						

Total Harmonic Distortion: 20% max
Power Factor: 90% min
Line Regulation: 1% output variation across input voltage range
Load Regulation: 5% output variation across input voltage range
Current Crest Factor: 1.5 max
Environmental Protection: IP66 outdoor rated
EMI: FCC47 SubPart15, CISPR15 and CISPR22 Class A
Protection: Meet UL1310 for Class 2; Inherent short-circuit protection, self-limited; overload protected; 3.2KV output insulation
AC Input and DC Output: 2 (0.78mm²) Solid Copper Wires, 15cm long

Dimensions

Fig. A



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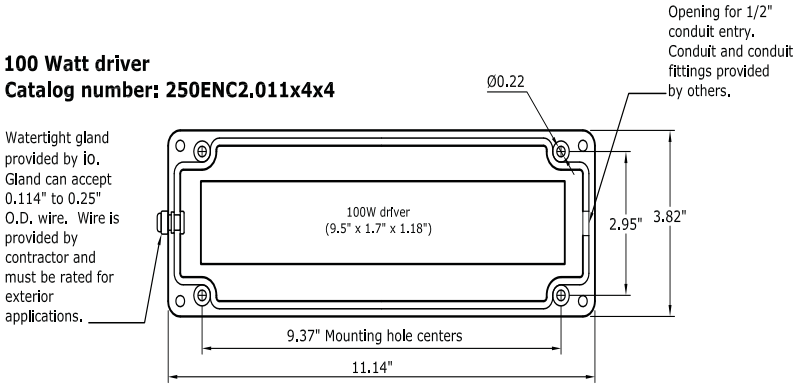
Tel: + 1 847 390-5205 · Fax: + 1 847 390-5264 · Revised 09/05PJJ

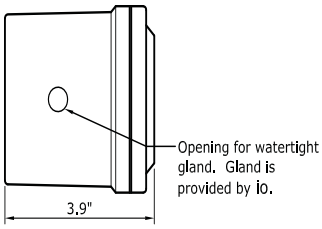
line

100W driver enclosure

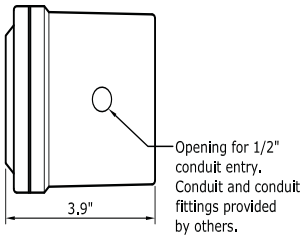
100 Watt driver
Catalog number: 250ENC2.011x4x4



Front view without cover



Left end view with cover



Right end view with cover

Enclosure Construction

Enclosure material is a molded fiberglass reinforced polyester (thermoset). The gasket is poured polyurethane seamless gasket that provides watertight, dust-tight environmental seal. The cover screws are recessed, captive and stainless steel.

Enclosure Industry Standards

UL/cUL 50	File E64358 type 1, 3, 4X, 6P, 12
NEMA 250	Type 1, 3, 4X, 6P, 12
CSA Std 22.2	File LR069014 type 1, 3, 4X, 6P, 12
Temp rating	(-40°C to +120°C)
Flammability rating	UL94-5V

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T: 847 735 7000 F: 847 735 7001 info@iolighting.com www.iolighting.com

line™ .75

SYMMETRIC

io

Application

io Lighting's **line series .75** is approximately .75" x .75" in cross section. UL Listed for damp locations, its low profile housing enables functional luminous intensities from "tight" architectural details such as niches, coves & casework. Similar to halogen light sources, LEDs are point sources that offer superior definition to three dimensional objects and sparkle to reflective surfaces.

series .75 is a low voltage linear accent luminaire that may be ordered in incremental nominal lengths that range from 6" to 96". Optional beam spreads along the perpendicular axis of the fixture include 10°, 45°, and 65°. For details on the asymmetric beam spread, see dedicated specification sheet. **io** ensures that each LED is driven with the proper current and voltage which enables the average rated life to be 50,000 hours at 70% of the lamp lumen output. To ensure proper performance, architectural details should allow for ventilation and air flow around the fixture. Ambient temperature surrounding the fixture shall not exceed 120˚F.

Light Output

line series .75 is available with two lumen outputs for white light only. Red, green and blue are available in high output only. IES format files may be obtained from the factory or downloaded from **www.iolighting.com.**

Standard Output	High Output
3000K White: 34 lms/ft	3000K White: 170 lms/ft
5000K White: 40 lms/ft	5000K White: 230 lms/ft

Construction

The light weight, yet durable, extruded aluminum housing provides recommended heat sink requirements for LEDs. Patented optical assembly is composed of a customized acrylic material that offers very high transmisivity, UV stability, and excellent longevity. **series .75** is UL Listed for damp locations only.

