State of Utah

GARY R. HERBERT
Governor

GREGORY S. BELL
Lt. Governor

Department of Administrative Services
KIMBERLY K. HOOD
Executive Director

Division of Facilities Construction and Management
DAVID G. BUXTON
Director

ADDENDUM NO. 5

Date: May 27, 2010

To: Prime Contractors/RFP Respondents:
Big-D, Jacobsen, Layton, McCarthy/Westland, Okland, Walbridge

From: Dave McKay, Project Manager

Reference: Utah Valley University
Pope Science Building Addition - Request for Proposals for Construction Services
DFCM Project No. 09020790

Subject: **Addendum No. 5**

Pages	Addendum Cover Sheet	1	page
	Revised Project Schedule	1	page
	Architect's Addendum No. 5	362	pages
	Total	364	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.

5.1 **SCHEDULE CHANGES:** See attached Revised Project Schedule – Final Addendum, Cost Proposal, Cost Reduction Proposal, Schedule, and Subcontrator List submission dates rescheduled (changes are highlighted).

5.2 **GENERAL ITEMS:**

5.2.1 Reminder to all finalists regarding Selection Committee scoring: particularly in light of the various 'bid services' emphasis on 'Cost' as the dominant selection criterion, DFCM reminds the Finalists, that the Selection Committee will **carefully** evaluate the various subcontractors, their strengths, experience, and role as part of forming a score for 'Strength of Team' and 'Project Management Approach'.

5.2.2 See attached Architect's Addendum No. 5 dated May 26, 2010.

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

PROJECT SCHEDULE – REVISED
PER ADDENDUM NO. 5 DATED MAY 27, 2010

PROJECT NAME: **POPE SCIENCE BUILDING ADDITION**
UTAH VALLEY UNIVERSITY – OREM, UTAH

DFCM PROJECT NO. **09020790**

Event	Day	Date	Time	Place
Request for Proposals and Construction Documents Available	Tuesday	March 30, 2010	12:00 NOON	DFCM 4110 State Office Bldg SLC, UT and the DFCM web site *
Mandatory Pre-Proposal Site Meeting	Thursday	April 8, 2010	3:00 PM	Student Center, SC213A Utah Valley University Orem, UT
Last Day to Submit Questions prior to submittal of Statements of Qualifications	Monday	April 19, 2010	4:00 PM	E-mail dmckay@utah.gov or call Dave McKay 801-541-9019
Addendum Deadline	Tuesday	April 20, 2010	4:00 PM	DFCM web site *
Prime Contractors turn in References, Statements of Qualifications, Management Plans (including Schedule), and Termination/Debarment Certifications	Thursday	April 22, 2010	12:00 NOON	DFCM 4110 State Office Bldg SLC, UT
Mandatory Finalists Meeting (Contract Documents to be distributed on CD)	Friday	May 7, 2010	3:00 PM	Student Center SC213A Utah Valley University Orem, UT Use Student Center Parking
Last Date to Submit Questions for Final Addendum	Thursday	May 20, 2010	12:00 NOON	E-mail dmckay@utah.gov or call Dave McKay 801-541-9019
Final Addendum Deadline (exception for bid delays)	Thursday	May 27, 2010	4:00 PM	DFCM web site *
Prime Contractors Turn In Cost Proposals, Cost Reduction Proposals, Schedule	Thursday	June 3, 2010	12:00 NOON	DFCM 4110 State Office Bldg SLC, UT
Subcontractor List Due	Friday	June 4, 2010	12:00 NOON	DFCM 4110 State Office Bldg SLC, UT Fax 801-538-3677
Interviews	Wednesday	June 9, 2010	See General Items Section 2.2.3	Student Center SC213A Utah Valley University Orem, UT Use Student Center Parking
Announcement	Thursday	June 10, 2010	4:00 PM	DFCM web site *
Substantial Completion Date	Saturday	December 31, 2011		

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

Utah Valley University

NEW SCIENCE BUILDING

ADDENDUM NO. 5

May 26, 2010

The original specifications and drawings, dated May 07, 2010 for the project referenced above are amended in the Addendum No. 5, dated May 26, 2010.

Receipt of this addendum shall be acknowledged by inserting its number and date in the space provided on the bid form.

This addendum consists of 362 total pages.

Attachments: This addendum includes the following attachments:

Attachment 01:
Revised architectural specifications and drawings (150 sheets) as referred to in addendum items (each drawing numbered to match addendum item that refers to it).

Attachment 02:
Civil Addendum (5 pages)

Attachment 03:
Laboratory Addendum (15 pages)

Attachment 04:
Structural Addendum (30 pages)

Attachment 05:
Mechanical Addendum (104 pages)

Attachment 06:
Electrical Addendum (45 pages)

AD5-A00 <u>General</u>
In all locations throughout Architectural drawings indicating sprayed foam insulation, a minimum R-30 is required.

AD5-A01 <u>General</u>
Roller shades to be included from finished floor to 12'-6" above finished floor in the following locations:

- Level 0: W11, W12, W13, W14 and W15
- Level 1: W11, W12, W13, W14, W15 and W16
- Level 2: W11, W12, W13, W14, W15 and W16 (from level of adjacent finished floor in this location).

AD5-A02 General

Carpet for project will be procured via state contract. State of Utah Contract Number: MA2095.

AD5-A03 General

Provide full height 3-5/8" furring spaced 2" from wall to provide 6" cavity for LCD panel flush installation. Furred area to be approximately 6'-0" wide at each location. Gyp. Bd. to be installed to enclose screen at all four sides. Blocking will be required in wall at all locations. Refer to AV drawings for LCD screen locations

AD5-A04 Specification Section 012300

Additive Alternate numbers have been modified as follows:

Alternate 4 is now Alternate 6
Alternate 5 is now Alternate 7

AD5-A05 Specification Section 015000

Delete paragraph 1.3G from specification section. Delete paragraph 3.2.E.1 from specification section.

AD5-A06 Specification Section 033000

Delete paragraph 3.9C.

AD5-A07 Specification Section 034500

Section 034500 Precast Architectural Concrete added to specification. *See attachment.*

AD5-A08 Specification Section 057300

Revise 1.2A Summary to read as follows:

1. Glass-supported railings
2. Aluminum handrails

AD5-A09 Specification Section 057300

To 2.1, add the following:

1. Aluminum Handrail (at Auditorium, Lecture Rooms, and where not part of the glass-supported railing assembly)

   a. Basis-of-Design:
      1) Blumcraft of Pittsburgh.

   b. Post (for floor mounted applications): PCN-SPN-1
   c. Handrail bracket (for wall-mounted applications) : WBN-SW
   d. Handrail: 583
   e. Fitting: FS-3 or compatible fitting as recommended by manufacturer
   f. Finish: Satin clear anodized

AD5-A10 Specification Section 064023

Add paragraphs O and P to article 2.5 Cabinet Hardware and Accessories:

O. Hat and Coat Hook: Hafele 842.34.000, 7/8"x2-7/8"x5", brushed stainless steel, stainless steel pan head screw
P. Coat Hook: Hafele 842.34.050, 7/8"x1-1/2"x2-3/8", brushed stainless steel, stainless steel pan head screw

AD5-A11 <u>Specification Section 075419</u>
Delete the following from paragraph 2.2 A – "Membrane must be manufactured by the company supplying the warranty." Add the following manufacturers to the list:

h. Dow Roofing Systems

AD5-A12 <u>Specification Section 077620</u>
Section 077620 Roof Pavers added to specification. *See attachment.*

AD5-A13 <u>Specification Section 086200</u>
Revise 1.2A, item #1 to read:

1. Self-flashing unit skylights with integral curb.

Revise 2.5B to read:

B. Integral Curb: Extruded-aluminum, self-flashing type.

1. Height: 12 inches exposed surface above finished roof membrane.
2. Construction: Double wall.
3. Insulation: Manufacturer's standard rigid or semirigid type.

AD5-A14 <u>Specification Section 088000</u>
Revise paragraphs 2.2 D and 2.9 B as shown. *See attachment.*

AD5-A15 <u>Specification Section 093000</u>
This section requires approval of products other than those indicated as the Basis of Design. Interceramic Tile is approved for use in place of the Basis of Design product for ceramic wall tile and porcelain mosaic floor tile.

AD5-A16 <u>Specification Section 095113</u>
Revise article 2.3. Add articles 2.4 and 2.5. Modify article 2.7. Add articles 2.8 and 2.9. See attachment.

AD5-A17 <u>Specification Section 096813</u>
Add article 2.3 Walk-Off Carpet Tile: WT. *See attachment.*

AD5-A18 <u>Specification Section 101100</u>
Section 101100 Visual Display Surfaces added to specification. *See attachment.*

AD5-A19 <u>Specification Section 102800</u>
Section 102800 Toilet Accessories added to specification. *See attachment.*

AD5-A20 <u>Specification Section 107113</u>
Section 107113 Exterior Sun Control added to specification. *See attachment.*

AD5-A21 <u>Specification Section 122113</u>
Delete section 122113 Horizontal Louver Blinds from specification (per Addendum #4) and replace with section 122413 Roller Shades. *See attachment.*

AD5-A22 <u>Specification Section 126100</u>
Add Fixed Tables to specification section. Delete testing requirement 1.7.B.3. Revise warranties described in paragraph 1.10.A.2. items a and b. Revise paragraph 2.1J Fabric. *See attachment.*

AD5-A23 Specification Section 323113
Section 323113 Chain Link Fencing added to specification. *See attachment.*

AD5-A24 Door Schedule
Information added for door 030C. *See attachment.*

AD5-A25 Door Schedule
Vinyl lettering requirement has been added to door 130H. Per IBC requirements, the lettering must be 1" tall in a contrasting color (black). *See attachment.*

AD5-A26 Door Schedule
Change hardware set at door 134E to 31.

AD5-A27 Door Schedule
Change hardware set at door 134L to 61.

AD5-A28 Door Schedule
Information added for door 240H. *See attachment.*

AD5-A29 Drawing Sheet AS-102
Change "NIBCO T-580-S6-R-66-LL" to "NIBCO T-580-70" in irrigation schedule.

AD5-A30 Drawing Sheet AS-104
Change plant spacing of Arctostaphylos uva-ursi from 15" on center to 30" on center.

AD5-A31 Drawing Sheet GI-100
Add general note #5 to sheet to read:

"GENERAL CONTRACTOR TO PROVIDE PAINTED STENCIL IN ACCESSIBLE CEILING SPACES AT ALL FIRE WALLS, FIRE BARRIERS, SMOKE BARRIERS, AND SMOKE PARTITIONS WITH THE FOLLOWING **"FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS".** LETTERING TO BE NO LESS THAN ½" HIGH AND BE REPEATED AT INTERVALS NOT EXCEEDING 30 FEET MEASURED HORIZONTALLY ALONG PARTITION."

AD5-A32 Drawing Sheet GI-101
Add general note #5 to sheet to read:

"GENERAL CONTRACTOR TO PROVIDE PAINTED STENCIL IN ACCESSIBLE CEILING SPACES AT ALL FIRE WALLS, FIRE BARRIERS, SMOKE BARRIERS, AND SMOKE PARTITIONS WITH THE FOLLOWING **"FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS".** LETTERING TO BE NO LESS THAN ½" HIGH AND BE REPEATED AT INTERVALS NOT EXCEEDING 30 FEET MEASURED HORIZONTALLY ALONG PARTITION."

AD5-A33 Drawing Sheet GI-101
Modify note at Room 176, which points to the north and east walls to read:

"RE: WALL TYPE J2D, SHEET AE-140".

AD5-A34 Drawing Sheet GI-101
Delete 1-hr. rated wall assembly tag shown around room 268A.

AD5-A35 Drawing Sheet GI-101

Exit width requirements at Stair 140U have been revised as follows:

487 occupants
98" Required
102" Provided

AD5-A36 <u>Drawing Sheet GI-102</u>
Exit width requirements at Stair 240U have been revised as follows:

487 occupants
98" Required
102" Provided

AD5-A37 <u>Drawing Sheet GI-102</u>
Add general note #5 to sheet to read:

"GENERAL CONTRACTOR TO PROVIDE PAINTED STENCIL IN ACCESSIBLE CEILING SPACES AT ALL FIRE WALLS, FIRE BARRIERS, SMOKE BARRIERS, AND SMOKE PARTITIONS WITH THE FOLLOWING **"FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS".** LETTERING TO BE NO LESS THAN ½" HIGH AND BE REPEATED AT INTERVALS NOT EXCEEDING 30 FEET MEASURED HORIZONTALLY ALONG PARTITION."

AD5-A38 <u>Drawing Sheet GI-103</u>
Add general note #5 to sheet to read:

"GENERAL CONTRACTOR TO PROVIDE PAINTED STENCIL IN ACCESSIBLE CEILING SPACES AT ALL FIRE WALLS, FIRE BARRIERS, SMOKE BARRIERS, AND SMOKE PARTITIONS WITH THE FOLLOWING **"FIRE AND/OR SMOKE BARRIER – PROTECT ALL OPENINGS".** LETTERING TO BE NO LESS THAN ½" HIGH AND BE REPEATED AT INTERVALS NOT EXCEEDING 30 FEET MEASURED HORIZONTALLY ALONG PARTITION."

AD5-A39 <u>Drawing Sheet GI-200</u>
Under the first item FABRICATORS (IBC 1704.2) in the SPECIAL INSPECTION AND TESTING UNDER THE PROVISIONS OF IBC 1704 AND FOR MISCELLANEOUS AREAS chart, the following note should be added:

"Steel Fabricator(s) to be on DFCM's approved list."

AD5-A40 <u>Drawing Sheet AS-100</u>
Delete reference to sheet A101 and replace with AS-101.

AD5-A41 <u>Drawing Sheet AD-101</u>
Revise demolition notes as follows:

9. REMOVE EXISTING FLOORS, FOUNDATIONS, AND FOOTINGS AS INDICATED AND REQUIRED TO FACILITATE NEW CONSTRUCTION.

12. REMOVE EXISTING BRICK VENEER AND SUPPORTS COMPLETE, SALVAGE BRICK FOR RE-USE.

AD5-A42 <u>Drawing Sheet AD-111</u>
Revise demolition notes as follows:

9. REMOVE EXISTING FLOORS, FOUNDATIONS, AND FOOTINGS AS INDICATED AND REQUIRED TO FACILITATE NEW CONSTRUCTION.

12. REMOVE EXISTING BRICK VENEER AND SUPPORTS COMPLETE, SALVAGE BRICK FOR RE-USE.

AD5-A43 Drawing Sheet AD-111
Revise demolition note #17, depicted southwest of gridline intersection F2/6.5 and F4/6.3, to demolition note #9. *See attached drawing.*

AD5-A44 Drawing Sheet AD-121
Revise demolition notes as follows:

9. REMOVE EXISTING FLOORS, FOUNDATIONS, AND FOOTINGS AS INDICATED AND REQUIRED TO FACILITATE NEW CONSTRUCTION.

12. REMOVE EXISTING BRICK VENEER AND SUPPORTS COMPLETE, SALVAGE BRICK FOR RE-USE.

AD5-A45 Drawing Sheet AD-131
Revise demolition notes as follows:

9. REMOVE EXISTING FLOORS, FOUNDATIONS, AND FOOTINGS AS INDICATED AND REQUIRED TO FACILITATE NEW CONSTRUCTION.

12. REMOVE EXISTING BRICK VENEER AND SUPPORTS COMPLETE, SALVAGE BRICK FOR RE-USE.

AD5-A46 Drawing Sheet AD-132
Revise demolition notes as follows:

9. REMOVE EXISTING FLOORS, FOUNDATIONS, AND FOOTINGS AS INDICATED AND REQUIRED TO FACILITATE NEW CONSTRUCTION.

12. REMOVE EXISTING BRICK VENEER AND SUPPORTS COMPLETE, SALVAGE BRICK FOR RE-USE.

AD5-A47 Drawing Sheet AE-101C
Add cabinet unit heater near gridline E8 between gridlines 6.0 and 6.1. *See attached drawing.*

AD5-A48 Drawing Sheet AE-102A
Revise finish designation for floor at Vestibule 030K from EM to WT. *See attached drawing* (whole sheet re-issued.)

AD5-A49 Drawing Sheet AE-102A
Whole sheet re-issued for addition of accent paint designations, whiteboard designations, tackboard designations, coat hook designations, and miscellaneous finish revisions. *See attached drawing* (whole sheet re-issued.)

AD5-A50 Drawing Sheet AE-102A
Add wall type tag J2A at interior portion of west wall at Stair 030D. *See attached drawing* (whole sheet re-issued.)

AD5-A51 Drawing Sheet AE-102B

Whole sheet re-issued for addition of accent paint designations, whiteboard designations, tackboard designations, coat hook designations, and miscellaneous finish revisions. *attached drawing* (whole sheet re-issued.)

AD5-A52 Drawing Sheet AE-102B
Clarification – Entire utility tunnel 072A is to receive finishes indicated. *attached drawing* (whole sheet re-issued.)

AD5-A53 Drawing Sheet AE-102C
Whole sheet re-issued for addition of accent paint designations, whiteboard designations, tackboard designations, coat hook designations, and miscellaneous finish revisions. *See attached drawing* (whole sheet re-issued.)

AD5-A54 Drawing Sheet AE-102C
Add wall and wall type designation H4A around cabinet unit heater near gridline E8 between gridlines 6.0 and 6.1. *See attached drawing* (whole sheet re-issued.)

AD5-A55 Drawing Sheet AE-102C
Change wall type designated as J1A to J1B where shown. *See attached drawing* (whole sheet re-issued.)

AD5-A56 Drawing Sheet AE-102D
Sheet has been re-issued to clarify hatches denoting carpet pattern. *See attached drawing* (whole sheet re-issued.)

AD5-A57 Drawing Sheet AE-103A
Revise ceiling layout at Group Study Areas 056 and 058. In Plan Legend at Type E ceiling, delete “Special/Custom” and replace with the following:

2’x6’ LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID

See attached drawing

AD5-A58 Drawing Sheet AE-103B
Revise ceiling beneath Atrium Stair landing to coordinate with changes made to stair landing framing. *See attached drawing.*

AD5-A59 Drawing Sheet AE-103C
Modify ceiling around added cabinet unit heater. *See attached drawing.*

AD5-A60 Drawing Sheet AE-111A
Add cabinet unit heater at Hallway 177. *See attached drawing.*

AD5-A61 Drawing Sheet AE-111A
Changed interior wall construction west of gridline E7 on gridline 6.8. *See attached drawing.*

AD5-A62 Drawing Sheet AE-111B
Revise stair width and dimensions at Stair 140U. *See attached drawing* (whole sheet re-issued.)

AD5-A63 Drawing Sheet AE-111B
Add finish notes around East Atrium Stair. *See attached drawing* (whole sheet re-issued.)

AD5-A64 Drawing Sheet AE-111B

Add notes and detail references to roof plan area west of F.0 and south of 6.3. *See attached drawing* (whole sheet re-issued.)

AD5-A65 Drawing Sheet AE-112A
At finish tag at hallway between Rooms 148A-148F. Modify finishes in Rooms 148A-148F as shown. *See attached drawing* (whole sheet re-issued.)

AD5-A66 Drawing Sheet AE-112A
Whole sheet re-issued for addition of accent paint designations, whiteboard designations, tackboard designations, coat hook designations, and miscellaneous finish revisions. *See attached drawing* (whole sheet re-issued.)

AD5-A67 Drawing Sheet AE-112A
Add wall type tag J2A at interior portion of west wall at Stair 130D. *See attached drawing* (whole sheet re-issued.)

AD5-A68 Drawing Sheet AE-112A
Changed interior wall construction west of gridline E7 on gridline 6.8. *See attached drawing* (whole sheet re-issued.)

AD5-A69 Drawing Sheet AE-112B
Add wall type and finish tags at Stair 140U. *See attached drawing* (whole sheet re-issued.)

AD5-A70 Drawing Sheet AE-112B
Revise wall type around existing exhaust duct on gridline 6.2 to 2 hr (J3B). *See attached drawing* (whole sheet re-issued.)

AD5-A71 Drawing Sheet AE-112B
Whole sheet re-issued for addition of accent paint designations, whiteboard designations, tackboard designations, coat hook designations, and miscellaneous finish revisions. *See attached drawing* (whole sheet re-issued.)

AD5-A72 Drawing Sheet AE-112C
Sheet has been re-issued to clarify hatches denoting carpet pattern. *See attached drawing* (whole sheet re-issued.)

AD5-A73 Drawing Sheet AE-113A
Revise ceiling layout at Group Study Areas 164 and 165. In Plan Legend at Type E ceiling, delete “Special/Custom” and replace with the following:

2’x6’ LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID

See attached drawing.

AD5-A74 Drawing Sheet AE-113A
The ceiling in room Radio Isotope Lab 156 shall be deleted and the Ceiling Type Shall be revised to ‘G’ – Exposed Structure.

AD5-A75 Drawing Sheet AE-113B
Modify ceiling and soffit layout along Campus Corridor 130. Add ceiling detail references and revise dimensions as shown. *See attached drawing* (whole sheet re-issued.)

AD5-A76 Drawing Sheet AE-113C

Whole Sheet re-issued. Ceiling at back of auditorium has been changed from Type C to Type H. Gypsum board drops have been added at curved edges of Type H ceiling. Light fixture layout has been revised and dimensions added. Type H ceiling has been added to Plan Legend and is as follows:

Type H - 2'X2' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID

See attached drawing.(whole sheet re-issued.)

AD5-A77 Drawing Sheet AE-121A
Changed interior wall construction west of gridline E7 on gridline 6.8. *See attached drawing.*

AD5-A78 Drawing Sheet AE-121B
Add wall section reference marker 6/AE316. Stair width revised as indicated on elsewhere in addendum. *See attached drawing.*

AD5-A79 Drawing Sheet AE-122A
Whole sheet re-issued for addition of accent paint designations, whiteboard designations, tackboard designations, coat hook designations, and miscellaneous finish revisions. *See attached drawing* (whole sheet re-issued.)

AD5-A80 Drawing Sheet AE-122A
Changed interior wall construction west of gridline E7 on gridline 6.8. *See attached drawing* (whole sheet re-issued.)

AD5-A81 Drawing Sheet AE-122B
Add wall type tags to Stair 240U as shown. *See attached drawing* (whole sheet re-issued.)

AD5-A82 Drawing Sheet AE-122B
Delete finish tag denoted as 240F and refer to finish tag 240. *See attached drawing* (whole sheet re-issued.)

AD5-A83 Drawing Sheet AE-122B
Add finish tag to Storage Room 246A. *See attached drawing* (whole sheet re-issued.)

AD5-A84 Drawing Sheet AE-122B
Add finish notes around East Atrium Stair. *See attached drawing* (whole sheet re-issued.)

AD5-A85 Drawing Sheet AE-122B
Whole sheet re-issued for addition of accent paint designations, whiteboard designations, tackboard designations, coat hook designations, and miscellaneous finish revisions. *See attached drawing* (whole sheet re-issued.)

AD5-A86 Drawing Sheet AE-122B
Revise wall type around existing exhaust duct on gridline 6.2 to 2 hr (J3B). *See attached drawing* (whole sheet re-issued.)

AD5-A87 Drawing Sheet AE-122C
Sheet has been re-issued to clarify hatches denoting carpet pattern. *See attached drawing* (whole sheet re-issued.)

AD5-A88 Drawing Sheet AE-123A

Revise ceiling layout at Group Study Areas 266 and 267. In Plan Legend at Type E ceiling, delete “Special/Custom” and replace with the following:

2’x6’ LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID

See attached drawing.

AD5-A89 Drawing Sheet AE-140
Add Wall Type J3B to sheet. *See attached drawing.*

AD5-A90 Drawing Sheet AE-201
Louver added to north wall of Stair 140 for tunnel ventilation. *See attached drawing.*

AD5-A91 Drawing Sheet AE-201
Changed interior wall construction west of gridline E7 on gridline 6.8. *See attached drawing.*

AD5-A92 Drawing Sheet AE-201
Clarification – windows W1a, W2a, and W5a are identical to windows W1, W2, and W5, respectively, with the exception of integral sunshades and lightshelves as noted on window type drawings on sheet AE-702.

AD5-A93 Drawing Sheet AE-201
Clarification – Louver notation is to indicate typical graphic of architectural louver. Louvers occur in penthouse and screen wall on gridline 6.48 between E4-E5, on gridline 6.37 between E8-E9, on gridline E9 between 6.4-6.6, on gridline 6.6 between E9-E8, on gridline 6.66 between E8-E7 and E5-E4, and on gridline E4 between 6.58-6.48.

AD5-A94 Drawing Sheet AE-202
Window type tags added to penthouse elevations 7 and 8. *See attached drawing.*

AD5-A95 Drawing Sheet AE-301
Add retaining wall elevations 4 and 5 to sheet. *See attached drawing.* (whole sheet re-issued.)

AD5-A96 Drawing 1/AE-315
Revise drawing at top of atrium wall. *See attached drawing.*

AD5-A97 Drawing Sheet AE-316
Add wall section 6 to sheet. *See attached drawing.* (whole sheet re-issued.)

AD5-A98 Drawing Sheet AE-319
Revise detail 7. *See attached drawing.*

AD5-A99 Drawing Sheet AE-319
Add detail 9. *See attached drawing.*

AD5-A100 Drawing 1/AE-403
Change column detail reference at gridlines F4.9 and F6.5 from 11/AE606 to 9/AE606.

AD5-A101 Drawing Sheet AE-404

Revise opening dimensions in wall for smoke control doors. Steel column has been relocated as shown. Detail reference has been revised as shown. *See attached drawing.*

AD5-A102 Drawing 4/AE-402
Delete elevation reference 20/AE701. Refer to floor plan for window type tag.

AD5-A103 Drawing 1/AE-402
Lecterns noted in Computer Classrooms. *See attached drawing*.

AD5-A104 Drawing 7/AE-404
Revise handrail note to read "CONTINUOUS HANDRAIL". Handrail material shall be aluminum, as specified, not stainless steel.

AD5-A105 Drawing 9/AE-404
Revise handrail note to read "CONTINUOUS HANDRAIL". Handrail material shall be aluminum, as specified, not stainless steel.

AD5-A106 Drawing 1/AE-405
Add cabinet unit heater at Hallway 177 as shown. *See attached drawing*.

AD5-A107 Drawing 3/AE413
Modify stair width dimensions as shown. *See attached drawing*. (whole sheet re-issued.)

AD5-A108 Drawing 2/AE413
Revise stair width and add notes as shown. *See attached drawing*. (whole sheet re-issued.)

AD5-A109 Drawing Sheet AE414
Entire sheet re-issued. Stair stringers have been extended at upper landing to bear at gridline 6.44. Upper landing has been changed to precast concrete. Stringer sizes have been added. Drawings have been updated to show this along with added notes, dimensions, and drawing references. *See attached drawing* (whole sheet re-issued.)

AD5-A110 Drawing Sheet AE415
Entire sheet re-issued with added notes, dimensions, and detail references. Gypsum board shown beneath stair and mid-landing has been removed. Mid-landing has been revised to precast concrete. Stringer sizes have been added. Elevation 6/AE415 has been revised to a section cut. Details 3, 8, and 11 have been revised. *See attached drawing* (whole sheet re-issued.)

AD5-A111 Drawing 11/AE-503
Elevation updated to reflect dimensional lettering, and aluminum lattice on veneer panel above cabinetry. *See attached drawing.*

AD5-A112 Drawing Sheet AE-505
Revisions made to Toilet Room Accessories Key to coordinate with newly issued specification. *See attached drawing.*

AD5-A113 Drawing Sheet AE-505
Drawings 1, 4, 7, 8, 10, 11 – revise note regarding handrail to read as follows:

1 ½" ALUMINUM HANDRAIL

AD5-A114 Drawing Sheet AE-508
Delete note “PAINTED WALL GRAPHIC” from sheet. Wall shall be painted an accent color. See attached revised and re-issued sheets AE-102B and AE-112B.

AD5-A115 Drawing Sheet AE-509
Add handrail elevations 11 and 12 to sheet. Handrails occur at north and west sides of accessible (1:12) ramp. *See attached drawing.*

AD5-A116 Drawing Sheet AE-611
Delete detail 17 from sheet.

AD5-A117 Drawing Sheet AE-612
Revise detail 9/AE612. *See attached drawing.* (whole sheet re-issued.)

AD5-A118 Drawing Sheet AE-612
Delete detail 10/AE612. Detail has been relocated to sheet AE319.

AD5-A119 Drawing Sheet AE-612
Revise detail 13/AE612. *See attached drawing* (whole sheet re-issued.)

AD5-A120 Drawing Sheet AE-612
Revise detail 14/AE612. *See attached drawing* (whole sheet re-issued.)

AD5-A121 Drawing Sheet AE-612
Revise detail 17/AE612. *See attached drawing* (whole sheet re-issued.)

AD5-A122 Drawing Sheet AE-615
Add detail 6 to sheet. *See attached drawing.*

AD5-A123 Drawing Sheet AE-615
Revise detail 2. *See attached drawing.*

AD5-A124 Drawing Sheet AE-621
Add Ceiling Detail 20 to sheet. *See attached drawing.*

AD5-A125 Drawing Sheet AE-621
Add Ceiling Detail 21 to sheet. *See attached drawing.*

AD5-A126 Drawing Sheet AE-622
Delete details 5 and 7 from sheet. Revise detail 6. *See attached drawing.*

AD5-A127 Drawing Sheet AE-631
Delete details 6 and 7 from sheet.

AD5-A128 Drawing Sheet AE-701
Add notes indicating window frame material to window types W28, W34 and W34a. *See attached drawing.*

AD5-A129 Drawing Sheet AE-701
Add notes indicating window frame material to window types W39 and W40. See attached drawing.

AD5-A130 Drawing Sheet AE-701
Add notes indicating window frame material to window types W41a and W43, W43a. *See attached drawing.*

AD5-A131 Drawing Sheet AE-701
Glazing types added to window type W32a. *See attached drawing.*

AD5-A132 Drawing Sheet AE-702
Glazing types added to window type W1b. *See attached drawing.*

AD5-A133 Drawing Sheet AE-702
Glazing types added to window type W7. *See attached drawing.*

AD5-A134 Drawing Sheet AE-702
Glazing types added to window type W42. *See attached drawing.*

AD5-A135 Drawing Sheet AE-702
Changed window type W2b. *See attached drawing.*

AD5-A136 Drawing Sheet AE-702
Changed window type W22. *See attached drawing.*

AD5-A137 Drawing Sheet AE-801
Finish schedule re-issued to complete missing information on various items. Coat hook schedule added to sheet. *See attached drawing* (whole sheet re-issued.)

AD5-A138 Drawing Sheet AE-801
Note added to clarify top of FRP height at all rooms where it occurs is 4'-0" A.F.F. *See attached drawing* (whole sheet re-issued.)

SECTION 034500 - PRECAST ARCHITECTURAL CONCRETE

PART 1 - GENERAL Add.#5

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Architectural precast concrete tread and landing units at atrium stair and east atrium stair.

B. Related Sections include the following:

1. Division 03 Section "Cast-In-Place Concrete" for installing connection anchors in concrete.
2. Division 03 Section "Glass-Fiber-Reinforced Concrete (GFRC)."
3. Division 05 Section "Structural Steel Framing" for furnishing and installing connections attached to structural-steel framing.

1.3 DEFINITION

A. Design Reference Sample: Sample of approved architectural precast concrete color, finish and texture, preapproved by Architect.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide architectural precast concrete units and connections capable of withstanding the following design loads within limits and under conditions indicated:

1. Loads: As indicated.
2. Dead Loads: Weight of treads.
3. Live Loads: 100 psf.
4. Seismic Loads: SDS = 0.79g.
5. Design framing system and connections to maintain clearances at openings, to allow for fabrication and construction tolerances, to accommodate live-load deflection, shrinkage and creep of primary building structure, and other building movements as follows:

a. Upward and downward movement of 3/4 inch.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. LEED Submittals:

1. Product Data for Credit MR 4: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.

C. Design Mixtures: For each precast concrete mixture. Include compressive strength and water-absorption tests.

D. Shop Drawings: Detail fabrication and installation of architectural precast concrete units. Indicate locations, plans, elevations, dimensions, shapes, and cross sections of each unit. Indicate joints, reveals, and extent and location of each surface finish. Indicate details at building corners.

1. Indicate separate face and backup mixture locations and thicknesses.
2. Indicate welded connections by AWS standard symbols. Detail loose and cast-in hardware and connections.
3. Indicate locations, tolerances, and details of anchorage devices to be embedded in or attached to structure or other construction.
4. Indicate location of each architectural precast concrete unit by same identification mark placed on panel.
5. Indicate relationship of architectural precast concrete units to adjacent materials.
6. Design Modifications: If design modifications are proposed to meet performance requirements and field conditions, submit design calculations and Shop Drawings. Do not adversely affect the appearance, durability, or strength of units when modifying details or materials and maintain the general design concept.
7. Comprehensive engineering analysis signed and sealed by the qualified professional engineer responsible for its preparation. Show governing panel types, connections, and types of reinforcement, including special reinforcement. Indicate location, type, magnitude, and direction of loads imposed on the building structural frame from architectural precast concrete.

E. Samples: For each type of finish indicated on exposed surfaces of architectural precast concrete units, in sets of 3, illustrating full range of finish, color, and texture variations expected; approximately 12 by 12 by 2 inches.

1. When other faces of precast concrete unit are exposed, include Samples illustrating workmanship, color, and texture of backup concrete as well as facing concrete.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Welding certificates.

C. Material Certificates: For the following items, signed by manufacturers:

1. Cementitious materials.
2. Reinforcing materials and prestressing tendons.
3. Admixtures.
4. Bearing pads.
5. Structural-steel shapes and hollow structural sections.

D. Material Test Reports: For aggregates.

E. Source quality-control test reports.

F. Field quality-control test and special inspection reports.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A precast concrete erector qualified to erect Category A (Architectural Systems) for non-load-bearing members.

B. Fabricator Qualifications: A firm that assumes responsibility for engineering architectural precast concrete units to comply with performance requirements. This responsibility includes preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

C. Design Standards: Comply with ACI 318 and design recommendations of PCI MNL 120, "PCI Design Handbook - Precast and Prestressed Concrete," applicable to types of architectural precast concrete units indicated.

D. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for types of units required, comply with PCI MNL 117, "Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products."

E. Welding: Qualify procedures and personnel according to AWS D1.1/D.1.1M, "Structural Welding Code - Steel"; and AWS D1.4, "Structural Welding Code - Reinforcing Steel."

F. Sample Panels: After sample approval and before fabricating architectural precast concrete units, produce a minimum of 2 sample panels approximately 16 sq. ft. in area for review by Architect. Incorporate full-scale details of architectural features, finishes, textures, and transitions in sample panels.

1. Locate panels where indicated or, if not indicated, as directed by Architect.
2. Damage part of an exposed-face surface for each finish, color, and texture, and demonstrate adequacy of repair techniques proposed for repair of surface blemishes.
3. After acceptance of repair technique, maintain one sample panel at manufacturer's plant and one at Project site in an undisturbed condition as a standard for judging the completed Work.
4. Demolish and remove sample panels when directed.

G. Range Samples: After sample panel approval and before fabricating architectural precast concrete units, produce a minimum of 3 sets of samples, approximately 16 sq. ft. in area, representing anticipated range of each color and texture on Project's units. Following range sample, maintain one set of samples at Project site and remaining sample sets at manufacturer's plant as color and texture approval reference.

H. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management And Coordination."

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver architectural precast concrete units in such quantities and at such times to limit unloading units temporarily on the ground.

B. Support units during shipment on nonstaining shock-absorbing material.

C. Store units with adequate dunnage and bracing and protect units to prevent contact with soil, to prevent staining, and to prevent cracking, distortion, warping or other physical damage.

D. Place stored units so identification marks are clearly visible, and units can be inspected.

E. Handle and transport units in a position consistent with their shape and design in order to avoid excessive stresses which would cause cracking or damage.

F. Lift and support units only at designated points shown on Shop Drawings.

1.9 SEQUENCING

A. Furnish loose connection hardware and anchorage items to be embedded in or attached to other construction without delaying the Work. Provide locations, setting diagrams, templates, instructions, and directions, as required, for installation.

PART 2 - PRODUCTS

2.1 MOLD MATERIALS

A. Molds: Rigid, dimensionally stable, non-absorptive material, warp and buckle free, that will provide continuous and true precast concrete surfaces within fabrication tolerances indicated; nonreactive with concrete and suitable for producing required finishes.

1. Mold-Release Agent: Commercially produced liquid-release agent that will not bond with, stain or adversely affect precast concrete surfaces and will not impair subsequent surface or joint treatments of precast concrete.

B. Surface Retarder: Chemical set retarder, capable of temporarily delaying final hardening of newly placed concrete mixture to depth of reveal specified.

2.2 REINFORCING MATERIALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 60 percent.

B. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed.

C. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

D. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60 ASTM A 706/A 706M, deformed bars, assembled with clips.

E. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn galvanized steel wire into flat sheets.

F. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

G. Supports: Suspend reinforcement from back of mold or use bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place according to PCI MNL 117.

2.3 CONCRETE MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type III, white, unless otherwise indicated.

B. Normal-Weight Aggregates: Except as modified by PCI MNL 117, ASTM C 33, with coarse aggregates complying with Class 5S. Stockpile fine and coarse aggregates for each type of exposed finish from a single source (pit or quarry) for Project.

1. Face-Mixture-Coarse Aggregates: Selected, hard, and durable; free of material that reacts with cement or causes staining; to match selected finish sample.

   a. Gradation: Uniformly graded.

2. Face-Mixture-Fine Aggregates: Selected, natural or manufactured sand of same material as coarse aggregate, unless otherwise approved by Architect.

C. Coloring Admixture: ASTM C 979, synthetic or natural mineral-oxide pigments or colored water-reducing admixtures, temperature stable, and nonfading.

D. Water: Potable; free from deleterious material that may affect color stability, setting, or strength of concrete and complying with chemical limits of PCI MNL 117.

E. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.

F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures and to not contain calcium chloride, or more than 0.15 percent chloride ions or other salts by weight of admixture.

1. Water-Reducing Admixtures: ASTM C 494/C 494M, Type A.
2. Retarding Admixture: ASTM C 494/C 494M, Type B.
3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
4. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
5. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
7. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017 M.

2.4 STEEL CONNECTION MATERIALS

A. Carbon-Steel Shapes and Plates: ASTM A 36/A 36M.

B. Carbon-Steel-Headed Studs: ASTM A 108, AISI 1018 through AISI 1020, cold finished, AWS D1.1/D1.1M, Type A or B, with arc shields and with minimum mechanical properties of PCI MNL 117, Table 3.2.3.

C. Carbon-Steel Plate: ASTM A 283/A 283M.

D. Malleable Iron Castings: ASTM A 47/A 47M.

E. Carbon-Steel Castings: ASTM A 27/A 27M, Grade 60-30.

F. High-Strength, Low-Alloy Structural Steel: ASTM A 572/A 572M.

G. Carbon-Steel Structural Tubing: ASTM A 500, Grade B.

H. Wrought Carbon-Steel Bars: ASTM A 675/A 675M, Grade 65.

I. Deformed-Steel Wire or Bar Anchors: ASTM A 496 or ASTM A 706/A 706M.

J. Carbon-Steel Bolts and Studs: ASTM A 307, Grade A; carbon-steel, hex-head bolts and studs; carbon-steel nuts, ASTM A 563; and flat, unhardened steel washers, ASTM F 844.

K. Shop-Primed Finish: Prepare surfaces of nongalvanized steel items, except those surfaces to be embedded in concrete, according to requirements in SSPC-SP 3 and shop-apply lead- and chromate-free, rust-inhibitive primer, complying with performance requirements in MPI 79 according to SSPC-PA 1.

L. Welding Electrodes: Comply with AWS standards.

2.5 BEARING PADS

A. Provide one of the following bearing pads for architectural precast concrete units as recommended by precast fabricator for application:

1. Elastomeric Pads: AASHTO M 251, plain, vulcanized, 100 percent polychloroprene (neoprene) elastomer, molded to size or cut from a molded sheet, Type A durometer hardness of 50 to 70, ASTM D 2240, minimum tensile strength 2250 psi, ASTM D 412.
2. Random-Oriented, Fiber-Reinforced Elastomeric Pads: Preformed, randomly oriented synthetic fibers set in elastomer. Type A durometer hardness of 70 to 90, ASTM D 2240; capable of supporting a compressive stress of 3000 psi with no cracking, splitting, or delaminating in the internal portions of pad. Test one specimen for every 200 pads used in Project.
3. Cotton-Duck-Fabric-Reinforced Elastomeric Pads: Preformed, horizontally layered cotton-duck fabric bonded to an elastomer; Type A durometer hardness of 80 to 100, ASTM D 2240; complying with AASHTO's "AASHTO Load and Resistance Factor Design (LRFD) Bridge Design Specifications, Division II, Section 18.10.2, or with MIL-C-882E.
4. Frictionless Pads: Tetrafluoroethylene (Teflon), glass-fiber reinforced, bonded to stainless or mild-steel plate, of type required for in-service stress.
5. High-Density Plastic: Multimonomer, nonleaching, plastic strip.

2.6 ACCESSORIES

A. Precast Accessories: Provide clips, hangers, plastic or steel shims, and other accessories required to install architectural precast concrete units.

B. Extruded Nosings: Aluminum units with abrasive filler consisting of aluminum oxide, silicon carbide, or a combination of both, in any epoxy-resin binder. Fabricate units in lengths necessary to accurately fit openings or conditions.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

   a. ACL Industries, Inc.
   b. American Safety Tread Co., Inc.
   c. Amstep Products.
   d. Armstrong Products, Inc.
   e. Balco, Inc.
   f. Granite State Casting Co.
   g. Mason’s Supply
   h. Wooster Products, Inc.

2. Provide ribbed units, with abrasive filler strips projecting 1/16 inch above aluminum extrusions.
3. Nosings: Square-back units, 1 7/8 inches wide, with lip.

2.7 GROUT MATERIALS

A. Sand-Cement Grout: Portland cement, ASTM C 150, Type I, and clean, natural sand, ASTM C 144 or ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

B. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, plasticizing and water-reducing agents, complying with ASTM C 1107, Grade A for drypack and Grades B and C for flowable grout and of consistency suitable for application within a 30-minute working time.

C. Epoxy-Resin Grout: Two-component, mineral-filled epoxy resin; ASTM C 881/C 881M, of type, grade, and class to suit requirements.

2.8 CONCRETE MIXTURES

A. Prepare design mixtures for each type of precast concrete required.

B. Design mixtures may be prepared by a qualified independent testing agency or by qualified precast plant personnel at architectural precast concrete fabricator's option.

C. Limit water-soluble chloride ions to maximum percentage by weight of cement permitted by ACI 318 or PCI MNL 117 when tested according to ASTM C 1218/C 1218M.

D. Normal-Weight Concrete Mixtures: Proportion full-depth mixture by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): 5000 psi minimum.
2. Maximum Water-Cementitious Materials Ratio: 0.45.

E. Water Absorption: 6 percent by weight or 14 percent by volume, tested according to PCI MNL 117.

F. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content complying with PCI MNL 117.

G. When included in design mixtures, add other admixtures to concrete mixtures according to manufacturer's written instructions.

2.9 MOLD FABRICATION

A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete-placement operations and temperature changes and for prestressing and detensioning operations. Coat contact surfaces of molds with release agent before

reinforcement is placed. Avoid contamination of reinforcement and prestressing tendons by release agent.

B. Maintain molds to provide completed architectural precast concrete units of shapes, lines, and dimensions indicated, within fabrication tolerances specified.

1. Form joints are not permitted on faces exposed to view in the finished work.
2. Edge and Corner Treatment: Uniformly radiused.

2.10 FABRICATION

A. Cast-in Anchors, Inserts, Plates, Angles, and Other Anchorage Hardware: Fabricate anchorage hardware with sufficient anchorage and embedment to comply with design requirements. Accurately position for attachment of loose hardware, and secure in place during precasting operations. Locate anchorage hardware where it does not affect position of main reinforcement or concrete placement.

1. Weld-headed studs and deformed bar anchors used for anchorage according to AWS D1.1/D1.1M and AWS C5.4, "Recommended Practices for Stud Welding."

B. Furnish loose hardware items including steel plates, clip angles, seat angles, anchors, dowels, cramps, hangers, and other hardware shapes for securing architectural precast concrete units to supporting and adjacent construction.

C. Cast-in reglets, slots, holes, and other accessories in architectural precast concrete units as indicated on the Contract Drawings.

D. Cast-in openings larger than 10 inches in any dimension. Do not drill or cut openings or prestressing strand without Architect's approval.

E. Reinforcement: Comply with recommendations in PCI MNL 117 for fabricating, placing, and supporting reinforcement.

1. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy the bond with concrete. When damage to epoxy-coated reinforcing exceeds limits specified in ASTM A 775/A 775M, repair with patching material compatible with coating material and epoxy coat bar ends after cutting.
2. Accurately position, support, and secure reinforcement against displacement during concrete-placement and consolidation operations. Completely conceal support devices to prevent exposure on finished surfaces.
3. Place reinforcement to maintain at least 3/4-inch minimum coverage. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.
4. Place reinforcing steel and prestressing strand to maintain at least 3/4-inch minimum concrete cover. Increase cover requirements for reinforcing steel to 1-1/2 inches when units are exposed to corrosive environment or severe exposure conditions. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Direct wire tie ends away from finished, exposed concrete surfaces.

5. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh spacing and wire tie laps, where required by design. Offset laps of adjoining widths to prevent continuous laps in either direction.

F. Reinforce architectural precast concrete units to resist handling, transportation, and erection stresses.

G. Comply with requirements in PCI MNL 117 and requirements in this Section for measuring, mixing, transporting, and placing concrete. After concrete batching, no additional water may be added.

H. Place face mixture to a minimum thickness after consolidation of the greater of 1 inch or 1.5 times the maximum aggregate size, but not less than the minimum reinforcing cover specified.

I. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in precast concrete units.

1. Place backup concrete mixture to ensure bond with face-mixture concrete.

J. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items, and minimize pour lines, honeycombing, or entrapped air on surfaces. Use equipment and procedures complying with PCI MNL 117.

1. Place self-consolidating concrete without vibration according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."

K. Comply with PCI MNL 117 for hot- and cold-weather concrete placement.

L. Identify pickup points of architectural precast concrete units and orientation in structure with permanent markings, complying with markings indicated on Shop Drawings. Imprint or permanently mark casting date on each architectural precast concrete unit on a surface that will not show in finished structure.