Electrical

4'-0" 22 AWG, 600 volt TFFN rated power cords are supplied with strain reliefs. 24 volt 100 watt power supply will be provided as a standard. See daisy chain and remote distance requirements in chart on the lower left hand corner of this specification sheet. Alternate power supply options are available. Consult **io** website or **io** representative for **io** driver specification sheets.

Power supply and dimming module must be specified separately. For detailed information, see the **LED Linear** brochure or download the Power Supply specification sheet from **www.iolighting.com**.

Power Consumption

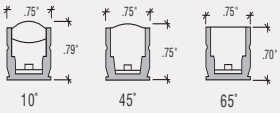
Standard Output: 2.1 w/ft **High Output: 7.6 w/ft**

Power consumption does not include power supply losses. Consult **io** driver specification sheets for losses associated with each driver option.

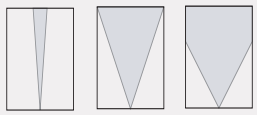
Finish

Anodized aluminum finish is standard. Custom finishes may be available upon request.

Dimensions



Beam Spreads



Power Supply

Standard Output

TYPE	SUPPLIES	REMOTE DISTANCE
24v100w	up to 35'-0"	7'-0" (w/22AWG)
	(2) RUNS UP TO	18'-0" (w/18AWG)
	49' WITH (1) RUN	46'-0" (w/14AWG)
	NTE 35'-0"	71'-0" (w/12AWG)

High Output

TYPE	SUPPLIES	REMOTE DISTANCE
24v100w	up to 12'-0"	7'-0" (w/22AWG)
		18'-0" (w/18AWG)
		46'-0" (w/14AWG)
		71'-0" (w/12AWG)

io Lighting
370 Corporate Woods Pkwy Vernon Hills, IL 60061-3107
T 847.735.7000 F 847.735.7001 E info@iolighting.com W iolighting.com

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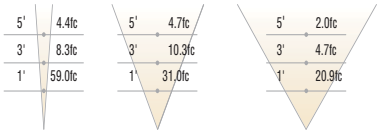
io line™ .75

SYMMETRIC

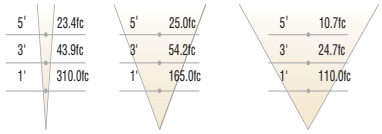
Light Output / Distributions / Electrical Feed Options

STANDARD OUTPUT



10°	45°	65°
3000K	3000K	3000K
8'-0"	8'-0"	8'-0"

HIGH OUTPUT



10°	45°	65°
3000K	3000K	3000K
8'-0"	8'-0"	8'-0"

ELECTRICAL END FEED OPTIONS

2 End feed

3 Right side feed

4 Left side feed

5 Bottom feed

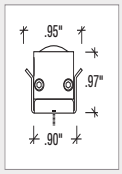
LIGHT OUTPUT CONVERSION TABLE

White Light Output	3000K S.O.	5000K S.O.	3000K H.O.	5000K H.O.
Light Output Multiplier	0.2(2)	0.24(2)	1.0(2)	1.35(2)

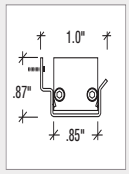
Color Light Output	RED	GREEN	BLUE
Light Output Multiplier	0.47(1)	0.71 (1)	0.24 (1)

IES format photometrics may be downloaded from **www.iolighting.com**

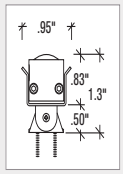
Mounting Options



100 Surface (**io** part #: SA.BK.SURF)



101 Side surface (**io** part #: SA.BK.WALL)



102 Field adjustable (**io** part #: SA.BK.ADJUST)

Order Code

0	.	03	.		.		.		.		.		.		.		.	
io		1		2		3		4		5		6		7		8		9		10

1. LINE SERIES

03 .75 S.O. or H.O.

2. LOCATION

I Interior
E Exterior (Note: Rated for damp locations face down only)

3. COLOR

3K White 3000K (Standard)(2)
3KHO White 3000K (High Output)(2)
5K White 5000K (Standard)(2)
5KHO White 5000K (High Output)(2)
R Red(1)
G Green(1)
B Blue(1)

4. DISTRIBUTION

10 10 degree
45 45 degree
65 65 degree

5. MOUNTING

100 Surface
101 Side surface
102 Field adjustable

6. FINISH

1 Anodized Aluminum
2 Anodized Custom Color

7. LENGTH

	UNITS	(ACTUAL)
01	6"	(6.26")(3)
02	12"	(11.95")(3)
03	18"	(17.7")(3)
04	24"	(23.26")(3)
05	30"	(28.95")(3)
06	36"	(34.7")(3)
07	42"	(40.26")(3)
08	48"	(45.95")(3)
09	54"	(51.7")(3)
10	60"	(57.26")(3)
11	66"	(62.95")(3)
12	72"	(68.7")(3)
13	78"	(79.95")(3)
14	84"	(85.7")(3)
15	90"	(91.26")(3)
16	96"	(96.95")(3)

8. ELECTRICAL FEED

2 End feed
3 Right side feed
4 Left side feed
5 Bottom feed

FOR CONTINUOUS ROW

2-2 Right end feed
Left end feed
3-4 Right side feed
Left side feed
5-5 Right bottom feed
Left bottom feed

9. VOLTAGE / DIMMING

1 120v
2 277v
3 120v w/dim
4 277v w/dim
5 Other

10. SPECIFY DRIVER / DIMMING

Note: Reference **io** power supply specification sheet for driver and dimming options. If left blank, **io** will supply 100 watt drivers. Download Power Supply specification sheet from **www.iolighting.com**

Footnotes

Footnotes

1. Refer to conversion table for output.
2. White light variance between LED's within a single fixture will not exceed +/- 200k.
3. "Actual" length provided includes end feed and non-feed endcaps. Add .27 to each length when electrical feeds occur on both endcaps (for continuous row mounting).

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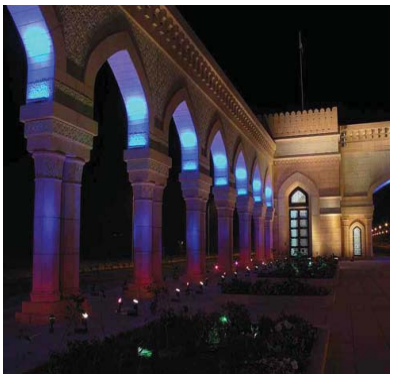
ADVANCE

XITANIUM
LED Drivers

Universal Outdoor Drivers for 12V and 24V LED systems



Applications

Orientation/Step Lighting

Architectural Lighting

Channel Letters

Contour Lighting

Edge Lighting

LEDs have evolved into a practical, flexible light source for a wide variety of illumination applications. Common LED products available in the market today are configured in a series-parallel array – designed to be powered by a suitable 24vdc driver – which allows flexibility to connect variable load levels. These operating voltages have become the standard in the industry.

The Brain Behind the Bright Idea

Xitanium LED drivers from Advance are designed specifically for 24V LED systems and incorporate features that enable broad commercialization of end-use solid-state lighting products.

Features	Benefits
UL Class 2	Limited output voltage and current plus isolation for safe operation
UL Outdoor Damp location rated - IP 66	Fully potted for moisture resistance and thermal benefits
Ultra small, compact size	Facilitates new, low-profile fixture design
Extreme low temperature Performance (-40°C)	Allows use in any outdoor application
Generous high temperature capability (+60°C)	Margin flexibility to facilitate fixture design
Tightly regulated output (1% line, 5% load)	Consistent light output across line and load levels
5 year warranty	Peace of mind for your new products and for end users...from the industry's most trusted component maker
Powered by Advance	Advance is preferred by end users – Enhance the value of your product

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Quick Selection Table

Catalog Number	Description	Application
LEDINTA0024V41FO	Intellivolt 100 Watt 24Vdc Outdoor	24Vdc LED Systems