M. Cure concrete, according to requirements in PCI MNL 117, by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture. Cure units until compressive strength is high enough to ensure that stripping does not have an effect on performance or appearance of final product.

N. Discard and replace architectural precast concrete units that do not comply with requirements, including structural, manufacturing tolerance, and appearance, unless repairs meet requirements in PCI MNL 117 and Architect's approval.

2.11 FABRICATION TOLERANCES

A. Fabricate architectural precast concrete units straight and true to size and shape with exposed edges and corners precise and true so each finished panel complies with PCI MNL 117 product tolerances as well as position tolerances for cast-in items.

B. Position Tolerances: For cast-in items measured from datum line location, as indicated on Shop Drawings.

1. Weld Plates: Plus or minus 1 inch.
2. Inserts: Plus or minus 1/2 inch.
3. Handling Devices: Plus or minus 3 inches.
4. Reinforcing Steel and Welded Wire Fabric: Plus or minus 1/4 inch where position has structural implications or affects concrete cover; otherwise, plus or minus 1/2 inch.
5. Reinforcing Steel Extending out of Member: Plus or minus 1/2 inch of plan dimensions.
6. Tendons: Plus or minus 1/4 inch, vertical; plus or minus 1 inch, horizontal.
7. Location of Bearing Surface from End of Member: Plus or minus 1/4 inch.
8. Allowable Rotation of Plate, Inserts: 2-degree rotation or 1/4 inch maximum over the full dimension of unit.
9. Position of Sleeve: Plus or minus 1/2 inch.

2.12 FINISHES

A. Panel faces shall be free of joint marks, grain, and other obvious defects. Corners, including false joints shall be uniform, straight, and sharp. Finish exposed-face surfaces of architectural precast concrete units to match approved sample panels and as follows:

Submit sample panels of each of the following for Architect's final selection:

1. Abrasive-Blast Finish: Use abrasive grit, equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces.
2. Acid-Etched Finish: Use acid and hot-water solution, equipment, application techniques, and cleaning procedures to expose aggregate and surrounding matrix surfaces. Protect hardware, connections, and insulation from acid attach.
3. Honed Finish: Use continuous mechanical abrasion with fine grit, followed by filling and rubbing procedures.

B. Finish exposed top, bottom and back surfaces of architectural precast concrete units to match face-surface finish.

C. Seal precast tread and landing units with clear, non-slip sealer, as recommended by manufacturer, to reduce stain penetration into concrete.

2.13 SOURCE QUALITY CONTROL

A. Quality-Control Testing: Test and inspect precast concrete according to PCI MNL 117 requirements. If using self-consolidating concrete, also test and inspect according to PCI TR-6, "Interim Guidelines for the Use of Self-Consolidating Concrete in Precast/Prestressed Concrete Institute Member Plants."

B. Strength of precast concrete units will be considered deficient if units fail to comply with ACI 318 requirements for concrete strength.

C. Testing: If there is evidence that strength of precast concrete units may be deficient or may not comply with ACI 318 requirements, precaster will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42/C 42M.

1. A minimum of three representative cores will be taken from units of suspect strength, from locations directed by Architect.
2. Cores will be tested in an air-dry condition.
3. Strength of concrete for each series of 3 cores will be considered satisfactory if average compressive strength is equal to at least 85 percent of 28-day design compressive strength and no single core is less than 75 percent of 28-day design compressive strength.
4. Test results will be made in writing on same day that tests are performed, with copies to Architect, Contractor, and precast concrete fabricator. Test reports will include the following:

    a. Project identification name and number.
    b. Date when tests were performed.
    c. Name of precast concrete fabricator.
    d. Name of concrete testing agency.
    e. Identification letter, name, and type of precast concrete unit(s) represented by core tests; design compressive strength; type of break; compressive strength at breaks, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.

D. Patching: If core test results are satisfactory and precast concrete units comply with requirements, clean and dampen core holes and solidly fill with precast concrete mixture that has no coarse aggregate, and finish to match adjacent precast concrete surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting structural frame or foundation and conditions for compliance with requirements for installation tolerances, true and level bearing surfaces, and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Do not install precast concrete units until supporting cast-in-place building structural framing has attained minimum allowable design compressive strength or supporting steel or other structure is complete.

3.2 INSTALLATION

A. Install clips, hangers, bearing pads, and other accessories required for connecting architectural precast concrete units to supporting members and backup materials.

B. Erect architectural precast concrete level, plumb, and square within specified allowable tolerances. Provide temporary supports and bracing as required to maintain position, stability, and alignment as units are being permanently connected.

1. Install temporary steel or plastic spacing shims or bearing pads as precast concrete units are being erected. Tack weld steel shims to each other to prevent shims from separating.
2. Maintain horizontal and vertical joint alignment and uniform joint width as erection progresses.
3. Remove projecting lifting devices and grout fill voids within recessed lifting devices flush with surface of adjacent precast surfaces when recess is exposed.

C. Connect architectural precast concrete units in position by bolting, welding, grouting, or as otherwise indicated on Shop Drawings. Remove temporary shims, wedges, and spacers as soon as practical after connecting and grouting are completed.

1. Do not permit connections to disrupt continuity of roof flashing.

D. Welding: Comply with applicable AWS D1.1/D1.1M and AWS D1.4 for welding, welding electrodes, appearance, quality of welds, and methods used in correcting welding work.

1. Protect architectural precast concrete units and bearing pads from damage by field welding or cutting operations, and provide noncombustible shields as required.
2. Welds not specified shall be continuous fillet welds, using no less than the minimum fillet as specified by AWS.
3. Clean weld-affected metal surfaces with chipping hammer followed by brushing, and apply a minimum 4.0-mil- thick coat of galvanized repair paint to galvanized surfaces according to ASTM A 780.
4. Remove, reweld, or repair incomplete and defective welds.

E. At bolted connections, use lock washers, tack welding, or other approved means to prevent loosening of nuts after final adjustment.

1. Where slotted connections are used, verify bolt position and tightness. For sliding connections, properly secure bolt but allow bolt to move within connection slot. For friction connections, apply specified bolt torque and check 25 percent of bolts at random by calibrated torque wrench.

F. Grouting Connections: Grout connections where required or indicated. Retain grout in place until hard enough to support itself. Pack spaces with stiff grout material, tamping until voids are completely filled. Place grout to finish smooth, level, and plumb with adjacent concrete surfaces. Keep grouted joints damp for not less than 24 hours after initial set. Promptly remove grout material from exposed surfaces before it affects finishes or hardens.

3.3 ERECTION TOLERANCES

A. Erect architectural precast concrete units level, plumb, square, true, and in alignment without exceeding the noncumulative erection tolerances of PCI MNL 117, Appendix I.

3.4 FIELD QUALITY CONTROL

A. Field welds will be subject to visual inspections and nondestructive testing according to ASTM E 165 or ASTM E 709. High-strength bolted connections will be subject to inspections.

B. Testing agency will report test results promptly and in writing to Contractor and Architect.

C. Repair or remove and replace work where tests and inspections indicate that it does not comply with specified requirements.

D. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.5 REPAIRS

A. Repair architectural precast concrete units if permitted by Architect. The Architect reserves the right to reject repaired units that do not comply with requirements.

B. Mix patching materials and repair units so cured patches blend with color, texture, and uniformity of adjacent exposed surfaces and show no apparent line of demarcation between original and repaired work, when viewed in typical daylight illumination from a distance of 20 feet.

C. Wire brush, clean, and paint damaged prime-painted components with same type of shop primer.

D. Remove and replace damaged architectural precast concrete units when repairs do not comply with requirements.

3.6 CLEANING

A. Clean surfaces of precast concrete units exposed to view.

B. Clean mortar, plaster, fireproofing, weld slag, and other deleterious material from concrete surfaces and adjacent materials immediately.

C. Clean exposed surfaces of precast concrete units after erection and completion of joint treatment to remove weld marks, other markings, dirt, and stains.

1. Perform cleaning procedures, if necessary, according to precast concrete fabricator's recommendations. Clean soiled precast concrete surfaces with detergent and water, using

stiff fiber brushes and sponges, and rinse with clean water. Protect other work from staining or damage due to cleaning operations.

2. Do not use cleaning materials or processes that could change the appearance of exposed concrete finishes or damage adjacent materials.

END OF SECTION 034500

SECTION 077620 – ROOF PAVERS

PART 1 - GENERAL Add.#5

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Scope: provide design and engineering, labor, material, equipment, related services, and supervision required, including, but not limited to, manufacturing, fabrication, and installation for pre-cast concrete plaza paver system as required for the complete performance of the work, and as shown on the Drawings and as herein specified.

B. Section includes: The Work specified in the Section includes, but shall not be limited to:

1. Precast concrete pavers installed on thinset.
2. Precast concrete pavers installed on concrete slabs on grade and elevated concrete structural slabs with open joints and pedestals.

C. Related Sections:

1. Division 02 Section "Selective Site and Structure Demolition."
2. Division 03 Section "Cast-in-Place Concrete."
3. Division 03 Section "Glass-Fiber-Reinforced Concrete (GFRC)."
4. Division 06 Section "Miscellaneous Rough Carpentry."
5. Division 07 Section "Thermal Insulation."
6. Division 07 Section "Polyvinyl-Chloride (PVC) Roofing."
7. Division 07 Section "Joint Sealants."
8. Division 08 Section "Glazed Aluminum Curtain Walls."

1.3 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C 33 - Specification for Concrete Aggregates.
2. ASTM C 150 - Specification for Portland Cement.
3. ASTM C 67 - Method of Sampling and Testing Brick and Structural Clay Tile.
4. ASTM C 140 - Specification for Concrete.

B. Tile Council of America (TCA):

1. TCA F101 - Installation Method Cement Mortar Bonded.

C. American National Standards Institute (ANSI):

1. ANSI A-118.4 - Latex Portland Cement Mortar.
2. ANSI A-118.6 - Grout - Latex.

1.4 ACTION SUBMITTALS

A. Submit under provisions of Section 013300 – Submittal Procedures.

1. Product Data: Manufacturer's data sheets on each product to be used, including:
   a. Test Reports: Three copies, showing compliance with specified ASTM requirements.
   b. Preparation instructions and recommendations.
   c. Storage and handling requirements and recommendations.
   d. Installation methods.

B. Shop Drawings:
1. Layout drawings of each paved area showing the pattern of pavers, indicate pavers requiring cutting, indicate setting bed methods in each area, drainage patterns and drains. Include details of setting beds, noting all materials and their thickness, show details at curbs and vertical surfaces.

C. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.

D. Verification Samples: For each finish product specified, three sample pavers of each manufactured, type, size and color selected or specified.

E. LEED Submittals:

1. Product Data for Credit MR 4: Provide 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.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For installer of pre-cast concrete paver system.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications:

1. Precast products shall be produced by a single manufacturer unless otherwise specified.
2. Manufacturer shall submit evidence of having not less than ten years successful production of this product.

3. The paver manufacturer shall demonstrate, either by proven field performance or a laboratory freeze-thaw test, that the paving units have adequate durability if they are to be subjected to a freeze-thaw environment.
    a. Satisfactory field performance is indicated when units similar in composition and made with the same manufacturing process as those to be supplied to the purchaser, do not exhibit objectionable deterioration after at least 3 years.
    b. The units used as the basis for proven field performance shall have been exposed to the same general type of environment, temperature range and traffic volume as is contemplated for the units supplied to the purchaser.

B. Installer Qualifications:

1. Subcontractor shall submit evidence of skill and not less than five years specialized experience with this product.

C. Source Limitations for Pavers: Obtain from single source from single manufacturer for each product and installation method.

D. Source Limitations for Paver Accessories: Obtain from single source from single manufacturer for each product and installation method.

E. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Architect.
2. Do not proceed with remaining work until workmanship, color, and sheen are approved by Architect.
3. Refinish mock-up area as required to produce acceptable work.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and handle precast concrete pavers in such a manner as to prevent damage. Units shall be stored above ground on pallets. Pallets shall be clean and non-staining. All damaged or otherwise unsuitable material shall be immediately removed from the job site.

1. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1. Do not work during freezing weather or on wet or frozen sub-base.

1.9 WARRANTY

A. Special Warranty: Manufacturer and Installer agree to repair or replace roof pavers and components that leak, deteriorate beyond normal weathering, or otherwise fail in materials or workmanship within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Products specified are those as manufactured by Hanover Architectural Products. Items specified are to establish a standard of quality for design, function, materials and appearance. Equivalent products by other manufacturers are acceptable. The Architect will be the sole judge of the basis of what is equivalent.

1. Requests for substitutions will be considered in accordance with provisions of Section 016000 - Product Requirements.

2.2 PAVERS

A. Precast Concrete Pavers

1. Product: Prest Pavers
2. Size: 23-7/8 inches by 23-7/8 inches by 2 inches thick.
3. Finish and color: To match existing adjacent plaza

B. Precast Material Requirements:

1. Precast Cementitious Materials: Materials shall conform to the following applicable ASTM Specifications:
   a. Portland Cement: ASTM C 150 for Portland Cement.

2. Aggregates shall conform to ASTM specifications, except that grading requirements shall not necessarily apply:
   a. Normal Weight: ASTM C 33 for Concrete Aggregates.

3. Other Constituents: Coloring pigments, integral water repellents, etc., shall be previously established as suitable for use in concrete and either shall conform to ASTM Standards where applicable, or shall be shown by test or experience not to be detrimental to the durability of the concrete.

C. Precast Performance Requirements:

1. Compressive Strength: At the time of delivery to the work site, the average compressive strength shall not be less than 8,000 psi with no individual unit less than 7,000 psi (48,000 kPa) per ASTM C 140.
    a. Absorption: The average shall not be greater than 6% per ASTM C140.
    b. Flexural Strength: Not less than 800 psi (5500 kPa) per ASTM 293.
    c. Load carrying capacity: Paver units shall have a tested center load capacity of 1,850 lb (840 kg). WT CL96
    d. Freeze/thaw: Durability of the paver shall meet the freeze/thaw tests in accordance with Section 8 of ASTM C67. Specimens, when tested, shall have no breakage and not greater than 1% loss in dry weight of any individual unit when subject to 50 cycles of freeze/ thaw.
    e. Sizing: Permissible variations in dimensions shall not differ by more than 1/16 inch (1.6 mm) from width, height, length or thickness. Standard units are manufactured with a 3/16 inch (4.8 mm) bevel on all four sides of finished surface. Unit shall conform to a true plane and not differ by more than 1/16 inch (1.6 mm) in either concave and/or convex warpage.

2.3 INSTALLATION MATERIALS

A. System: Thinset Mortar Method - Pedestrian Installation.

1. Latex Mortar Mix: ANSI A-118.4.
2. Water: Clean and free of deleterious acids, alkalies or organic materials.
3. Grout: ANSI A-118.6, Grout - Latex.
4. Sealant: As specified in Section 07 91 26 - Joint Fillers.
5. Back-up: As specified in Section 07 91 26 - Joint Fillers.
6. Bond Breaker: As specified in Section 07 91 26 - Joint Fillers.

B. System: Open Joint Pedestal Mounted.

1. Work shall include precast concrete pavers, pedestals and accessory materials required for complete and proper installation of the paver system.

2. Pedestal Systems:
    a. Adjustable Pedestals: Elevator Adjustable Pedestals as manufactured by Hanover Architectural Products to accommodate pitches/slopes as indicated on drawings.

3. Other Accessory Materials:
    a. Shall be either provided by the manufacturer of the precast concrete pavers and precast units, or shall be specifically recommended by them.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Concrete shall not exceed 1/8 inch in 10 feet (3 mm in 3 m) from required plane. Concrete to be steel troweled with fine broom finish. No curing or sealing compound used.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 INSTALLATION

A. Install in accordance with manufacturer's instructions.

1. Placement Tolerance:
   a. Maximum of 1/16 inch (1.6 mm) height variation between adjacent pavers.
   b. Individual pavers shall not vary more than 1/16 inch (1.6 mm) from level across width of the paver.
   c. Paved areas shall not vary more than 1/4 inch (6 mm) from level in a distance of 10 feet (3 m) measured at any location and in any direction.
   d. Joints between pavers to be 1/8 inch (3 mm).

B. Thinset Mortar Method - Pedestrian Installation:

1. Installation of Mortar bed as per TCA F102. Materials use shall follow instructions of manufacturer for use in mortar method.
2. Install precast concrete pavers.
3. Grouting of pavers in strict accordance with grout manufacturer's directions and instructions. Latex or acrylic additives of the same manufacturer as the grout.
4. Control and expansion joints shall be installed per TCA EJ 171. Joint materials used shall follow manufacturer's directions and instructions.
5. Rework mixes from time to time to maintain proper consistency, as recommended by manufacturer but do not add ingredients. Discard mortar that has reached its initial set.
6. Field cut precast pavers in accordance with manufacturer's recommendations for methods, equipment and precautions.
7. Cleaning: Remove mortar stains and all other types of soiling from exposed paver surfaces, wash and scrub clean.

C. Pedestal and Open Joint Installation:

1. Inspection of deck and fixed elevation locations. All height or location problems to be corrected before installation.
2. Compare layout of deck to shop drawings or architectural drawings. All variances of field conditions to drawings to be reviewed and corrected prior to starting installation.

3. Tabs and shim plates are placed, maximum of 2 shims per location, at intersection of grid line if finished surface is to follow slope of substrates. Paver size centerlines shall be adhered to.
4. Level surface installation using adjustable or stand screw-top pedestal to follow manufacturer's installation procedures. No variances to system allowed.
5. Minor height and pitch adjustments are handled with 1/8 inch (3 mm) rubber shim plates.

3.4 PROTECTION

A. Protect installed products until completion of project.

B. Remove and replace pavers which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in same manner as original units, with same joint treatment to eliminate evidence of replacement.

C. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION 077620

2. Provide safety glazing labeling.

2.9 INSULATING-GLASS TYPES

A. Glass Type C & D: Low-e-coated, clear insulating glass.

1. Overall Unit Thickness: 1 inch.
2. Thickness of Each Glass Lite: 6.0 mm.
3. Outdoor Lite: Clear Heat-strengthened float glass or fully tempered float glass. As indicated or required by authorities having jurisdiction and indicated on drawings.
4. Interspace Content: Air.
5. Indoor Lite: Clear Heat-strengthened float glass or fully tempered float glass. As indicated or required by authorities having jurisdiction and indicated on drawings.
6. Low-E Coating: Pyrolytic or sputtered on second surface.
7. Visible Light Transmittance: 64 percent minimum.
8. Winter Nighttime U-Factor: 0.28 maximum.
9. Summer Daytime U-Factor: 0.26 maximum.
10. Solar Heat Gain Coefficient: 0.27 maximum.
11. Provide safety glazing labeling.
12. Basis-of-Design: PPG Solarban 70XL on clear

B. Glass Type E & F: Low-e-coated, tinted insulating glass. Heat strengthened or tempered both lites as required.

1. Overall Unit Thickness: 1 inch.
2. Thickness of Each Glass Lite: 6.0 mm.
3. Outdoor Lite: Tinted heat-strengthened float glass or fully tempered float glass. As required by authorities having jurisdiction and indicated on drawings.
4. Interspace Content: Air.
5. Indoor Lite: Clear heat-strengthened float glass or fully tempered float glass. As required by authorities having jurisdiction and indicated on drawings.
6. Low-E Coating: Pyrolytic or sputtered on third surface.
7. Visible Light Transmittance: 32 percent minimum.
8. Winter Nighttime U-Factor: 0.28 maximum.
9. Summer Daytime U-Factor: 0.26 maximum.
10. Solar Heat Gain Coefficient: 0.25 maximum.
11. Provide safety glazing labeling.
12. Basis-of-Design: PPG Solar Gray on Solarban 70XL. Add#4

C. Glass Type: Silicone-coated, tinted, insulating spandrel glass.

1. Overall Unit Thickness: 1 inch.
2. Thickness of Each Glass Lite: 6.0 mm.
3. Outdoor Lite: Tinted heat-strengthened float glass or fully tempered float glass.
4. Interspace Content: Air.
5. Indoor Lite: Clear heat-strengthened float glass or fully tempered float glass.
6. Coating Location: Fourth surface.

NON-RESIDENTIAL FENESTRATION CALCULATION REPORT / BID REPORT ACCORDING TO NFRC CMA PROCEDURES – NFRC STANDARD SIZE

NOTE: This is NOT an NFRC Label Certificate. This document can NOT be used in place of NFRC Label Certificate and can be used only for Bid and Design Purposes

PRODUCT LISTING:

					Performance at NFRC Standard Size		
ID	**Name**	**Framing Ref**	**Glazing Ref**	**Spacer Ref**	**U**	**SHGC**	**VT**
					Btu/h·ft²·F	**-**	**-**
	EFCO5900, SB70XL Solargray				0.45	0.18	0.28
	EFCO5900, SB70XL Clear		GA-PPG-2868		0.45	0.26	0.59

FRAME, GLAZING and SPACER ASSEMBLIES:

GLAZING LISTING:

Glazing Ref	Suplier ID	Description
GA-PPG-2868	PPG Industries	SB70XL Clear/Air/Clear
	PPG Industries	SB70XL Solargray/Air/Clear

SPACER LISTING:

Spacer Ref	Suplier ID	Description
	PPG Industries	PPG Intercept Spacer

FRAMING LISTING:

Framing Ref	Suplier ID	Description
	EFCO Corporation	

NON-RESIDENTIAL FENESTRATION CALCULATION REPORT / BID REPORT ACCORDING TO NFRC CMA PROCEDURES – ACTUAL PRODUCT SIZE

PRODUCT LISTING:

					Fenestration Performance at Actual Size*				
ID	**Qty**	**Total Area**	**Name**	**EnergyPlus Report File**	**Width**	**Height**	**U**	**SHGC**	**VT**
		in²			**in.**	**in.**	**Btu/h·ft²·F**	**-**	**-**
	1	6200.01	EFCO5900, SB70XL Solargray		78.74	78.74	0.45	0.18	0.28
	1	6200.01	EFCO5900, SB70XL Clear		78.74	78.74	0.45	0.26	0.59

* *Individual product performance at actual size is listed in the above table and has been determined in accordance with NFRC technical procedures; however the actual size performance calculations above are for information purposes and use in area-weighted average calculations and energy simulation programs.*

Calculation/Bid Report
Not Label Certificate

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes modular, tufted carpet tile.

B. Related Requirements:

1. Division 09 Section "Resilient Base and Accessories and Resilient Tile Flooring" for resilient wall base and accessories installed with carpet tile.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include installation recommendations for each type of substrate.

B. LEED Submittals:

1. Product Data for Credit EQ 4.3:

a. For carpet tile, documentation indicating compliance with testing and product requirements of CRI's "Green Label Plus" program.
b. For installation adhesive, documentation including printed statement of VOC content.

C. Shop Drawings: Show the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.

3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.
10. Transition details to other flooring materials.

D. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- long Samples.

E. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

F. Sustainability: Provide the Statement of the Achievement Level the carpet has attained for Gold, 52 to 70 points, based on specific Sustainable Attribute Performance for all product stages according to ANSI/NSF 140.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd..

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups at locations and in sizes shown on Drawings.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

1.10 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.

C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.

D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.11 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, excess static discharge, loss of tuft bind strength, loss of face fiber, and delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE CP1

A. Products: Subject to compliance with requirements, provide the following:

1. Interface floor “Happening” retrospective Glasbac retile.

B. Color: As designated on drawings.

C. Pattern: As designated on drawings.

D. Fiber Content: 100 percent nylon 6, 6.

E. Pile Characteristic: Tufted Tip-Sheared pile.

F. Density: 55 GH oz./cu. yd.

G. Pile Thickness: 0.11 inches for finished carpet tile according to ASTM D 6859.

H. Stitches: 8.66 per inch.

I. Gage: 1/12 inch.

J. Surface Pile Weight: 17 oz./sq. yd.

K. Primary Backing/Backcoating: Manufacturer's standard composite materials.

L. Secondary Backing: Manufacturer's standard material.

M. Backing System: Glasbac RE.

N. Size: 19.69 by 19.69 inches.

O. Applied Soil-Resistance Treatment: Protekt.

P. Antimicrobial Treatment: Interrcept.

Q. Performance Characteristics: As follows:

1. Appearance Retention Rating: Heavy traffic, 3.0 minimum according to ASTM D 7330.
2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm.
3. Dry Breaking Strength: Not less than 100 lbf according to ASTM D 2646.
4. Tuft Bind: Not less than 5 lbf according to ASTM D 1335.
5. Delamination: Not less than 4 lbf/in. according to ASTM D 3936.
6. Dimensional Tolerance: Within 1/32 inch of specified size dimensions, as determined by physical measurement.
7. Dimensional Stability: 0.2 percent or less according to ISO 2551 (Aachen Test).
8. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.

9. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) according to AATCC 16, Option E.
10. Electrostatic Propensity: Less than 2 kV according to AATCC 134.
11. Emissions: Provide carpet tile that complies with testing and product requirements of CRI's "Green Label Plus" program.

2.2 CARPET TILE CP2 & CP3

A. Products: Subject to compliance with requirements, provide the following:

1. Interface “On Board” Glas Bac RE Tile.

B. Color: As designated on drawings.

C. Pattern: As designated on drawings.

D. Fiber Content: 100 percent nylon 6, 6.

E. Pile Characteristic: Tufted cut-and-loop.

F. Density: 7266 oz./cu/ yd.

G. Pile Thickness: 0.16 inches for finished carpet tile according to ASTM D 6859.

H. Stitches: 10 stitches per inch.

I. Gage: 5/64 ends per inch.

J. Surface Pile Weight: 17 oz./sq. yd.

K. Primary Backing/Backcoating: Manufacturer’s standard composite materials. Glas Bac RE Tile.

L. Secondary Backing: Manufacturer’s standard material.

M. Backing System: Glas Bac RE.

N. Size: 19.69 by 19.69 inches.

O. Applied Soil-Resistance Treatment: Proteckt.

P. Antimicrobial Treatment: Intercept.

Q. Performance Characteristics: As follows:

1. Appearance Retention Rating: Moderate traffic, 2.5 minimum according to ASTM D 7330.
2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm.
3. Dry Breaking Strength: Not less than 100 lbf according to ASTM D 2646.

4. Delamination: Not less 4 lbf/in. according to ASTM D 3936.
5. Dimensional Tolerance: Within 1/32 inch of specified size dimensions, as determined by physical measurement.
6. Resistance to Insects: Comply with AATCC 24.
7. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
8. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) according to AATCC 16, Option E.
9. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.
10. Electrostatic Propensity: Less than 2 kV according to AATCC 134.
11. Emissions: Provide carpet tile than complies with testing and product requirements of CRI's "Green Label Plus" program.

2.3 WALK-OFF CARPET TILE: WT

A. Products: Subject to compliance with requirements, provide the following:

1. Interface "Entry Level" Glas Bac RE Tile.

B. Color: As designated on drawings.

C. Pattern: As designated on drawings.

D. Fiber Content: 100 percent nylon 6, 6.

E. Pile Characteristic: Tufted textured loop.

F. Density: 6,720 oz./cu/ yd.

G. Pile Thickness: 0.15 inches for finished carpet tile according to ASTM D 6859.

H. Stitches: 10 stitches per inch.

I. Gage: 1/12 ends per inch.

J. Tufted Yarn Weight: 28 oz./sq. yd.

K. Primary Backing/Backcoating: Manufacturer's standard composite materials. Glas Bac RE Tile.

L. Secondary Backing: Manufacturer's standard material.

M. Backing System: Glas Bac RE.

N. Size: 19.69 by 19.69 inches.

O. Antimicrobial Treatment: Intercept.

P. Performance Characteristics: As follows:

1. Appearance Retention Rating: Moderate traffic, 2.5 minimum according to ASTM D 7330.
2. Critical Radiant Flux Classification: Not less than 0.45 W/sq. cm.
3. Dry Breaking Strength: Not less than 100 lbf according to ASTM D 2646.
4. Delamination: Not less 4 lbf/in. according to ASTM D 3936.
5. Dimensional Tolerance: Within 1/32 inch of specified size dimensions, as determined by physical measurement.
6. Resistance to Insects: Comply with AATCC 24.
7. Colorfastness to Crocking: Not less than 4, wet and dry, according to AATCC 165.
8. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) according to AATCC 16, Option E.
9. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria, not less than 1-mm halo of inhibition for gram-negative bacteria, and no fungal growth, according to AATCC 174.
10. Electrostatic Propensity: Less than 2 kV according to AATCC 134.
11. Emissions: Provide carpet tile than complies with testing and product requirements of CRI's "Green Label Plus" program.

Add#5

2.4 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.

B. Concrete Subfloors: Verify that concrete slabs comply with ASTM F 710 and the following:

1. Slab substrates are dry and free of curing compounds, sealers, hardeners, and other materials that may interfere with adhesive bond. Determine adhesion and dryness characteristics by performing bond and moisture tests recommended by carpet tile manufacturer.
2. Subfloor finishes comply with requirements specified in Division 03 Section "Cast-in-Place Concrete" for slabs receiving carpet tile.
3. Subfloors are free of cracks, ridges, depressions, scale, and foreign deposits.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch wide or wider and protrusions more than 1/32 inch unless more stringent requirements are required by manufacturer's written instructions.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive for heavy traffic areas. Double stick patches at corners of carppet tiles for light traffic areas.

C. Maintain dye lot integrity. Do not mix dye lots in same area.

D. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.

E. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

G. Install pattern parallel to walls and borders.

H. Install carpet tile mono lithically.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 101100 - VISUAL DISPLAY SURFACES

Add.#5

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Markerboards.
2. Visual display rails.
3. Visual display wall panels.
4. Tackable wallcovering and trim.

1.3 DEFINITIONS

A. Tackboard: Framed or unframed, tackable, visual display board assembly.

B. Visual Display Board Assembly: Visual display surface that is factory fabricated into composite panel form, either with or without a perimeter frame; includes chalkboards, markerboards, and tackboards.

C. Visual Display Surface: Surfaces that are used to convey information visually, including surfaces of chalkboards, markerboards, tackboards, and surfacing materials that are not fabricated into composite panel form but are applied directly to walls.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for visual display surfaces.

1. Include rated capacities, operating characteristics, electrical characteristics and individual panel weights for sliding visual display units.

B. LEED Submittals:

1. Product Data for Credit IEQ 4.1: For adhesives, documentation including printed statement of VOC content.

2. Product Data for Credit IEQ 4.4: For composite wood products, documentation indicating that the product contains no urea formaldehyde.

C. Shop Drawings: For visual display surfaces. Include plans, elevations, sections, details, and attachments to other work.

1. Show locations of panel joints.
2. Include sections of typical trim members.

D. Samples for Initial Selection: For each type of visual display surface indicated, for units with factory-applied color finishes, and as follows:

1. Actual sections of porcelain-enamel face sheet tackboard assembly display rail.
2. Include accessory Samples to verify color selected.

E. Samples for Verification: For each type of visual display surface indicated.

1. Visual Display Surface: Not less than 8-1/2 by 11 inches, mounted on substrate indicated for final Work. Include one panel for each type, color, and texture required.
2. Trim: 6-inch- long sections of each trim profile.
3. Display Rail: 6-inch- long sections.
4. Support System: 6-inch- long sections.
5. Accessories: Full-size Sample of each type of accessory.

F. Product Schedule: For visual display surfaces. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for surface-burning characteristics of fabrics.

C. Warranties: Sample of special warranties.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For visual display surfaces to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain visual display surfaces from single source from single manufacturer. Visual display and tackable wallcovering may be from different manufacturers.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

C. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate appearance and aesthetic effects and set quality standards for installation.

D. Preinstallation Conference: Conduct conference at Project site.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver factory-built visual display surfaces, including factory-applied trim where indicated, completely assembled in one piece without joints, where possible. If dimensions exceed maximum manufactured panel size, provide two or more pieces of equal length as acceptable to Architect. When overall dimensions require delivery in separate units, prefit components at the factory, disassemble for delivery, and make final joints at the site.

B. Store visual display surfaces vertically with packing materials between each unit.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install visual display surfaces until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Field Measurements: Verify actual dimensions of construction contiguous with visual display surfaces by field measurements before fabrication.

1.10 WARRANTY

A. Special Warranty for Porcelain-Enamel Face Sheets: Manufacturer's standard form in which manufacturer agrees to repair or replace porcelain-enamel face sheets that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

   a. Surfaces lose original writing and erasing qualities.
   b. Surfaces exhibit crazing, cracking, or flaking.

2. Warranty Period: 50 years from date of Substantial Completion, or life of the building.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Porcelain-Enamel Face Sheet: Manufacturer's standard steel sheet with porcelain-enamel coating fused to steel; uncoated thickness indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Adplemco.
b. Claridge Products and Equipment, Inc.
c. PolyVision Corporation; a Steelcase company.
d. Aarco Products, Inc.
e. Platinum Visual Systems.

2. Gloss Finish: Gloss as indicated; dry-erase markers wipe clean with dry cloth or standard eraser.

B. Plastic-Impregnated Cork Sheet: Seamless, homogeneous, self-sealing sheet consisting of granulated cork, linseed oil, resin binders, and dry pigments that are mixed and calendared onto fabric or natural burlap backing; with washable vinyl finish and integral color throughout.

C. Hardboard: ANSI A135.4, tempered.

D. Particleboard: ANSI A208.1, Grade M-1, made with binder containing no urea formaldehyde.

E. Fiberboard: ASTM C 208.

F. Extruded Aluminum: ASTM B 221, Alloy 6063.

2.2 MARKERBOARD ASSEMBLIES

A. Porcelain-Enamel Markerboards: Balanced, high-pressure, factory-laminated markerboard assembly of three-ply construction consisting of backing sheet, core material, and porcelain-enamel face sheet with low-gloss finish.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. AARCO Products, Inc.
b. ADP Lemco, Inc.
c. Claridge Products and Equipment, Inc.
d. Platinum Visual Systems; a division of ABC School Equipment, Inc.
e. PolyVision Corporation; a Steelcase company.

2. MDF Core: 1/2 inch thick; with 0.015-inch- thick, aluminum sheet backing.
3. Laminating Adhesive: Manufacturer's standard, moisture-resistant thermoplastic type.

2.3 TACKABLE WALLCOVERING

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Wall Talkers – Tac – Wall
2. Forbo Linoleum – Bulletin Board.

B. Plastic-Impregnated-Cork Tackboard: 1/4-inch- thick, plastic-impregnated cork sheet calendered onto a natural burlap backing.

2.4 VISUAL DISPLAY RAILS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. AARCO Products, Inc.
2. Claridge Products and Equipment, Inc.
3. Platinum Visual Systems; a division of ABC School Equipment, Inc.
4. PolyVision Corporation; a Steelcase company.
5. ADP Lemco, Inc.

B. General: Manufacturer's standard, aluminum-framed, tackable cork visual display surface fabricated into narrow rail shape and designed for displaying material.

C. Adhesive: Mildew-resistant, nonstaining adhesive, for use with specific tack wall panels and substrate application, as recommended in writing by visual display surface manufacturer.

1. Adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.5 SLIDING VISUAL DISPLAY UNITS

A. Vertical-Sliding Visual Display Units: Factory-fabricated units consisting of extruded-aluminum tubular frame, fixed-rear visual display panel, and aluminum-framed vertical-sliding panels; designed for recessed mounting. Provide panels that operate smoothly without vibration or chatter.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. AARCO Products, Inc.
b. ADP Lemco, Inc.

c. Claridge Products and Equipment, Inc.
d. Platinum Visual Systems; a division of ABC School Equipment, Inc.
e. PolyVision Corporation; a Steelcase company.

2. Type: Tubular frame on four sides. Unit shall be designed to support panels independent of wall.
3. Two-Track Units: Fabricate unit with fixed rear panel covering entire rear surface. Provide two sliding panels, each equal to not less than one-half of overall height of unit.
4. Sliding Panels: Fabricated from not less than 5/8 inch - thick, kraft-paper honeycomb core; designed to be rigid and to resist warpage.

5. Hardware: Manufacturer's standard, neoprene ball-bearing end rollers, four on each side of each sliding panel. Counterbalance each sliding panel with lead counterweights supported by steel aircraft cable over ball-bearing sheaves; with removable cover plate for access to counterweights. Provide rubber bumpers at top and bottom for each sliding panel.

2.6 MARKERBOARD AND TACKBOARD ACCESSORIES

A. Aluminum Frames and Trim: Fabricated from not less than 0.062-inch- thick, extruded aluminum; standard size and shape.

1. Field-Applied Trim: Manufacturer's standard, snap-on trim with no visible screws or exposed joints.
2. Factory-Applied Trim: Manufacturer's standard.

B. Chalktray: Manufacturer's standard, continuous.

1. Box Type: Extruded aluminum with slanted front, grooved tray, and cast-aluminum end closures.
2. Solid Type: Extruded aluminum with ribbed section and smoothly curved exposed ends.

C. Map Rail: Provide the following accessories:

1. Display Rail: Continuous and integral with map rail; fabricated from cork approximately 1 to 2 inches wide.
2. End Stops: Located at each end of map rail.
3. Map Hooks and Clips: Two map hooks with flexible metal clips for every 48 inches of map rail or fraction thereof.
4. Paper Holder: Extruded aluminum; designed to hold paper by clamping action.

2.7 FABRICATION

A. Porcelain-Enamel Visual Display Assemblies: Laminate porcelain-enamel face sheet and backing sheet to core material under heat and pressure with manufacturer's standard flexible, waterproof adhesive.

B. Visual Display Boards: Factory assemble visual display boards unless otherwise indicated.

1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display boards at manufacturer's factory before shipment.

C. Factory-Assembled Visual Display Units: Coordinate factory-assembled units with trim and accessories indicated. Join parts with a neat, precision fit.

1. Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of board, as acceptable to Architect.
2. Provide manufacturer's standard vertical-joint system between abutting sections of markerboards.

D. Aluminum Frames and Trim: Fabricate units straight and of single lengths, keeping joints to a minimum. Miter corners to a neat, hairline closure.

1. Where factory-applied trim is indicated, trim shall be assembled and attached to visual display units at manufacturer's factory before shipment.

2.8 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.9 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A31, Class II, 0.010 mm or thicker.

2.10 VISUAL DISPLAY SURFACE SCHEDULE

A. WB1

1. Markerboard: Porcelain-Enamel markerboard assembly

a. Color: as selected by architect from manufacturer’s standard colors

2. Corners: Square
3. Width: 4’-0”
4. Height: 4’-0”

5. Mounting: Wall
6. Aluminum Trim: Manufacturer's standard with clear anodic finish.
7. Accessories: Chalktray, Map Rail

B. WB2

1. Markerboard: Porcelain-Enamel markerboard assembly

   a. Color: as selected by architect from manufacturer's standard colors

2. Corners: Square
3. Width: 6'-0"
4. Height: 4'-0"
5. Mounting: Wall
6. Aluminum Trim: Manufacturer's standard with clear anodic finish.
7. Accessories: Chalktray, Map Rail

C. WB3

1. Markerboard: Porcelain-Enamel markerboard assembly

   a. Color: as selected by architect from manufacturer's standard colors
2. Corners: Square

3. Width: 8'-0"
4. Height: 4'-0"
5. Mounting: Wall
6. Aluminum Trim: Manufacturer's standard with clear anodic finish.
7. Accessories: Chalktray, Map Rail

D. WB4

1. Markerboard: Porcelain-Enamel markerboard assembly

   a. Color: as selected by architect from manufacturer's standard colors

2. Corners: Square
3. Width: 10'-0"
4. Height: 4'-0"
5. Mounting: Wall
6. Aluminum Trim: Manufacturer's standard with clear anodic finish.
7. Accessories: Chalktray, Map Rail

E. WB5

1. Markerboard: Porcelain-Enamel markerboard assembly

   a. Color: as selected by architect from manufacturer's standard colors

2. Corners: Square
3. Width: 12’-0”
4. Height: 4’-0”
5. Mounting: Wall
6. Aluminum Trim: Manufacturer’s standard with clear anodic finish.
7. Accessories: Chalktray, Map Rail

F. WB6

1. Markerboard: Porcelain-Enamel markerboard assembly

   a. Color: as selected by architect from manufacturer’s standard colors

2. Corners: Square
3. Width: 16’-0”
4. Height: 4’-0”
5. Mounting: Wall
6. Aluminum Trim: Manufacturer’s standard with clear anodic finish.
7. Accessories: Chalktray, Map Rail

G. WB7

1. Markerboard: Porcelain-Enamel markerboard assembly

   a. Color: as selected by architect from manufacturer’s standard colors

2. Corners: Square
3. Width: 20’-0”
4. Height: 4’-0”
5. Mounting: Wall
6. Aluminum Trim: Manufacturer’s standard with clear anodic finish.
7. Accessories: Chalktray, Map Rail

H. WB8

1. Vertical Sliding Markerboard: Porcelain-Enamel markerboard assembly

   a. Color: as selected by architect from manufacturer’s standard colors

2. Corners: Square
3. Width: 10’-0”
4. Height: 6’-0”
5. Mounting: Wall
6. Aluminum Trim: Manufacturer’s standard with clear anodic finish.
7. Accessories: Chalktray, Map Rail

I. WB9

1. Existing Markerboard: To remain

2. Note: if removed from wall, store in vertical position and protect during duration of construction.

J. TB1

1. Tackable Wallcovering: Plastic Impregnated Cork Tackable Surface

   a. Color: as selected by architect from manufacturer’s standard colors

2. Corners: Square
3. Width: 4’-0”
4. Height: 8’-0”
5. Mounting: adhesive to wall
6. Aluminum Trim: Manufacturer’s standard j-trim with clear anodic finish on all exposed edges.

K. TB2

1. Tackable Wallcovering: Plastic Impregnated Cork Tackable Surface

   a. Color: as selected by architect from manufacturer’s standard colors

2. Corners: Square
3. Width: 12’-0”
4. Height: 4’-0”
5. Mounting: adhesive to wall
6. Aluminum Trim: Manufacturer’s standard j-trim with clear anodic finish on all exposed edges.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances, surface conditions of wall, and other conditions affecting performance of the Work.

B. Examine walls and partitions for proper preparation and backing for visual display surfaces.

C. Examine walls and partitions for suitable framing depth where sliding visual display units will be installed.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Comply with manufacturer's written instructions for surface preparation.

B. Clean substrates of substances that could impair the performance of and affect the smooth, finished surfaces of visual display boards, including dirt, mold, and mildew.

C. Prepare surfaces to achieve a smooth, dry, clean surface free of flaking, unsound coatings, cracks, defects, projections, depressions, and substances that will impair bond between visual display surfaces and wall surfaces.

1. Prime wall surfaces indicated to receive visual display wall coverings and as recommended in writing by primer/sealer manufacturer and wall covering manufacturer.
2. Prepare surfaces to receive visual display wall coverings and test for moisture according to requirements specified in Division 09 Section "Wall Coverings."
3. Prepare substrates indicated to receive visual display wall covering as required by manufacturer's written instructions to achieve a smooth, dry, clean, structurally sound surface that is uniform in color.

a. Gypsum Board: Prime with primer as recommended in writing by primer/sealer manufacturer and wall covering manufacturer.
b. Painted Surfaces: Treat areas susceptible to pigment bleeding.

D. Prepare recesses for sliding visual display units as required by type and size of unit.

3.3 INSTALLATION, GENERAL

A. General: Install visual display surfaces in locations and at mounting heights indicated on Drawings, or if not indicated, at heights indicated below. Keep perimeter lines straight, level, and plumb. Provide grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories necessary for complete installation.

1. Mounting Height: 36 inches above finished floor to top of chalktray.

3.4 INSTALLATION OF FACTORY-FABRICATED VISUAL DISPLAY BOARDS AND ASSEMBLIES

A. Visual Display Boards: Attach visual display boards to wall surfaces. As recommended by manufacturer but not less than at 16 inches o.c. provide blocking as recommended. Conceal all fastners.

3.5 INSTALLATION OF VISUAL DISPLAY RAILS

A. Display Rails: Install rails in locations and at mounting heights indicated on Drawings. Attach to wall surface with fasteners at not more than 16 inches o.c.

3.6 INSTALLATION OF VISUAL DISPLAY WALL COVERING

A. General: Comply with visual display wall covering manufacturers' written installation instructions.

B. Install seams horizontal and level, with lowest seam 24 inches above finished floor. Railroad fabric (reverse roll direction) to ensure color matching.

C. Double cut seams, with no gaps or overlaps. Remove air bubbles, wrinkles, blisters, and other defects.

D. After installation, clean visual display wall covering according to manufacturer's written instructions. Remove excess adhesive at finished seams, perimeter edges, and adjacent surfaces.

E. Provide manufacturers alum J-Trim at all edges.

3.7 CLEANING AND PROTECTION

A. Clean visual display surfaces according to manufacturer's written instructions. Attach one cleaning label to visual display surface in each room.

B. Touch up factory-applied finishes to restore damaged or soiled areas.

C. Cover and protect visual display surfaces after installation and cleaning.

3.8 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain motor-operated, sliding visual display units.

END OF SECTION 101100

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

Add.#5

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.
2. Public-use shower room accessories.
3. Underlavatory guards.
4. Custodial accessories.

B. Owner-Furnished and Installed Material:

1. TA2 – Toilet Tissue Dispenser.
2. TA3 – Paper Towel Dispenser
3. TA4 – Soap Dispenser.
4. TA17 – Toilet Seat Cover Dispenser

C. Related Sections:

1. Division 08 Section "Mirrors" for frameless mirrors.
2. Division 09 Section "Tiling" for ceramic toilet and bath accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify products using designations indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same Part 2 articles, obtain products from single source from single manufacturer.

1.7 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.

B. Brass: ASTM B 19, flat products; ASTM B 16/B 16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.

D. Galvanized-Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

E. Galvanized-Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
6. Tubular Specialties Manufacturing, Inc.

B. Grab Bar (TA1):

1. Mounting: Flanges with concealed fasteners.
2. Material: Stainless steel, 0.05 inch thick.

   a. Finish: Smooth, No. 4 finish (satin).

3. Outside Diameter: 1-1/4 inches.
4. Configuration and Length: As indicated on Drawings.

C. Vendor TAS:

1. Type: Sanitary napkin and Condom.
2. Mounting: Fully recessed, designed for 4-inch wall depth.
3. Operation: Single coin (25 cents).
4. Exposed Material and Finish: Stainless steel, No. 4 finish (satin).
5. Lockset: Tumbler type with separate lock and key for coin box.

D. Sanitary-Napkin Disposal Unit TA6:

1. Mounting: Surface mounted.
2. Door or Cover: Self-closing, disposal-opening cover.
3. Receptacle: Removable.
4. Material and Finish: Stainless steel, No. 4 finish (satin).

2.3 PUBLIC-USE SHOWER ROOM ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
6. Tubular Specialties Manufacturing, Inc.

B. Shower Curtain Rod TA12:

1. Description: 1-inch OD; fabricated from nominal 0.0375-inch- thick stainless steel.
2. Mounting Flanges: Stainless-steel flanges designed for exposed fasteners.
3. Finish: No. 4 (satin).

C. Shower Curtain TA13:

1. Size: Minimum 12 inches wider than opening by 72 inches high.
2. Material: Vinyl, minimum 0.006 inch thick, opaque, matte.
3. Color: White.
4. Grommets: Corrosion resistant at minimum 6 inches o.c. through top hem.
5. Shower Curtain Hooks: Chrome-plated or stainless-steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide one hook per curtain grommet.

D. Folding Shower Seat TA8:

1. Configuration: L-shaped seat, designed for wheelchair access.
2. Seat: Phenolic or polymeric composite of slat-type or one-piece construction in color as selected by Architect.
3. Mounting Mechanism: Stainless steel, No. 4 finish (satin).

E. Soap Dish TA14:

1. Description: Without washcloth bar.
2. Mounting: Surface mounted.
3. Material and Finish: Stainless steel, No. 4 finish (satin).

2.4 UNDERLAVATORY GUARDS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Plumberex Specialty Products, Inc.
2. Truebro by IPS Corporation.

B. Underlavatory Guard TA7:

1. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings.
2. Material and Finish: Antimicrobial, molded plastic, white.

2.5 CUSTODIAL ACCESSORIES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.
6. Tubular Specialties Manufacturing, Inc.

B. Mop and Broom Holder TA11:

1. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
2. Length: 36 inches.
3. Hooks: Three.
4. Mop/Broom Holders: Four, spring-loaded, rubber hat, cam type.
5. Material and Finish: Stainless steel, No. 4 finish (satin).

    a. Shelf: Not less than nominal 0.05-inch- thick stainless steel.
    b. Rod: Approximately 1/4-inch- diameter stainless steel.

2.6 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 102800

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

1. Scope: Provide design and engineering, labor, material, equipment, related services, and supervision required, including, but not limited to, manufacturing, fabrication, erection, and installation for exterior sun control devices as required for the complete performance of the work, and as shown on the Drawings and as herein specified.
2. Section Includes: The work specified in this Section includes, but shall not be limited to, horizontal, fixed, extruded aluminum exterior sun control assemblies.

B. Related Sections:

1. Division 08 Section "Aluminum-Framed Entrances and Storefronts."
2. Division 08 Section "Glazed Aluminum Curtain Walls."

1.3 REFERENCES

A. General: The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by the basic designation only. The edition/revision of the referenced publications shall be the latest date as of the date of the Contract Documents, unless otherwise specified.

1. ASTM C 1036 also includes traditional thickness designations in IP units, but all thicknesses in this Section are expressed in millimeters.
2. American Architectural Manufacturers Association (AAMA):
   a. AAMA 611, "Voluntary Specifications for Anodized Architectural Aluminum (Revised)."
   b. AAMA 2605, "Voluntary Specification, Performance Requirements, and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels."
3. American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE):
   a. ASHRAE/IESNA 90.1, "Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings" (co-sponsored by IESNA).
4. American Welding Society (AWS):

a. AWS D1.2, "Structural Welding Code - Aluminum" (copyrighted by AWS, ANSI approved).

5. ASTM (ASTM):
   a. ASTM B 26/B 26M, "Standard Specification for Aluminum-Alloy Sand Castings."
   b. ASTM B 209/B 209M, "Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate."
   c. ASTM B 221/B 221M, "Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Shapes, and Tubes."
6. National Association of Architectural Metal Manufacturers (NAAMM):
   a. NAAMM MFM, "Metal Finishes Manual."
7. SSPC: The Society for Protective Coatings (SSPC):
   a. SSPC Paint 12, "Paint Specification No. 12 Cold-Applied Asphalt Mastic (Extra Thick Film)."

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide exterior sun control assemblies capable of withstanding the effects of loads and stresses from dead loads, live loads, snow loads, wind loads, and normal thermal movement without evidencing permanent deformation of assembly or components including blades, frames, and supports; noise or metal fatigue caused by blade rattle or flutter; or permanent damage to fasteners and anchors.

1. Dead Load: As required by applicable building code or indicated in drawings.
2. Live Load: As required by applicable building code or indicated in drawings.
3. Snow Load: As required by applicable building code or indicated in drawings.
4. Wind Load: As required by applicable building code or indicated in drawings.
5. Thermal Movements: Allow for thermal movement resulting from the following maximum change (range) in ambient and surface temperatures in engineering, fabricating, and installing exterior metal fabrications to prevent buckling, opening of joints, overstressing of components and connections, and other detrimental effects. Base engineering calculation on actual surface temperatures of materials due to both solar heat gain and nighttime sky heat loss.
   a. Temperature Change (Range): 120 °F or 67 °C ambient, 180 °F or 100 °C material surfaces.

1.5 ACTION SUBMITTALS

A. Product Data: Submit product data showing material proposed. Submit sufficient information to determine compliance with the Drawings and Specifications. Product data shall include, but shall not be limited to, manufacturer’s technical and descriptive data on exterior sun control components and assemblies.

B. Shop Drawings: Submit shop drawings for each product and accessory required. Include information not fully detailed in manufacturer’s standard product data, including, but not limited to, plans; elevations; and sections and details showing profiles, angles, and spacing of blades, frames and supports. Show unit dimensions related to supporting and adjoining structures and construction. Indicate anchorage details and locations.

1. Submit shop drawings which have been signed and sealed by a professional engineer licensed to practice in the State of Utah.
2. Submit samples for verification purposes. Submit 2 inch (51 mm) by 3 inch (76 mm) minimum size sample of selected color coating. Additional samples may be required to show design, fabrication techniques, and workmanship.

C. Quality Control Submittals:

1. Design Data: For installed products indicated to comply with certain design loadings, include structural analysis data signed and sealed by the professional engineer who was responsible for their preparation. Only the loading on the structure at the connections will be reviewed.
2. Qualification Data: Submit 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 of architects and owners, and other information specified.

D. Samples:

1. Submit samples for initial color selection. Submit samples of each specified finish. Submit samples in form of manufacturer's color charts showing full range of colors and finishes available. Where finishes involve normal color variations, include samples showing the full, range of variations expected.

E. LEED Submittals:

1. Product Data for Credit MR 4: Provide 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.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications: Manufacturer shall be a firm engaged in the manufacture of exterior sun control devices of types and sizes required, and whose products have been in satisfactory use in similar service for a minimum of 10 years.
2. Installer Qualifications: Installer shall be a firm that shall have a minimum of five years of successful installation experience with projects utilizing exterior sun control devices similar in type and scope to that required for this Project.
3. Engineer Qualifications: The engineer shall be a professional engineer legally authorized to practice in the jurisdiction where the Project is located and experienced in providing engineering services of the kind indicated that have resulted in the installation of products similar to this Project in material, design, and extent, and that have a record of successful in-service performance.

4. Welder Qualifications: Qualify welding processes and welding operators in accordance with AWS standard qualification procedures. Operators shall carry proof of qualification on their persons.

B. Regulatory Requirements: Comply with applicable requirements of the laws, codes, ordinances, and regulations of Federal, State, and local authorities having jurisdiction. Obtain necessary approvals from such authorities.

C. Welding Standards: Comply with applicable provisions of AWS D1.2.

D. Pre-Installation Conference: Conduct pre-installation conference in accordance with Section 013100. Prior to commencing the installation, meet at the Project site to review the material selections, installation procedures, and coordination with other trades. Pre-installation conference shall include, but shall not be limited to, the Owner, the Contractor, the Architect, the Installer, and any trade that requires coordination with the work. Date and time of the pre-installation conference shall be acceptable to the Owner and the Architect.

E. Coordination: Coordinate installation of exterior sun control devices with provision of exterior wall system, window framing system, curtain wall system, etc., to ensure proper structural support is provided, attachment of exterior sun control devices is compatible with substrate, and weathertightness of exterior envelope is maintained.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to the Project site in supplier's or manufacturer's original wrappings and containers, labeled with supplier's or manufacturer's name, material or product brand name, and lot number, if any.

B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1.8 PROJECT CONDITIONS

A. Field Measurements: Take field measurements prior to fabrication of the work and preparation of shop drawings, to ensure proper fitting of the work. Show recorded measurements on final shop drawings. Notify the Owner and the Architect, in writing, of any dimensions found which are not within specified dimensions and tolerances in the Contract Documents, prior to proceeding with the fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the work.

1. Established Dimensions: Where field measurements can not be made without delaying the work, guarantee dimensions and proceed with fabricating of exterior sun control assemblies without field measurements. Coordinate construction to ensure that exterior sun control assemblies correspond to established dimensions.

1.9 WARRANTY

A. General: See Section 017700 - Closeout Procedures.

B. Special Warranty: The Contractor shall warrant the work of this Section to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship for a period of five years. This special warranty shall extend the one year period of limitations contained in the General Conditions. The special warranty shall be countersigned by the manufacturer and the Installer.

C. Special PVDF Finish Warranty: Submit a written warranty, signed by manufacturer, covering failure of the factory-applied exterior finish within the specified warranty period and agreeing to repair finish or replace work that shows evidence of finish deterioration. Deterioration of finish includes, but shall not be limited to, color fade, chalking, cracking, peeling, and loss of film integrity.

1. Warranty Period: Warranty period shall be 10 years from date of Substantial Completion.

D. Additional Owner Rights: The warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to and run concurrent with other warranties made by the Contractor under requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: Products specified are those as manufactured by Intertec, a Div. of Doralco. Items specified are to establish a standard of quality for design, function, materials, and appearance. Equivalent products by other manufacturers are acceptable. The Architect will be the sole judge of the basis of what is equivalent.

B. Substitutions: If the Contractor desires to make substitutions of materials, comply with requirements specified in Section 016000 - Product Requirements.

2.2 MATERIALS

A. LEED Requirements:

1. Recycled Content Materials: Provide building materials with recycled content such that post-consumer recycled content plus one-half of pre-consumer recycled content constitutes a minimum of 20 percent of the cost of materials used for the Project. See LEED Green Building Rating System.

B. Aluminum:

1. Aluminum Extrusions: ASTM B 221/B 221M, Alloy 6063-TB or T2.
2. Aluminum Sheet: ASTM B 209/B 209M, Alloy 3003 or Alloy 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.
3. Aluminum Castings: ASTM B 26/B 26M, Alloy 319.

C. Fasteners: Same basic metal and alloy as fastened metal or 300 Series stainless steel unless otherwise indicated. Do not use metals that are incompatible with joined materials.

1. Use types and sizes to suit unit instillation conditions.
2. Use Phillips flat-head screws for exposed fasteners, unless otherwise indicated.

D. Anchors and Inserts: Type, size, and material required for loading and installation indicated. Use non-ferrous metal or hot dip galvanized anchors and inserts for exterior installations and elsewhere as needed for corrosion resistance. Use toothed steel or expansion bolt devices for drilled-in-place anchors.

2.3 HORIZONTAL, FIXED, EXTRUDED ALUMINUM EXTERIOR SUN CONTROLS

A. General: Provide horizontal, fixed, extruded aluminum exterior sun control assemblies complying with the following:

1. Infill: 16” deep x 2” high Airfoil. Length as indicated on drawings
2. Connector: 2” wide alligator clip attached to aluminum curtainwall.
3. Endcap: 1/8” aluminum endcap to match airfoil.

2.4 FABRICATION

A. Assemble exterior sun control assemblies in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitation. Clearly mark units for reassembly and coordinated installation.

B. Exterior sun control assemblies shall be assembled in accordance with manufacturer recommendations.

C. Maintain equal blade spacing, including, but not limited to, separation between blades and frames to produce a uniform appearance.

D. Include supports, anchorage, and accessories required for complete assembly.

2.5 FINISHES

A. Comply with NAAMM MFM for architectural metal products for recommendations for applying and designating finishes. Finish exterior sun control devices after assembly if welded.

1. Aluminum Finishes: Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.

a. High-Performance Organic Finish: Three-coat metallic fluoropolymer finish complying with AAMA 2605 and containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1) Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions: Examine areas and conditions under which the work is to be installed, and notify the Contractor in writing, with a copy to the Owner and the Architect, of any conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected.

1. Beginning of the work shall indicate acceptance of the areas and conditions as satisfactory by the Installer.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to the Project Site.

3.3 INSTALLATION

A. Install exterior sun control devices in accordance with reviewed product data, final shop drawings, and engineering calculations.

B. Locate and place exterior sun control assemblies level, plumb, and at indicated alignment with adjacent work.

C. Use concealed anchorage.

D. Form closely fitted joints with exposed connections accurately located and secured.

E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be finished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

F. Protect galvanized and non-ferrous metal surfaces from corrosion or galvanic action by applying a heavy coating or bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

3.4 CLEANING

A. Periodically clean exposed surfaces of exterior sun control devices that are not protected by temporary covering to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.

B. Before final inspection, clean exposed surfaces with water and a mild soap not harmful to finishes.

C. Clean-up and touch-up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

3.5 PROTECTION

A. Provide final protection and maintain conditions in a manner acceptable to the Installer, that shall ensure that the exterior sun control devices shall be without damage at time of Substantial Completion.

1. Use temporary protective coverings where needed and approved by the manufacturer. Remove protective covering at the time of Substantial Completion.

END OF SECTION 107113

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes roller shades.

B. Related Sections include the following:

1. Division 06 Section "Miscellaneous Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions.

B. Shop Drawings: Show location and extent of roller shades. Include elevations, sections, details, and dimensions not shown in Product Data. Show installation details, mountings, attachments to other work, operational clearances, and relationship to adjoining work.

C. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Ceiling suspension system members and attachment to building structure.
2. Ceiling-mounted or penetrating items including light fixtures, air outlets and inlets, speakers, sprinklers, recessed shades, and special moldings at walls, column penetrations, and other junctures of acoustical ceilings with adjoining construction.
3. Shade mounting assembly and attachment.
4. Size and location of access to shade operator and adjustable components.
5. Minimum Drawing Scale: 1/4 inch = 1 foot.

D. Samples for Initial Selection: For each colored component of each type of shade indicated.

1. Include similar Samples of accessories involving color selection.

E. Samples for Verification:

1. Complete, full-size operating unit not less than 16 inches wide for each type of roller shade indicated.
2. For the following products:

F. Product Certificates: For each type of roller shade, signed by product manufacturer.

G. Maintenance Data: For roller shades to include in maintenance manuals. Include the following:

1. Methods for maintaining roller shades and finishes.
2. Precautions about cleaning materials and methods that could be detrimental to fabrics, finishes, and performance.
3. Operating hardware.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. Source Limitations: Obtain roller shades through one source from a single manufacturer.

C. Fire-Test-Response Characteristics: Provide roller shade band materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. Flame-Resistance Ratings: Passes NFPA 701.

D. Product Standard: Provide roller shades complying with WCMA A 100.1.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in factory packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same designations indicated on Drawings and in a window treatment schedule.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and wet and dirty finish work in spaces, including painting, is complete and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operable glazed units' operation

hardware throughout the entire operating range. Notify Architect of discrepancies. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Roller Shades: Before installation begins, for each size, color, texture, and pattern indicated, full-size units equal to 5 percent of amount installed, but not fewer than 2 units.

PART 2 - PRODUCTS

2.1 ROLLER SHADES

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:

B. Products: Subject to compliance with requirements, provide one of the following:

1. Hunter Douglas, Inc.; Hunter Douglas Window Fashions Division;.
2. Lutron Shading Solutions by VIMCO.
3. MechoShade Systems, Inc.
4. Silent Gliss USA, Inc.
5. Verosol USA, Inc.; OEM Shades Inc.

C. Shade Band Material: PVC-coated polyester.

1. Shade Fabric: Euroveil, dense Basketweave 5300 Series.
2. Fabric Width: As indicated on Drawings.
3. Colors: 5311 Graphite.
4. Material Openness Factor: 5 percent.
5. Bottom Hem: Straight.
6. Trim: As indicated by manufacturer's designation for style and color.

D. Rollers: Electrogalvanized or epoxy primed steel or extruded-aluminum tube of diameter and wall thickness required to support and fit internal components of operating system and the weight and width of shade band material without sagging; designed to be easily removable from support brackets; with manufacturer's standard method for attaching shade material.

E. Direction of Roll: Regular, from back of roller.

F. Mounting Brackets: Galvanized or zinc-plated steel.

G. Fascia: L-shaped, formed-steel sheet or extruded aluminum; long edges returned or rolled; continuous panel concealing front and bottom of shade roller, brackets, and operating hardware and operators; length as indicated on Drawings; removable design for access.

H. Top/Back Cover: L-shaped; material and finish to match fascia; combining with fascia and end caps to form a six-sided headbox enclosure sized to fit shade roller and operating hardware inside.

I. Pocket with Ceiling Slot Opening: Six-sided box units for recessed installation; fabricated from formed-steel sheet, extruded aluminum, or wood; with a bottom consisting of slot opening of minimum dimension to allow lowering and raising of shade and a removable or an openable, continuous metal access panel concealing rollers, brackets, and operating hardware and operators within; capacity for one roller shade per pocket, unless otherwise indicated on Drawings.

1. Corner Section: Factory formed and welded.

J. Bottom Bar: Steel or extruded aluminum. Provide concealed, by pocket of shade material, internal-type bottom bar with concealed weight bar as required for smooth, properly balanced shade operation.

K. Audiovisual Light-Blocking Shades: Designed for eliminating all visible light gaps when shades are fully closed; fabricated from blackout shade band material with headbox and bottom bar extended and formed for light-tight joints among shade components and between shade components and adjacent construction.

1. Side Channels and Perimeter Seals: Manufacturer's standard design for eliminating light gaps when shades are closed.
2. Shade Band Retention System: Manufacturer's standard design for guiding shade band material through range of travel and holding shade band flat with edges of material within side channels.

L. Mounting: As indicated on Drawings, mounting permitting easy removal and replacement without damaging roller shade or adjacent surfaces and finishes.

M. Shade Operation: Manual; with continuous-loop bead-chain, clutch, and cord tensioner and bracket lift operator.

1. Position of Clutch Operator: Right side of roller, as determined by hand of user facing shade from inside, unless otherwise required.
2. Clutch: Capacity to lift size and weight of shade; sized to fit roller or provide adaptor.
3. Lift-Assist Mechanism: Manufacturer's standard spring assist for balancing roller shade weight and lifting heavy roller shades.
4. Loop Length: Full length of roller shade.
5. Bead Chain: Stainless steel.
6. Cord Tensioner Mounting: Wall.
7. Operating Function: Stop and hold shade at any position in ascending or descending travel.

2.2 ROLLER SHADE FABRICATION

A. Product Description: Roller shade consisting of a roller, a means of supporting the roller, a flexible sheet or band of material carried by the roller, a means of attaching the material to the roller, a bottom bar, and an operating mechanism that lifts and lowers the shade.

B. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.

1. Lifting Mechanism: With permanently lubricated moving parts.

C. Unit Sizes: Obtain units fabricated in sizes to fill window and other openings as follows, measured at 74 deg F:

1. Shade Units Installed between (Inside) Jambs: Edge of shade not more than 1/4 inch from face of jamb. Length equal to head to sill dimension of opening in which each shade is installed.
2. Shade Units Installed Outside Jambs: Width and length as indicated, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

D. Installation Brackets: Designed for easy removal and reinstallation of shade, for supporting fascia, roller, and operating hardware and for hardware position and shade mounting method indicated.

E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to shade hardware and adjoining construction; type designed for securing to supporting substrate; and supporting shades and accessories under conditions of normal use.

F. Color-Coated Finish: For metal components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

G. Colors of Metal and Plastic Components Exposed to View: As selected by Architect from manufacturer's full range, unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions, and located so shade band is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain roller shades. Refer to Division 01 Section Demonstration and Training."

END OF SECTION 122413

SECTION 126100 - FIXED AUDIENCE SEATING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section includes fixed audience seating with the following:

1. Standard mounting.
2. Molded-plastic chairs with upholstered inserts.
3. Self-rising seat mechanism.
4. Power and data service to individual seats.
5. Fixed tables at Lecture Room 031 (seats are N.I.C.) with power and data service Add.#5

B. Related Sections:

1. Division 26 Sections for electrical service and connections to seating junction box locations for aisle lighting fixtures and power receptacles.
2. Division 27 Sections for voice and data communication service and connections to seating junction box locations for data ports.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fixed audience seating. Include electrical characteristics.

B. LEED Submittals:

1. Product Data for Credit IEQ 4.4: For each composite wood product, documentation indicating that product contains no urea formaldehyde.

C. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Seating Layout: Show seating layout, aisle widths, row-lettering and chair-numbering scheme, chair widths, and chair spacing in each row.
2. Accessories: Show accessories, including locations of left- and right-hand tablet arms, electrical devices, accessibility provisions, and attachments to other work.
3. Wiring Diagrams: For power, signal, and control wiring.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Molded Plastic: Manufacturer's standard-size unit, not less than 3 inches square.
2. Plastic Laminate: Manufacturer's standard-size unit, not less than 3 inches square.
3. Baked-on Coating Finishes: Manufacturer's standard-size unit, not less than 3 inches square.
4. Aluminum Finishes: Manufacturer's standard-size unit, not less than 3 inches square.
5. Wood and Plywood Materials and Finishes: Manufacturer's standard-size unit, not less than 3 inches square.
6. Upholstery Fabric: Full width by 36-inch- long section of fabric from dye lot to be used for the Work, with specified treatments applied. Show complete pattern repeat. Mark top and face of fabric.
7. Row-Letter and Chair-Number Plates: Full-size units with letters and numbers marked.
8. Aisle Lighting: Full-size unit.
9. Power and Data Service Devices: Full-size units.
10. Exposed Fasteners: Full-size units of each type.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of flame-retardant treatment of fabric, from manufacturer.

B. Field quality-control reports.

C. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fixed audience seating to include in maintenance manuals. Include the following:

1. Methods for maintaining upholstery fabric.
2. Precautions for cleaning materials and methods that could be detrimental to seating finishes and performance.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials from the same production run that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Chair Seats and Backs: Furnish a quantity of full-size units equal to 5 percent of amount installed for each type and size of chair seat and back.
2. Upholstered, Slip-on Cushions: Furnish a quantity of full-size units equal to 5 percent of amount installed for each type and size of cushion.
3. Tablet Arms: Furnish a quantity of full-size units equal to 5 percent of amount installed for each type and size of tablet arm.

4. Armrests: Furnish a quantity of full-size units equal to 5 percent of amount installed for each type of armrest.
5. Power Receptacles: Furnish a quantity of full-size units equal to 5 percent of amount installed.
6. Data Ports: Furnish a quantity of full-size units equal to 5 percent of amount installed.

1.7 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of seating required, including accessories and mounting components, from single source from single manufacturer.

1. Upholstery Fabric: Obtain fabric of a single dye lot for each color and pattern of fabric required.

B. Fire-Test-Response Characteristics of Upholstered Chairs:

1. Fabric: Class 1 according to DOC CS 191 and 16 CFR 1610.61, tested according to California Technical Bulletin 117.
2. Padding: Comply with California Technical Bulletin 117.
3. ~~Full-Scale Fire Test: Comply with California Technical Bulletin 133.~~ Add.#5

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups for the following types of fixed audience seating including fabric, finishes, and accessories:

a. Size: Two typical seats or a typical two-seat unit.

2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

E. Preinstallation Conference: Conduct conference at Project site.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install seating until spaces are enclosed and weathertight, wet work in spaces is complete and dry, work above ceilings is complete, and temporary or permanent HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

B. Field Measurements: Verify actual dimensions of seating layout and construction contiguous with seating by field measurements before fabrication.

1.9 COORDINATION

A. Coordinate layout and installation of electrical wiring and devices with seating layout to ensure that floor junction boxes for electrical devices are accurately located to allow connection without exposed conduit.

1. Coordinate wiring and power receptacles installed in seating with requirements in Division 26 Sections.
2. Coordinate wiring and data ports installed in seating with requirements in Division 27 Sections.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of fixed audience seating that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including standards, beams, and pedestals.
b. Faulty operation of self-rising seat mechanism.
c. Faulty operation of electrical components.
d. Wear and deterioration of fabric and stitching beyond normal use.
e. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.

2. Warranty Periods: As follows, from date of Substantial Completion.

a. Structural: Ten years.
b. Operating Mechanisms: Five years. Add.#5
c. Electrical Components: Five years.
d. Plastic, Wood, and Paint Components: Five years.

PART 2 - PRODUCTS

2.1 MATERIALS AND FINISHES

A. Steel: ASTM A 36/A 36M plates, shapes, and bars; ASTM A 513 mechanical tubing; ASTM A 1008/A 1008M cold-rolled sheet; and ASTM A 1011 hot-rolled sheet and strip.

B. Cast Iron: ASTM A 48/A 48M, Class 25, gray iron castings free of blow holes and hot checks with parting lines ground smooth.

C. Cast Aluminum: ASTM B 85 aluminum-alloy die castings.

D. Metal Finish: Finish exposed metal parts with manufacturer's standard minimum 1.5-mil- thick, polyester baked-on powder coating.

1. Color: As selected by Architect from manufacturer's full range.

E. Medium-Density Fiberboard: ANSI A208.2, Grade MD, made with binder containing no urea formaldehyde.

F. Concealed Plywood: HPVA HP-1 hardwood plywood, made with adhesive containing no urea formaldehyde, or DOC PS 1 softwood plywood, as standard with manufacturer.

G. Exposed Plywood: HPVA HP-1, Face Grade A, hardwood veneer core with color-matched hardwood-veneer faces, made with adhesive containing no urea formaldehyde.

H. Hardwood Lumber and Veneer Faces: White oak selected to be free of visible defects.

1. Stain and Finish: As selected by Architect from manufacturer's full range.

I. Plastic Laminate: NEMA LD 3, Grade VGS for vertical surfaces and Grade HGS for horizontal surfaces.

1. Color and Pattern: As selected by Architect from manufacturer's full range.

J. Fabric:
1. Color and Pattern:
a. FAS-1 (Auditorium 134): Pallas Textiles, Turtle Neck/Common Ground Collection, no. 27.146 or approved equivalent.
1) 100% Solution Dyed Nylon
2) 54” width
3) Nano-Tex/Light Acrylic finish/backing
4) 102,000 Double Rubs (Wyzenbeek)
5) Color as selected by Architect from full range in collection
b. FAS-2 (Lecture Rooms 073, 139, 246, 260): Pallas Textiles, Metro, no. 27.116 or approved equivalent.
1) 61% Rayon, 33% Polyester, 6% Cotton
2) 54” width
3) Teflon/Light Acrylic finish/backing
4) 100,000 Double Rubs (Wyzenbeek)
5) Color as selected by Architect from full range in collection Add.#5

K. Upholstery Padding: Flexible, cellular, molded or slab polyurethane foam.

L. Molded Plastic: High-density polyethylene or polypropylene, blow or injection molded, with smooth or textured surface that is mar and dent resistant.

1. Provide with UV inhibitors to retard fading where exposed to sunlight.
2. Color and Texture: As selected by Architect from manufacturer's full range.

2.2 FIXED AUDIENCE SEATING (FAS-1)

A. Fixed Audience Seating: Interior assembly-space seating in permanent arrangement at Auditorium 134 as shown on Drawings.

1. Basis-of-Design Product: Subject to compliance with requirements, provide KI, Inc.; Concerto Auditorium Seating or comparable product by one of the following:

a. American Seating Company.
b. Hussey Seating Company.
c. Irwin Seating Company.

B. Chair Mounting Standards: Floor attached of the following material:

1. Steel: One-piece heavy-tube or reinforced sheet with welded mounting plate and welded connections for seat pivots, backs, armrests, and end panels.

C. End Panels:

1. Material: Plastic laminate.
2. Style: Rectangular with rounded corners.

D. Fabric Upholstered Chairs:

1. Backs:

a. Padding Thickness: 2 inches.
b. Rear Panel: Molded plastic back shroud with 7-ply, molded plywood inner structure.
c. Top Corners: Rounded.

2. Seats: Two part and as follows:

a. Padding Thickness: Minimum 3 inches at front and rear edge.
b. Seat Underside: Molded-plastic shell.

E. Chair Width: Vary chair widths to accommodate sightlines and row lengths, with minimum chair width of 19 inches from center to center of armrests.

F. Back Height: Standard-style backs, 34-1/2 inches high.

G. Back Pitch: Fixed.

H. Chair Seat Hinges: Self-lubricating, compensating type with noiseless self-rising seat mechanism passing ASTM F 851 and with positive internal stops cushioned with rubber or neoprene.

I. Chair Back Hinges: Self-lubricating type with noiseless mechanism that raises back to vertical position when chair is unoccupied.

J. Self-Rising Seat Mechanism: Gravity-actuated, full fold.

K. Armrests: Molded plastic with rounded edges and concealed mounting. Add.#4

L. Aisle Lighting Fixtures: Manufacturer's standard concealed in armrest fixtures.

1. Bulb: LED.
2. Power: 24 V.
3. For low-voltage lighting, provide manufacturer's voltage-reduction device housed in safety enclosure equipped with fuses, terminal blocks, and safety disconnect.

M. Power and Data Service Package: Manufacturer's standard service to individual seats including terminal devices and wiring with 18 inches of extra length and as follows.

1. Power Receptacles: 120 V/20A receptacles, factory-wired and installed in a 4-circuit system with dedicated phase and neutral conductors, and an insulated equipment grounding conductor. Evenly distribute receptacles to each of 4 circuits in each row of seating indicated. Arrange for a single-point of connection at the end of each row of seating comply with Division 26 requirements for wiring, raceways and receptacles.
2. Data Ports: Empty raceways and boxes for data wiring and receptacle jack to be furnished and installed under Division 27.
3. Location: Manufacturer’s standard location.

N. Row-Letter and Chair-Number Plates: Manufacturer's standard.

1. Attachment: Manufacturer's standard method. At underside of seat visible when seat is up.

O. Tablet Arms: Manufacturer's standard-size, foldaway tablet arm with plastic-laminate writing surface over medium-density fiberboard or plywood core and with rounded, matching PVC edges.

1. Mounting: Right-hand mounted unless otherwise indicated.
2. Fold-Away Mechanism: Cast-iron or steel hinge and swivel mechanism that gives positive support in open position and semiautomatic return to stored position below arm block and parallel to chair.

P. Accessible Seating:

1. Seats where wheelchair spaces are indicated, shall not receive chairs.
2. Provide chairs with retractable arm on aisle side in locations indicated, (noted on drawings as designated aisle seats) but not less than 5 percent of aisle seats. Identify these seats with a sign or marker.

2.3 FIXED AUDIENCE SEATING (FAS-2)

A. Fixed Audience Seating: Interior assembly-space seating in permanent arrangement at Lecture Rooms 073, 139, 246, and 260 as shown on Drawings.

1. Basis-of-Design Product: Subject to compliance with requirements, provide KI, Inc.; Sequence Seating, Torsion shell or comparable product by one of the following:

    a. American Seating Company.
    b. Hussey Seating Company.
    c. Irwin Seating Company.

B. Chair Mounting Standards: Floor attached of the following material:

1. Steel: One-piece heavy-tube or reinforced sheet with welded mounting plate and welded connections for seat pivots, backs, armrests, and end panels.

C. Chair Mounting Beam: Steel horizontal beam mounted on floor-attached steel support pedestals spaced at intervals of 2 to 2-1/2 chair widths.

D. Chair Mounting Pedestal: Floor-attached pedestal, manufacturer's standard seminar base.

~~E. Modesty Panels:~~

~~1. Material: Dimpled Steel.~~ Add.#4
~~2. Style: Rectangular with rounded corners, 1/4 inch radius.~~

F. Fabric Upholstered Chairs:

1. Backs:

    a. Padding Thickness: 9/16 inches.
    b. Rear Panel: Molded plastic.
    c. Top Corners: Rounded.

2. Seats: Two part and as follows:

    a. Padding Thickness: Minimum 15/16 inches at front and rear edge.
    b. Seat Underside: Molded-plastic shell.

G. Chair Width: Vary chair widths to accommodate sightlines and row lengths, with minimum chair width of 19 inches from center to center of armrests.

H. Back Height: Standard-style backs, 32-1/2 inches high.

I. Back Pitch: Fixed.

J. Chair Seat Hinges: Self-lubricating, compensating type with noiseless self-rising seat mechanism passing ASTM F 851 and with positive internal stops cushioned with rubber or neoprene.

K. Chair Back Hinges: Self-lubricating type with noiseless mechanism that raises back to vertical position when chair is unoccupied.

L. Self-Rising Seat Mechanism: Gravity-actuated, full fold.

M. Armrests: Molded plastic with rounded edges and concealed mounting. Add.#4

N. Aisle Lighting Fixtures: Manufacturer's standard concealed in armrest fixtures.

1. Bulb: LED.
2. Power: 24 V.
3. For low-voltage lighting, provide manufacturer's voltage-reduction device housed in safety enclosure equipped with fuses, terminal blocks, and safety disconnect.

O. Power and Data Service Package: Manufacturer's standard service to individual seats including terminal devices and wiring with 18 inches of extra length and as follows.

1. Power Receptacles: 120 V/20A receptacles, factory-wired and installed in a 4-circuit system with dedicated phase and neutral conductors, and an insulated equipment grounding conductor. Evenly distribute receptacles to each of 4 circuits in each row of seating indicated. Arrange for a single-point of connection at the end of each row of seating comply with Division 26 requirements for wiring, raceways and receptacles.
2. Data Ports: Empty raceways and boxes for data wiring and receptacle jack to be furnished and installed under Division 27.
3. Location: Manufacturer’s standard location.

P. Row-Letter and Chair-Number Plates: Manufacturer's standard.

1. Attachment: Manufacturer's standard method at underside of seat visible when seat is up.

Q. Tablet Arms: Manufacturer's standard-size, foldaway tablet arm with plastic-laminate writing surface over medium-density fiberboard or plywood core and with rounded, matching PVC edges.

1. Mounting: Right-hand mounted unless otherwise indicated.
2. Fold-Away Mechanism: Cast-iron or steel hinge and swivel mechanism that gives positive support in open position and semiautomatic return to stored position below arm block and parallel to chair.

R. Accessible Seating:

1. Seats where wheelchair spaces are indicated, shall not receive chairs.
2. Provide chairs with retractable arm on aisle side in locations indicated on Drawings (noted as designated aisle seats) but not less than 5 percent of aisle seats. Identify these seats with a sign or marker.

2.4 FIXED TABLES

Add.#5

A. Fixed tables: Interior fixed height seminar tables floor-mounted in permanent arrangement at Lecture Room 031 as shown on drawings.

1. Basis-of-Design Product: Subject to compliance with requirements, provide KI, Inc.; Fixed height seminar table tops with basic style rectangular bases or comparable product by one of the following:

    a. American Seating Company.
    b. Hussey Seating Company.
    c. Irwin Seating Company.

B. Table tops: Curved laminate tops, KI #UTS.20.C or equivalent
    1. Depth: 20”
    2. Edge detail: Vinyl bullnose
    3. Finish: Laminate. Color as selected by Architect from Manufacturer’s full range

C. Bases: Basic style rectangular base, KI #FPCPB or equivalent
    1. Material: Steel
    2. Mounting: Floor-mounted at stepped seating tiers
    3. Finish: As selected by Architect from Manufacturer’s full range.

D. Modesty Panels: Curved, KI #SMP.14.C or equivalent
    1. Height: 14”
    2. Material: Dimpled steel
    3. Finish: As selected by Architect from Manufacturer’s full range.

E. End Panels: Wrap-around style, KI #SMP.14.EP or equivalent
    1. Height: 14”
    2. Material: Dimpled steel

F. Power and Data Service Package: Manufacturer's standard service to individual tables, under surface, including terminal devices and wiring with 18 inches of extra length and as follows.

    1. Power Receptacles: 120 V/20A receptacles, factory-wired and installed in a 4-circuit system with dedicated phase and neutral conductors, and an insulated equipment grounding conductor. Evenly distribute receptacles to each of 4 circuits in each row of seating indicated. Arrange for a single-point of connection at the end of each row of seating comply with Division 26 requirements for wiring, raceways and receptacles.
    2. Data Ports: Empty raceways and boxes for data wiring and receptacle jack to be furnished and installed under Division 27.
    3. Location: Manufacturer’s standard location.

2.5 FABRICATION

A. Floor Attachments: Fabricate to conform to floor slope, if any, so that standards and pedestals are plumb and chairs are maintained at same angular relationship to vertical throughout Project.

B. Upholstery: Fabricate fabric-covered cushions with molded padding beneath fabric and with fabric covering free of welts, creases, stretch lines, and wrinkles. For each upholstered component, install pile and pattern run in a consistent direction.

C. Upholstered Chairs: Fabricate as follows:

1. Two-Part Upholstered Back: In length required to protect seat in raised position, with padded cushion glued to a curved steel, plywood, or molded-plastic support panel covered with easily replaceable fabric, and with curved rear shell that fully encloses upholstery edges.
2. Two-Part Seats: Upper part, an upholstered cushion with formed padding over a seven-ply plywood panel with fabric cover conforming to shape of cushion to conceal inner seat structure and hinge mechanism. Lower part, molded-plastic shell.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine floors, risers, and other adjacent work and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

C. Examine locations of HVAC supply ducts.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install seating in locations indicated and fastened securely to substrates according to manufacturer's written installation instructions.

1. Use installation methods and fasteners that produce fixed audience seating assemblies with individual chairs capable of supporting an evenly distributed 600-lb static load without failure or other conditions that might impair the chair's usefulness.
2. Install standards and pedestals plumb.

B. Install seating with chair end standards aligned from first to last row and with backs and seats varied in width to optimize sightlines.

C. Install riser-mounted attachments to maintain uniform chair heights above floor.

D. Install chairs in curved rows at a smooth radius.

E. Install seating so moving components operate smoothly and quietly.

F. Install wiring conductors and cables concealed in components of seating and accessible for servicing.

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
2. Tests for Power Receptacles: As specified in Division 26 Sections.
3. Tests for Data Ports: As specified in Division 27 Sections.

B. Prepare test and inspection reports.

3.4 ADJUSTING

A. Adjust chair backs so that they are aligned with each other in uniformly curved rows.

B. Adjust self-rising seat mechanisms so seats in each row are aligned when in upright position.

C. Verify that all components and devices are operating properly.

D. Verify that seating returns to correct at-rest position.

E. Repair minor abrasions and imperfections in finishes with coating that matches factory-applied finish.

F. Replace upholstery fabric damaged during installation.

END OF SECTION 126100

SECTION 323113 – CHAIN LINK FENCES AND GATES

PART 1 - GENERAL ADD#5

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Chain-Link Fences: Industrial.
2. Gates: swing.

B. Related Sections include the following:

1. Division 03 Section "Cast-in-Place Concrete" for concrete.

C. Alternates: Refer to Division 01 Section "Alternates" for description of Work in this Section affected by alternates.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide chain-link fences and gates capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Minimum Post Size and Maximum Spacing for Wind Velocity Pressure: Determine based on mesh size and pattern specified, and on the following minimum design wind pressures and according to CLFMI WLG 2445:
   a. Wind Speed: 85 mph.
   b. Fence Height: 8 feet.
   c. Line Post Group: IA, ASTM F 1043, Schedule 40 steel pipe.
   d. Wind Exposure Category: B.
2. Determine minimum post size, group, and section according to ASTM F 1043 for framework up to 8 feet high, and post spacing not to exceed 10 feet.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.

1. Fence and gate posts, rails, and fittings.
2. Chain-link fabric, reinforcements, and attachments.
3. Gates and hardware.

B. Shop Drawings: Show locations of fences, gates, posts, rails, tension wires, details of extended posts, extension arms, gate swing, or other operation, hardware, and accessories. Indicate materials, dimensions, sizes, weights, and finishes of components. Include plans, gate elevations, sections, details of post anchorage, attachment, bracing, and other required installation and operational clearances.

1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Initial Selection: Manufacturer's color charts or 6-inch lengths of actual units showing the full range of colors available for components with factory-applied color finishes.

D. Product Certificates: For each type of chain-link fence, and gate, signed by product manufacturer.

1. Strength test results for framing according to ASTM F 1043.

E. Qualification Data: For Installer.

F. Field quality-control test reports.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed chain-link fences and gates similar in material, design, and extent to those indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

1. Engineering Responsibility: Preparation of data for chain-link fences and gates, including Shop Drawings, based on testing and engineering analysis of manufacturer's standard units in assemblies similar to those indicated for this Project.

B. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Include 10 ft. length of fence and gate complying with requirements.
   a. Approval of mockups is also for other material and construction qualities specifically approved by Architect in writing.
   b. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless such deviations are specifically approved by Architect in writing.
2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

B. Interruption of Existing Utility Service: Do not interrupt utility services to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Architect no fewer than two days in advance of proposed interruption of utility services.
2. Do not proceed with interruption of utility services without Architect's written permission.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Chain-Link Fences and Gates:
   a. American Fence Company, 3310 S West Temple
      Salt Lake City, UT, 84115
      801.487.7431
   b. United Fence Co., 2525 S 2700 W
      Salt Lake City, UT 84119-1227
      801.972.2348

2.2 CHAIN-LINK FENCE FABRIC

A. General: 8 feet height. Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with ASTM A 392, CLFMI CLF 2445, and requirements indicated below:

1. Steel Wire Fabric: Metalic-coated wire with a diameter of 0.148 inch.
   a. Mesh Size: 2 inches.
   b. Weight of Aluminum Coating: ASTM A 491, Type I, 0.35 oz./sq. ft..

c. Weight of Metallic (Zinc) Coating: ASTM A 392, Type II, Class 2, 2.0 oz./sq. ft. with zinc coating applied before weaving.
d. Weight of Zn-5-Al-MM Aluminum-Mischmetal Alloy Coating: ASTM F 1345, Type III, Class 1, 0.60 oz./sq. ft.
e. Coat selvage ends of fabric that is metallic coated before the weaving process with manufacturer's standard clear protective coating.

2. Selvage: Knuckled at both selvages.

2.3 INDUSTRIAL FENCE FRAMING

A. Posts and Rails: Comply with ASTM F 1043 for framing, ASTM F 1083 for Group IC round pipe, and the following:

1. Group: IA, round steel pipe, Schedule 40.
2. Fence Height: 8 feet.
3. Strength Requirement: Heavy industrial according to ASTM F 1043.
4. Post Diameter and Thickness: According to ASTM F 1083.
5. Post Size and Thickness: According to ASTM F 1043.
   a. Top Rail: 1.66 inches.
   b. Line Post: 2.375 inches.
   c. End, Corner and Pull Post: 2.875 inches.
   d. Swing Gate Post: According to ASTM F 900.
6. Coating for Steel Framing:
   a. Metallic Coating:
      1) Type A, consisting of not less than minimum 2.0-oz./sq. ft. average zinc coating per ASTM A 123/A 123M or 4.0-oz./sq. ft. zinc coating per ASTM A 653/A 653M.
      2) Type B, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film.
      3) External, Type B, zinc with organic overcoat, consisting of a minimum of 0.9 oz./sq. ft. of zinc after welding, a chromate conversion coating, and a clear, verifiable polymer film. Internal, Type D, consisting of 81 percent, not less than 0.3-mil- thick, zinc pigmented coating
      4) Type C, Zn-5-Al-MM alloy, consisting of not less than 1.8-oz./sq. ft. coating.
      5) Coatings: Any coating above.
7. Aluminum Finish: Mill finish complying with ASTM B 429.

2.4 TENSION WIRE

A. General: Provide horizontal tension wire at the following locations:

1. Location: Extended along top and bottom of fence fabric.

B. Metallic-Coated Steel Wire: 0.177-inch- diameter, marcelled tension wire complying with ASTM A 817, ASTM A 824, and the following:

1. Metallic Coating: Type II, zinc coated (galvanized) by hot-dip process, with the following minimum coating weight:
   a. Class 1: Not less than 0.8 oz./sq. ft. of uncoated wire surface.
   b. Class 2: Not less than 1.2 oz./sq. ft. of uncoated wire surface.
   c. Class 3: Not less than 2 oz./sq. ft. of uncoated wire surface.
   d. Matching chain-link fabric coating weight.

2. Metallic Coating: Type III, Zn-5-Al-MM alloy with the following minimum coating weight:
   a. Class 1: Not less than 0.6 oz./sq. ft. of uncoated wire surface.
   b. Class 2: Not less than 1 oz./sq. ft. of uncoated wire surface.
   c. Matching chain-link fabric coating weight.

C. Aluminum Wire: 0.192-inch- diameter tension wire, mill finished, complying with ASTM B 211, Alloy 6061-T94 with 50,000-psi minimum tensile strength.

2.5 INDUSTRIAL SWING GATES

A. General: Comply with ASTM F 900 for double swing gate types.

1. Metal Pipe and Tubing: Galvanized steel. Comply with ASTM F 1043 and ASTM F 1083 for materials and protective coatings.
2. Metal Pipe and Tubing: Aluminum. Comply with ASTM B 429 and ASTM F 1043 for materials and protective coatings.

B. Frames and Bracing: Fabricate members from round, galvanized steel tubing with outside dimension and weight according to ASTM F 900 and the following:

1. Gate Fabric Height: 2 inches less than adjacent fence height.
2. Leaf Width: As indicated.
3. Frame Members:
   a. Tubular Steel: 1.90 inches round.

C. Frame Corner Construction:

1. Assembled with corner fittings and 5/16-inch- diameter, adjustable truss rods for panels 5 feet wide or wider.

D. Hardware: Latches permitting operation from both sides of gate, hinges, center gate stops and keepers for each gate leaf more than 5 feet wide. Fabricate latches with integral eye openings for padlocking; padlock accessible from both sides of gate.

2.6 FITTINGS

A. General: Comply with ASTM F 626.

B. Post and Line Caps: Provide for each post.

1. Line post caps with loop to receive tension wire or top rail.

C. Rail and Brace Ends: Attach rails securely to each gate, corner, pull, and end post.

D. Rail Fittings: Provide the following:

1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.
2. Rail Clamps: Line and corner boulevard clamps for connecting intermediate and bottom rails in the fence line-to-line posts.