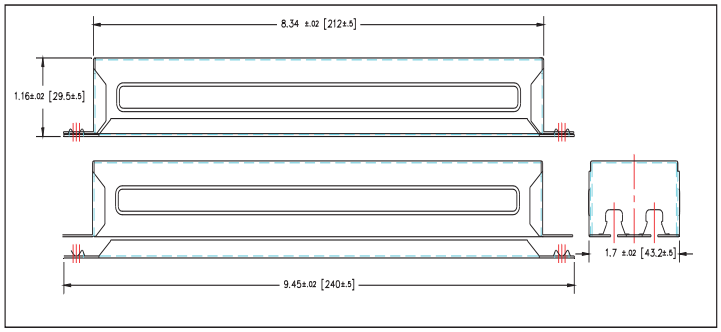
LED Driver Specifications

Description	Catalog Number	Input			Output			Case Temp Max (°C)	Figure	Weight (Grams)
		Volts (V)	Power Max (W)	Current Max (A)	Power Max (W)	Voltage Nom (V)	Current Max (A)			
100 Watt	LEDINTA0024V41FO	120	117.0	0.98	100.0	24.0	4.1	90	A	640
		230		0.51						
		277		.042						

Total Harmonic Distortion: 20% max
Power Factor: 90% min
Line Regulation: 1% output variation across input voltage range
Load Regulation: 5% output variation across input voltage range
Current Crest Factor: 1.5 max
Environmental Protection: IP66 outdoor rated
EMI: FCC47 SubPart15, CISPR15 and CISPR22 Class A
Protection: Meet UL1310 for Class 2; Inherent short-circuit protection, self-limited; overload protected; 3.2KV output insulation
AC Input and DC Output: 2 (0.78mm²) Solid Copper Wires, 15cm long

Dimensions

Fig. A

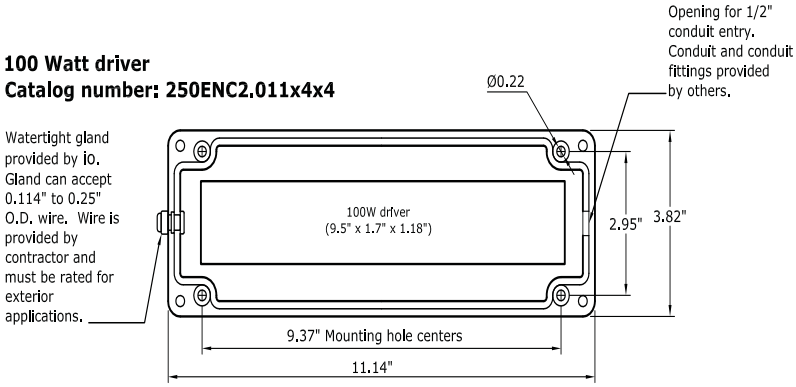


Advance, A Division of Philips Electronics North America · 10275 W Higgins Road · Rosemont, IL 60018 · USA
Tel: + 1 847 390-5205 · Fax: + 1 847 390-5264 · Revised 09/05PJJ

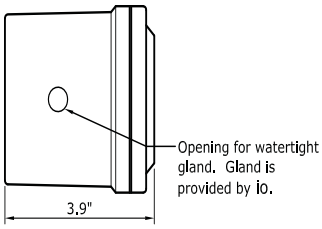
line

100W driver enclosure

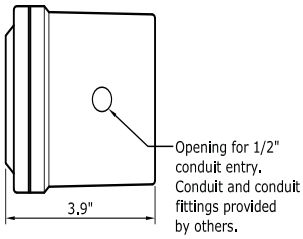
100 Watt driver
Catalog number: 250ENC2.011x4x4



Front view without cover



Left end view with cover



Right end view with cover

Enclosure Construction

Enclosure material is a molded fiberglass reinforced polyester (thermoset). The gasket is poured polyurethane seamless gasket that provides watertight, dust-tight environmental seal. The cover screws are recessed, captive and stainless steel.

Enclosure Industry Standards

UL/cUL 50	File E64358 type 1, 3, 4X, 6P, 12
NEMA 250	Type 1, 3, 4X, 6P, 12
CSA Std 22.2	File LR069014 type 1, 3, 4X, 6P, 12
Temp rating	(-40°C to +120°C)
Flammability rating	UL94-5V

io Lighting LLC, 370 Corporate Woods Pkwy, Vernon Hills, Illinois 60061-3107
T: 847 735 7000 F: 847 735 7001 info@iolighting.com www.iolighting.com

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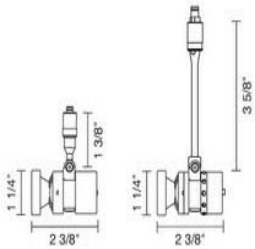
LEDRA™ II

Description:
The Ledra II is a fully adjustable Uni-Light fixture. Integral AC/DC converter allows fixture to work on all Bruck tracks with standard 12VAC transformers. Fixture works with electronic transformer but, must meet minimum 20% load. Internal dimming, through integral 32-step switching, controls on each fixture for precise setting. The small size, long life, lack of UV, and cool beam makes the Ledra II ideal for displays, casework, difficult to maintain locations, and applications requiring efficient rich color accents. Ledra II may only be used with a magnetic transformer.