E. Tension and Brace Bands: Pressed steel.

F. Tension Bars: Steel, length not less than 2 inches shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.

G. Truss Rod Assemblies: Steel, hot-dip galvanized after threading rod and turnbuckle or other means of adjustment.

H. Tie Wires, Clips, and Fasteners: According to ASTM F 626.

1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, complying with the following:
   a. Hot-Dip Galvanized Steel: 0.106-inch- diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric.

I. Finish:

1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. zinc.
2. Aluminum: Mill finish.

2.7 CAST-IN-PLACE CONCRETE

A. Materials: Portland cement complying with ASTM C 150, Type I aggregates complying with ASTM C 33, and potable water for ready-mixed concrete complying with ASTM C 94/C 94M.

1. Concrete Mixes: Normal-weight concrete with not less than 3000-psi compressive strength (28 days), 3-inch slump, and 1-inch maximum size aggregate.

B. Materials: Dry-packaged concrete mix complying with ASTM C 387 for normal-weight concrete mixed with potable water according to manufacturer's written instructions.

2.8 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

B. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance.

1. Do not begin installation before final grading is completed, unless otherwise permitted by Architect.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 INSTALLATION, GENERAL

A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.

1. Install fencing on established boundary lines inside property line.

3.4 CHAIN-LINK FENCE INSTALLATION

A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

B. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.

1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
   a. Exposed Concrete: Extend 2 inches above grade; shape and smooth to shed water.
   b. Concealed Concrete: Top 2 inches below gradeto allow covering with surface material.

c. Posts Set into Voids in Concrete: Form or core drill holes not less than 5 inches deep and 3/4 inch larger than OD of post. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions, and finished sloped to drain water away from post.

C. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 30 degrees or more.

D. Line Posts: Space line posts uniformly at 10 feet o.c.

E. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts.

1. Locate horizontal braces at midheight of fabric 6 feet or higher, on fences with top rail and at 2/3 fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

F. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch- diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric.

1. Top Tension Wire: Install tension wire through post cap loops.
2. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric and tie to each post with not less than same diameter and type of wire.

G. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

H. Bottom Rails: Install, spanning between posts.

I. Chain-Link Fabric: Apply fabric to inside of enclosing framework. Leave 1 inch between finish grade or surface and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

J. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches o.c.

K. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at 1 end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.

1. Maximum Spacing: Tie fabric to line posts at 12 inches o.c. and to braces at 24 inches o.c.

L. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

3.5 GATE INSTALLATION

A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation and lubricate where necessary.

3.6 GATE OPERATOR INSTALLATION

A. General: Install gate operators according to manufacturer's written instructions, aligned and true to fence line and grade.

B. Excavation for Support Posts: Hand-excavate holes for bases/pads, in firm, undisturbed soil to dimensions and depths and at locations as required by gate-operator component manufacturer's written instructions and as indicated.

3.7 ADJUSTING

A. Gate: Adjust gate to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Lubricate hardware and other moving parts.

3.8 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's personnel to adjust, operate, and maintain gates. Refer to Division 01 Section "Closeout Procedures and Demonstration and Training."

END OF SECTION 323113

DOOR SCHEDULE

Door Number	Width	Description	Height	Thickness	Door Type	Material	Glazing	Finish	Hardware	Frame Type	Frame Material	Frame Depth	Finish	Fire Rating	2 Remarks
030A	6' - 0"	PR	7' - 0"	1 3/4"	D4a	ALUM	B	-	AL-02	W3	ALUM	7 1/2"	-		Power Operator, CR
030B	6' - 0"	PR	7' - 0"	1 3/4"	D4a	ALUM	B	-	AL-02	W10	ALUM	7 1/2"	-		Power Operator, CR
030C	6' - 0"	PR	7' - 0"	1 3/4"	D1	HM	-	PNT	03	F1a	HM	5 3/4"	PNT	60 Min.	Level 2 Physical Performance B
030D	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	17	F1	HM	5 3/4"	PNT	60 Min.	
030E	6' - 0"	PR	7' - 0"	1 3/4"	D5	WD	-	STN	04	F2	HM	7 1/2"	PNT		CR, Mechanical Lock
030F	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	40	F1	HM	5 3/4"	PNT		
030G	1' - 6"	SNGL	7' - 0"	1 3/4"	D1	HM	-	PNT	50	F1	HM	5 3/4"	PNT		Level 1 Physical Performance C
030H	6' - 0"	PR	7' - 0"	1 3/4"	D5a	WD	-	STN	14	F2	HM	5 3/4"	PNT		Hold Open
030J	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	21	F1	HM	5 3/4"	PNT	60 Min.	Hold Open
030K	8' - 0"	OH	8' - 11"	0"	D9	STL	-	CLR	01	-	-		-	60 Min.	
030L	6' - 0"	PR	7' - 0"	1 3/4"	D4a	ALUM	B	-	AL-03	W25	ALUM	4 1/2"	-		Power Operator
030M	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	23	F1	HM	5 3/4"	PNT		
030N	6' - 0"	PR	7' - 0"	1 3/4"	D4a	ALUM	B	-	AL-03	W10	ALUM	5"	-		Power Operator
030P	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	22	F1	HM	5 3/4"	PNT	60 Min.	
031A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	5 3/4"	PNT		
031B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	5 3/4"	PNT		
032A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	5 3/4"	PNT		
032B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	5 3/4"	PNT		
033A	12' - 0"	OH	10' - 0"	2"	D9	STL	-	CLR		-	-		-		
033B	6' - 0"	PR	7' - 0"	1 3/4"	D5a	HM	-	PNT	26	F2	HM	5 3/4"	PNT	60 Min.	Level 3 Physical Performance A
033C	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	HM	-	PNT	38	F1	HM	5 3/4"	PNT		Level 2 Physical Performance B
033D	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	HM	-	PNT	38	F1	HM	5 3/4"	PNT		Level 2 Physical Performance B
033E	6' - 0"	PR	7' - 0"	1 3/4"	D5a	HM	-	PNT	51	F2	HM	8 1/4"	PNT		Level 3 Physical Performance A
033F	6' - 0"	PR	7' - 0"	1 3/4"	D5	HM	-	PNT	39	F2	HM	5 3/4"	PNT		Level 3 Physical Performance A
033G	10' - 0"	OH	10' - 0"	2"	D9	STL	-	CLR	01	-	-		-		Level 1 Physical Performance C
033H	9' - 0"	PR	7' - 0"	1 3/4"	D5	HM	-	PNT	05	F2a	HM	7 1/2"	PNT		Level 2 Physical Performance B
033J	9' - 0"	PR	7' - 0"	1 3/4"	D5	HM	-	PNT	05	F2a	HM	7 1/2"	PNT		Level 2 Physical Performance B
034A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	15	F1	HM	5 3/4"	PNT	60 Min.	CR
034B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	59	F1	HM	5 3/4"	PNT		
034C	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	59	F1	HM	5 3/4"	PNT		
034D	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	59	F1	HM	5 3/4"	PNT		
035A	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	72	F1	HM	5 3/4"	PNT	60 Min.	
035B	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	HM	-	PNT	71	F1	HM	5 3/4"	PNT		Level 1 Physical Performance C
035C	6' - 0"	PR	8' - 0"	1 3/4"	D5	HM	-	PNT	55	F2	HM	5 3/4"	PNT		Level 1 Physical Performance C, Removable Mullion Req.
035D	6' - 0"	PR	8' - 0"	1 3/4"	D5	HM	-	PNT	07	F2a	HM	7 1/2"	PNT		Level 2 Physical Performance B, Removable Mullion Req.
036A	4' - 0"	UN	7' - 0"	1 3/4"	D6	WD	F	STN	37	F2	HM	5 3/4"	PNT		
036B	4' - 0"	UN	7' - 0"	1 3/4"	D6	WD	F	STN	25	F2	HM	5 3/4"	PNT	60 Min.	
037A	4' - 0"	UN	7' - 0"	1 3/4"	D6	WD	F	STN	16	F2	HM	5 3/4"	PNT	60 Min.	CR
038A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
038B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
039A	4' - 0"	UN	7' - 0"	1 3/4"	D6	WD	F	STN	16	F2	HM	5 3/4"	PNT	60 Min.	CR
040A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	62	F3	HM	5 3/4"	PNT		
042A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	13	F1	HM	5 3/4"	PNT		CR
043A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	45	F1	HM	5 3/4"	PNT		
044A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	5 3/4"	PNT		
044B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	5 3/4"	PNT		
044C	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	59	F1	HM	5 3/4"	PNT		
044D	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	11	F1	HM	5 3/4"	PNT		CR
046A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	5 3/4"	PNT		
047A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	8 1/4"	PNT		
047B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	59	F1	HM	5 3/4"	PNT		
047C	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	8 1/4"	PNT		
047D	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	59	F1	HM	5 3/4"	PNT		
047E	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	5 3/4"	PNT		CR
047F	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	5 3/4"	PNT		
048A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	11	F1	HM	8 1/4"	PNT		CR
048B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	58	F1	HM	5 3/4"	PNT		
049A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	11	F1	HM	8 1/4"	PNT		CR
050A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	5 3/4"	PNT		
051A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	63	F1	HM	8 1/4"	PNT		
051B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	41	F1	HM	5 3/4"	PNT		
052A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	11	F1	HM	8 1/4"	PNT		CR
052B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	11	F1	HM	8 1/4"	PNT		CR
052C	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	41	F1	HM	5 3/4"	PNT		
052D	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	5 3/4"	PNT		
052E	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	59	F3	HM	5 3/4"	PNT		
053A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	11	F1	HM	8 1/4"	PNT		CR
053B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	5 3/4"	PNT		
054A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	40	F1	HM	5 3/4"	PNT		
055A	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	41	F1	HM	5 3/4"	PNT		
056A	6' - 0"	PR	7' - 0"	1 3/4"	D4a	ALUM	B	-	AL-04	W11	ALUM	7 1/2"	-		
057A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR

Door Number	Width	Description	Height	Thickness	Door Type	Material	Glazing	Finish	Hardware	Frame Type	Frame Material	Frame Depth	Finish	Fire Rating	Remarks
057B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	12	F1	HM	5 3/4"	PNT		CR
057C	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	41	F1	HM	5 3/4"	PNT		
057D	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	5 3/4"	PNT		
057E	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	59	F3	HM	5 3/4"	PNT		
059A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	49	F1	HM	5 3/4"	PNT		
060A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
060B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
061A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	47	F1	HM	5 3/4"	PNT		
062A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
062B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	38	F1	HM	5 3/4"	PNT		
062C	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	38	F1	HM	5 3/4"	PNT		
063A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	5 3/4"	PNT		
064A	4' - 6"	UN	7' - 0"	1 3/4"	D7	WD	F	STN	65	F2	HM	8 1/4"	PNT		
064B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	59	F1	HM	5 3/4"	PNT		
064D	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	5 3/4"	PNT		
065A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F1	HM	5 3/4"	PNT		
066A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
066B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	38	F1	HM	5 3/4"	PNT		
066C	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	38	F1	HM	5 3/4"	PNT		
067A	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	48	F1	HM	5 3/4"	PNT		
068A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	29	F1	HM	5 3/4"	PNT		CR
068B	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	57	F1	HM	5 3/4"	PNT		
068C	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	57	F1	HM	5 3/4"	PNT		
068D	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	57	F1	HM	5 3/4"	PNT		
068E	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	57	F1	HM	5 3/4"	PNT		
068F	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	42	F1	HM	5 3/4"	PNT		
068G	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	60	F1	HM	5 3/4"	PNT		
068H	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	57	F1	HM	5 3/4"	PNT		
068J	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	5 3/4"	PNT		
068K	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	41	F1	HM	5 3/4"	PNT		
069A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
069B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	5 3/4"	PNT		
069C	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	28	F1	HM	5 3/4"	PNT		CR
070A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	40	F1	HM	5 3/4"	PNT		
070B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	59	F1	HM	5 3/4"	PNT		
071A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
071B	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	56	F1	HM	5 3/4"	PNT		
071C	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	41	F1	HM	5 3/4"	PNT		
072A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	40	F1	HM	5 3/4"	PNT		
072B	6' - 0"	PR	7' - 0"	1 3/4"	D5	WD	-	STN	54	F2	HM	5 3/4"	PNT		Weather Seal
072C	2' - 6"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	59	F1	HM	5 3/4"	PNT		
073A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
073B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
074A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
074B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
130A	10' - 4 1/8"	OH	8' - 11"	0"	D10	ALUM	-	CLR	02	-	-		-		Key Operated
130B	10' - 4 1/8"	OH	8' - 11"	0"	D10	ALUM	-	CLR	02	-	-		-		Key Operated
130C	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	18	F1	HM	5 3/4"	PNT	60 Min.	
130D	4' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	18	F1	HM	5 3/4"	PNT	60 Min.	
130E	9' - 0"	SNGL	9' - 0"	1 1/4"	D9	STL	-	CLR		-	-		-	60 Min.	Motor Operated Smoke Control Door
130F	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	40	F1	HM	5 3/4"	PNT		
130G	1' - 6"	SNGL	7' - 0"	1 3/4"	D1	HM	-	PNT	50	F1	HM	5 3/4"	PNT		Level 1 Physical Performance C
130H	3' - 0"	SNGL	7' - 0"	1 3/4"	D4	ALUM	F	-	AL-05	W16	ALUM	0"	-		DOOR TO REMAIN OPEN DURING BUSINESS HOURS
130J	9' - 0"	SNGL	9' - 0"	1 1/4"	D9	STL	-	CLR		-	-		-	60 Min.	Motor Operated Smoke Control Door
130K	9' - 0"	SNGL	9' - 0"	1 1/4"	D9	STL	-	CLR		-	-		-	60 Min.	Motor Operated Smoke Control Door
130L	9' - 0"	SNGL	9' - 0"	1 1/4"	D9	STL	-	CLR		-	-		-	60 Min.	Motor Operated Smoke Control Door
130M	9' - 0"	SNGL	9' - 0"	1 1/4"	D9	STL	-	CLR		-	-		-	60 Min.	Motor Operated Smoke Control Door
130N	9' - 0"	SNGL	9' - 0"	1 1/4"	D9	STL	-	CLR		-	-		-	60 Min.	Motor Operated Smoke Control Door
130P	9' - 0"	SNGL	9' - 0"	1 1/4"	D9	STL	-	CLR		-	-		-	60 Min.	Motor Operated Smoke Control Door
131A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	62	F3	HM	5 3/4"	PNT		
132A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	HM	-	PNT	62	F1a	HM	5 3/4"	PNT		Level 2 Physical Performance B
1 132B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F1	HM	5 3/4"	PNT		
134A	6' - 0"	PR	7' - 0"	1 3/4"	D5	WD	-	STN	09	F2	HM	7 1/4"	PNT	90 Min.	Hold Open, CR
134B	6' - 0"	PR	7' - 0"	1 3/4"	D5	WD	-	STN	10	F2	HM	7 1/4"	PNT	90 Min.	Hold Open
134C	6' - 0"	PR	7' - 0"	1 3/4"	D5	WD	-	STN	10	F2	HM	7 1/4"	PNT	90 Min.	Hold Open
134D	6' - 0"	PR	7' - 0"	1 3/4"	D5	WD	-	STN	30	F2	HM	7 1/4"	PNT	90 Min.	Hold Open
134E	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	10	F1	HM	5 3/4"	PNT		
134G	6' - 0"	PR	7' - 0"	1 3/4"	D5	HM	-	PNT	08	F2	HM	7 1/4"	PNT		Level 2 Physical Performance B
134H	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	59	F1	HM	5 3/4"	PNT		
134J	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	45	F1	HM	5 3/4"	PNT		
134L	3' - 0"	SNGL	7' - 0"	1 3/4"	D5	WD	2	STN	61	F2	HM	5 3/4"	PNT		
134N	6' - 0"	PR	7' - 0"	1 3/4"	D5	HM	-	PNT	08	F2	HM	7 1/2"	PNT		Level 2 Physical Performance B
136A	3' - 0"	SNGL	7' - 0"	1 3/4"	D4	ALUM	F	-	AL-06	W8a	ALUM	7 1/4"	-		
1 136B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F1	HM	5 3/4"	PNT		

Door Number	Width	Description	Height	Thickness	Door Type	Material	Glazing	Finish	Hardware	Frame Type	Frame Material	Frame Depth	Finish	Fire Rating	Remarks
137A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	62	F1	HM	5 3/4"	PNT		
138A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
138B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
139A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
139B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
139C	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	59	F1	HM	5 3/4"	PNT		
140A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
140B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	5 3/4"	PNT		
140V	8' - 6"	PR	7' - 0"	1 3/4"	D5a	HM	-	PNT	08.1	F2a	HM	7 1/2"	PNT	20 Min.	Level 3 Physical Performance A
141A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	61	F1	HM	5 3/4"	PNT		
142A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	8 1/4"	PNT		
143A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	30	F1	HM	5 3/4"	PNT		CR
144A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	31	F1	HM	5 3/4"	PNT		CR
145A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	45	F1	HM	5 3/4"	PNT		
147A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
147B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	5 3/4"	PNT		
148A	4' - 0"	UN	7' - 0"	1 3/4"	D6	WD	F	STN	33	F2	HM	5 3/4"	PNT		CR
148B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	61	F1	HM	5 3/4"	PNT		
148C	4' - 0"	UN	7' - 0"	1 3/4"	D6	WD	F	STN	65	F2	HM	5 3/4"	PNT		
148D	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	5 3/4"	PNT		
148E	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	58	F1	HM	5 3/4"	PNT		
148F	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	5 3/4"	PNT		
148G	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	59	F1	HM	5 3/4"	PNT		
149A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	62	F3	HM	5 3/4"	PNT		
150A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	62	F3	HM	5 3/4"	PNT		
151A	4' - 0"	UN	7' - 0"	1 3/4"	D6	WD	F	STN	33	F2	HM	8 1/4"	PNT		CR
152A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
153A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	63	F1	HM	5 3/4"	PNT		
153B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	44	F1	HM	5 3/4"	PNT		
154A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
155A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	5 3/4"	PNT		
156A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	5 3/4"	PNT		
157A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	5 3/4"	PNT		CR
157B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	58	F1	HM	5 3/4"	PNT		
157C	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	58	F1	HM	5 3/4"	PNT		
158A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	5 3/4"	PNT		
158B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	8 1/4"	PNT		
159A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	8 1/4"	PNT		
160A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
161A	4' - 6"	UN	7' - 0"	1 3/4"	D7	WD	F	STN	33	F2	HM	5 3/4"	PNT		CR
161B	4' - 6"	UN	7' - 0"	1 3/4"	D7	WD	F	STN	67	F2	HM	5 3/4"	PNT		
162A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	45	F1	HM	5 3/4"	PNT		
163A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	31	F1	HM	5 3/4"	PNT		CR
166A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
166B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	40	F1	HM	5 3/4"	PNT		
167A	4' - 0"	UN	7' - 0"	1 3/4"	D6	WD	F	STN	33	F2	HM	8 1/4"	PNT		CR
167B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	58	F1	HM	5 3/4"	PNT		
167C	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	58	F1	HM	5 3/4"	PNT		
167D	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	58	F1	HM	5 3/4"	PNT		
167E	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	58	F1	HM	5 3/4"	PNT		
168A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	5 3/4"	PNT		
169A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
170A	4' - 0"	UN	7' - 0"	1 3/4"	D6	WD	F	STN	33	F2	HM	8 1/4"	PNT		CR
170B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	5 3/4"	PNT		
170C	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	61	F1	HM	5 3/4"	PNT		
171A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
171B	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	56	F1	HM	5 3/4"	PNT		
172A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	62	F3	HM	5 3/4"	PNT		
172B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	62	F3	HM	5 3/4"	PNT		
173A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
173B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	58	F1	HM	5 3/4"	PNT		
173C	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	43	F1	HM	5 3/4"	PNT		
173D	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	58	F1	HM	5 3/4"	PNT		
174A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	62	F1	HM	8 1/4"	PNT		
174B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	5 3/4"	PNT		
174C	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	5 3/4"	PNT		
175A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
175B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	5 3/4"	PNT		CR
176A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
176B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	40	F1	HM	5 3/4"	PNT		
177A	4' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	73	F1	HM	5 3/4"	PNT		AREA OF REFUGE Sign
177B	4' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	06	F1	HM	5 3/4"	PNT		AREA OF REFUGE Sign
240A	6' - 0"	PR	8' - 0"	3/4"	D11a	GLS	J	-	AL-01	W32	ALUM	4 1/2"	-		Power Operator, CR
240B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	32	F1	HM	5 3/4"	PNT	60 Min.	CR

Door Number	Width	Description	Height	Thickness	Door Type	Material	Glazing	Finish	Hardware	Frame Type	Frame Material	Frame Depth	Finish	Fire Rating	Remarks
240C	12' - 0"	OH	8' - 0"	0"	D9	STL	-	CLR	02	-	-		-	60 Min.	Key Operated
240D	6' - 0"	PR	7' - 0"	1 3/4"	D5a	WD	-	STN	19	F2	HM	5 3/4"	PNT	60 Min.	
240E	9' - 4 1/8"	OH	8' - 11"	0"	D10	ALUM	-	CLR	02	-	-		-		Key Operated
240F	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	40	F1	HM	5 3/4"	PNT		
240G	1' - 6"	SNGL	7' - 0"	1 3/4"	D1	HM	-	PNT	50	F1	HM	5 3/4"	PNT		Level 1 Physical Performance C
240H	11' - 3"	FD	9' - 0"		D12									60 Min.	Refer to 083513 Folding Doors
240J	7' - 4"	PR	7' - 0"	1 3/4"	D5a	WD	-	STN	19	F2	HM	5 3/4"	PNT	60 Min.	
240K	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	32	F1	HM	7 1/4"	PNT		CR
240M	6' - 0"	PR	7' - 0"	1 3/4"	D4a	ALUM	B	-	AL-02	W37	ALUM	4 1/2"	-		Power Operator, CR
240N	6' - 0"	PR	7' - 0"	1 3/4"	D4a	ALUM	B	-	AL-03	W37	ALUM	4 1/2"	-		Power Operator
240P	8' - 6"	PR	7' - 0"	1 3/4"	D5a	WD	-	STN	20	F2	HM	5 3/4"	PNT	60 Min.	
241A	3' - 0"	SNGL	8' - 0"	1 3/4"	D11	GLS	H	-	36	W36	ALUM	4 1/2"	-		
241B	6' - 0"	PR	8' - 0"	3/4"	D11a	GLS	J	-	AL-01	W35	ALUM	4 1/2"	-		Power Operator, CR
241C	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
241D	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	59	F1	HM	5 3/4"	PNT		
241E	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
241F	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
241G	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
241H	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
241J	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
241K	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	59	F1	HM	5 3/4"	PNT		
241M	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	36	F3	HM	5 3/4"	PNT		
241P	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
241Q	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	69	F3	HM	5 3/4"	PNT		
241R	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	69	F3	HM	5 3/4"	PNT		
242B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242C	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242D	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	34	F1	HM	5 3/4"	PNT		Power Operator
242E	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	35	F1	HM	5 3/4"	PNT		
242F	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242G	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F3	HM	5 3/4"	PNT		
242J	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242K	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242M	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242N	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242Q	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242R	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242S	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242T	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242U	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242V	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242W	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242X	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242Y	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
242Z	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
243A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
243B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
243C	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
243D	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
243E	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
243F	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
243G	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	45	F1	HM	5 3/4"	PNT		
243H	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
243J	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
243K	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	5 3/4"	PNT		
243M	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	5 3/4"	PNT		
243P	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
243Q	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
243R	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
243T	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	68	F4	HM	5 3/4"	PNT		
244A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	28	F2	HM	5 3/4"	PNT		
246A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
246B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
246C	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	59	F1	HM	5 3/4"	PNT		
247A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
248A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
248B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	61	F1	HM	5 3/4"	PNT		
248C	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	61	F1	HM	5 3/4"	PNT		
249A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	8 1/4"	PNT		
250B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	8 1/4"	PNT		
251A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	30	F1	HM	5 3/4"	PNT		CR
251B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	58	F1	HM	5 3/4"	PNT		
251C	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	58	F1	HM	5 3/4"	PNT		

Door Number	Width	Description	Height	Thickness	Door Type	Material	Glazing	Finish	Hardware	Frame Type	Frame Material	Frame Depth	Finish	Fire Rating	Remarks
252A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	31	F1	HM	5 3/4"	PNT		CR
253A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	45	F1	HM	5 3/4"	PNT		
1 254A	4' - 0"	UN	7' - 0"	1 3/4"	D6	WD	F	STN	GL-02	F2	HM	8 1/4"	PNT		CR
254B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	61	F1	HM	5 3/4"	PNT		
255A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
255B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	61	F1	HM	5 3/4"	PNT		
255C	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	61	F1	HM	5 3/4"	PNT		
256A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	62	F1	HM	5 3/4"	PNT		
257A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
258A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
258B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	58	F1	HM	5 3/4"	PNT		
259A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
259B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
260A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
260B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
261A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	62	F3	HM	5 3/4"	PNT		
262A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
262B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	58	F1	HM	5 3/4"	PNT		
263A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
263B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
264A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	45	F1	HM	5 3/4"	PNT		
265A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	31	F1	HM	5 3/4"	PNT		CR
268A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
268B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
268C	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	40	F1	HM	5 3/4"	PNT		
269A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	62	F1	HM	5 3/4"	PNT		
270A	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	68	F1	HM	5 3/4"	PNT		
270C	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	17	F1	HM	5 3/4"	PNT	60 Min.	
271A	4' - 0"	UN	7' - 0"	1 3/4"	D6	WD	F	STN	33	F2	HM	5 3/4"	PNT		CR
272A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	56	F1	HM	8 1/4"	PNT		
272B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	40	F1	HM	5 3/4"	PNT		
273A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
273B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	59	F1	HM	5 3/4"	PNT		
273C	3' - 0"	SNGL	7' - 0"	1 3/4"	D3	WD	F	STN	46	F1	HM	5 3/4"	PNT		
274A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	64	F1	HM	5 3/4"	PNT		
274B	3' - 0"	SNGL	7' - 0"	1 3/4"	D3	WD	F	STN	68	F1	HM	5 3/4"	PNT		
274C	3' - 0"	SNGL	7' - 0"	1 3/4"	D3	WD	F	STN	46	F1	HM	5 3/4"	PNT		
275A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
275B	3' - 0"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	46	F1	HM	5 3/4"	PNT		
276A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
276B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT		
277A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
277B	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	44	F1	HM	5 3/4"	PNT		
277C	3' - 0"	SNGL	7' - 0"	1 3/4"	D3	WD	F	STN	68	F1	HM	5 3/4"	PNT		
278A	3' - 6"	SNGL	7' - 0"	1 3/4"	D2	WD	F	STN	28	F1	HM	8 1/4"	PNT		CR
279A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT	20 Min.	
279B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	70	F3	HM	8 1/4"	PNT	20 Min.	
280A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	27	F3	HM	8 1/4"	PNT	20 Min.	
280B	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	27	F3	HM	8 1/4"	PNT	20 Min.	
280C	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	WD	-	STN	40	F1	HM	5 3/4"	PNT		
300A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	HM	-	PNT	24	F1	HM	5 3/4"	PNT	60 Min.	Level 2 Physical Performance B
301A	3' - 0"	SNGL	7' - 0"	1 3/4"	D1	HM	-	PNT	47	F1	HM	5 3/4"	PNT		Level 2 Physical Performance B
302A	6' - 0"	PR	7' - 0"	1 3/4"	D5a	HM	-	PNT	53	F2	HM	5 3/4"	PNT		Level 2 Physical Performance B
302B	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	HM	-	PNT	03.1	F1	HM	5 3/4"	PNT		Level 2 Physical Performance B
302C	3' - 6"	SNGL	7' - 0"	1 3/4"	D1	HM	-	PNT	03.1	F1	HM	5 3/4"	PNT		Level 2 Physical Performance B
303A	8' - 0"	OH	10' - 0"	2"	D9	STL	-	CLR	01	-	-		-		Chain operated, insulated
304A	6' - 0"	PR	7' - 0"	1 3/4"	D5	HM	-	PNT	52	F2	HM	5 3/4"	PNT		Level 1 Physical Performance C

GLAZING SCHEDULE

A - 1/4" CLEAR
B - 1/4" CLEAR, TEMPERED
C - 1" INSUL. UNIT (ULTRA-CLEAR)
D - 1" INSUL. UNIT, TEMPERED (ULTRA-CLEAR)
E - 1" INSUL. UNIT (GRAY)
F - 1" INSUL. UNIT, TEMPERED (GRAY)
G - 1" INSUL. UNIT (GRAY, SPANDREL PANEL)
H - 1/2" CLEAR, TEMPERED
J - 3/4" CLEAR, TEMPERED

DOOR SCHEDULE - ADDENDUM 5 UPDATE 2

8 REMOVE ROOFING ENTIRELY TO CONCRETE DECK. CAP DRAINS

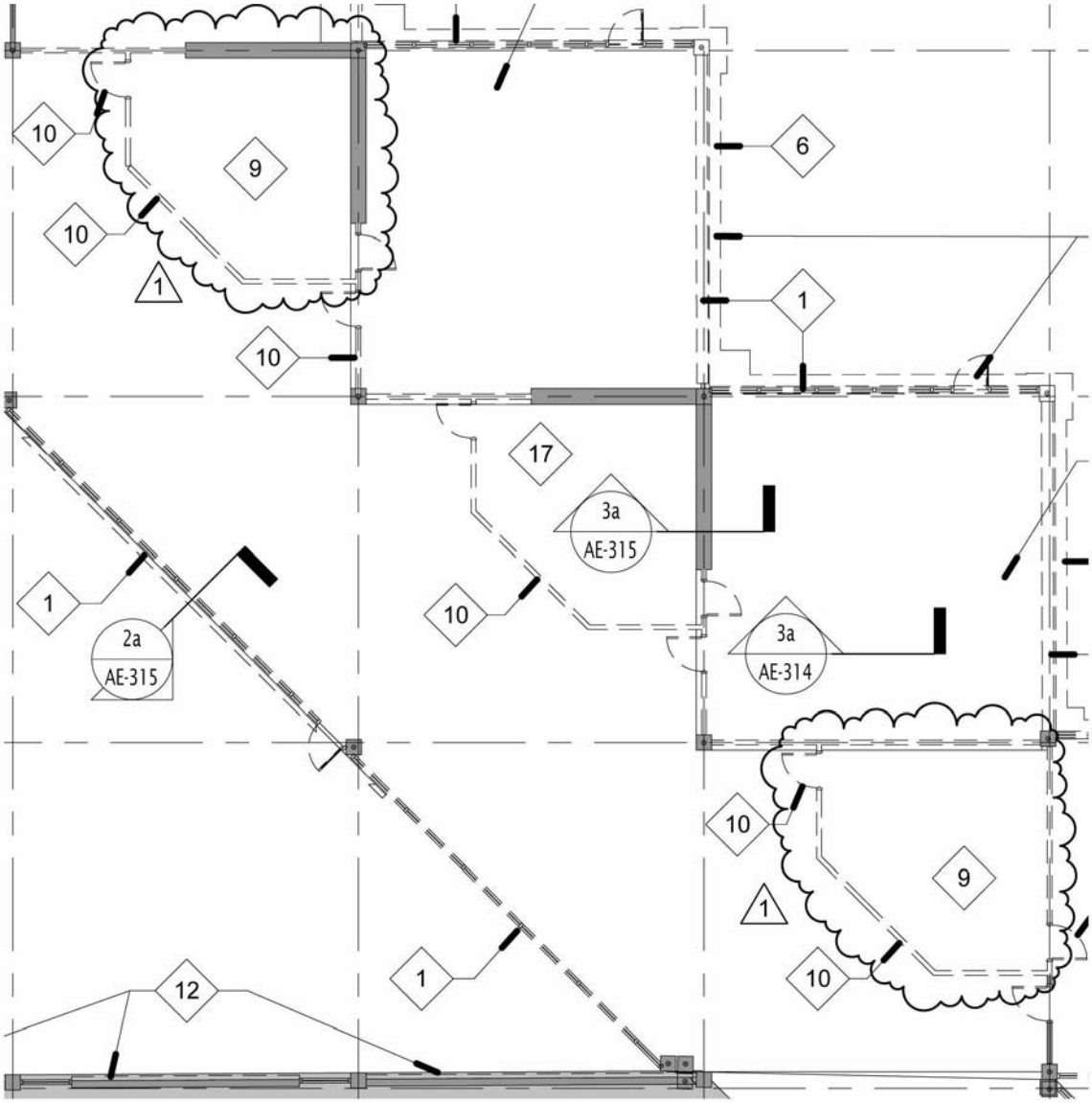
9 REMOVE EXISTING FLOORS, FOUNDATIONS AND FOOTINGS AS INDICATED & REQUIRED TO FACILITATE NEW CONSTRUCTION. (1)

10 REMOVE EXISTING WALLS, WINDOWS AND DOORS AS INDICATED

11 REMOVE EXISTING MECH. AND COMMUNICATION EQUIPMENT

12 REMOVE EXISTING BRICK VENEER AND SUPPORTS COMPLETE. SALVAGE BRICK FOR RE-USE. (1)

13 EXISTING CONCRETE FLOOR SLAB TO BE REMOVED. CONTRACTOR TO COORDINATE ALL WORK TO ACCOMMODATE NEW UTILITY TUNNEL



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:29:39 PM

GSBS ARCHITECTS

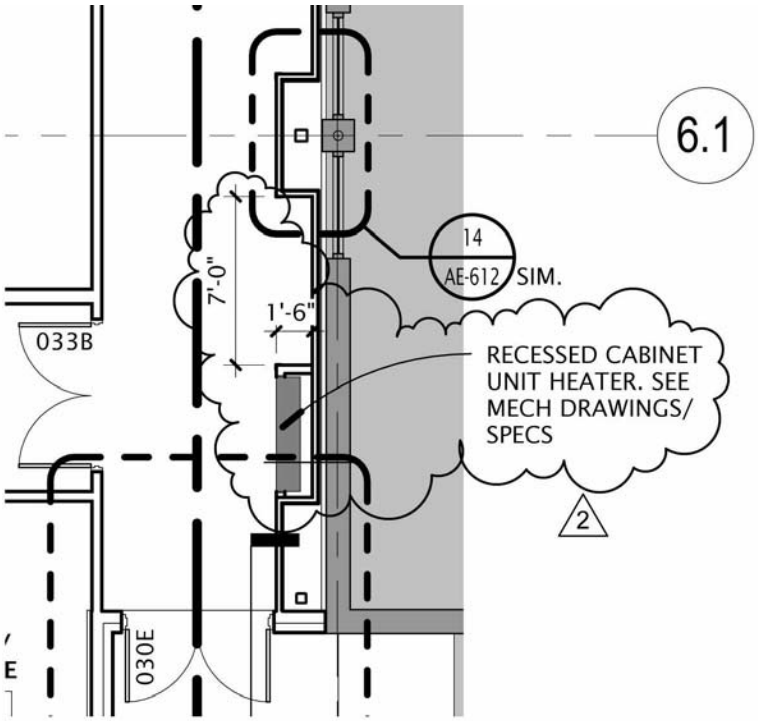
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

1 / AD-111

AD5-A43

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE: 05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:29:24 PM

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AE-101C

AD5-A47

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

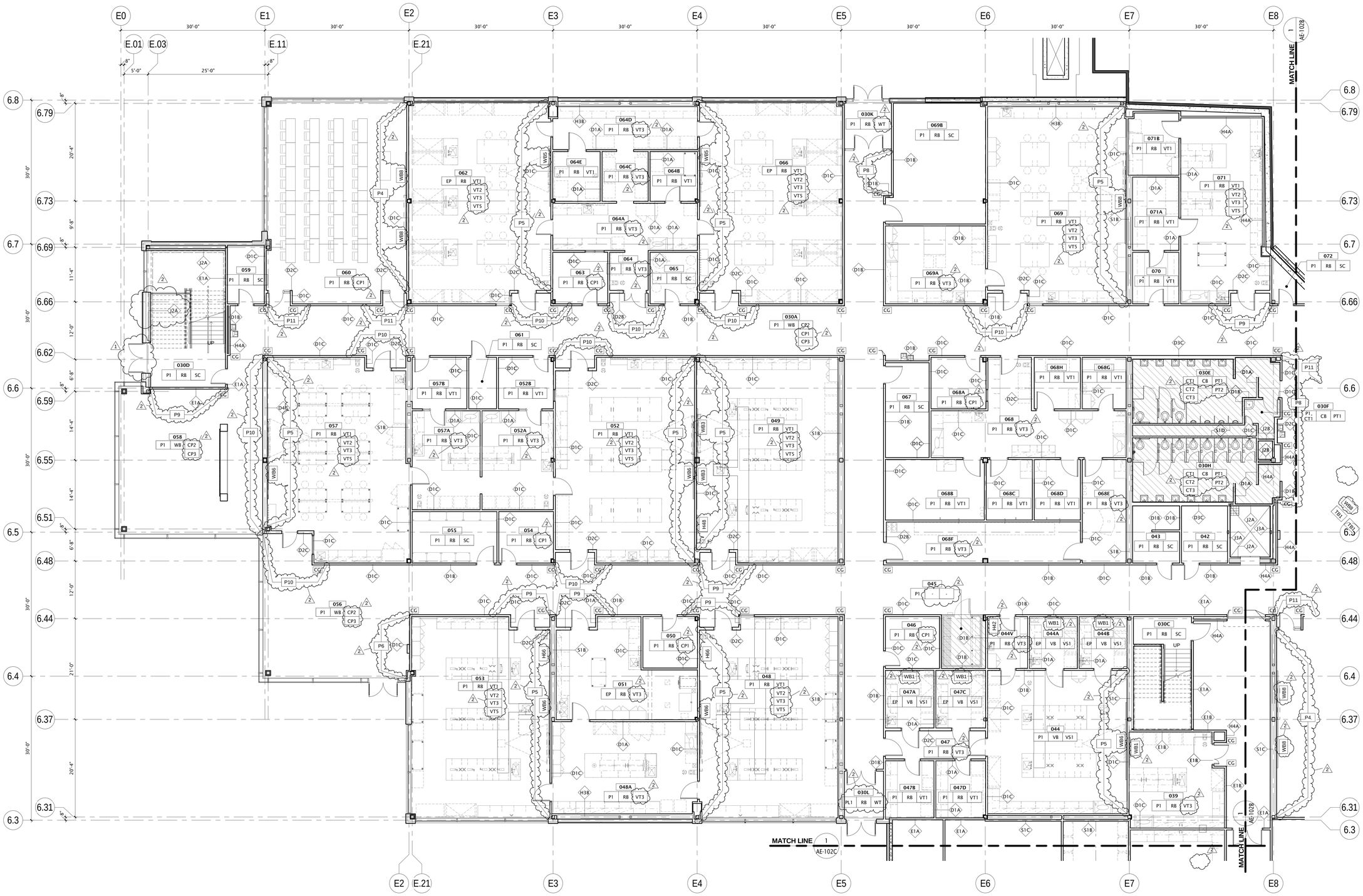
P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

STATE OF UTAH
116302
LICENSED ARCHITECT

REVISIONS:

1	05.19.2010	Addendum 4
2	05.26.2010	Addendum 5



INDICATES EXTENT OF RECESSED SLAB. SEE DETAILS

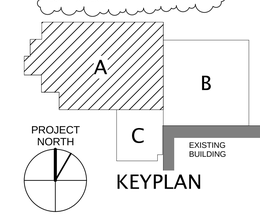
GENERAL NOTES

- CLASSROOM FURNITURE (CONFERENCE TABLES, DESKS AND CLASSROOM CHAIRS) ARE SHOWN FOR REFERENCE ONLY. AUDITORIUM AND LECTURE HALL FIXED SEATING IS A PART OF THE BUILD-OUT.

- SEE SHEET AE-140 FOR WALL TYPE LEGEND
- SEE SHEET AE-801 FOR FINISH SCHEDULE

- ALL EXTERIOR CLERESTORY & VISION WINDOWS TO BE OUTFITTED W/ METAL HORIZONTAL LOUVERED BLINDS U.N.O.

SEE SHEET AE-102D, AE122C & AE128 FOR FLOOR PATTERNS.



Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 0 WTFI PLAN- AREA A

CONSTRUCTION DOCUMENTS

AE-102A

1 AE-102A LEVEL 0 WTFI PLAN - AREA A
1/8" = 1'-0"
8' 4' 0' 8' 16'

1 AE-102B LEVEL 0 WTFI PLAN - AREA B

1/8" = 1'-0"

8' 4' 0' 8' 16'

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

STATE OF UTAH
116302
LICENSED ARCHITECT

REVISIONS:

1	05.26.2010	Addendum 5

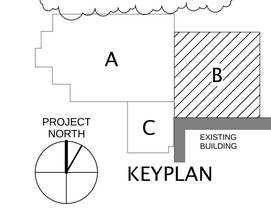
GENERAL INDICATES EXTENT OF RECESSED SLAB. SEE DETAILS.

- CLASSROOM FURNITURE (CONFERENCE TABLES, DESKS AND CLASSROOM CHAIRS) ARE SHOWN FOR REFERENCE ONLY. AUDITORIUM AND LECTURE HALL FIXED SEATING IS A PART OF THE BUILD-OUT.

- SEE SHEET AE-140 FOR WALL TYPE LEGEND
- SEE SHEET AE-801 FOR FINISH SCHEDULE

- ALL EXTERIOR CLERESTORY & VISION WINDOWS TO BE OUTFITTED W/ METAL HORIZONTAL LOUVERED BLINDS U.N.O.

- SEE SHEET AE-102D, AE-122C & AE112B FOR FLOOR PATTERNS.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 0 WTFI PLAN- AREA B

CONSTRUCTION DOCUMENTS

AE-102B

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

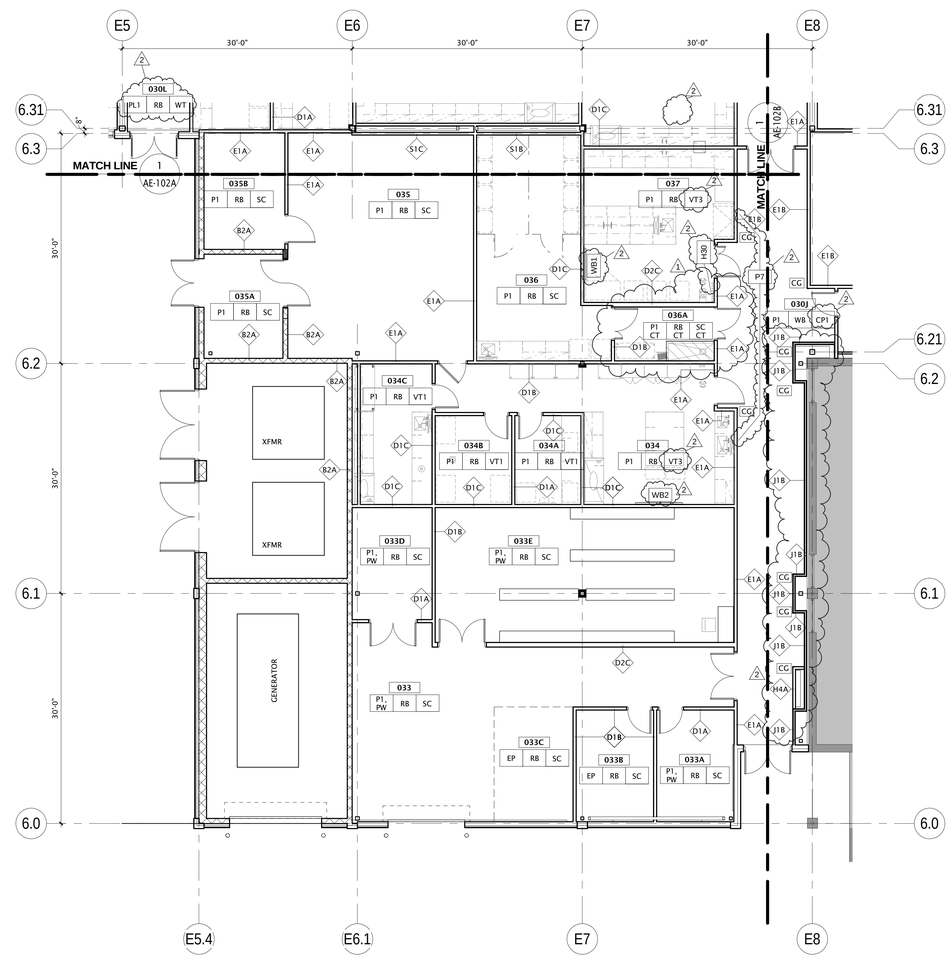
P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

STATE OF UTAH
116302
LICENSED ARCHITECT

REVISIONS:

1	05.19.2010	Addendum 4
2	05.26.2010	Addendum 5



1 AE-102C 1/8" = 1'-0"

LEVEL 0 WTFI PLAN - AREA C

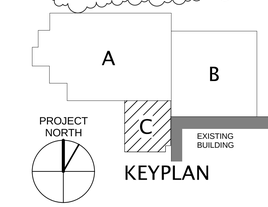
8' 4' 0' 8' 16'

INDICATES EXTENT OF RECESSED SLAB. SEE DETAILS

GENERAL NOTES

- CLASSROOM FURNITURE (CONFERENCE TABLES, DESKS AND CLASSROOM CHAIRS) ARE SHOWN FOR REFERENCE ONLY. AUDITORIUM AND LECTURE HALL FIXED SEATING IS A PART OF THE BUILD-OUT.
- SEE SHEET AE-140 FOR WALL TYPE LEGEND
- SEE SHEET AE-801 FOR FINISH SCHEDULE
- ALL EXTERIOR CLERESTORY & VISION WINDOWS TO BE OUTFITTED W/ METAL HORIZONTAL LOUVERED BLINDS U.N.O.

SEE SHEET AE-102D, AE-122C & AE-112E FOR FLOOR PATTERNS.



Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 0 WTFI PLAN- AREA C

CONSTRUCTION DOCUMENTS

AE-102C

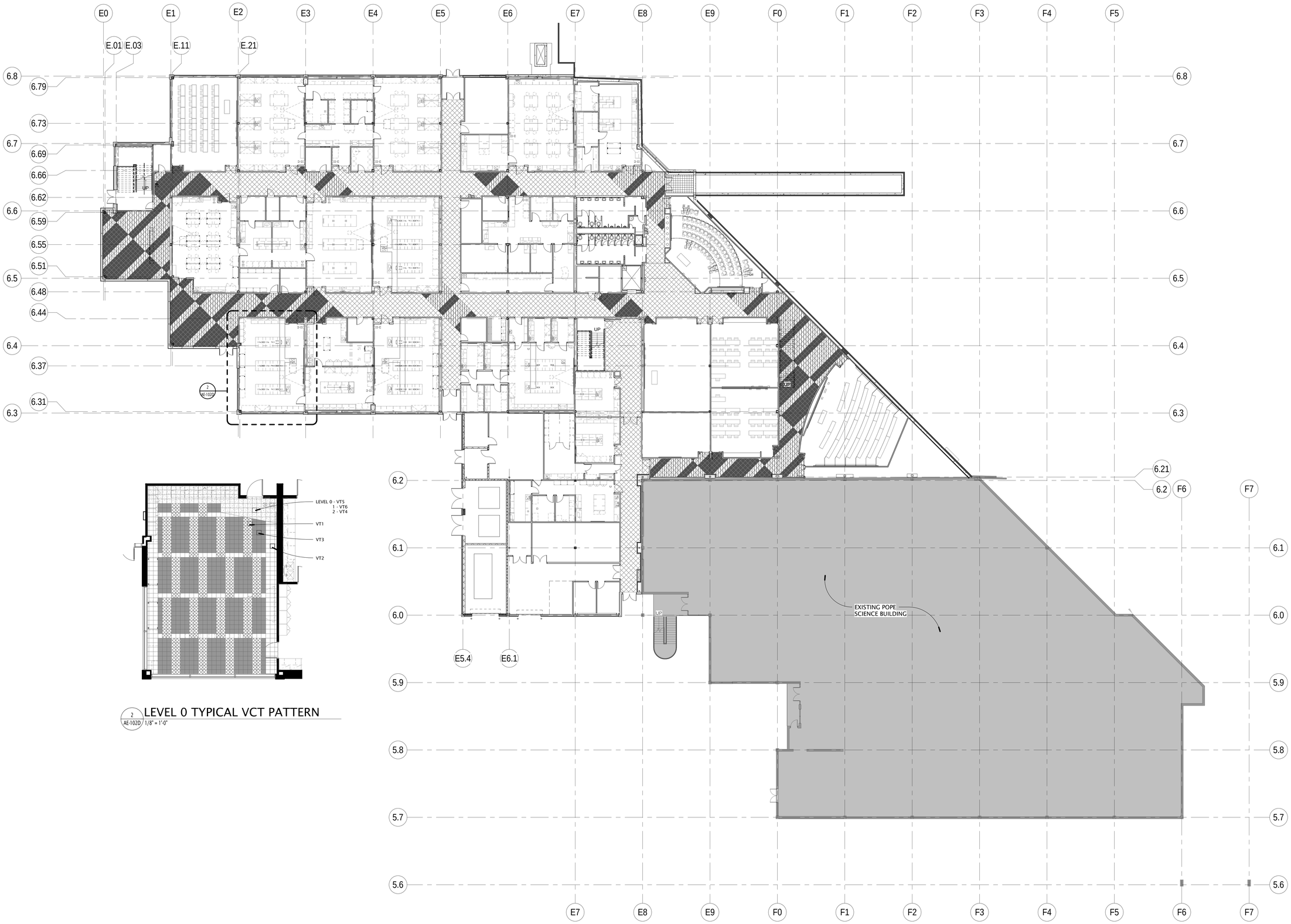
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

STATE OF UTAH
116302
LICENSED ARCHITECT

REVISIONS:

CARPET LEGEND

- CP1
- CP2
- CP3



1 AE-102D / 1/16" = 1'-0"
LEVEL 0 FLOOR PATTERN PLAN

2 AE-102D / 1/8" = 1'-0"
LEVEL 0 TYPICAL VCT PATTERN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 0 FLOOR PATTERN PLAN

CONSTRUCTION DOCUMENTS

AE-102D

PLAN LEGEND

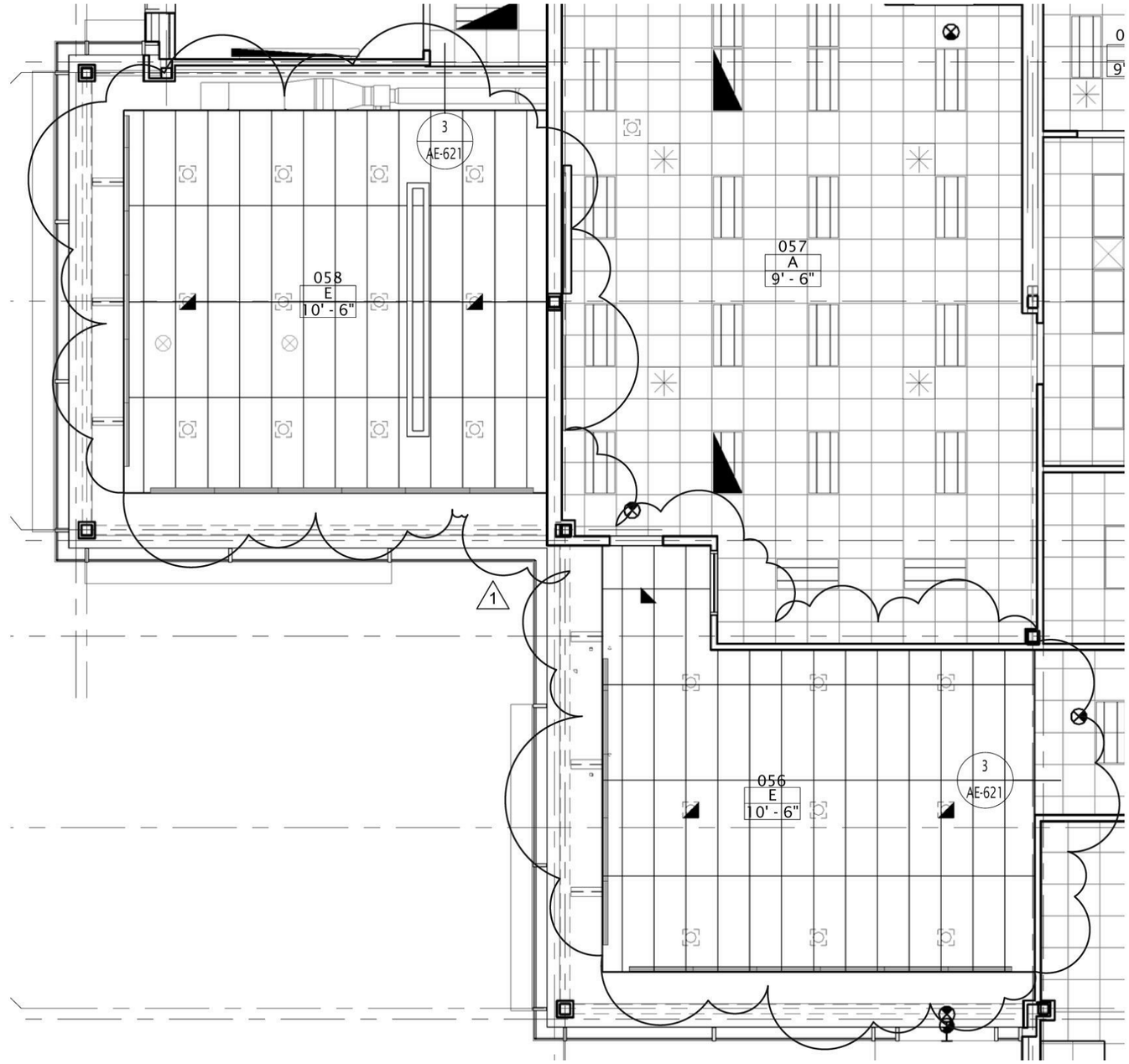
ROOM #	100
TYPE	A
ELEVATION	9'-0"

TYPE A	2' x 2' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID
TYPE B	VINYL OR MYLAR FACED PANEL IN SUSPENDED GRID
TYPE C	5/8" GYPSUM BOARD (PAINTED) ON METAL SUSPENSION SYSTEM
TYPE D	5/8" GYPSUM BOARD (EPOXY PAINTED) ON METAL SUSPENSION SYSTEM
TYPE E	2' x 6' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID (1)
TYPE F	2' x 2' LAY-IN METAL IN SUSPENDED GRID
TYPE G	EXPOSED STRUCTURE (1)
TYPE H	2' X 2' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID

SYMBOL LEGEND

- Lay-in Light Fixture
- Suspended or Surface Mounted Linear Light
- Recessed Light Fixture
- Pendant Light Fixture
- Pendant Light Fixture
- Mechanical Diffuser - Supply
- Mechanical Diffuser - Return

NOTE: COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS.



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

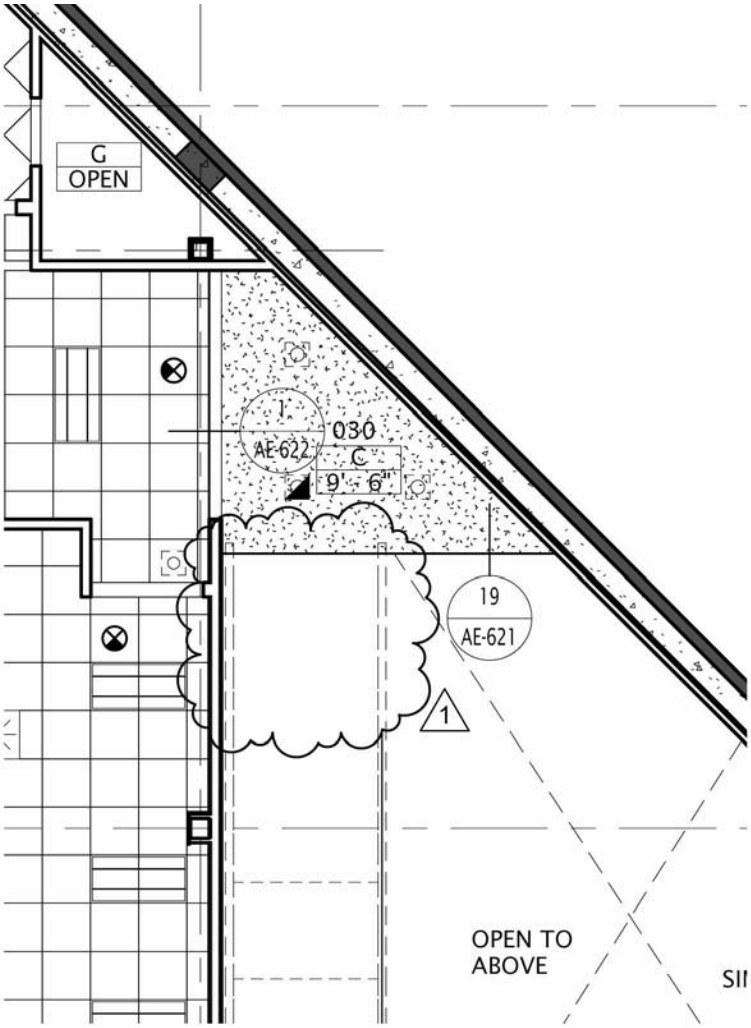
5/26/2010 4:35:41 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

1/AE-103A

AD5-A57

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE: 05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:29:11 PM

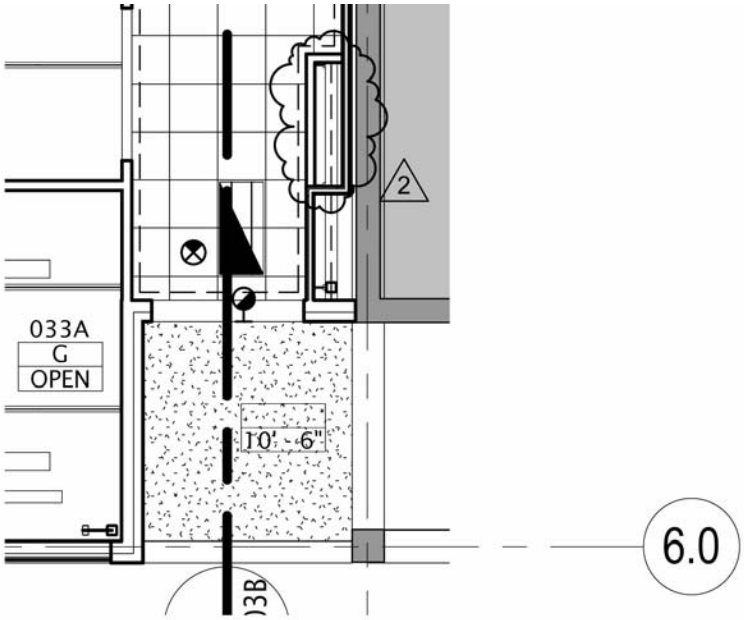
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AE-103B

AD5-A58

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:28:55 PM

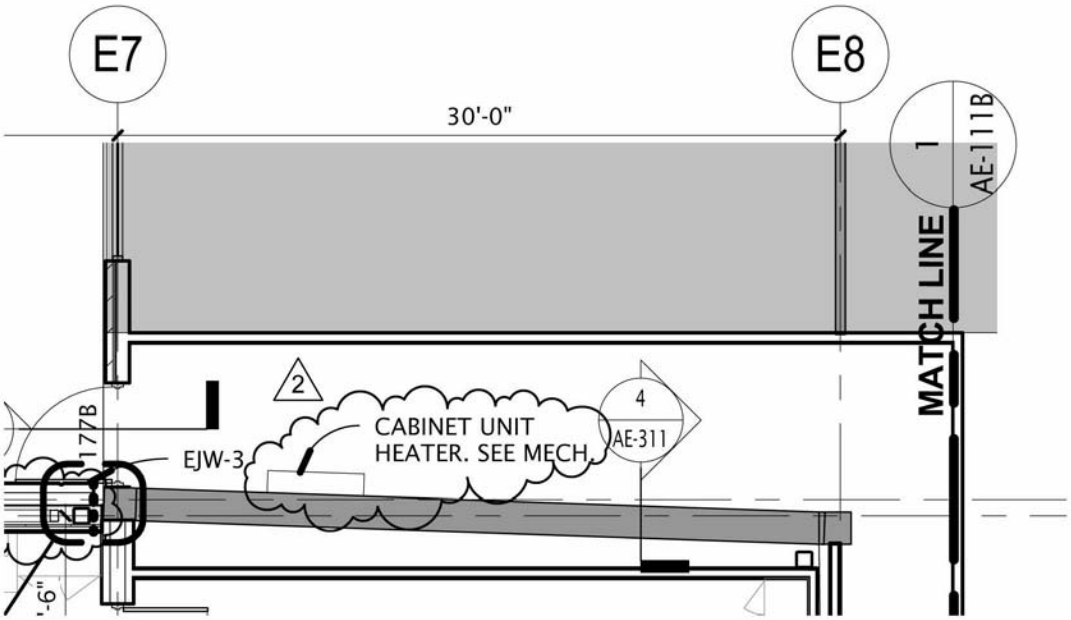
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AE-103C

AD5-A59

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:28:40 PM

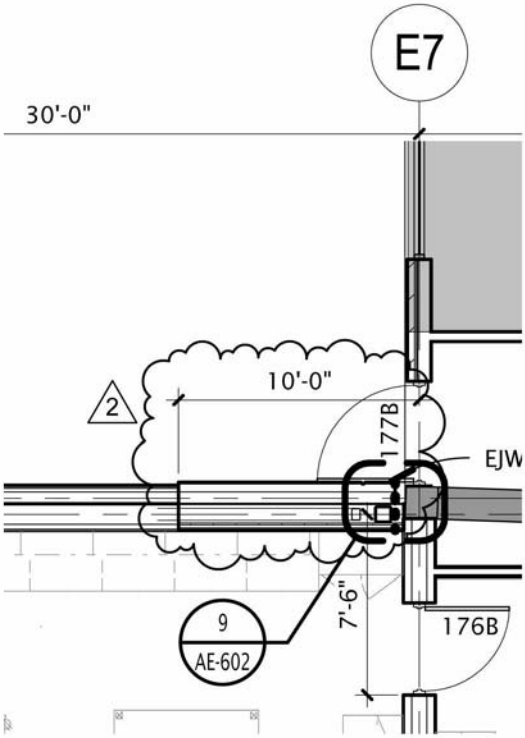
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AE-111A

AD5-A60

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:28:25 PM

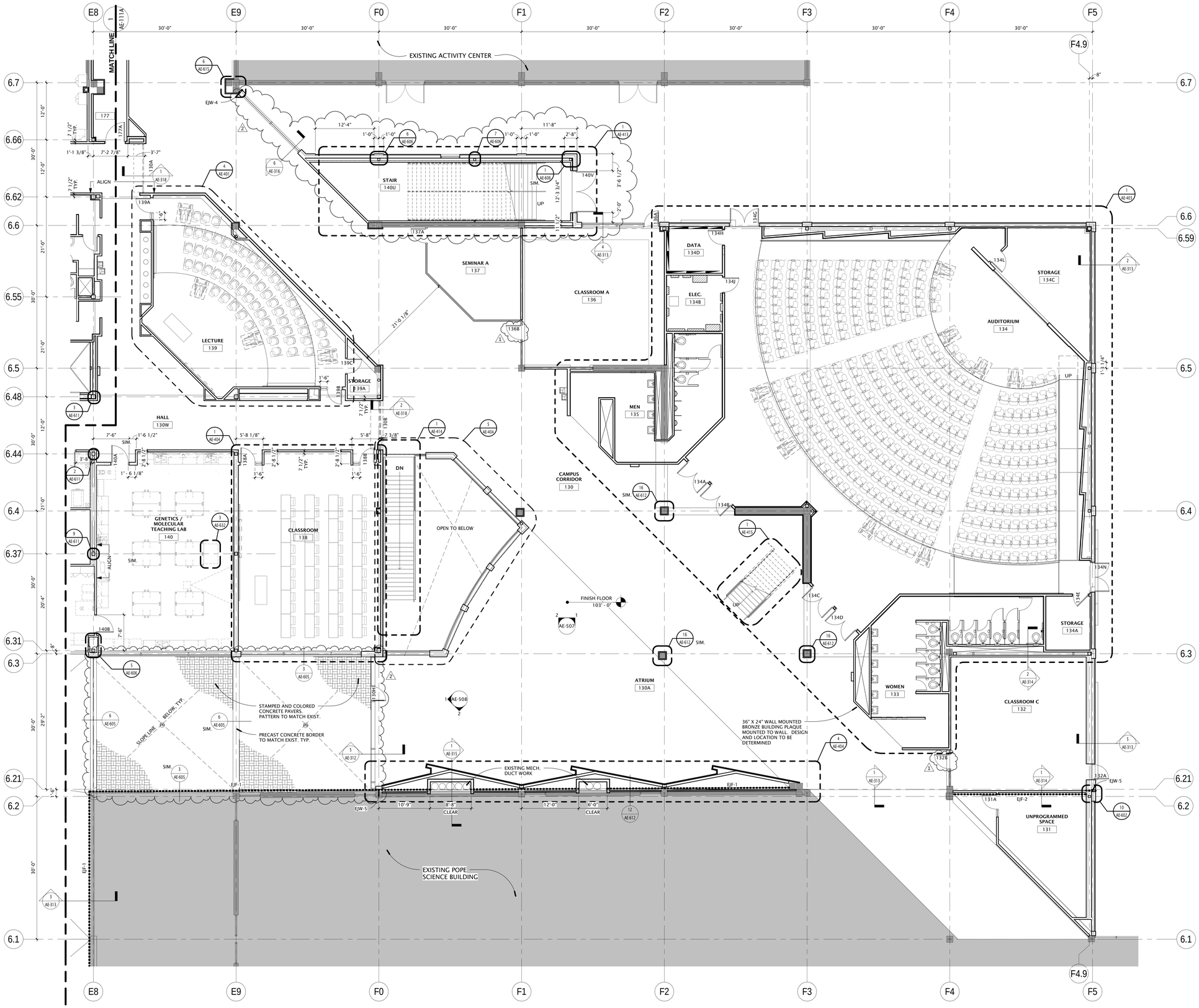
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AE-111A

AD5-A61

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



1 AE-111B 1/8" = 1'-0"

LEVEL 1 FLOOR PLAN - AREA B

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

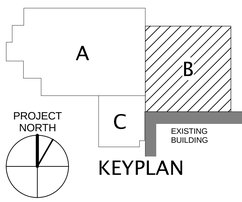
STATE OF UTAH LICENSED ARCHITECT 116302

REVISIONS:

1	05.19.2010	Addendum 4
2	05.26.2010	Addendum 5

REFER TO STRUCTURAL FRAMING PLANS FOR EXTENT OF STRUCTURAL MEMBERS REQUIRED TO RECEIVE FIREPROOFING.
REFER TO ARCHITECTURAL DETAILS FOR FIREPROOFING TYPE AND ASSEMBLY NUMBERS.

SEE LABORATORY FURNISHING (LF) SHEETS FOR ALL LABORATORY FIT-OUT.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 1 FLOOR PLAN - AREA B

CONSTRUCTION DOCUMENTS

AE-111B

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

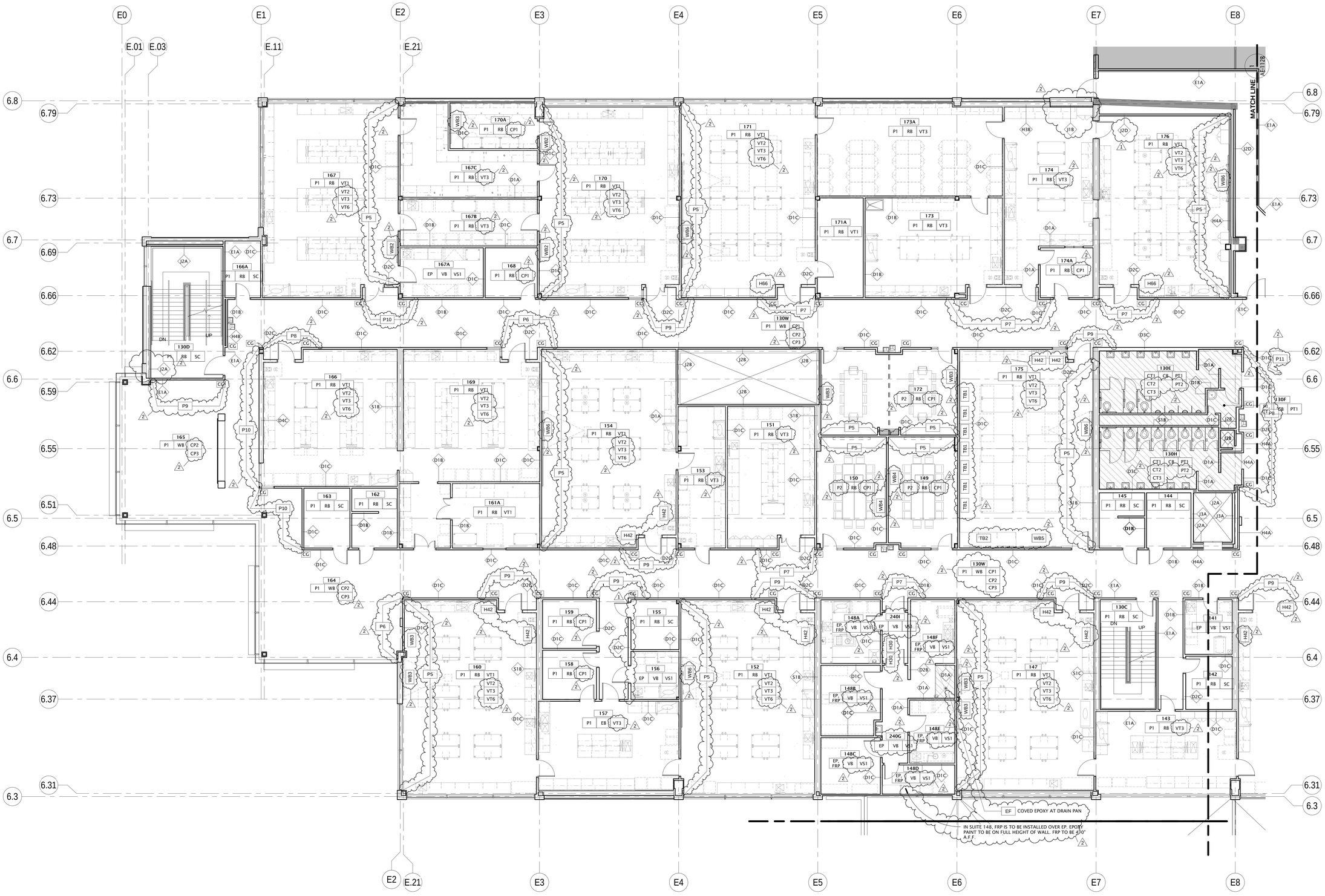
P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

STATE OF UTAH
116302
LICENSED ARCHITECT

REVISIONS:

1	05.19.2010	Addendum 4
2	05.26.2010	Addendum 5



INDICATES EXTENT OF RECESSED SLAB. SEE DETAILS

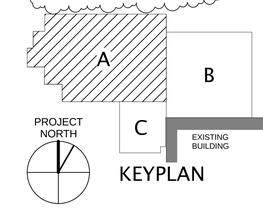
GENERAL NOTES

- CLASSROOM FURNITURE (CONFERENCE TABLES, DESKS AND CLASSROOM CHAIRS) ARE SHOWN FOR REFERENCE ONLY. AUDITORIUM AND LECTURE HALL FIXED SEATING IS A PART OF THE BUILD-OUT.

- SEE SHEET AE-140 FOR WALL TYPE LEGEND
- SEE SHEET AE-801 FOR FINISH SCHEDULE

- ALL EXTERIOR CLERESTORY & VISION WINDOWS TO BE OUTFITTED W/ METAL HORIZONTAL LOUVERED BLINDS U.N.O.

SEE SHEET AE-112B, AE-122C & AE1.128 FOR FLOOR PATTERNS.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

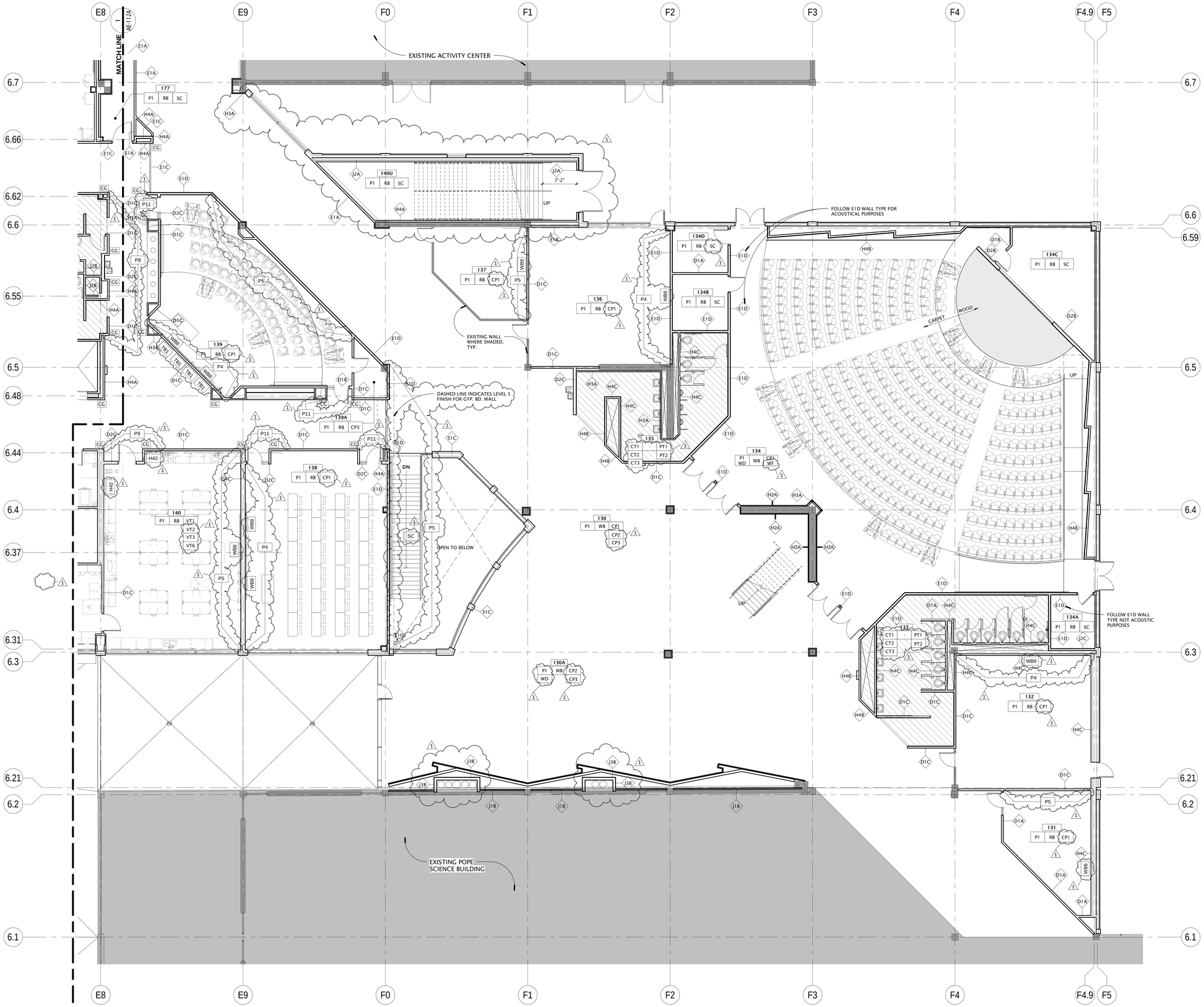
DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 1 WTFI PLAN - AREA A

CONSTRUCTION DOCUMENTS

AE-112A

1 / AE-112A LEVEL 1 WTFI PLAN - AREA A
1/8" = 1'-0"
8' 4' 0' 8' 16'



1 AE-112B LEVEL 1 WTFI PLAN - AREA B

1/8" = 1'-0"

8' 4' 0' 8' 16'

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

STATE OF UTAH LICENSED ARCHITECT 116302

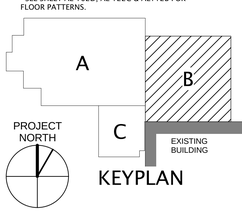
REVISIONS:

1	05.26.2010	Addendum 5

INDICATES EXTENT OF RECESSED SLAB. SEE DETAILS

GENERAL NOTES:

- CLASSROOM FURNITURE (CONFERENCE TABLES, DESKS AND CLASSROOM CHAIRS) ARE SHOWN FOR REFERENCE ONLY. AUDITORIUM AND LECTURE HALL FIXED SEATING IS A PART OF THE BUILD-OUT.
- SEE SHEET AE-140 FOR WALL TYPE LEGEND
- SEE SHEET AE-801 FOR FINISH SCHEDULE
- ALL EXTERIOR CLERESTORY & VISION WINDOWS TO BE OUTFITTED W/ METAL HORIZONTAL LOUVERED BLINDS U.N.O.
- SEE SHEET AE-102D, AE-122C & AE112B FOR FLOOR PATTERNS.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 1 WTFI PLAN - AREA B

CONSTRUCTION DOCUMENTS

AE-112B

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

STATE OF UTAH
116302
LICENSED ARCHITECT

REVISIONS:

CARPET LEGEND

- CP1
- CP2
- CP3

2 AE-112C LEVEL 1 TYPICAL VCT PATTERN
1/8" = 1'-0"

1 AE-112C LEVEL 1 FLOOR PATTERN PLAN
1/16" = 1'-0"

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 1 FLOOR PATTERN PLAN

CONSTRUCTION DOCUMENTS

AE-112C

PLAN LEGEND

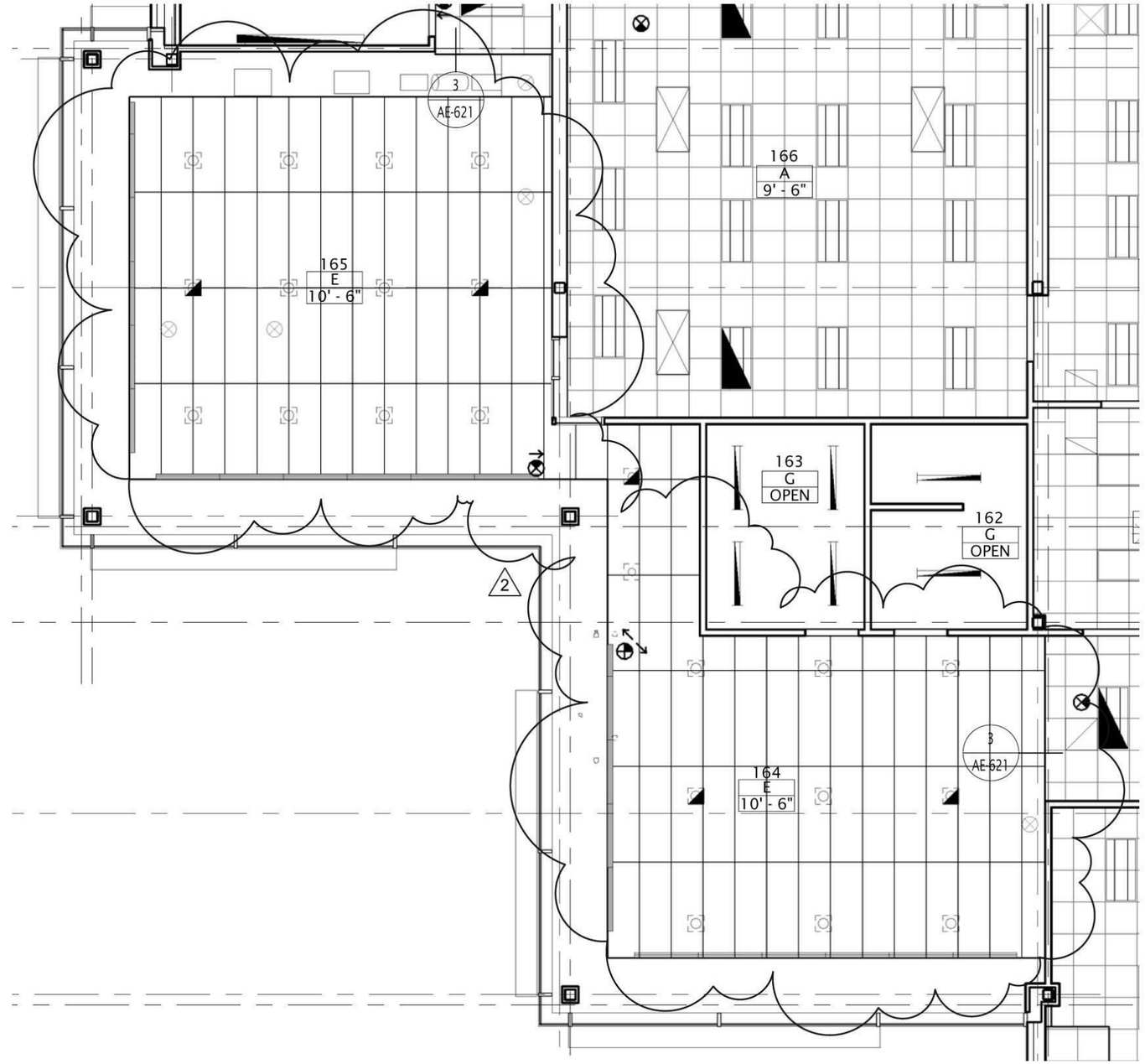
ROOM #	100
TYPE	A
ELEVATION	9'-0"

TYPE A	2' x 2' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID
TYPE B	VINYL OR MYLAR FACED PANEL IN SUSPENDED GRID
TYPE C	5/8" GYPSUM BOARD (PAINTED) ON METAL SUSPENSION SYSTEM
TYPE D	5/8" GYPSUM BOARD (EPOXY PAINTED) ON METAL SUSPENSION SYSTEM
TYPE E	2' x 6' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID (1)
TYPE F	2' x 2' LAY-IN METAL IN SUSPENDED GRID
TYPE G	EXPOSED STRUCTURE
TYPE H	2' X 2' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID (1)

SYMBOL LEGEND

- Lay-in Light Fixture
- Suspended or Surface Mounted Linear Light
- Recessed Light Fixture
- Pendant Light Fixture
- Pendant Light Fixture
- Mechanical Diffuser - Supply
- Mechanical Diffuser - Return

NOTE: COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS.



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:35:55 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

1/AE-113A

AD5-A73

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE: 05.26.2010

1 AE-113B LEVEL 1 REFLECTED CEILING PLAN - AREA B

1/8" = 1'-0"

8' 4' 0' 8' 16'

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

STATE OF UTAH
116302
LICENSED ARCHITECT

REVISIONS:

1	05.26.2010	Addendum 5

PLAN LEGEND

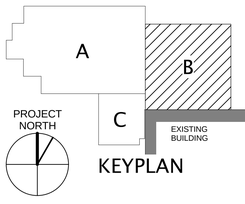
ROOM # 100
TYPE A
ELEVATION 9'-0"

TYPE A	2' x 2' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID
TYPE B	VINYL OR MYLAR FACED PANEL IN SUSPENDED GRID
TYPE C	5/8" GYPSUM BOARD (PAINTED) ON METAL SUSPENSION SYSTEM
TYPE D	5/8" GYPSUM BOARD (EPOXY PAINTED) ON METAL SUSPENSION SYSTEM
TYPE E	2' x 6' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID
TYPE F	2' x 2' LAY-IN METAL IN SUSPENDED GRID
TYPE G	EXPOSED STRUCTURE
TYPE H	2' X 2' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID

SYMBOL LEGEND

- Lay-in Light Fixture
- Suspended or Surface Mounted Linear Light
- Recessed Light Fixture
- Pendant Light Fixture
- Pendant Light Fixture
- Mechanical Diffuser - Supply
- Mechanical Diffuser - Return

NOTE: COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 1 REFLECTED CEILING PLAN - AREA B

CONSTRUCTION DOCUMENTS

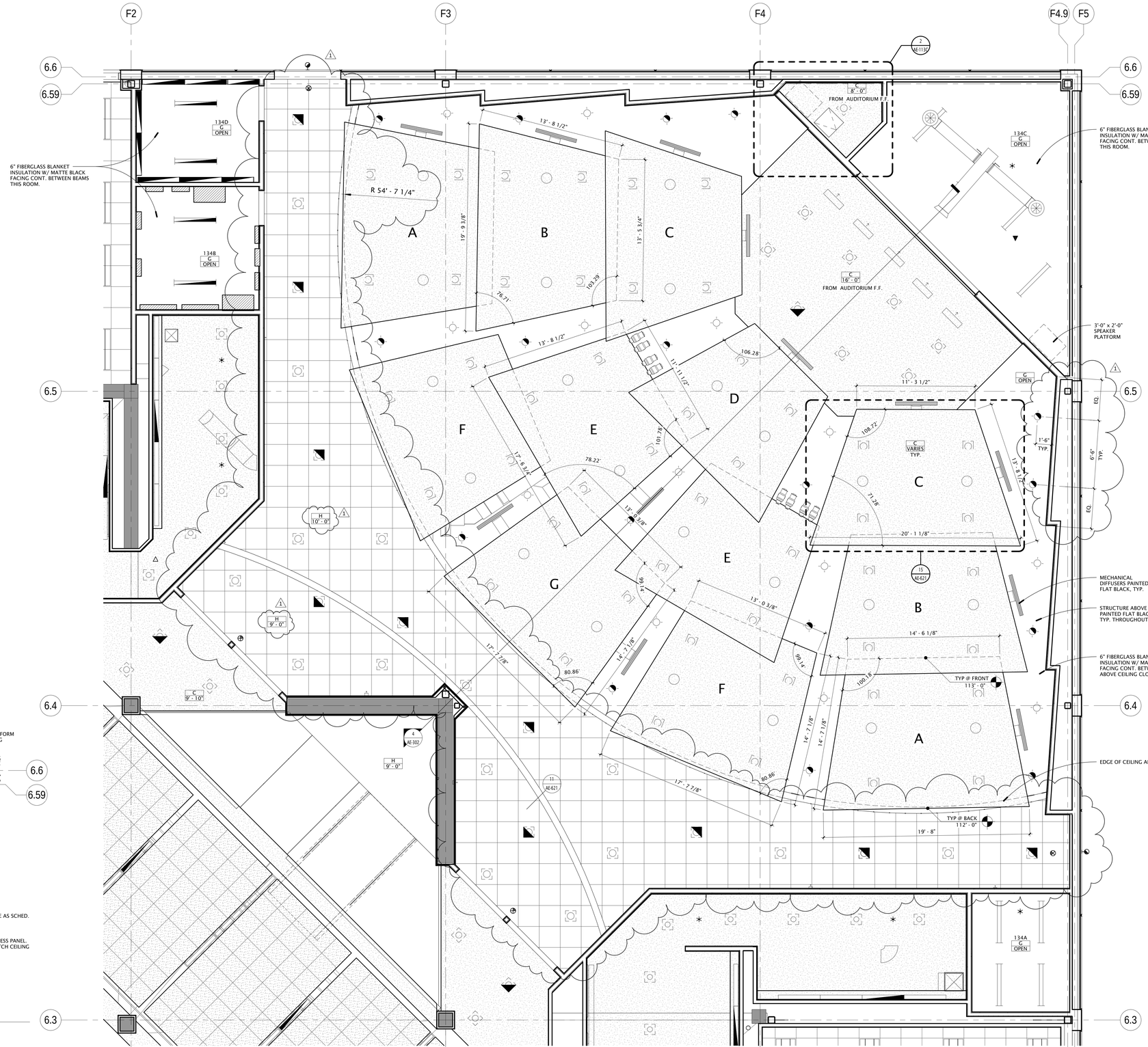
AE-113B

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

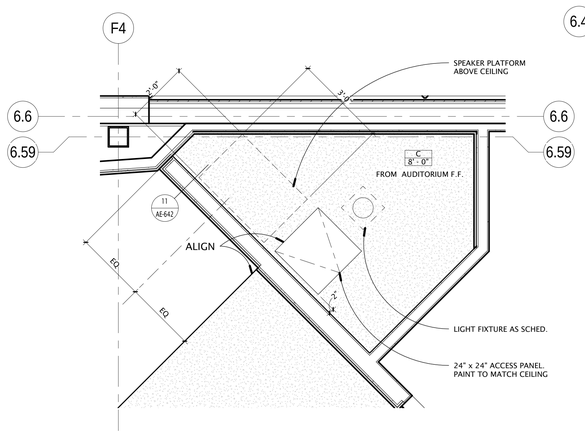
STATE OF UTAH LICENSED ARCHITECT 116302

REVISIONS:

1	05.26.2010	Addendum 5



1 AE-113C ENLARGED AUDITORIUM REFLECTED CEILING PLAN 1/4" = 1'-0"



2 AE-113C ENLARGED REFLECTED CEILING PLAN 1/2" = 1'-0"

PLAN LEGEND

ROOM # 100
TYPE A
ELEVATION 9'-0"

TYPE A	2' x 2' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID
TYPE B	VINYL OR MYLAR FACED PANEL IN SUSPENDED GRID
TYPE C	5/8" GYPSUM BOARD (PAINTED) ON METAL SUSPENSION SYSTEM
TYPE D	5/8" GYPSUM BOARD (EPOXY PAINTED) ON METAL SUSPENSION SYSTEM
TYPE E	2' x 6' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID
TYPE F	2' x 2' LAY-IN METAL IN SUSPENDED GRID
TYPE G	EXPOSED STRUCTURE
TYPE H	2' X 2' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID

SYMBOL LEGEND

- Lay-in Light Fixture
- Suspended or Surface Mounted Linear Light
- Recessed Light Fixture
- Pendant Light Fixture
- Pendant Light Fixture
- Mechanical Diffuser - Supply
- Mechanical Diffuser - Return

NOTE: COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS.

PROJECT NORTH

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

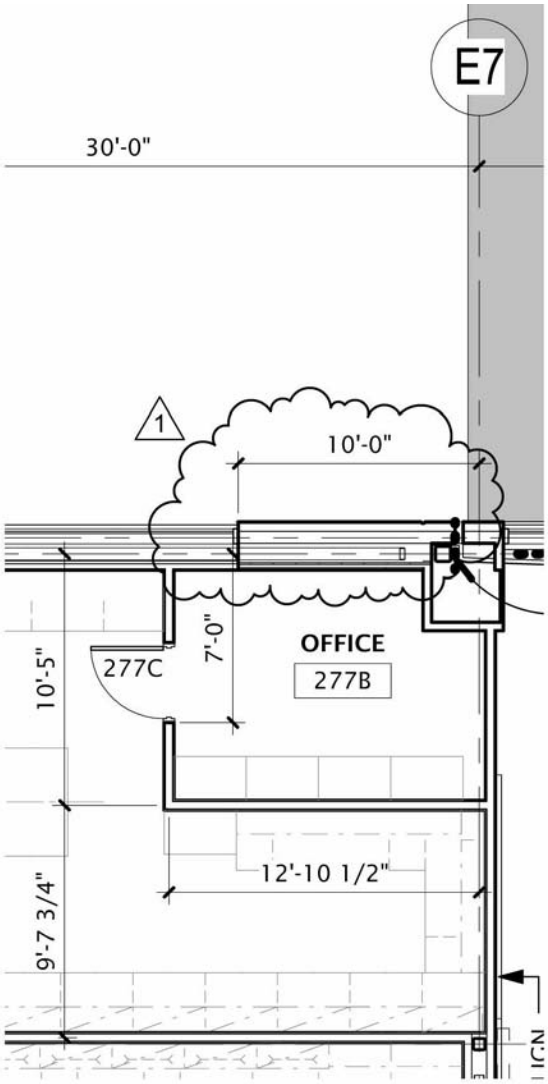
Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

ENLARGED REFLECTED CEILING PLAN

CONSTRUCTION DOCUMENTS

AE-113C



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:45:00 PM

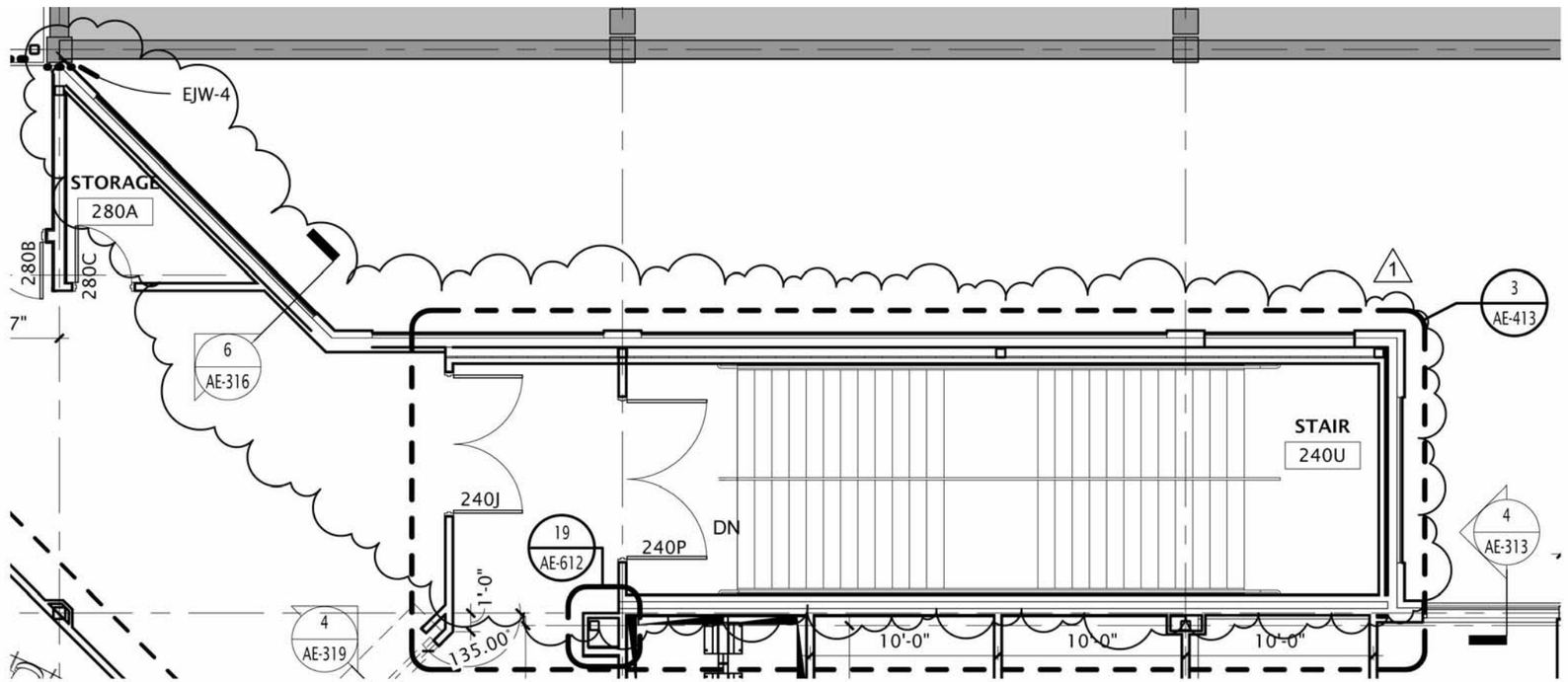
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AE-121A

AD5-A77

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AE-121B

AD5-A78

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE: 05.26.2010

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt
5/26/2010 4:34:13 PM

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

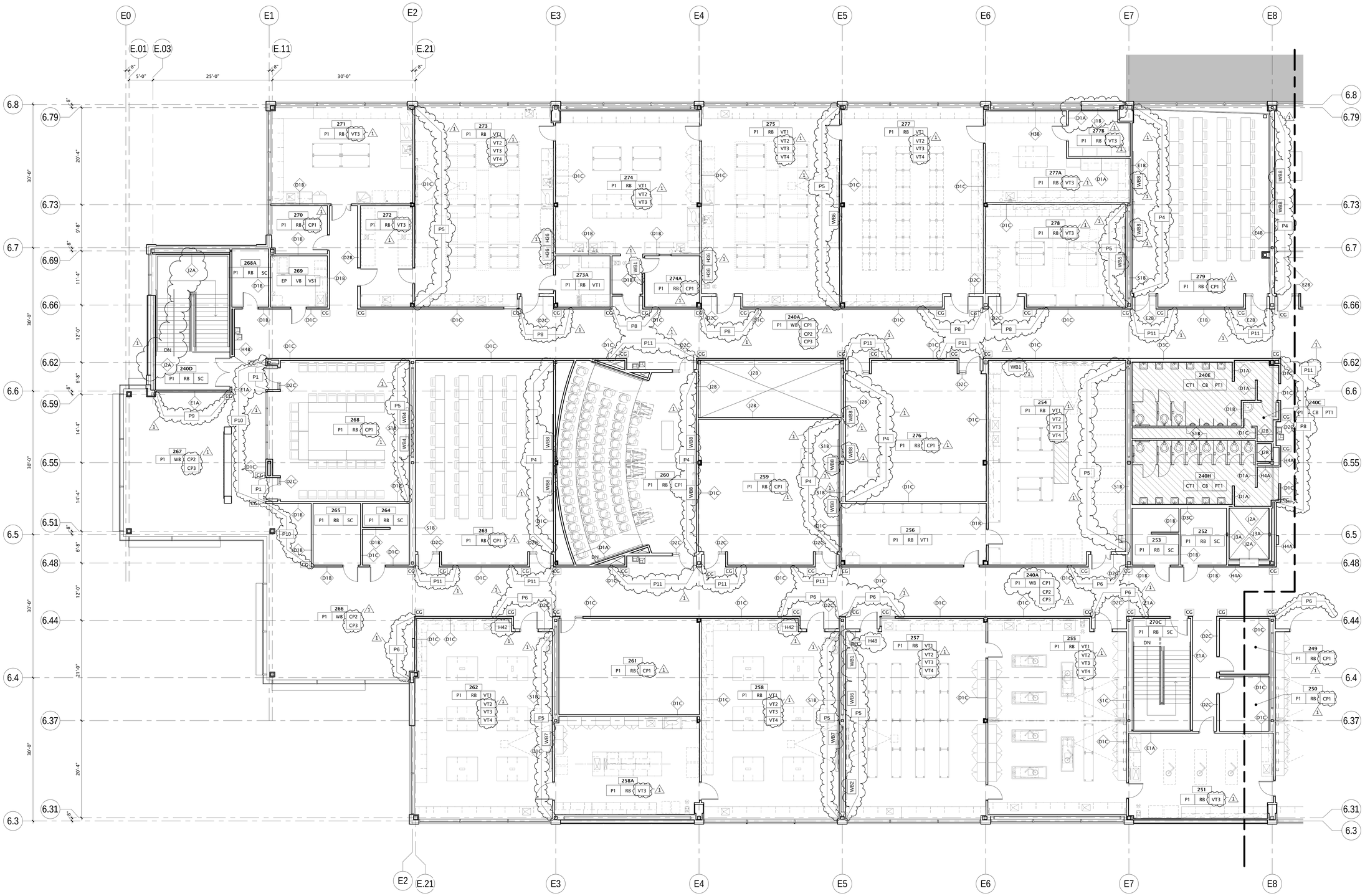
P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

STATE OF UTAH
116302
LICENSED ARCHITECT

REVISIONS:

1	05.26.2010	Addendum 5



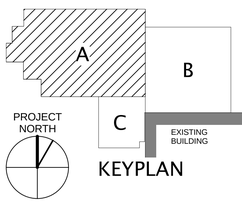
INDICATES EXTENT OF RECESSED SLAB. GENERAL NOTE SEE DETAILS

- CLASSROOM FURNITURE (CONFERENCE TABLES, DESKS AND CLASSROOM CHAIRS) ARE SHOWN FOR REFERENCE ONLY. AUDITORIUM AND LECTURE HALL FIXED SEATING IS A PART OF THE BUILD-OUT.

- SEE SHEET AE-140 FOR WALL TYPE LEGEND
- SEE SHEET AE-801 FOR FINISH SCHEDULE

- ALL EXTERIOR CLERESTORY & VISION WINDOWS TO BE OUTFITTED W/ METAL HORIZONTAL LOUVERED BLINDS U.N.O.

- SEE SHEET AE-102D, AE-122C & AE112B FOR FLOOR PATTERNS.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

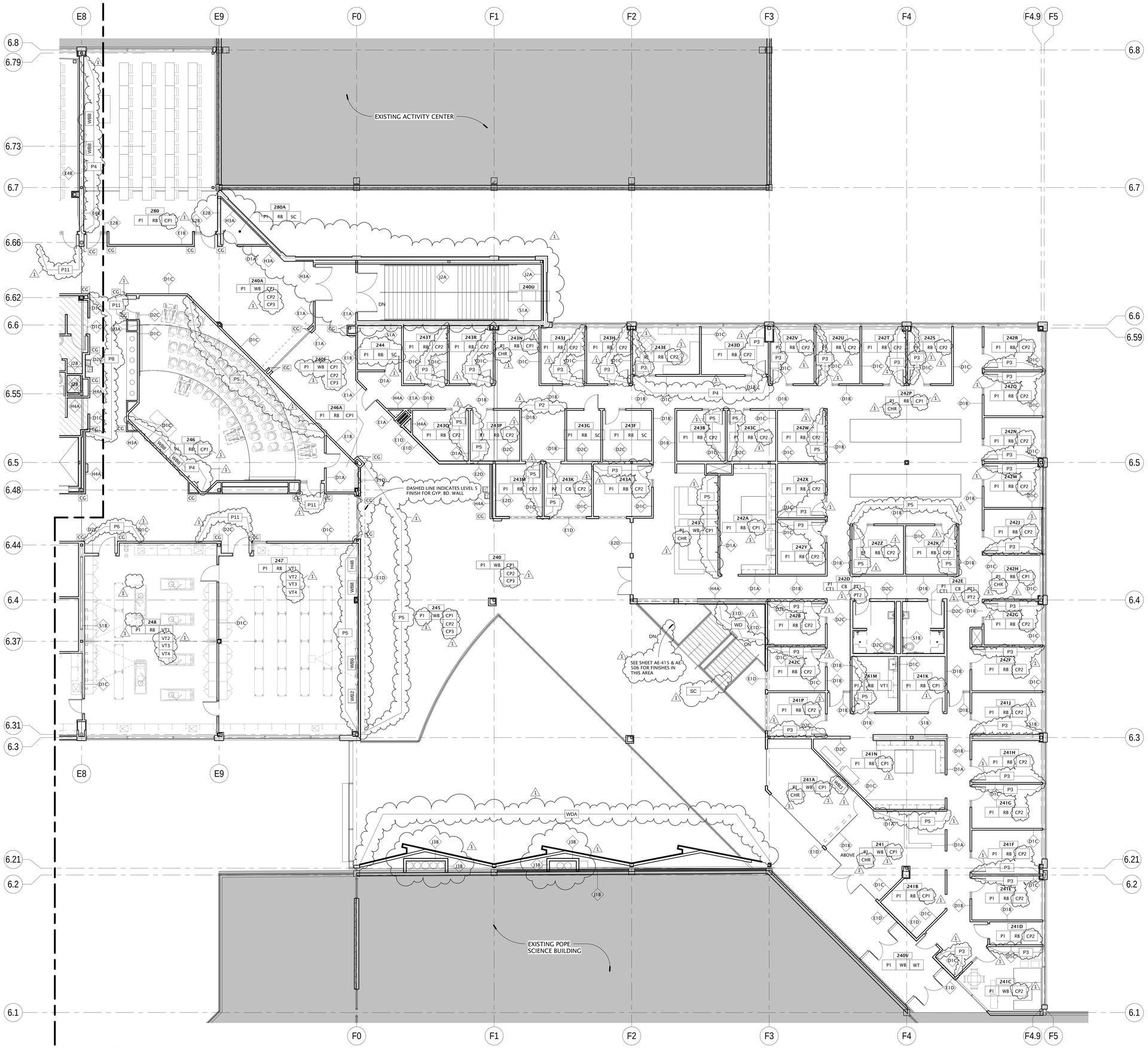
DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 2 WTFI PLAN- AREA A

CONSTRUCTION DOCUMENTS

AE-122A

1 / AE-122A LEVEL 2 WTFI PLAN - AREA A
1/8" = 1'-0"
8' 4' 0' 8' 16'



1 LEVEL 2 WTFI PLAN - AREA B
AE-122B 1/8" = 1'-0"

8' 4' 0' 8' 16'

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

STATE OF UTAH LICENSED ARCHITECT 116302

REVISIONS:

1	05.26.2010	Addendum 5

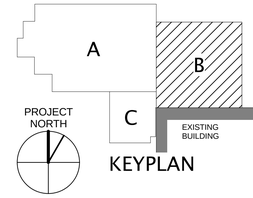
GENERAL NOTES

- CLASSROOM FURNITURE (CONFERENCE TABLES, DESKS AND CLASSROOM CHAIRS) ARE SHOWN FOR REFERENCE ONLY. AUDITORIUM AND LECTURE HALL FIXED SEATING IS A PART OF THE BUILD-OUT.

- SEE SHEET AE-140 FOR WALL TYPE LEGEND
- SEE SHEET AE-801 FOR FINISH SCHEDULE

- ALL EXTERIOR CLERESTORY & VISION WINDOWS TO BE OUTFITTED W/ METAL HORIZONTAL LOUVERED BLINDS U.N.O.

- SEE SHEET AE-102D, AE-122C & AE1128 FOR FLOOR PATTERNS.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 2 WTFI PLAN- AREA B

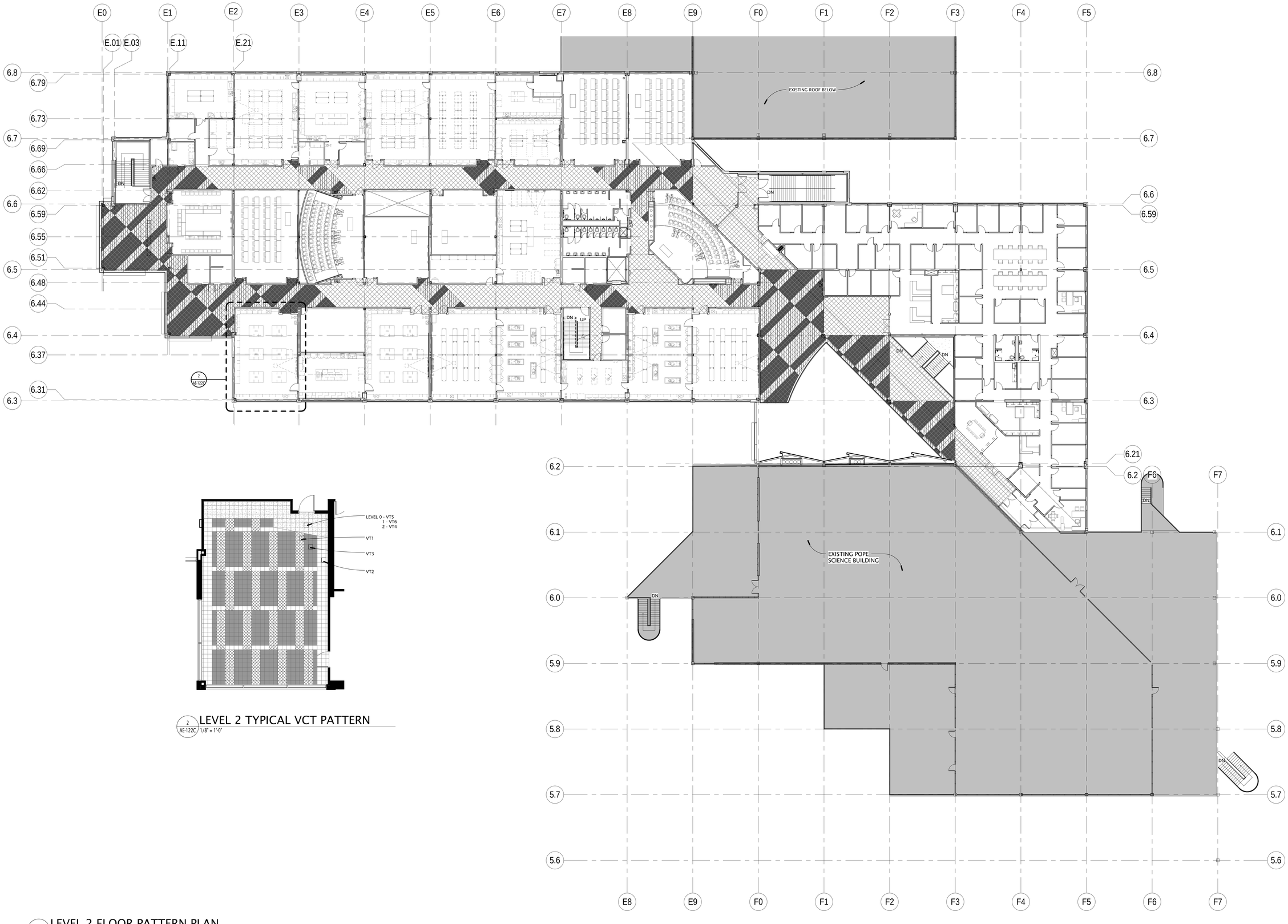
CONSTRUCTION DOCUMENTS

AE-122B

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

STATE OF UTAH 116302 LICENSED ARCHITECT

REVISIONS:



2 AE-122C LEVEL 2 TYPICAL VCT PATTERN
1/8" = 1'-0"

1 AE-122C LEVEL 2 FLOOR PATTERN PLAN
1/16" = 1'-0"

CARPET LEGEND

- CP1
- CP2
- CP3

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 2 FLOOR PATTERN PLAN

CONSTRUCTION DOCUMENTS

AE-122C

PLAN LEGEND

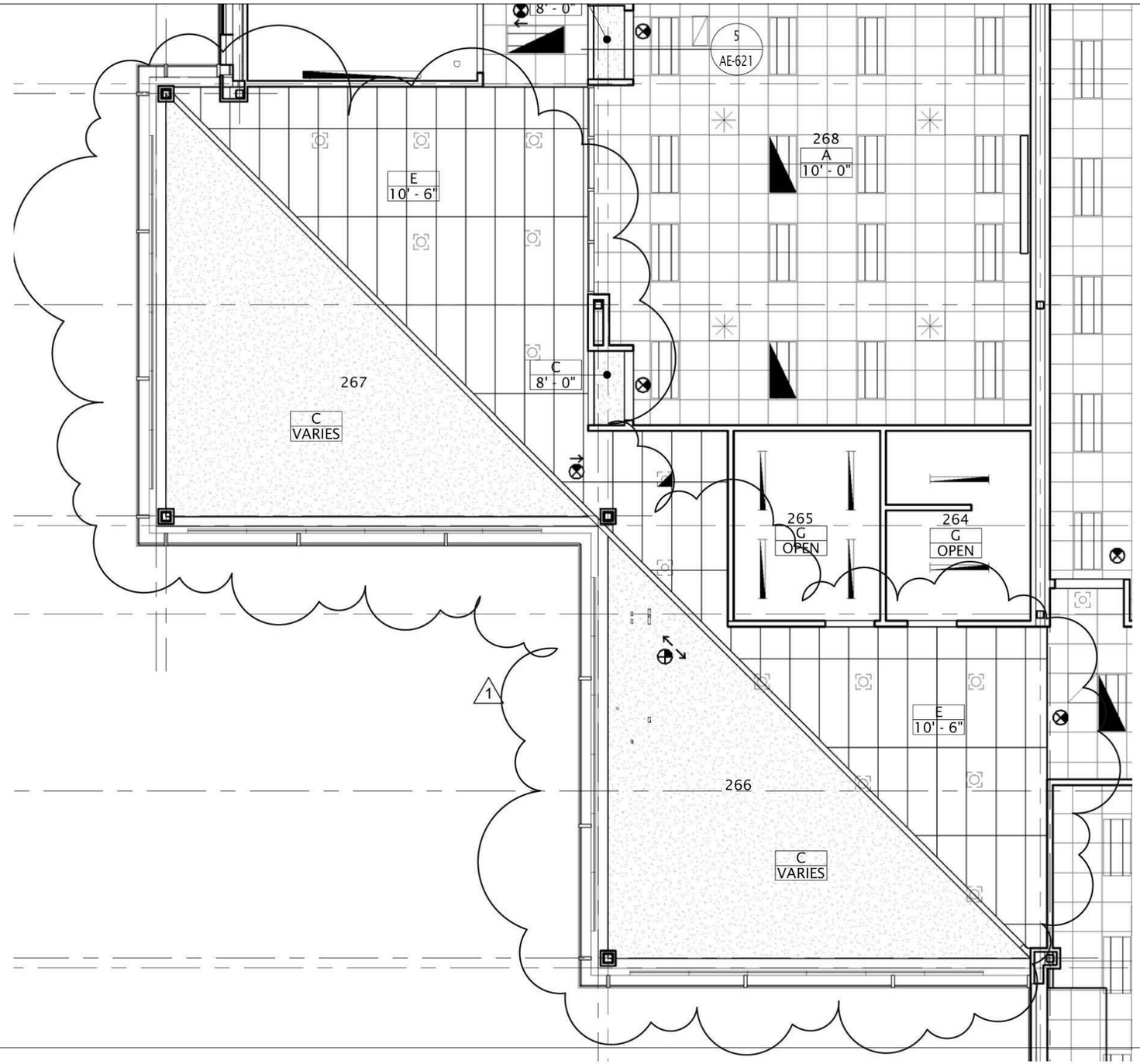
ROOM #	100
TYPE	A
ELEVATION	9'-0"

TYPE A	2' x 2' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID
TYPE B	VINYL OR MYLAR FACED PANEL IN SUSPENDED GRID
TYPE C	5/8" GYPSUM BOARD (PAINTED) ON METAL SUSPENSION SYSTEM
TYPE D	5/8" GYPSUM BOARD (EPOXY PAINTED) ON METAL SUSPENSION SYSTEM
TYPE E	2' x 6' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID (1)
TYPE F	2' x 2' LAY-IN METAL IN SUSPENDED GRID
TYPE G	EXPOSED STRUCTURE (1)
TYPE H	2' X 2' LAY-IN ACOUSTICAL TILE IN SUSPENDED GRID

SYMBOL LEGEND

- Lay-in Light Fixture
- Suspended or Surface Mounted Linear Light
- Recessed Light Fixture
- Pendant Light Fixture
- Pendant Light Fixture
- Mechanical Diffuser - Supply
- Mechanical Diffuser - Return

NOTE: COORDINATE WITH MECHANICAL AND ELECTRICAL DRAWINGS.



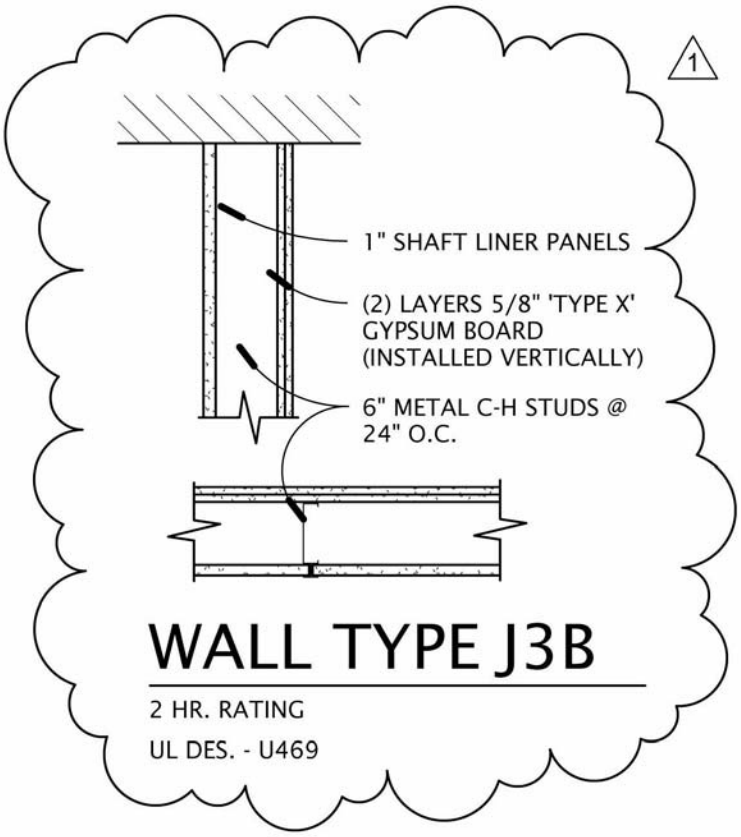
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

1/AE-123A

AD5-A88

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt
5/26/2010 4:34:34 PM



WALL TYPE J3B

2 HR. RATING

UL DES. - U469

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:31:21 PM

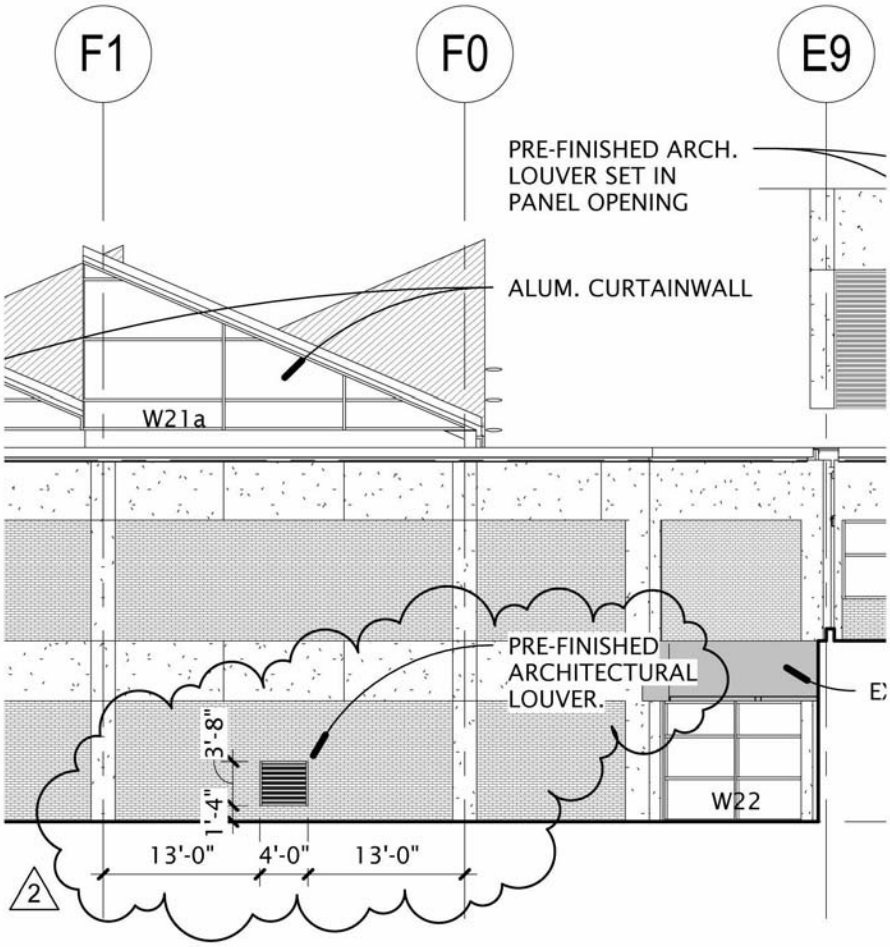
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AE-140

AD5-A89

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:31:07 PM

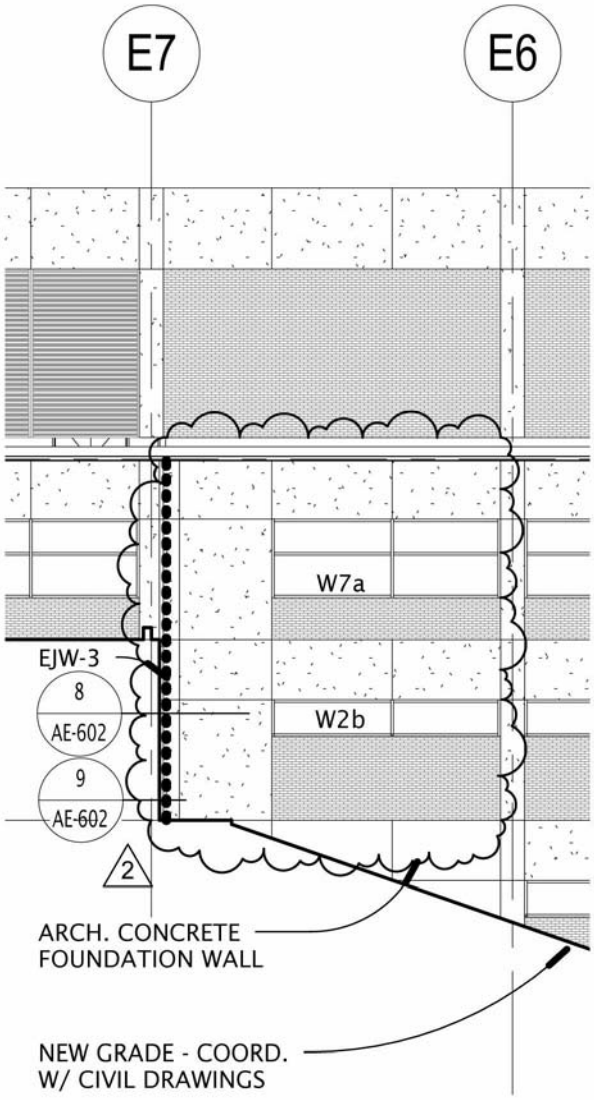
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AE-201

AD5-A90

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:30:54 PM

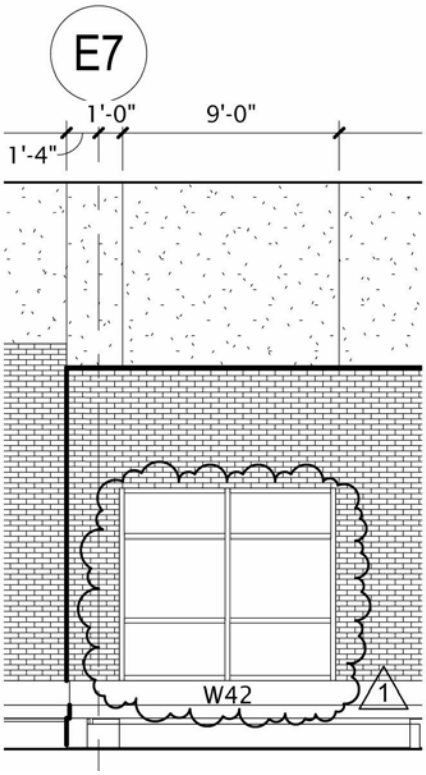
GSBS ARCHITECTS

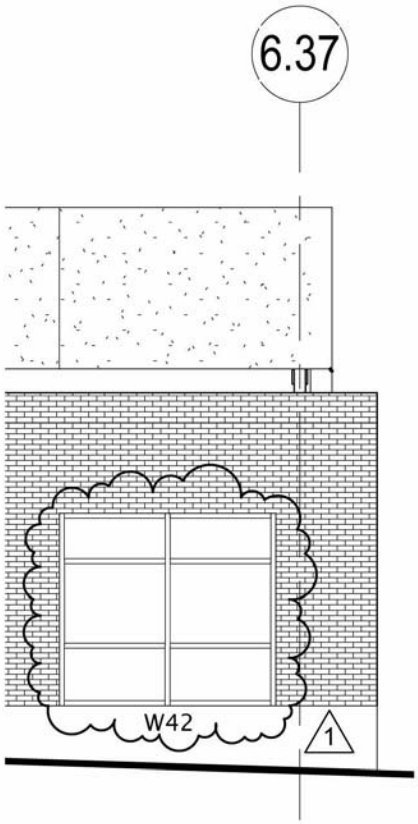
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

2/ AE-201

AD5-A91

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010





C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:30:41 PM

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

7 & 8/
AE-202

AD5-A94

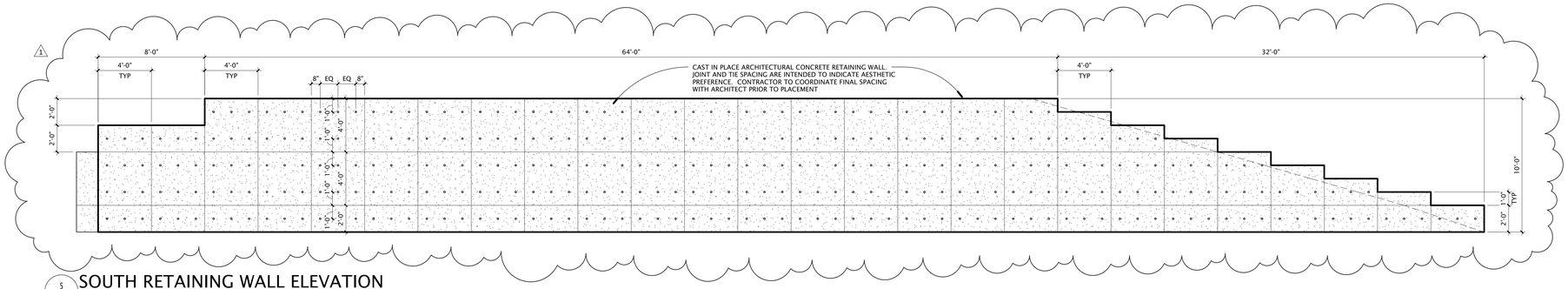
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

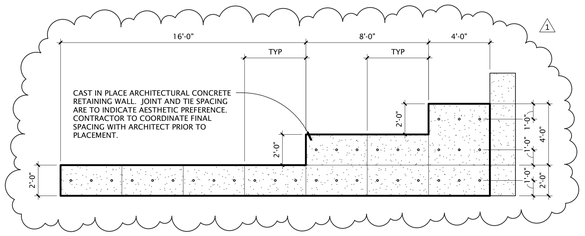
STATE OF UTAH
116302
LICENSED ARCHITECT

REVISIONS:

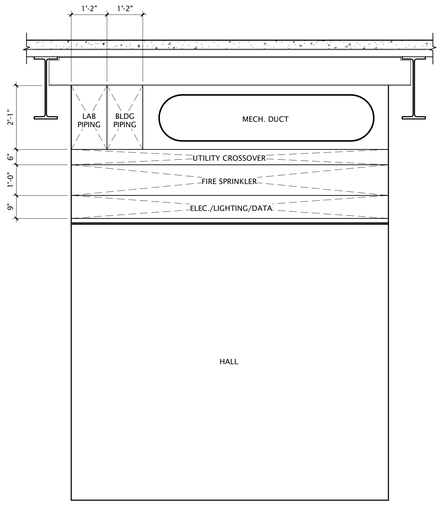
1	05.26.2010	Addendum 5



5 AE-301 SOUTH RETAINING WALL ELEVATION
1/4" = 1'-0"

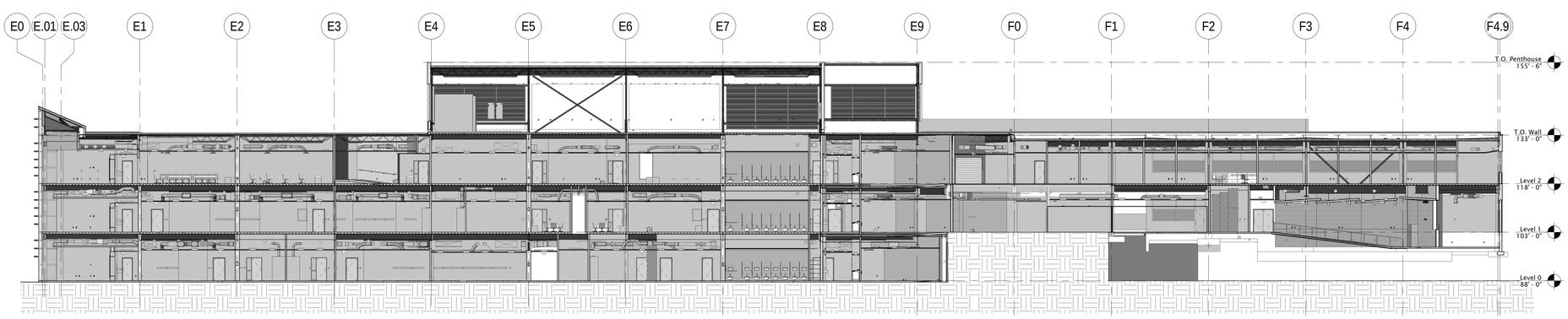


4 AE-301 WEST RETAINING WALL ELEVATION
1/4" = 1'-0"



3 AE-301 TYPICAL HALL SECTION
1/2" = 1'-0"

1 AE-301 BUILDING SECTION
1/16" = 1'-0"



2 AE-301 BUILDING SECTION
1/16" = 1'-0"

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

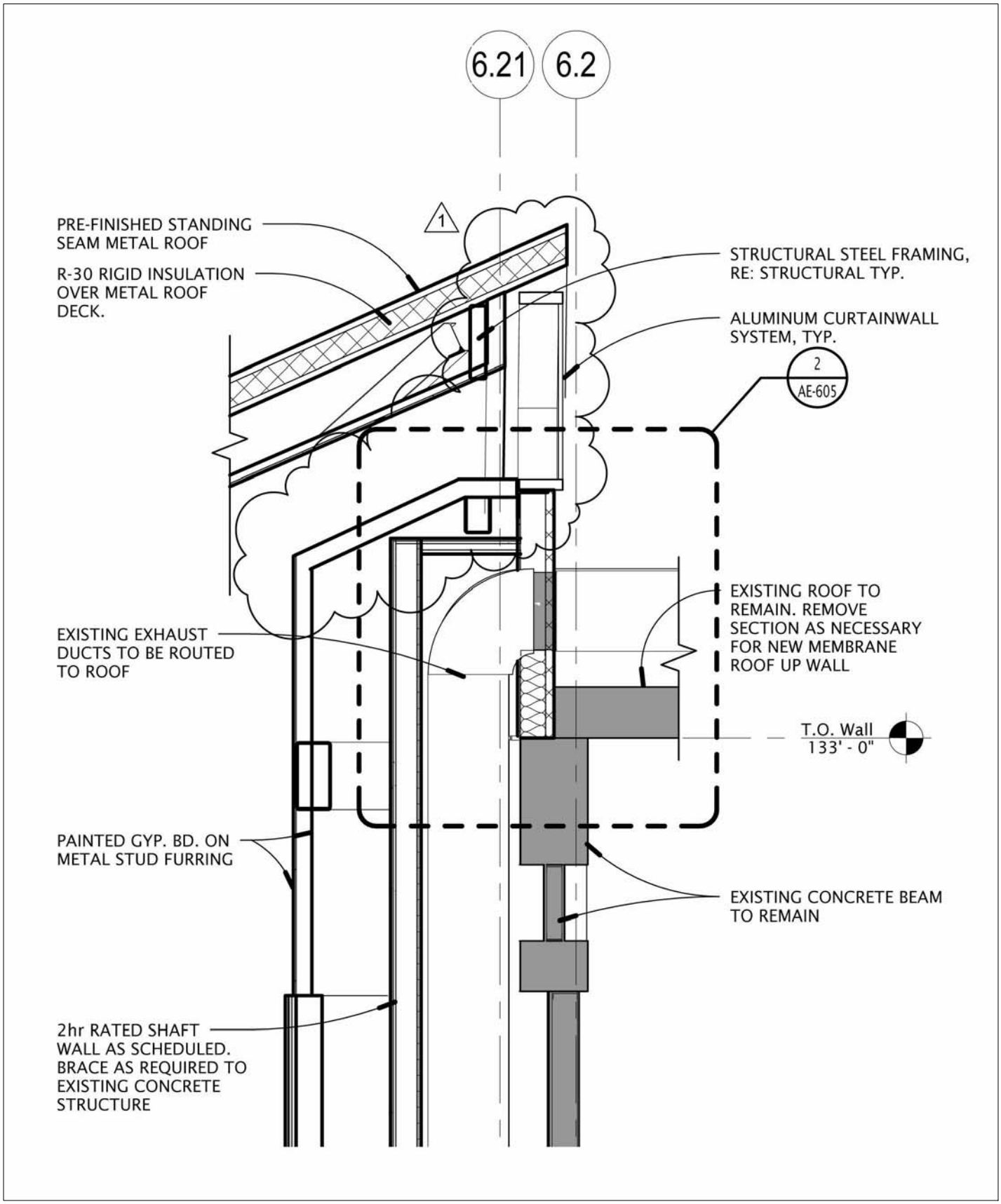
Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

BUILDING SECTIONS

CONSTRUCTION DOCUMENTS

AE-301



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:30:27 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

1 / AE-315

AD5-A96

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

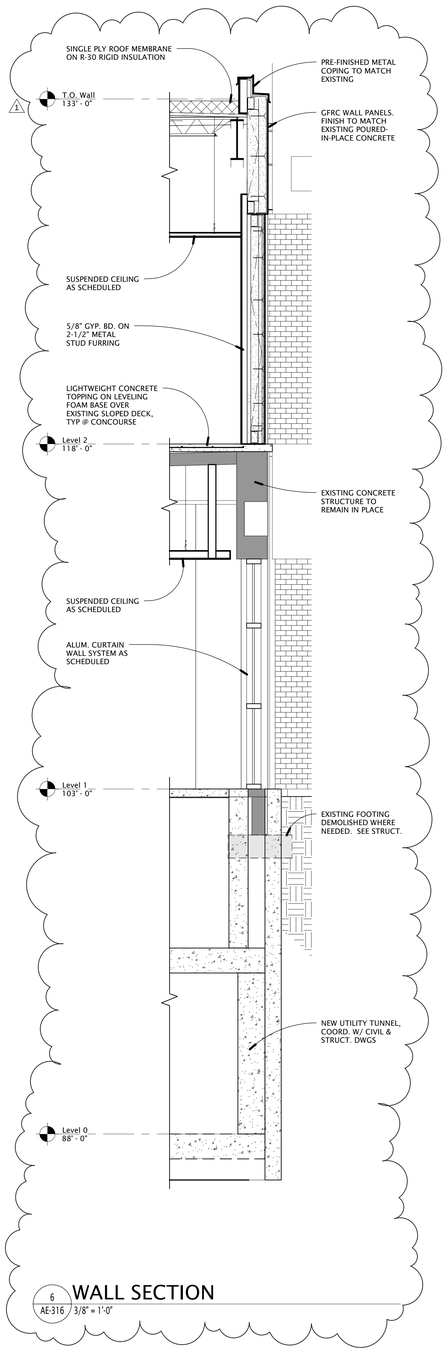
P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

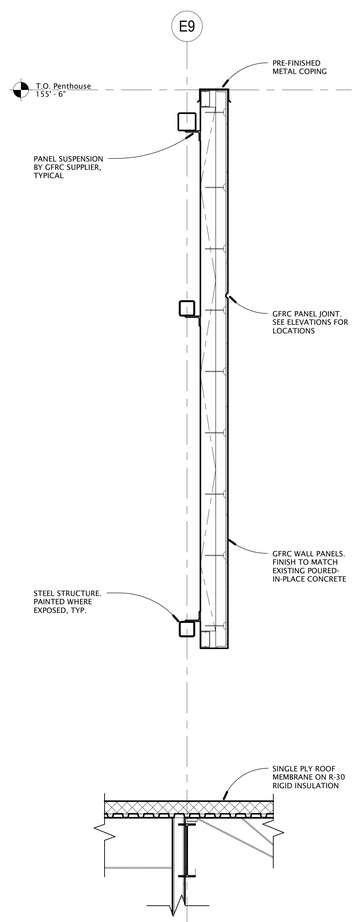
STATE OF UTAH
116302
LICENSED ARCHITECT

REVISIONS:

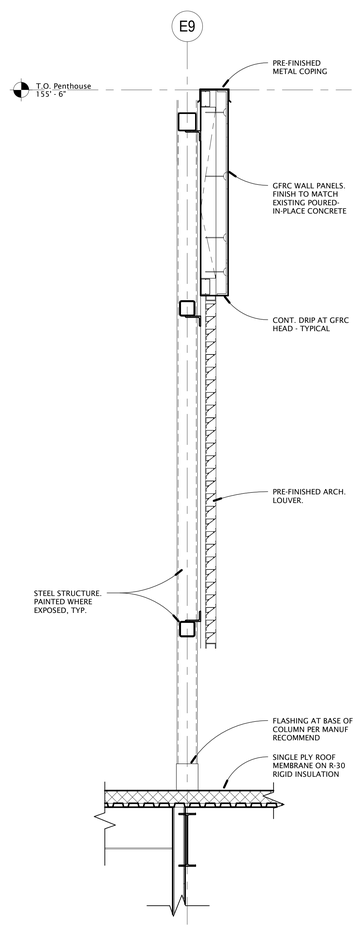
1	05.19.2010	Addendum 4



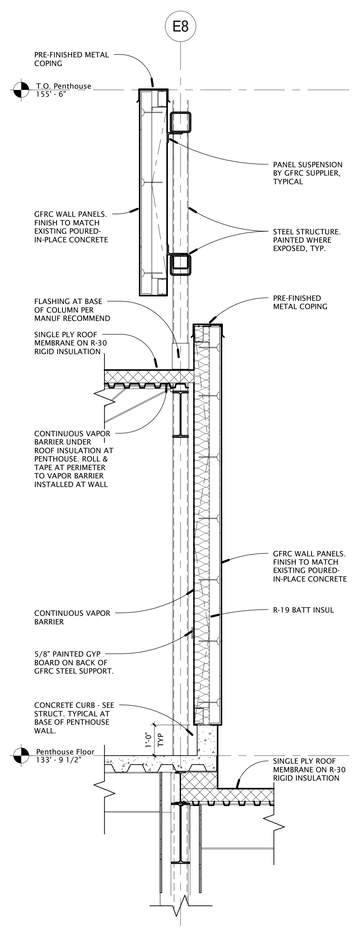
6 AE-316 WALL SECTION
3/8" = 1'-0"



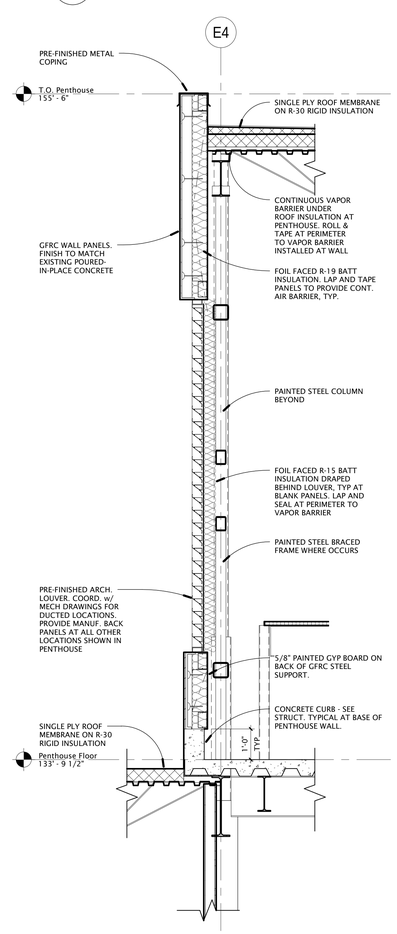
4 AE-316 WALL SECTION
1/2" = 1'-0"