Technical Specs:
Finish: matte chrome and bronze
Power consumption: 6.5 Watts
Drive current: 700mA
Lumen output: 65 at 700mA
Lamp life: 70% at 50,000hrs
5500 White with Luxeon III Star LED
3200 Warm White with Z- Power LED

Part Numbers:

135711/s	white 5000K, 10° lens, 1 3/8" stem
135711/m	white 5000K, 30° lens, 1 3/8" stem
135711/fl	white 5000K, 45° lens, 1 3/8" stem
135711bz/s	bronze, white 5000K, 10° lens, 1 3/8" stem
135711bz/m	bronze, white 5000K, 30° lens, 1 3/8" stem
135711bz/fl	bronze, white 5000K, 45° lens, 1 3/8" stem
135711-1/s	white 3000K, 10° lens, 1 3/8" stem
135711-1/m	white 3000K, 30° lens, 1 3/8" stem
135711-1/fl	white 3000K, 45° lens, 1 3/8" stem
135711-1bz/s	bronze, white 3000K, 10° lens, 1 3/8" stem
135711-1bz/m	bronze, white 3000K, 30° lens, 1 3/8" stem

15774 Gateway Circle Tustin, CA 92780 ph: (714) 259-9959 fax: (714) 259-9969 www.brucklighting.com

BRUCK.

135711-1bz/fl	bronze, white 3000K, 45° lens, 1 3/8" stem
135713/s	white 5000K, 10° lens, 3 5/8" stem
135713/m	white 5000K, 30° lens, 3 5/8" stem
135713/fl	white 5000K, 45° lens, 3 5/8" stem
135713bz/s	bronze, white 5000K, 10° lens, 3 5/8" stem
135713bz/m	bronze, white 5000K, 30° lens, 3 5/8" stem
135713bz/fl	bronze, white 5000K, 45° lens, 3 5/8" stem
135713-1/s	white 3000K, 10° lens, 3 5/8" stem
135713-1/m	white 3000K, 30° lens, 3 5/8" stem
135713-1/fl	white 3000K, 45° lens, 3 5/8" stem
135713-1bz/s	bronze, white 3000K, 10° lens, 3 5/8" stem
135713-1bz/m	bronze, white 3000K, 30° lens, 3 5/8" stem
135713-1bz/fl	bronze, white 3000K, 45° lens, 3 5/8" stem

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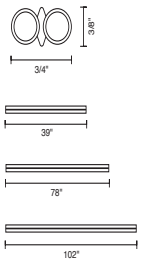
V/A TRACK

The V/A track consists of 2 extruded copper pipes with galvanized surface in chrome, bronze, gold or matte chrome. The plastic insulation is either black or grey.

STRAIGHT TRACK

12V | MAX 300W | SINGLE CIRCUIT

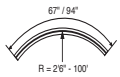


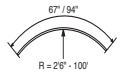
BZ	160031bz	39″
CH	160031ch	39″
G	160031g	39″
MC	160031mc	39″
BZ	160032bz	78″
CH	160032ch	78″
G	160032g	78″
MC	160032mc	78″
BZ	160033bz	102″
CH	160033ch	102″
MC	160033mc	102″

CURVED TRACK

12V | MAX 300W | SINGLE CIRCUIT

Custom curved V/A track bent horizontally or vertically in any radius from 2′ 6″ to 100′.





	horizontal curve	
BZ	160019-1bz	67″
CH	160019-1ch	67″
G	160019-1g	67″
MC	160019-1mc	67″
	horizontal curve	
BZ	160019-2bz	94″
CH	160019-2ch	94″
MC	160019-2mc	94″
	vertical curve	
BZ	160019-3bz	67″
CH	160019-3ch	67″
MC	160019-3mc	67″
	vertical curve	
BZ	160019-4bz	94″
CH	160019-4ch	94″
MC	160019-4mc	94″

END CAP

BK	160020blk
MC	160020mc

DEBURRING TOOL

160400

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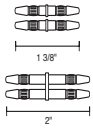
TRACK CONNECTOR / ISO CONNECTOR

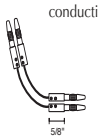
160402	conductive	CH
160409blk	isolator	BK
160409mc	isolator	MC



FLEXIBLE TRACK CONNECTOR

conductive

160501bz	55º-130º	BZ
160501ch	55º-130º	CH
160501g	55º-130º	G
160501mc	55º-130º	MC

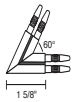


HORIZONTAL ANGLE CONNECTOR

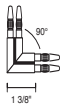
conductive

N 160411bz	45º	BZ
160411ch	45º	CH
160411g	45º	G
160411mc	45º	MC

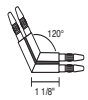
N 160420bz	60º	BZ
160420ch	60º	CH
160420g	60º	G
160420mc	60º	MC



160406bz	90º	BZ
160406ch	90º	CH
160406g	90º	G
160406mc	90º	MC



N 160421bz	120º	BZ
160421ch	120º	CH
160421g	120º	G
160421mc	120º	MC



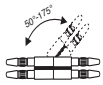
N 160408bz	135º	BZ
160408ch	135º	CH
160408g	135º	G
160408mc	135º	MC

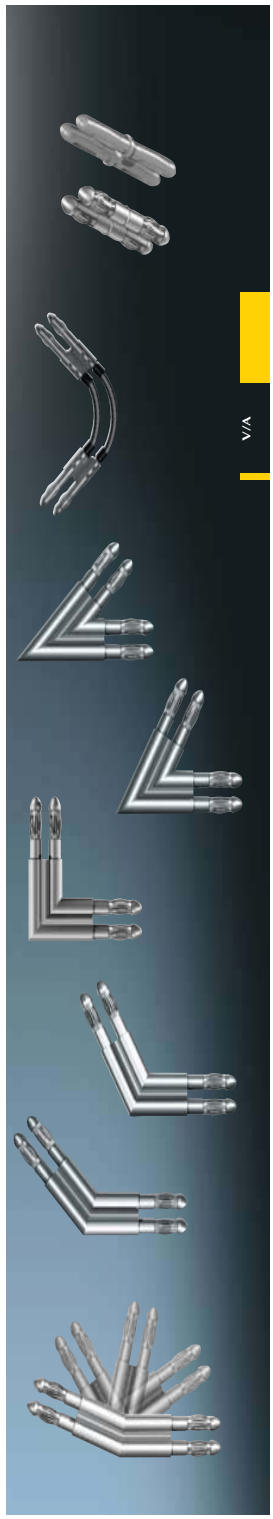
CUSTOM HORIZONTAL ANGLE CONNECTOR

conductive

custom angle in 5º increments, specify when ordering

N 160830bz	45º-180º	BZ
160830ch	45º-180º	CH
160830g	45º-180º	G
160830mc	45º-180º	MC





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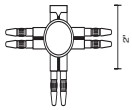
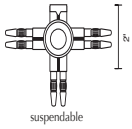
V/A CONNECTORS

HORIZONTAL T-CONNECTOR



BZ	N 160414bz	T-Connector
CH	160414ch	T-Connector
G	160414g	T-Connector
MC	160414mc	T-Connector

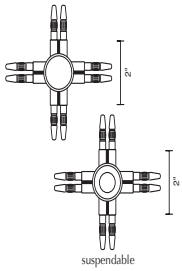
for use with 160605



suspendable

BZ	N 160416bz	T-Connector
CH	N 160416ch	T-Connector
G	N 160416g	T-Connector
MC	N 160416mc	T-Connector

HORIZONTAL CROSS CONNECTOR



suspendable

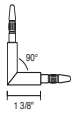
BZ	N 160404bz	Cross Connector
CH	160404ch	Cross Connector
G	160404g	Cross Connector
MC	160404mc	Cross Connector

for use with 160605

BZ	N 160412bz	Cross Connector
CH	N 160412ch	Cross Connector
G	N 160412g	Cross Connector
MC	N 160412mc	Cross Connector

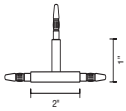
VERTICAL ANGLE CONNECTOR

conductive



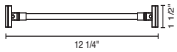
BZ	N 160407bz	90°
CH	160407ch	90°
G	160407g	90°
MC	160407mc	90°

BZ	N 160410bz	135°
CH	160410ch	135°
G	160410g	135°
MC	160410mc	135°



BZ	N 160403bz	T-Connector
CH	160403ch	T-Connector
G	160403g	T-Connector
MC	160403mc	T-Connector

TRACK SPACER



BZ	160210bz	12 1/4″
CH	160210ch	12 1/4″
G	N 160210g	12 1/4″
MC	160210mc	12 1/4″

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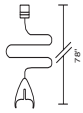
CORD SUSPENSION CLIP

aircraft cable with clamp adaptor

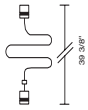
N 160600bz	78″	BZ
N 160600ch	78″	CH
N 160600g	78″	G
N 160600mc	78″	MC



CORD SUSPENSION II

for use with 160412 or 160416

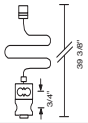
N 160605ch	39 3/8″	CH
N 160605mc	39 3/8″	MC



CORD SUSPENSION CROSS CONNECTOR

aircraft cable with clamp adaptor

160206ch	39 3/8″	CH
160206mc	39 3/8″	MC

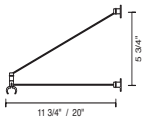


WALL & CEILING ATTACHMENT CLIP

160518bz	1″	BZ
160518ch	1″	CH
160518g	1″	G
160518mc	1″	MC
160519blk	3/8″	BK
160519mc	3/8″	MC

WALL EXTENSION ARM CLIP

160560bz	11 3/4″	BZ
160560ch	11 3/4″	CH
160560mc	11 3/4″	MC
160561bz	20″	BZ
160561ch	20″	CH
160561mc	20″	MC



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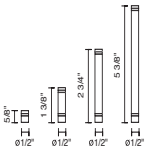
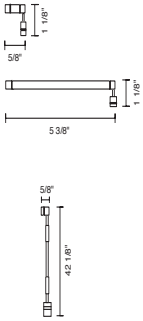
V/A MOUNTING SUPPORTS

SPACER



BZ	N 160430bz	5/8″
CH	160430ch	5/8″
G	160430g	5/8″
MC	160430mc	5/8″
BZ	N 160530bz	1 3/8″
CH	160530ch	1 3/8″
G	160530g	1 3/8″
MC	160530mc	1 3/8″
BZ	160531bz	2 3/4″
CH	160531ch	2 3/4″
G	160531g	2 3/4″
MC	160531mc	2 3/4″
BZ	N 160532bz	5 3/8″
CH	160532ch	5 3/8″
G	160532g	5 3/8″
MC	160532mc	5 3/8″

WALL SUSPENSION



CH	160565ch	5/8″
MC	160565mc	5/8″
CH	160566ch	5 3/8″
MC	160566mc	5 3/8″
CH	160580ch	42″ 1/8″
MC	160580mc	42″ 1/8″

PLATE DISC

BZ	160533bz
CH	160533ch
G	160533g
MC	160533mc

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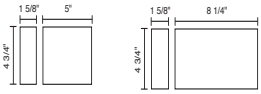
TC2 ELECTRONIC TRANSFORMER

Class II with 5A breakers included

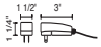
TC2-150/120v	3 x 50W, 120V
TC2-300/120v	6 x 50W, 120V



T-60 PLUG-IN TRANSFORMER

electronic transformer for standard wall sockets

70403	60W, 120V	BLK



PLUG-IN TRANSFORMER FOR LEDRA FIXTURES

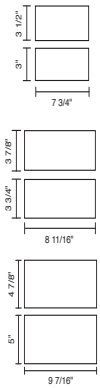
short circuit and overload protected, output DC 12V 700mA max, UL listed

70423	120V/250V	BLK

T REMOTE TRANSFORMER

2 secondary taps with circuit breaker included in housing, for separate switching separate transformers should be used, choke optional

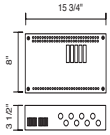
T-150/120v	150W, 120V	BLK
T-300/120v	300W, 120V	WH
T-300/277v	300W, 277V	WH
T-600/120v	2 x 300W, 120V	WH
T-600/277v	2 x 300W, 277V	WH
TCK-300	choke for 300W transformer	
TCK-600	choke for 600W transformer	



TQ REMOTE/SURFACE TRANSFORMER

4 secondary taps with primary and secondary circuit breaker included, zero clearance requirement, choke optional for dimming

TQ-150/120v	150W, 120V	WH
TQ-300/120v	300W, 120V	WH
TQ-300/277v	300W, 277V	WH
TQ-600/120v	2 x 300W, 120V	WH
TQ-600/277v	2 x 300W, 277V	WH
TCK-300	choke for 300W transformer	
TCK-600	choke for 600W transformer	



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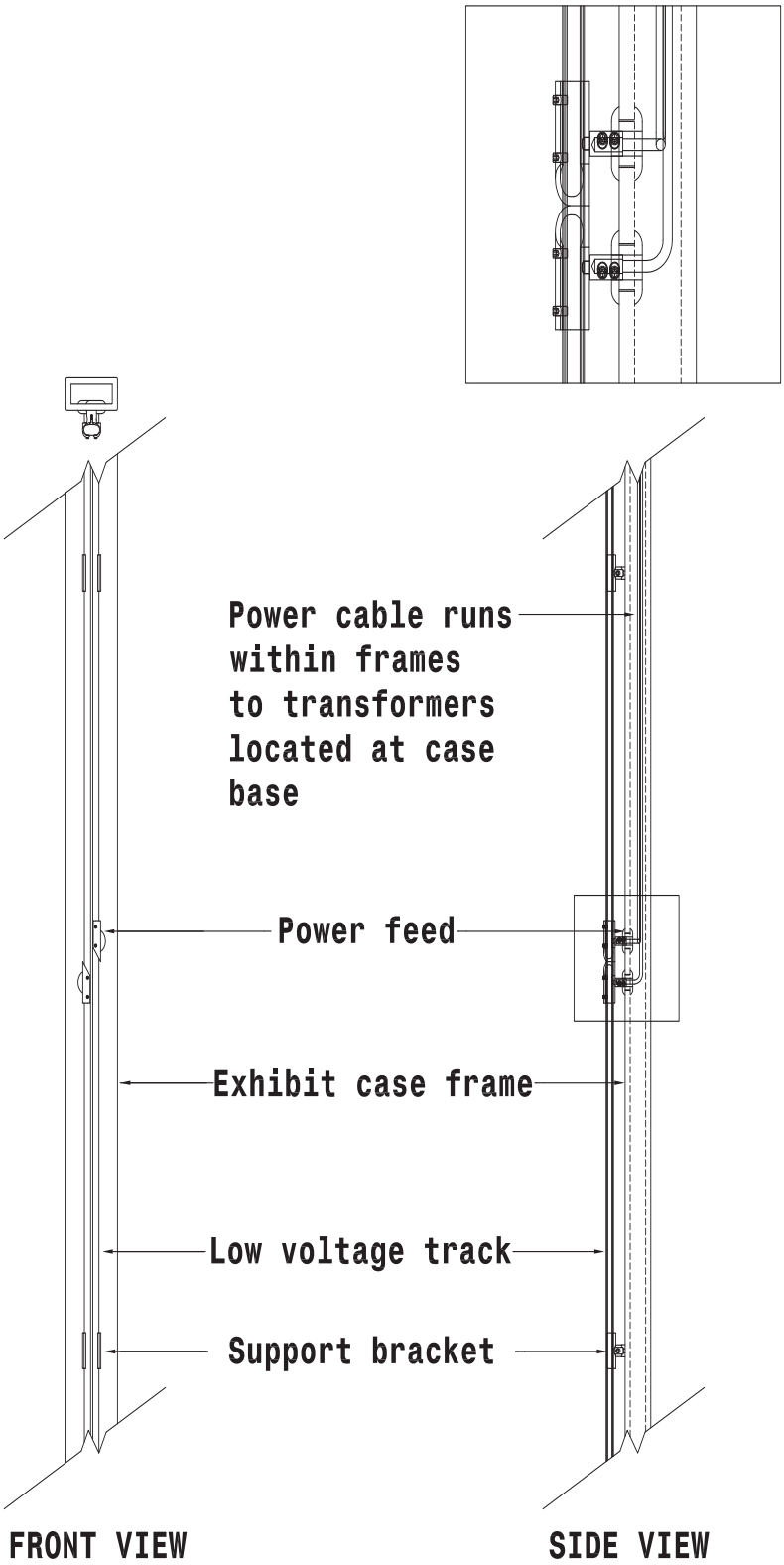

TYPICAL C-LV MOUNTING DETAIL AT EXHIBIT CASE (NOT TO SCALE)

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END OF SECTION