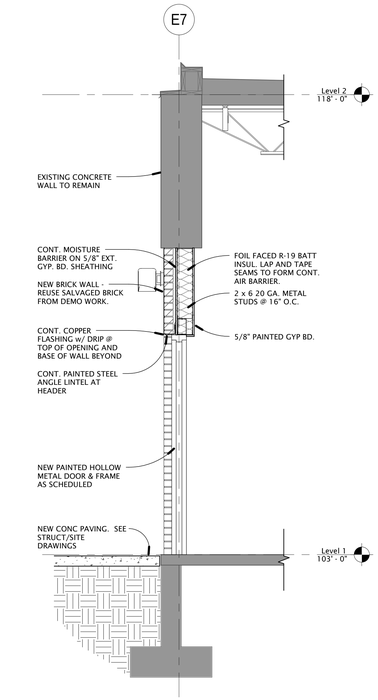
3 AE-316 WALL SECTION
1/2" = 1'-0"



2 AE-316 WALL SECTION
1/2" = 1'-0"



1 AE-316 WALL SECTION
1/2" = 1'-0"



5 AE-316 SECTION THROUGH BRICK INFILL
1/2" = 1'-0"

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

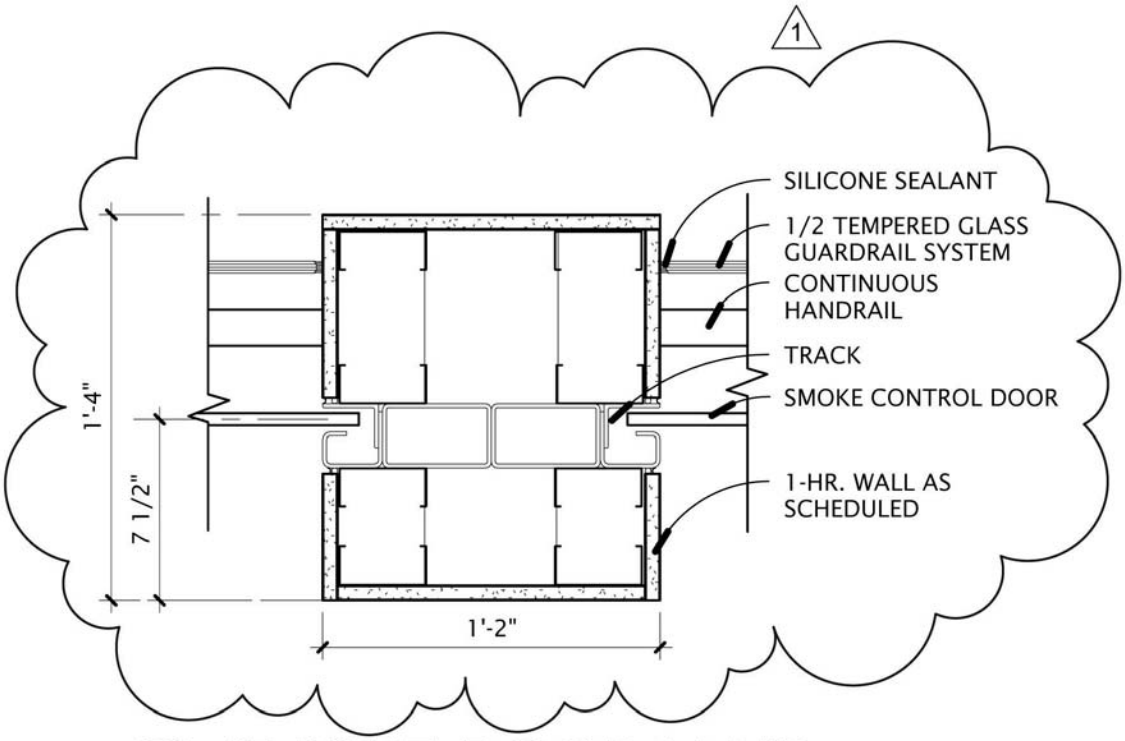
Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

WALL SECTIONS

CONSTRUCTION DOCUMENTS

AE-316



7
AE-319

SMOKE DOOR JAMB

1 1/2" = 1'-0"

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:30:10 PM

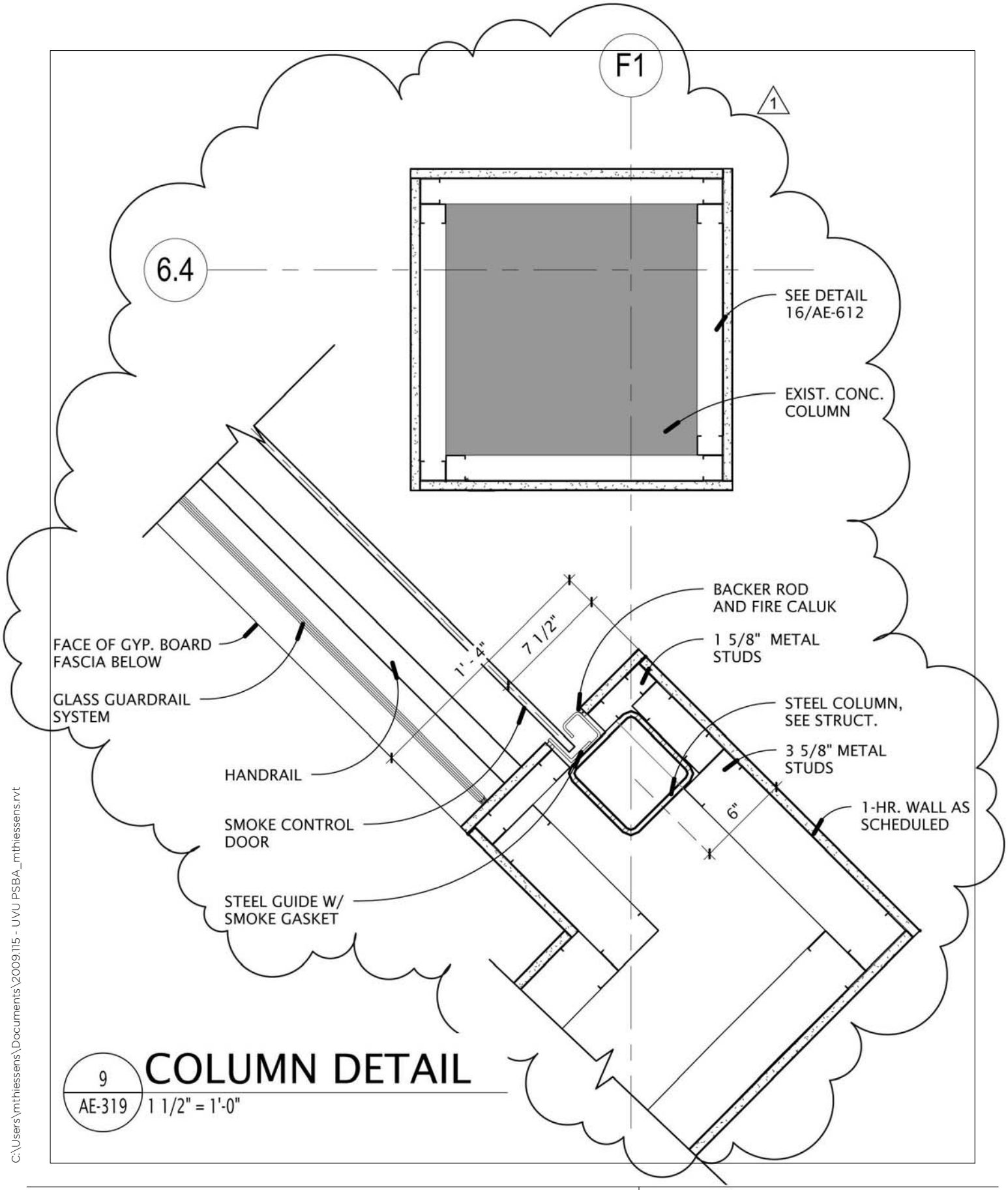
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

7/AE-319

AD5-A98

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



9
AE-319

COLUMN DETAIL

1 1/2" = 1'-0"

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:29:54 PM

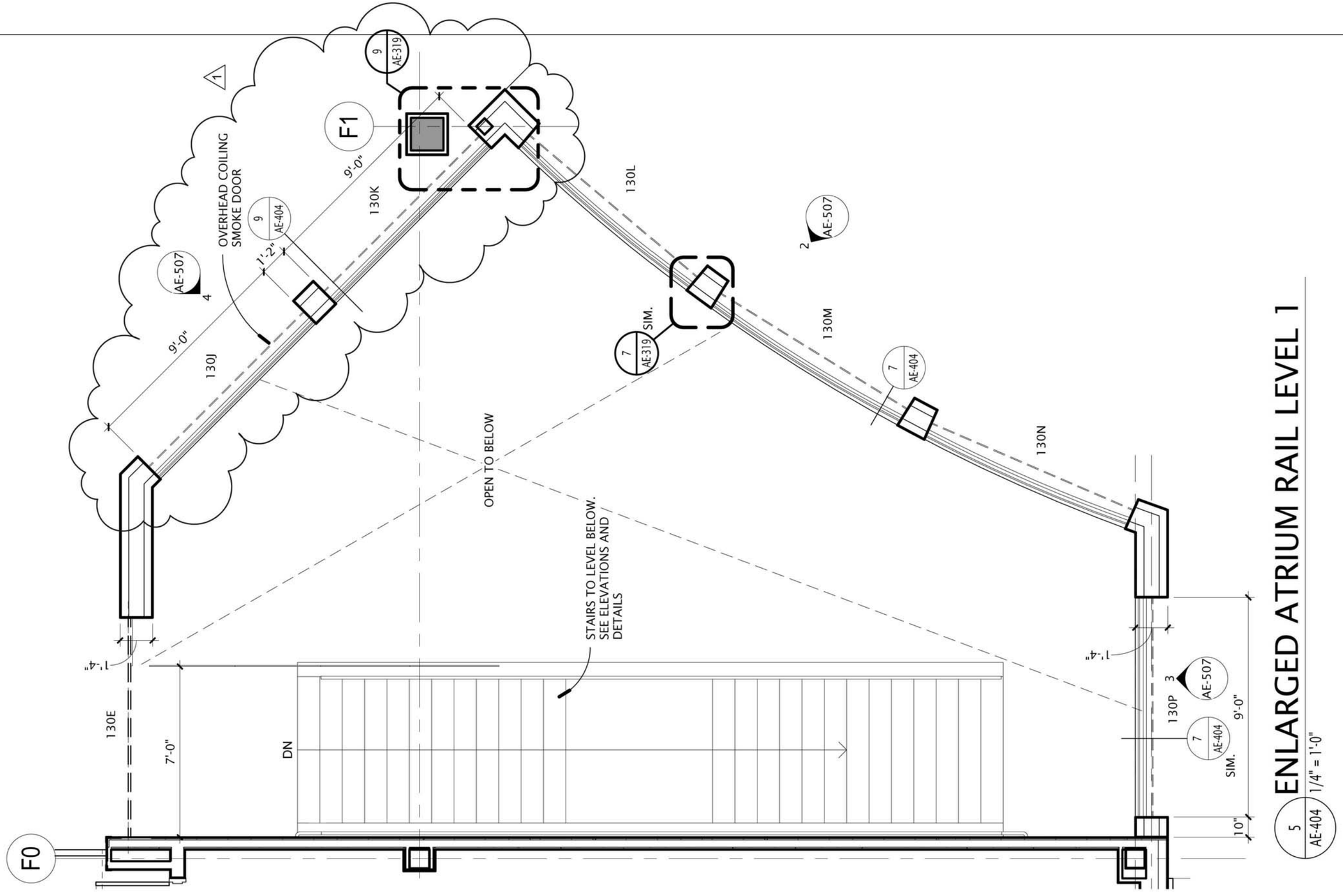
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

9/AE-319

AD5-A99

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



ENLARGED ATRIUM RAIL LEVEL 1

GSBS ARCHITECTS

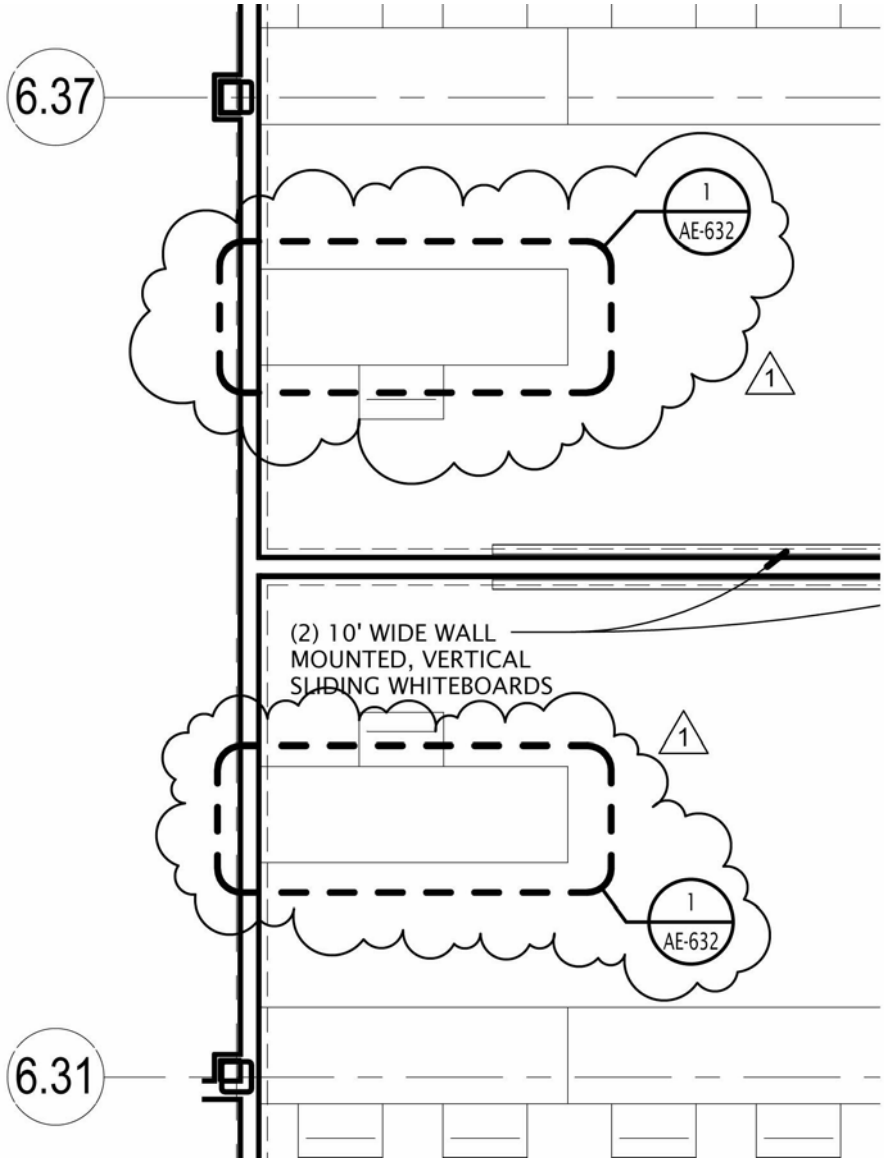
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

5/AE-404

AD5-A101

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt
5/26/2010 4:36:15 PM



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:27:50 PM

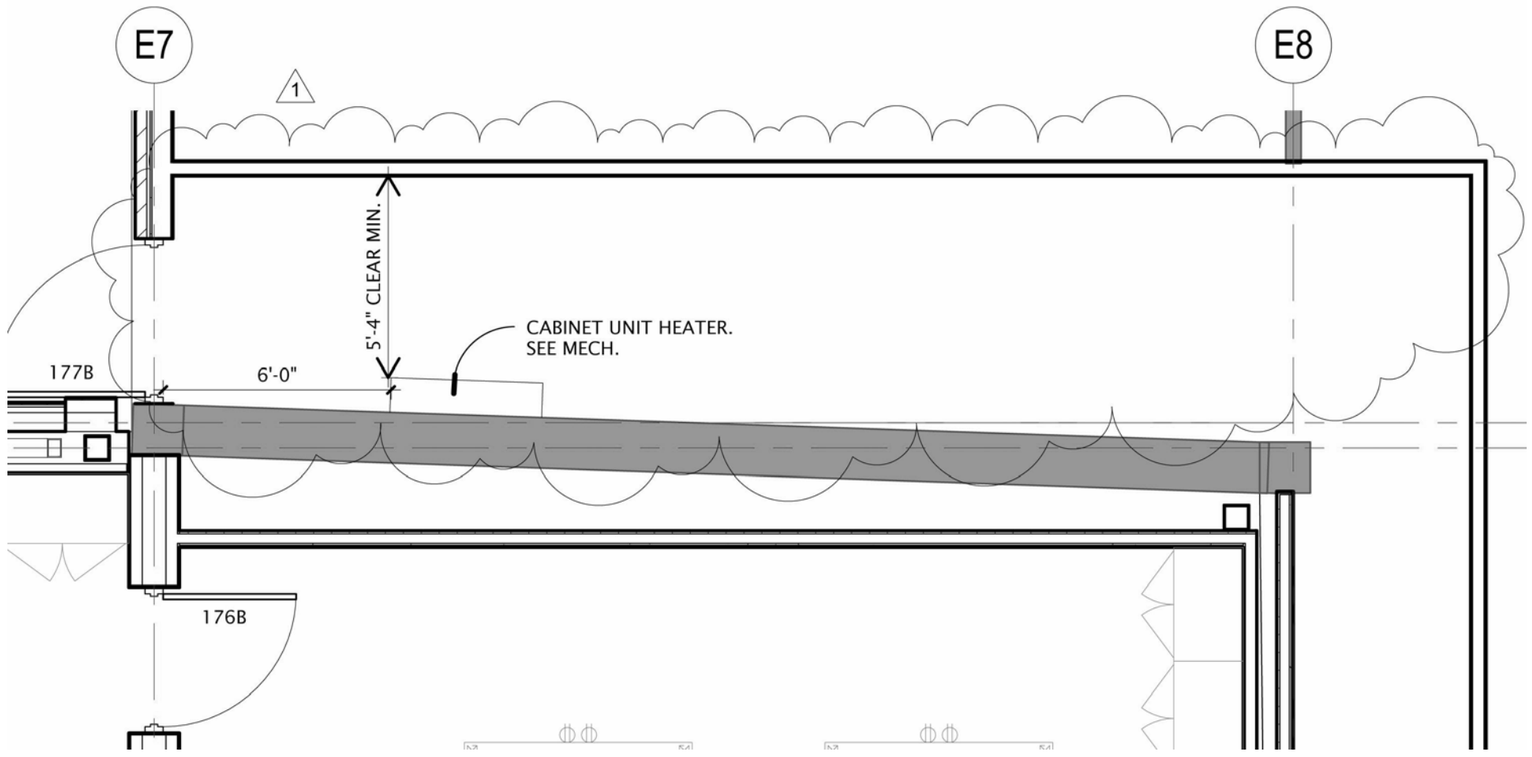
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

1/ AE-402

AD5-A103

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

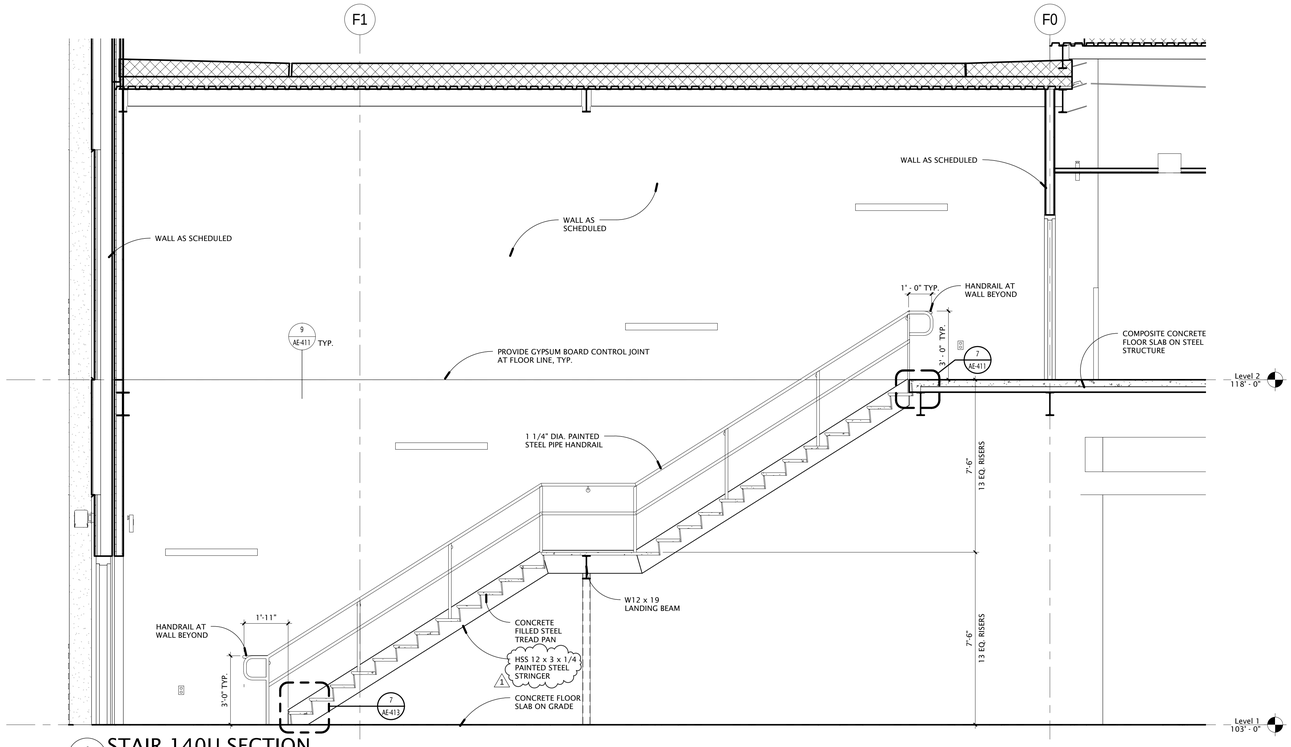
5/26/2010 4:34:00 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

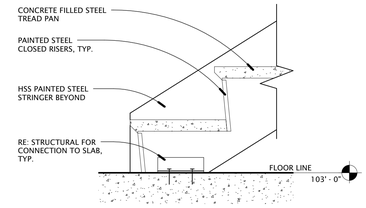
1/ AE-405

AD5-A106

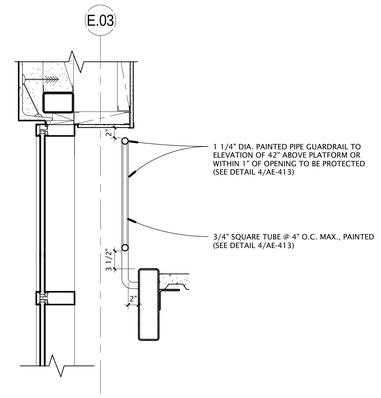
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



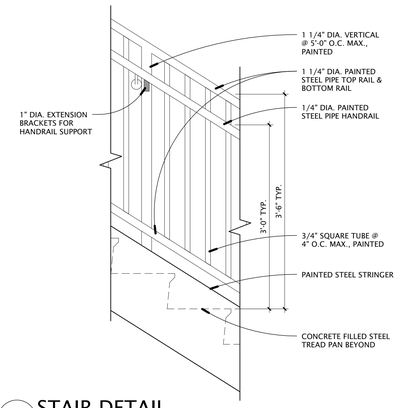
6 AE-413 STAIR 140U SECTION
3/8" = 1'-0"



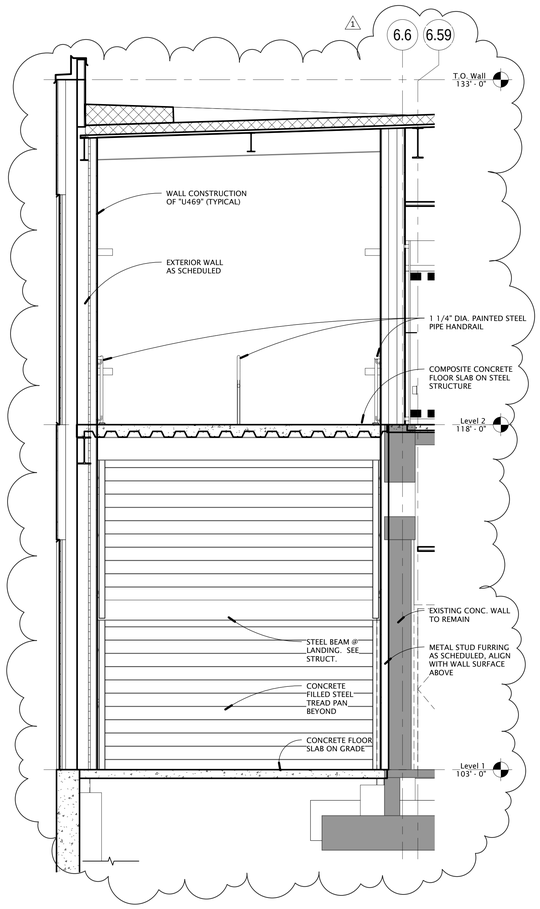
7 AE-413 STAIR BASE DETAIL, TYP.
1 1/2" = 1'-0"



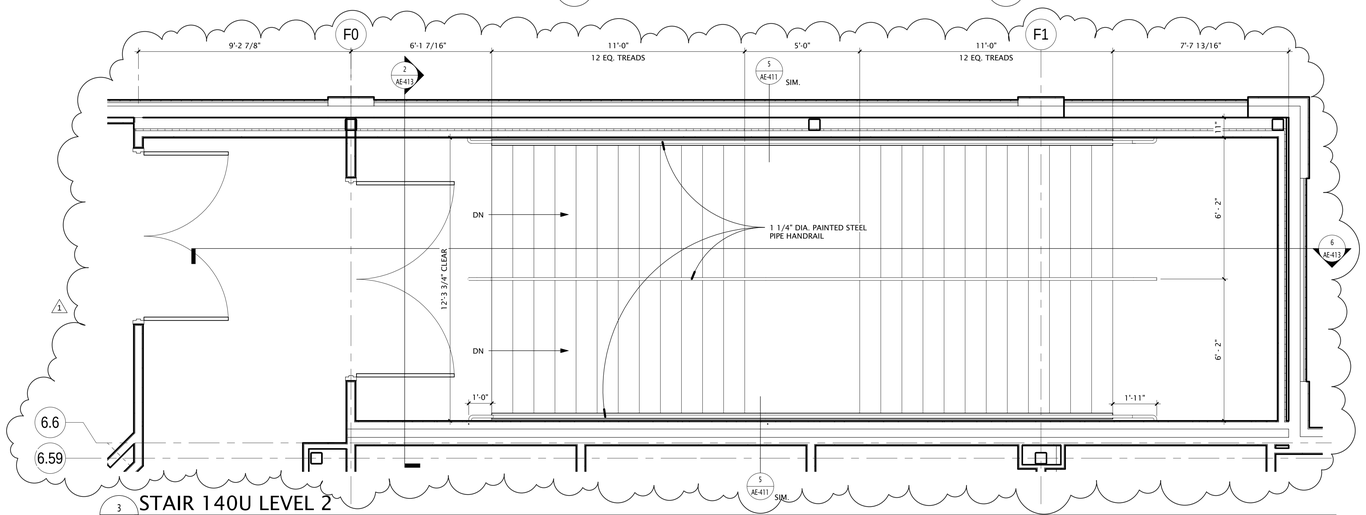
5 AE-413 GUARDRAIL DETAIL
1" = 1'-0"



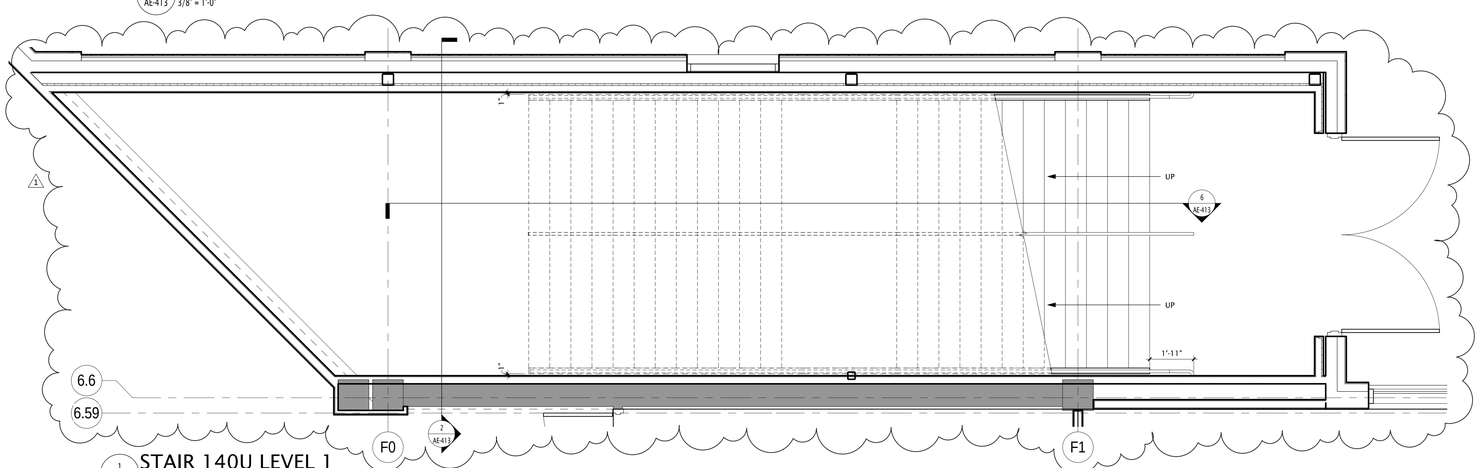
4 AE-413 STAIR DETAIL
1" = 1'-0"



2 AE-413 STAIR 140U SECTION
3/8" = 1'-0"



3 AE-413 STAIR 140U LEVEL 2
3/8" = 1'-0"



1 AE-413 STAIR 140U LEVEL 1
3/8" = 1'-0"

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

STATE OF UTAH
116302
LICENSED ARCHITECT

REVISIONS:

1	05.26.2010	Addendum 5

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

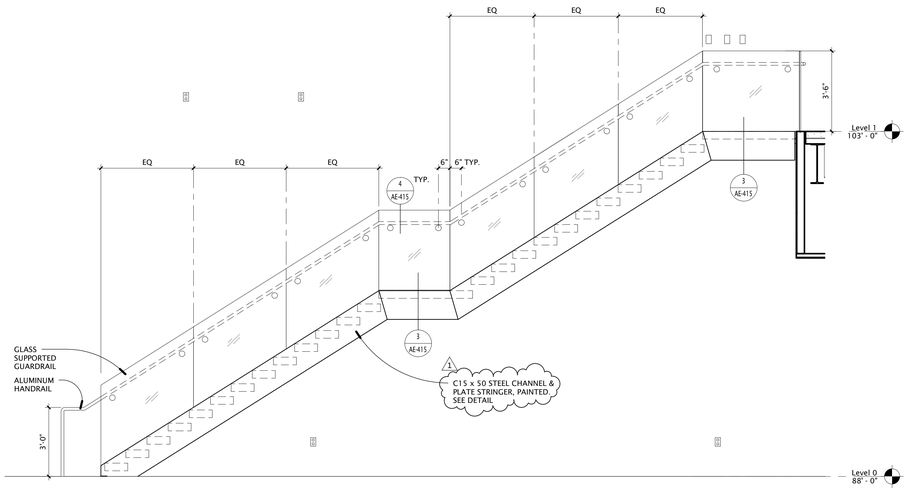
Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

VERTICAL CIRCULATION

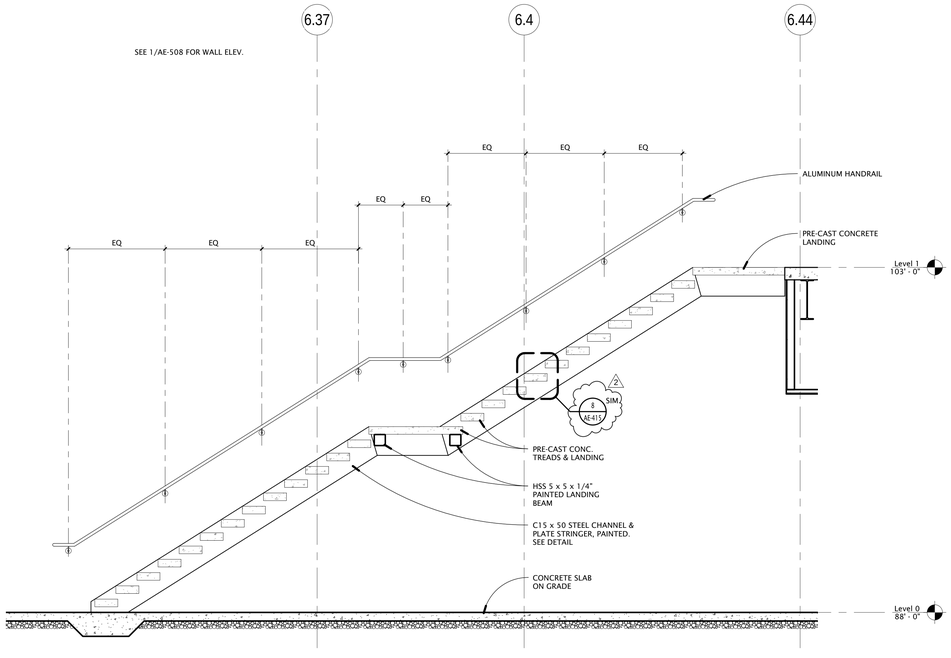
CONSTRUCTION DOCUMENTS

AE-413



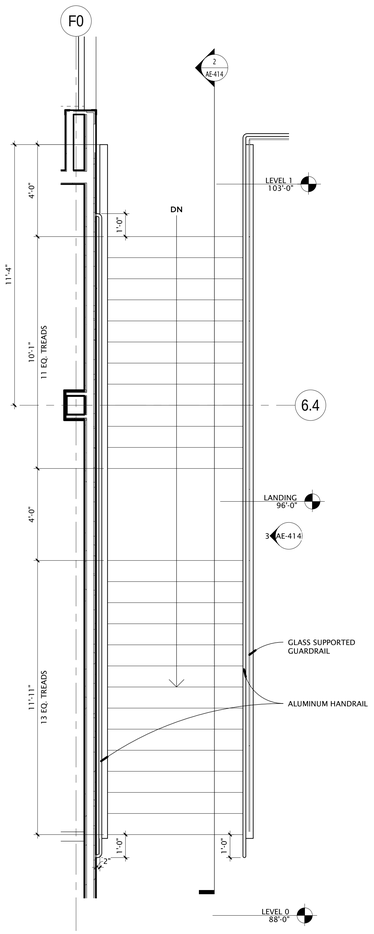
3 / AE-414 ATRIUM STAIR ELEVATION

3/8" = 1'-0"



2 / AE-414 ATRIUM STAIR SECTION

3/8" = 1'-0"



1 / AE-414 ATRIUM STAIR LEVEL 1

3/8" = 1'-0"

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

STATE OF UTAH
116302
LICENSED ARCHITECT

REVISIONS:

1	05.19.2010	Addendum 4
2	05.26.2010	Addendum 5

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

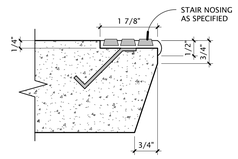
Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.15.00
ISSUED DATE:	05.07.2010

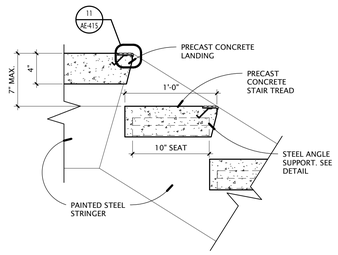
VERTICAL CIRCULATION

CONSTRUCTION DOCUMENTS

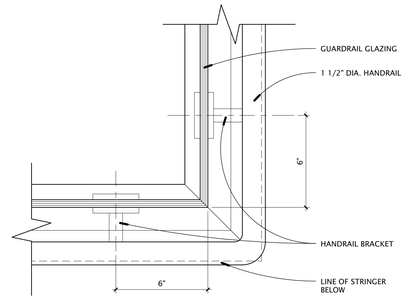
AE-414



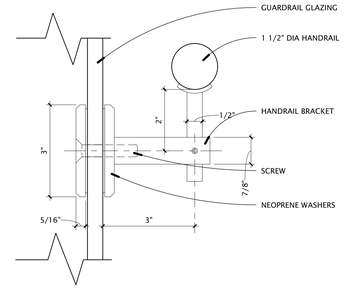
11 AE-415 STAIR NOSING DETAIL
6" = 1'-0"



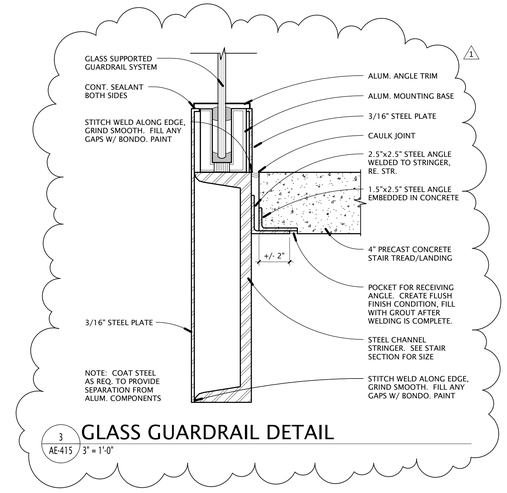
8 AE-415 CONCRETE TREAD DETAIL
1 1/2" = 1'-0"



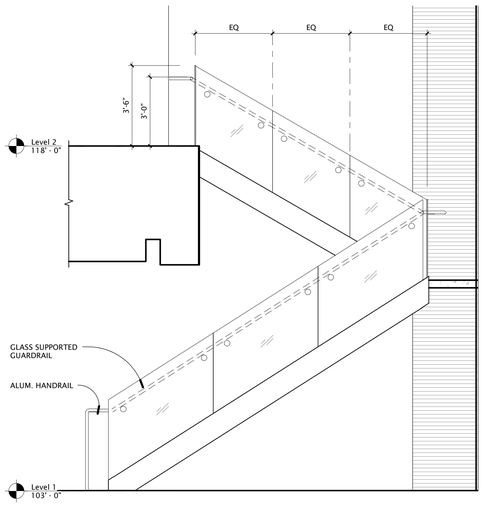
7 AE-415 HANDRAIL CORNER
3" = 1'-0"



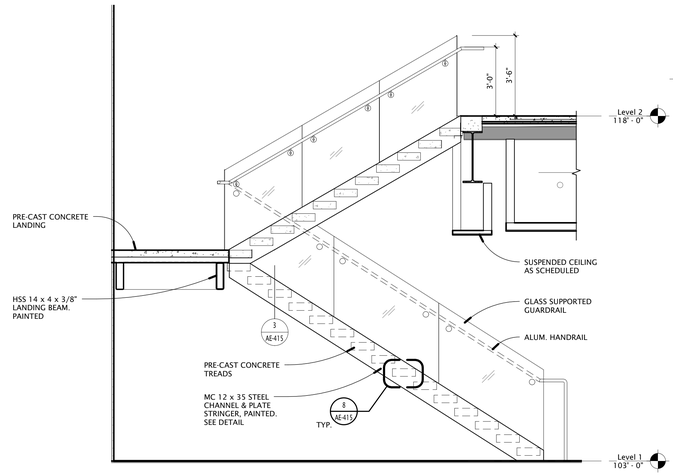
4 AE-415 HANDRAIL @ GLASS GUARDRAIL
6" = 1'-0"



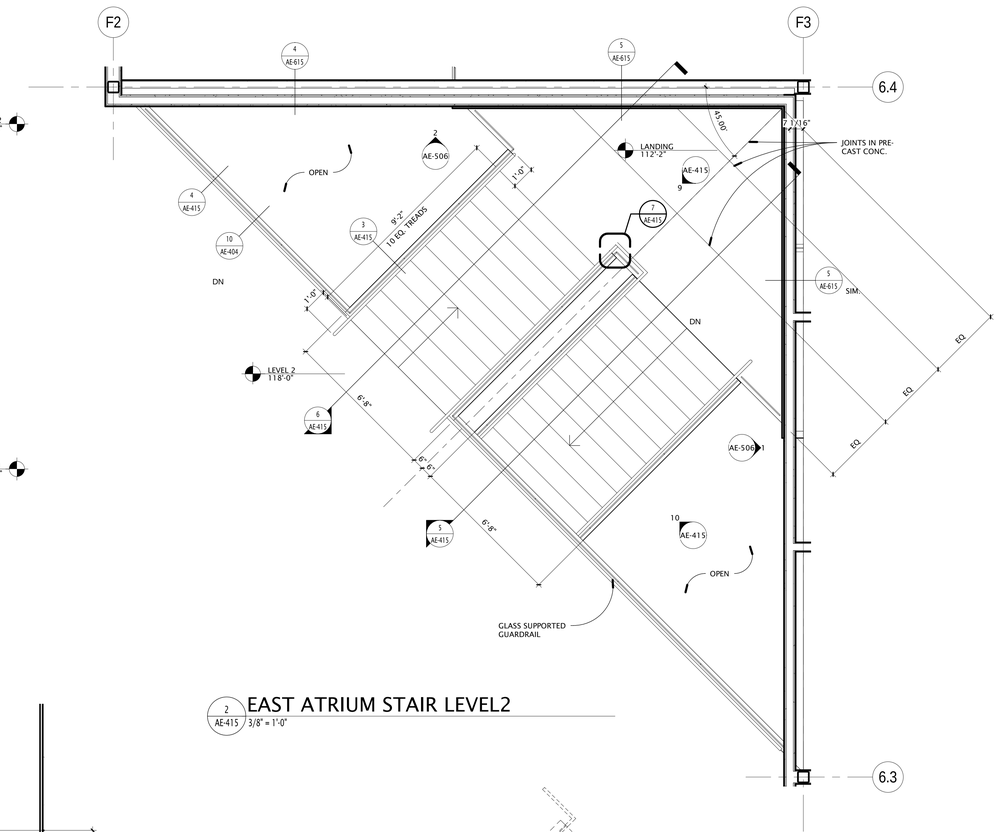
3 AE-415 GLASS GUARDRAIL DETAIL
3" = 1'-0"



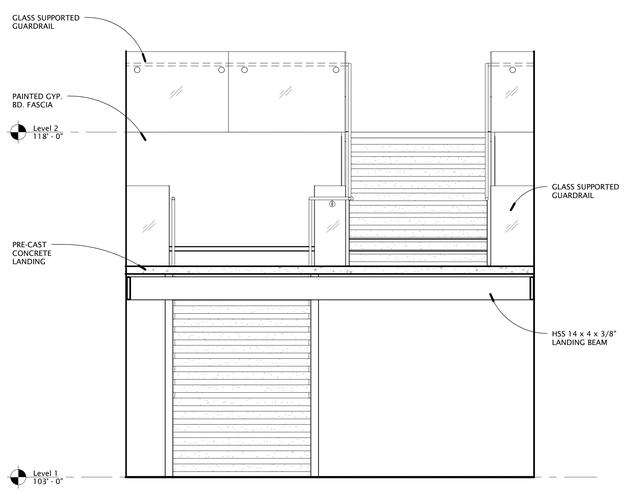
10 AE-415 EAST ATRIUM STAIR ELEVATION
3/8" = 1'-0"



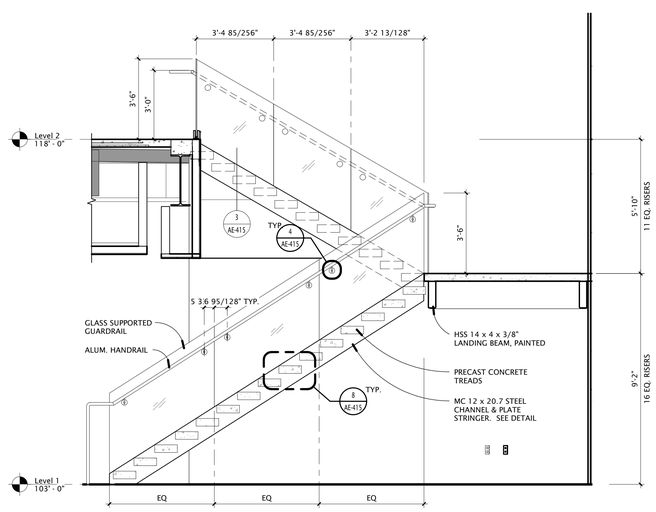
6 AE-415 EAST ATRIUM STAIR ELEVATION
3/8" = 1'-0"



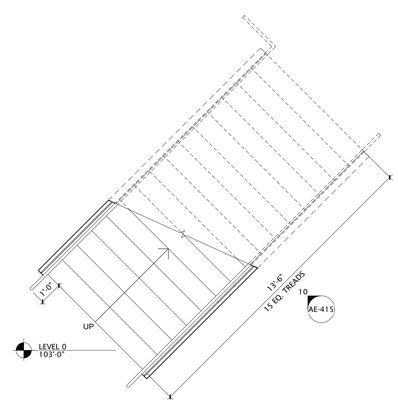
2 AE-415 EAST ATRIUM STAIR LEVEL2
3/8" = 1'-0"



9 AE-415 EAST ATRIUM STAIR ELEVATION
3/8" = 1'-0"



5 AE-415 EAST ATRIUM STAIR SECTION
3/8" = 1'-0"



1 AE-415 EAST ATRIUM STAIR LEVEL 1
3/8" = 1'-0"

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

STATE OF UTAH 116302 LICENSED ARCHITECT

REVISIONS:

1	05.26.2010	Addendum 5

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

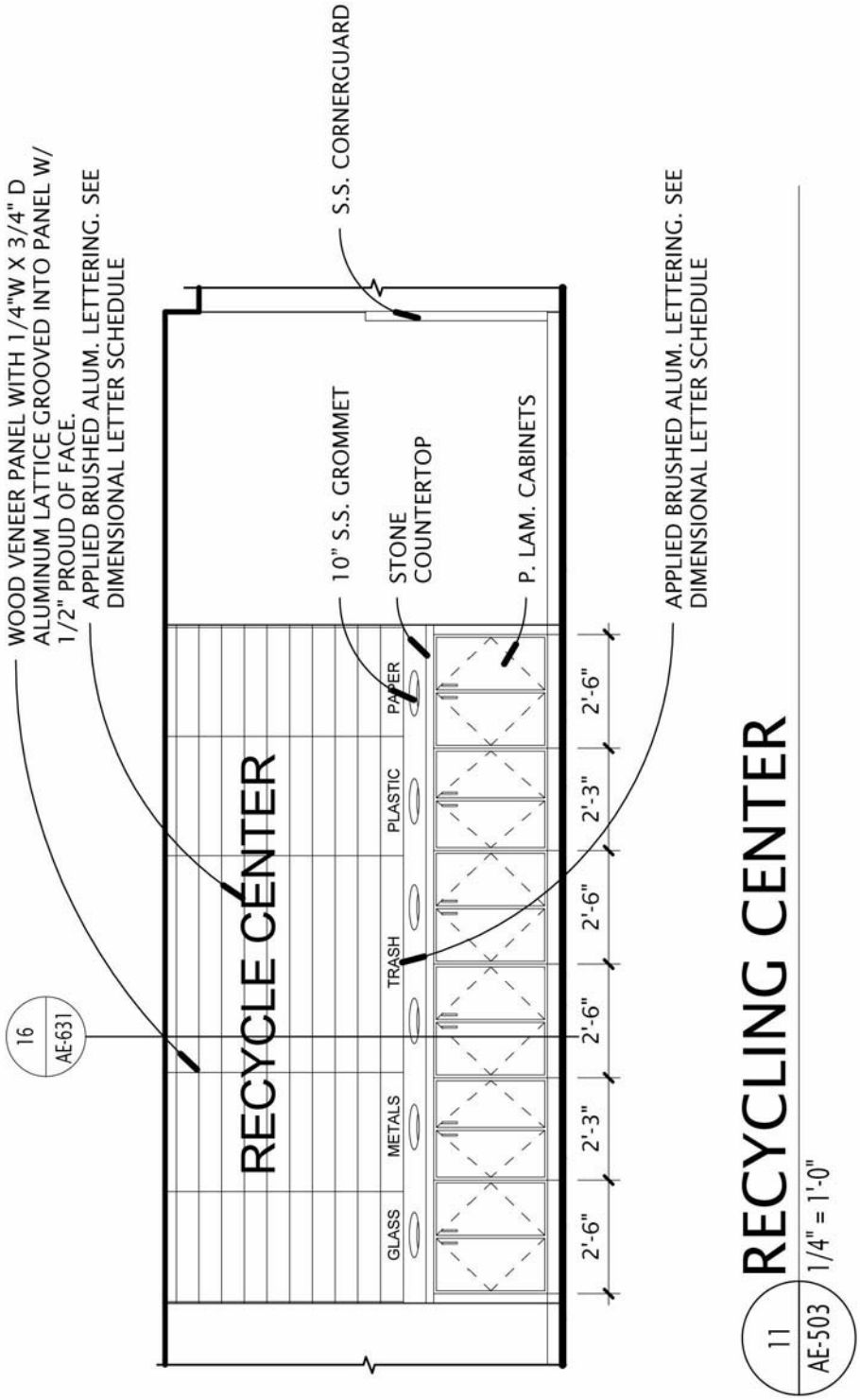
Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

VERTICAL CIRCULATION

CONSTRUCTION DOCUMENTS

AE-415



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:27:31 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

11/
AE-503

AD5-A111

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010

TOILET ROOM ACCESSORIES KEY

TAG	DESCRIPTION	REMARKS
TA1	1 1/4" OUTSIDE DIA. STAINLESS STEEL GRAB BAR	STAINLESS STEEL, SATIN FINISH, SNAP FLANGE, WALL THICKNESS NOT LESS THAN 18 GAUGE 1 1/2" CLEARANCE BETWEEN WALL SURFACE AND INSIDE FACE OF BAR.
TA2	TOILET TISSUE DISPENSER	OWNER/VENDOR SUPPLIED AND INSTALLED
TA3	PAPER TOWEL DISPENSER	OWNER/VENDOR SUPPLIED AND INSTALLED
TA4	SOAP DISPENSER	OWNER/VENDOR SUPPLIED AND INSTALLED
TA5	SANITARY NAPKIN VENDING UNIT	RECESSED TYPE, STAINLESS STEEL, ALL WELDED CONSTRUCTION. PROVIDE 1 IN EACH WOMEN'S RESTROOM. COIN OPERATED 25 CENT.
TA6	SANITARY NAPKIN DISPOSAL UNITS	SURFACE MOUNTED, STAINLESS STEEL, SELF CLOSING DOOR AND REMOVABLE STAINLESS STEEL RECEPTACLE ALL WELDED CONSTRUCTION. PROVIDE AT EACH WOMEN'S TOILET FIXTURE.
TA7	INSULATED LAVATORY GUARD	PROVIDE AT EACH LAVATORY, SEE SPECS
TA8	ADA SHOWER BENCH	PROVIDE IN EACH SHOWER LOCATION, SEE SPECIFICATIONS
TA9	1/4" POLISHED PLATE GLASS MIRROR	FRAMED, SIZE PER ELEVATIONS ABOVE EACH LAVATORY AS SPECIFIED IN SECTION 102800
TA10	FLOOR & WALL MOUNTED TOILET & URINAL PARTITIONS	BAKED ENAMEL
TA11	MOP AND BROOM HOLDER	SURFACE MOUNTED, STAINLESS STEEL
TA12	SHOWER CURTAIN ROD	HEAVY DUTY, 1" STAINLESS STEEL TUBING WITH SATIN FINISH. FLANGES TO BE ONE-PIECE SEAMLESS CONSTRUCTION. FASTEN TO WALL. REFER TO PLANS AND ELEVATIONS FOR SPECIFIC DIMENSIONS.
TA13	SHOWER CURTAIN W/ RINGS	OPAQUE, MATTE WHITE VINYL 0.2 mm THICK CURTAIN. ANTIBACTERIAL AND FLAME RETARDANT. CURTAIN SHALL HAVE NICKEL PLATED BRASS GROMMETS @ TOP EVERY 6" HEMMED BOTTOM AND SIDES. SHOWER CURTAIN RINGS SHALL BE STAINLESS STEEL CONSTRUCTION, PROVIDE AT EACH SHOWER.
TA14	SOAP DISH	PROVIDE IN EACH SHOWER LOCATION, SEE SPECIFICATIONS
TA15	SHELF	18 GAUGE SATIN-FINISH STAINLESS STEEL. 3/4" HEMMED EDGES. 16 GAUGE STAINLESS STEEL BRACKETS. REFER TO ELEVATIONS FOR SHELF LENGTH.
TA16	TOWEL HOOK	22 GAUGE SATIN-FINISH STAINLESS STEEL. CONCEALED MOUNTING BRACKET. HOOK TO PROTRUDE NOT MORE THAN 3 1/2"
TA17	TOILET SEAT COVER DISPENSER	OWNER/VENDOR SUPPLIED AND INSTALLED

1

1

1

1

NOTE:

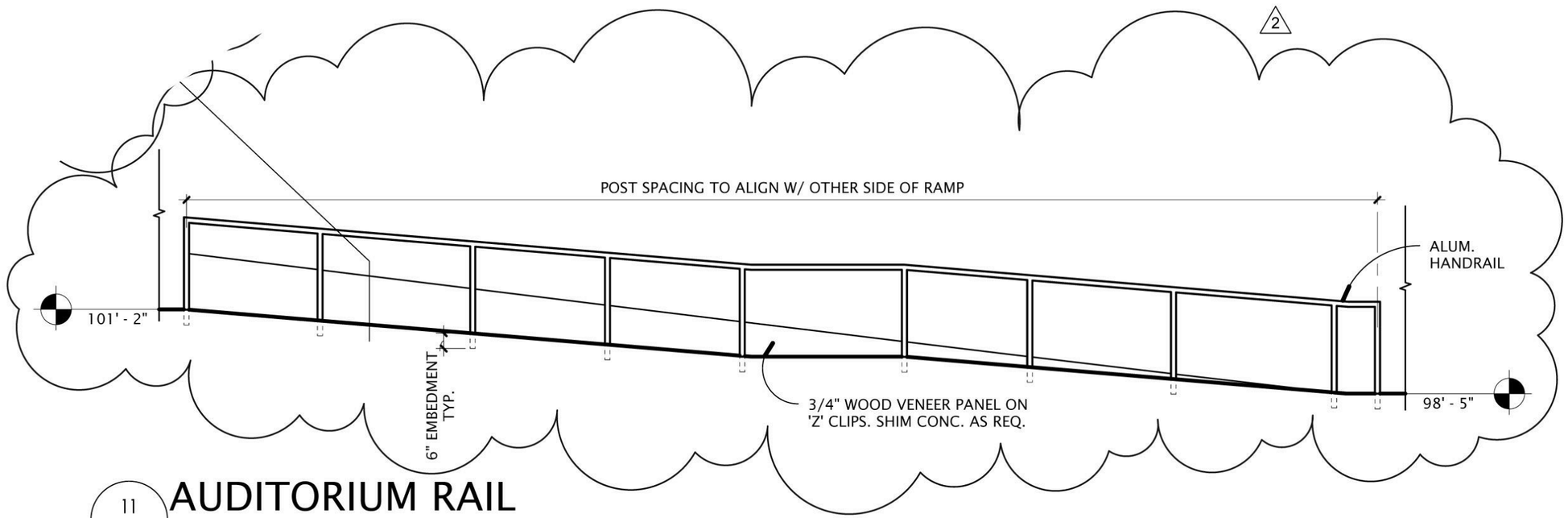
1. GENERAL CONTRACTOR SHALL PROVIDE FIRE RATED SOLID BLOCKING FOR ALL WALL MOUNTED ITEMS, TYPICAL.
2. ALL BRACES, BRACKETS , HINGES, SCREWS ETC.. FOR ACCESSORY FASTENERS SHALL BE STAINLESS STEEL.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AE-505

AD5-A112

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE: 05.26.2010



11
AE-509

AUDITORIUM RAIL

1/4" = 1'-0"

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

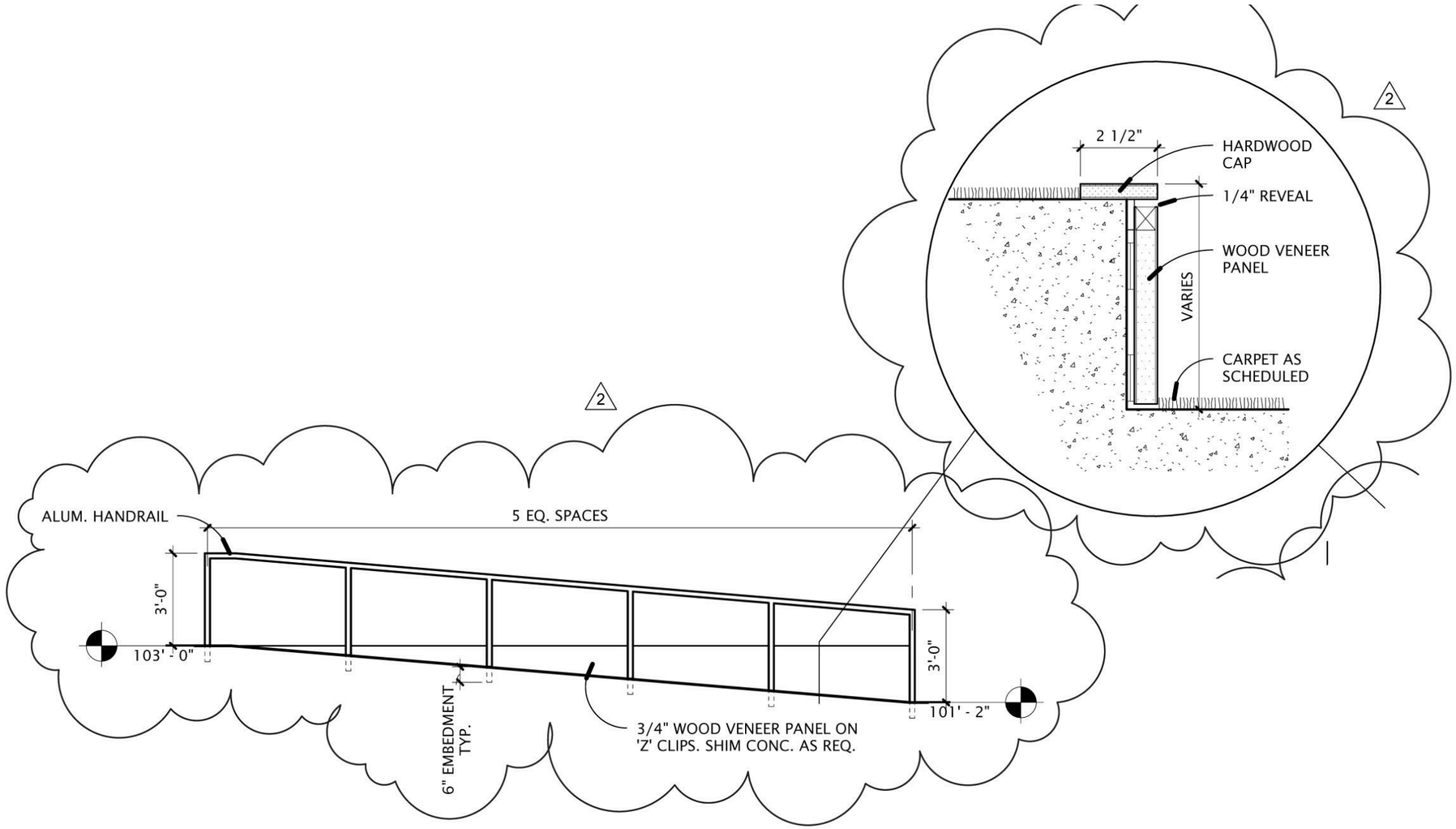
5/26/2010 4:35:28 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

11/AE-509

AD5-115a

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE: 05.26.2010



12 / AE-509

AUDITORIUM RAIL

1/4" = 1'-0"

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

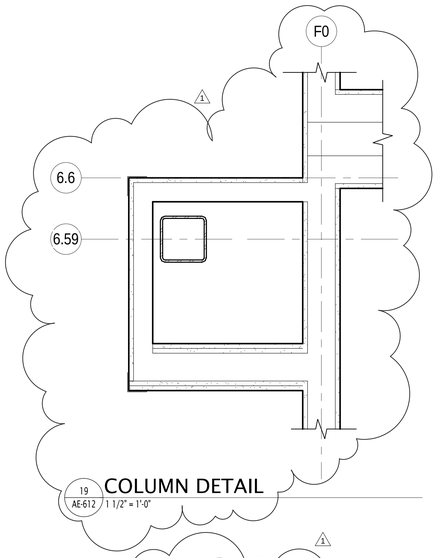
5/26/2010 4:34:48 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

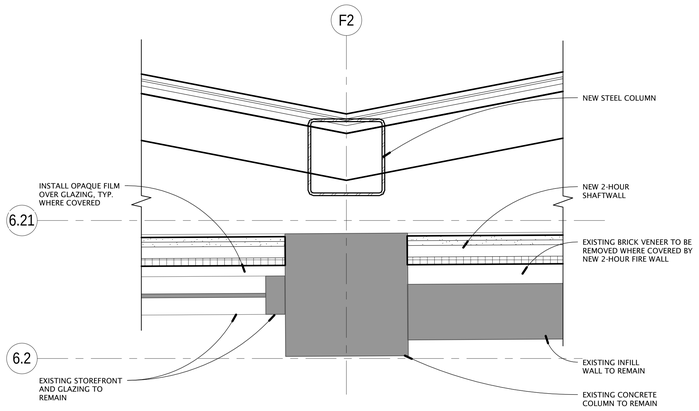
12/AE-509

AD5-115b

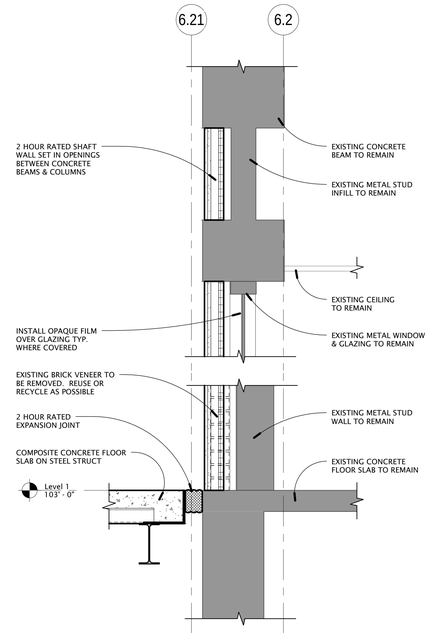
GSBS PROJECT NO.: 2009.115.00
ISSUED DATE: 05.26.2010



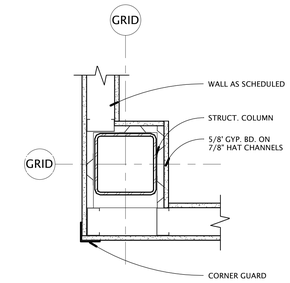
19 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



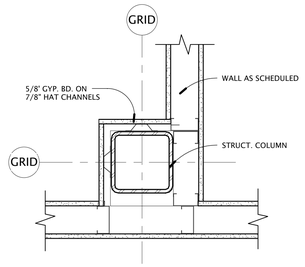
15 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



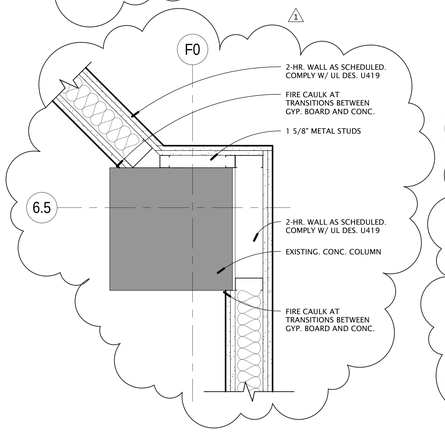
12 AE-612 WALL SECTION DETAIL 1" = 1'-0"



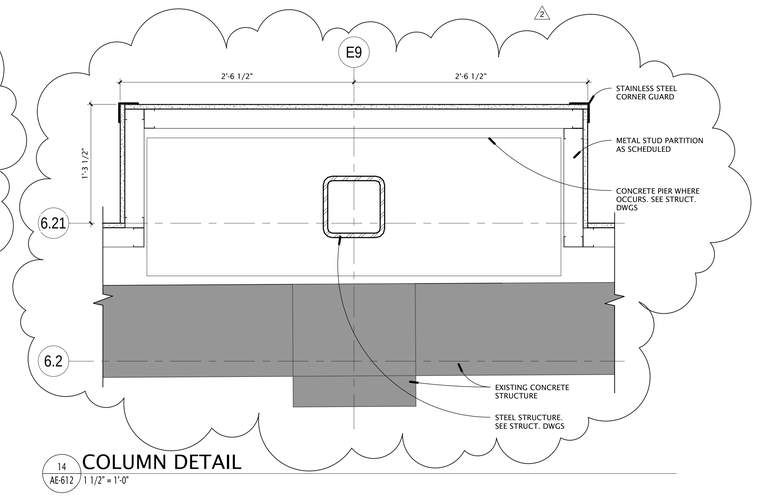
8 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



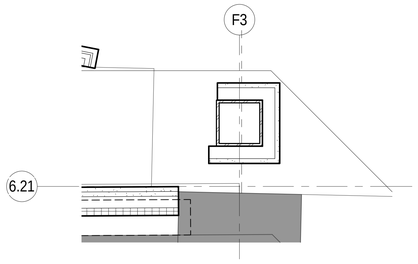
4 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



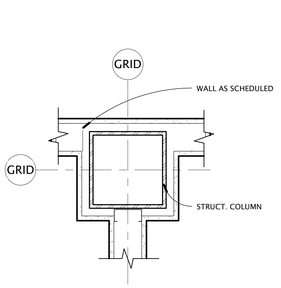
18 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



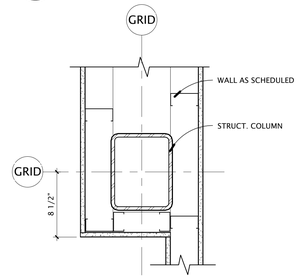
14 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



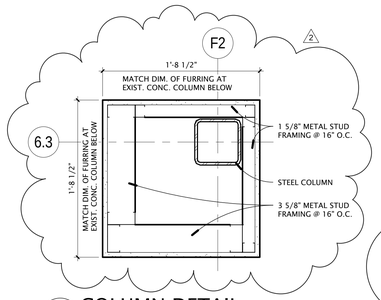
11 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



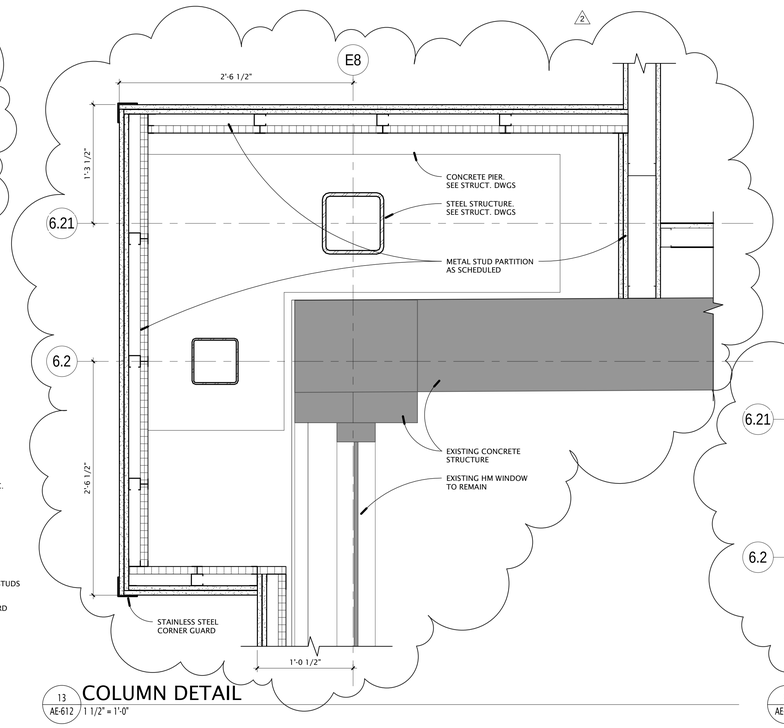
7 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



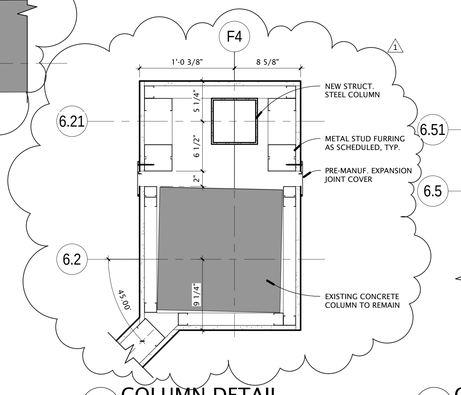
3 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



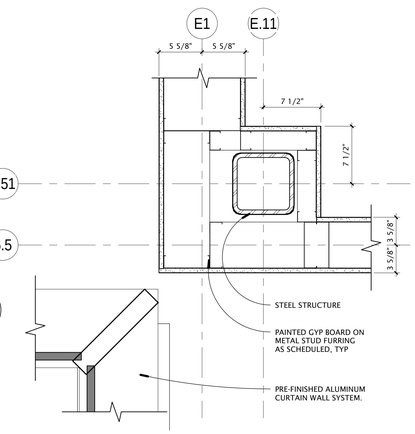
17 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



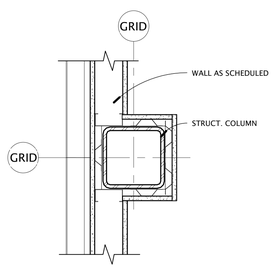
13 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



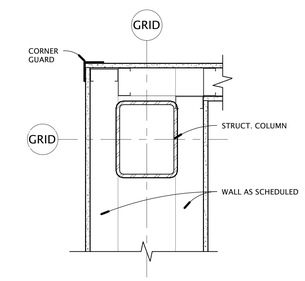
9 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



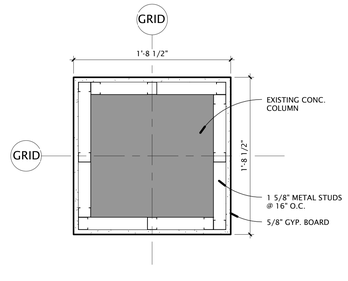
5 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



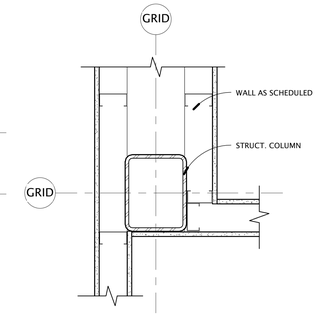
6 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



2 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



16 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"



1 AE-612 COLUMN DETAIL 1 1/2" = 1'-0"

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7915
www.gsbsarchitects.com

STATE OF UTAH 116302 LICENSED ARCHITECT

REVISIONS:

1	05.19.2010	Addendum 4
2	05.26.2010	Addendum 5

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

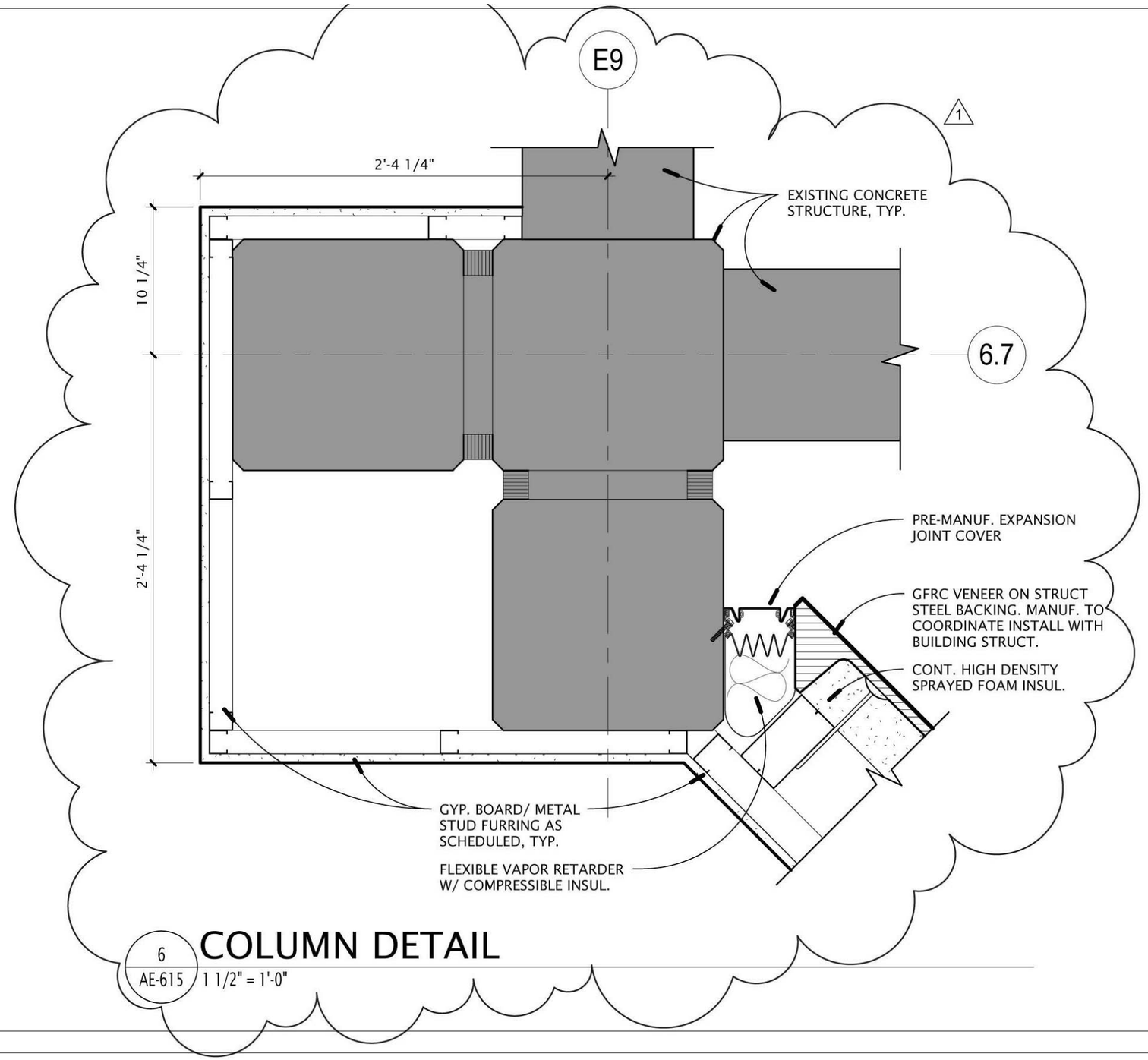
Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

INTERIOR DETAILS

CONSTRUCTION DOCUMENTS

AE-612



6
AE-615

COLUMN DETAIL

1 1/2" = 1'-0"

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

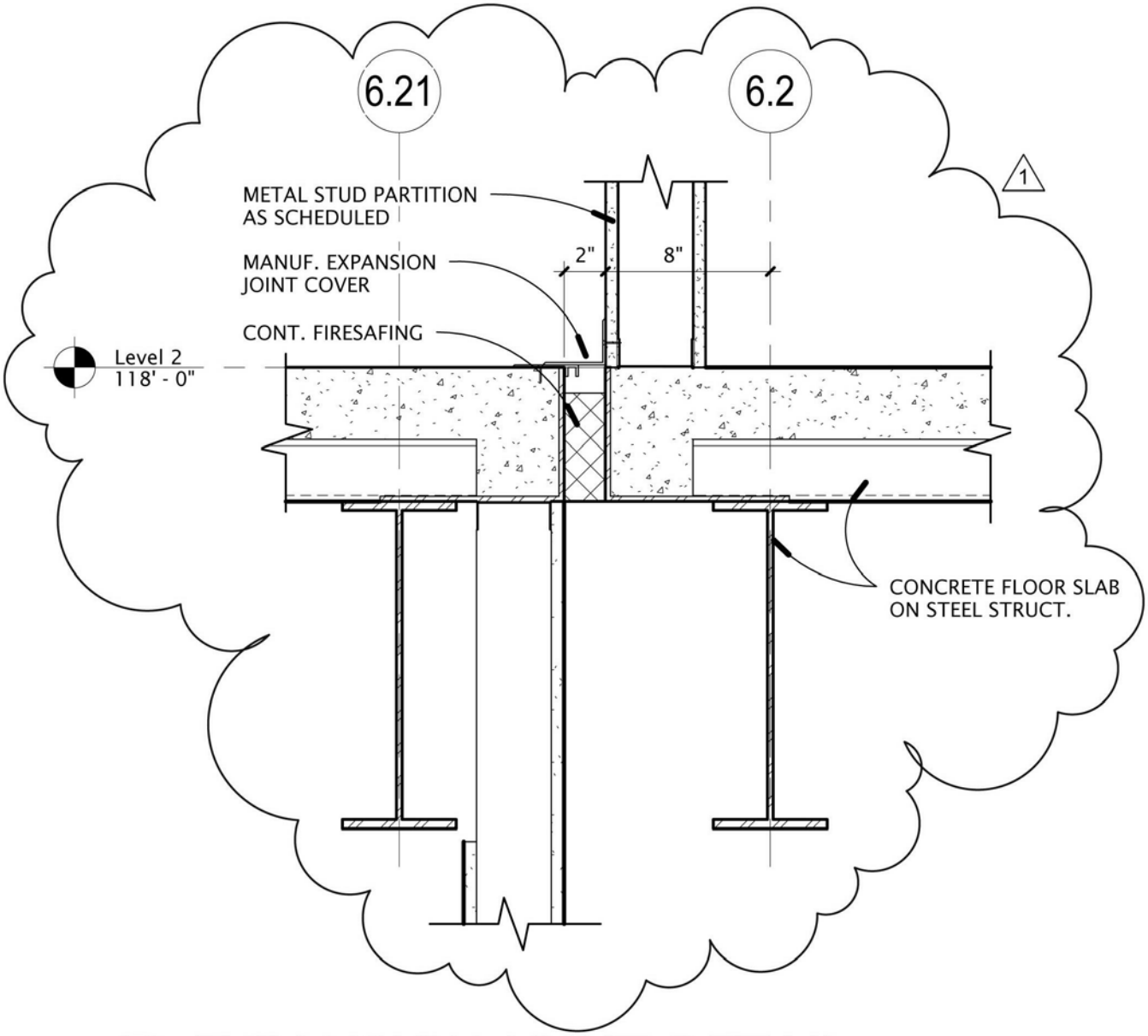
5/26/2010 4:36:31 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

6/AE-615

AD5-A122

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE: 05.26.2010



2
AE-615

EXPANSION JOINT DETAIL

1 1/2" = 1'-0"

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:27:12 PM

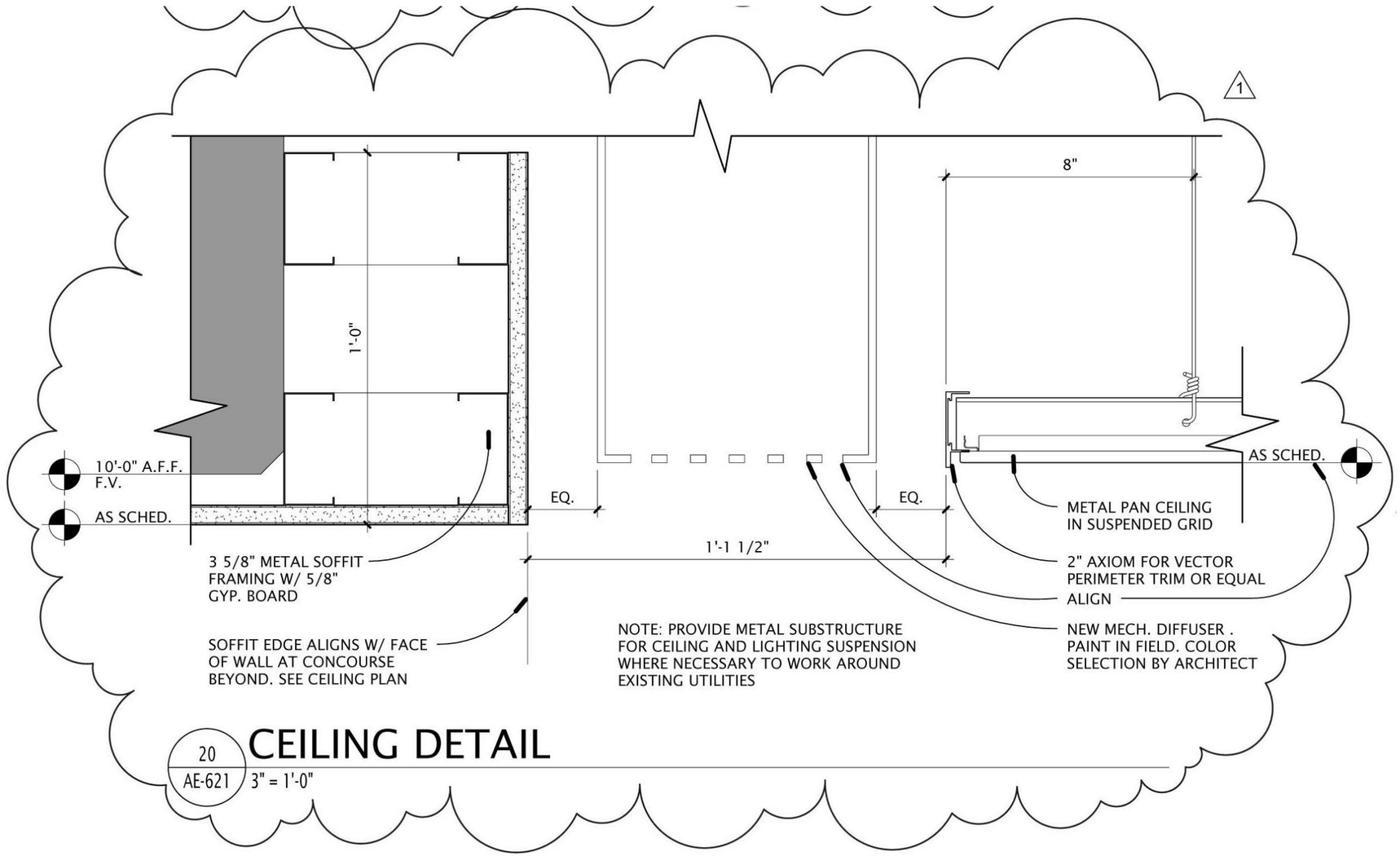
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

2/AE-615

AD5-A123

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



20
AE-621

CEILING DETAIL

3" = 1'-0"

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

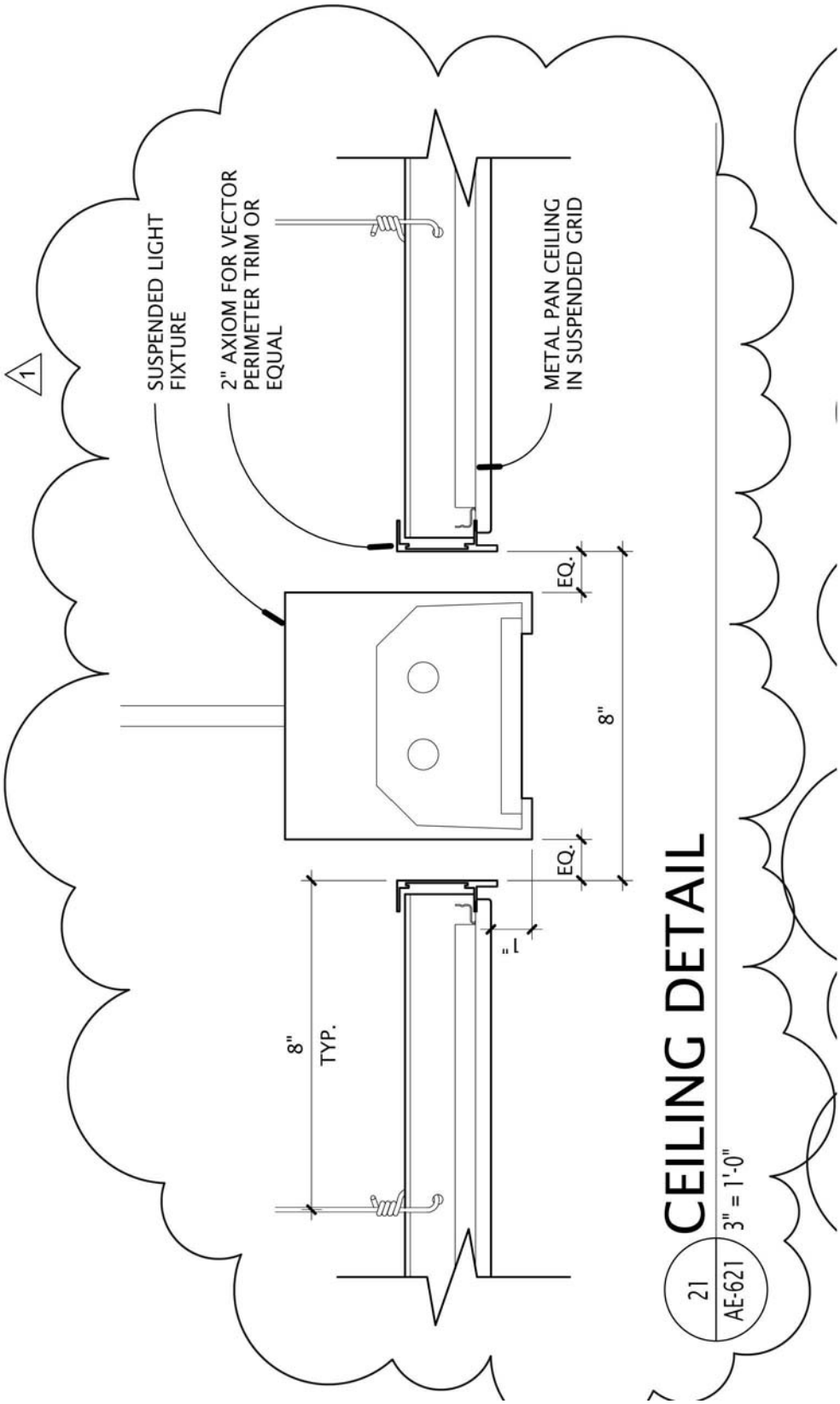
5/26/2010 4:33:46 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

20/AE-621

AD5-A124

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE: 05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:26:54 PM

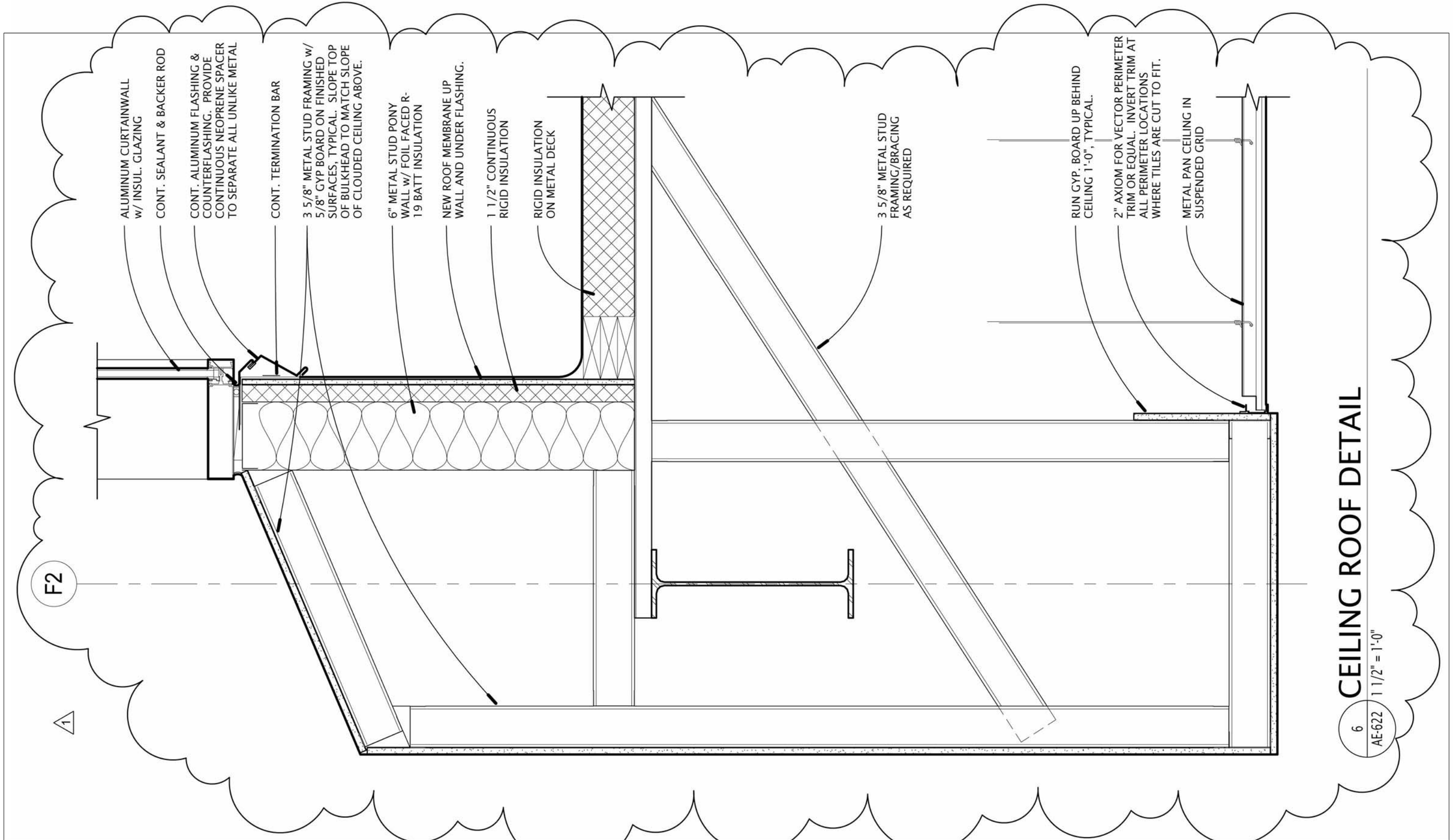
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

21/AE-621

AD5-A125

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



CEILING ROOF DETAIL

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

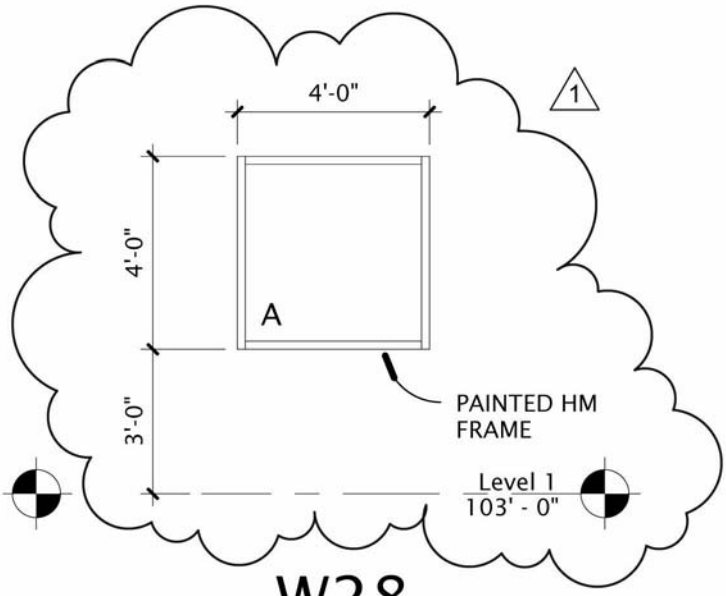
5/26/2010 4:33:32 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

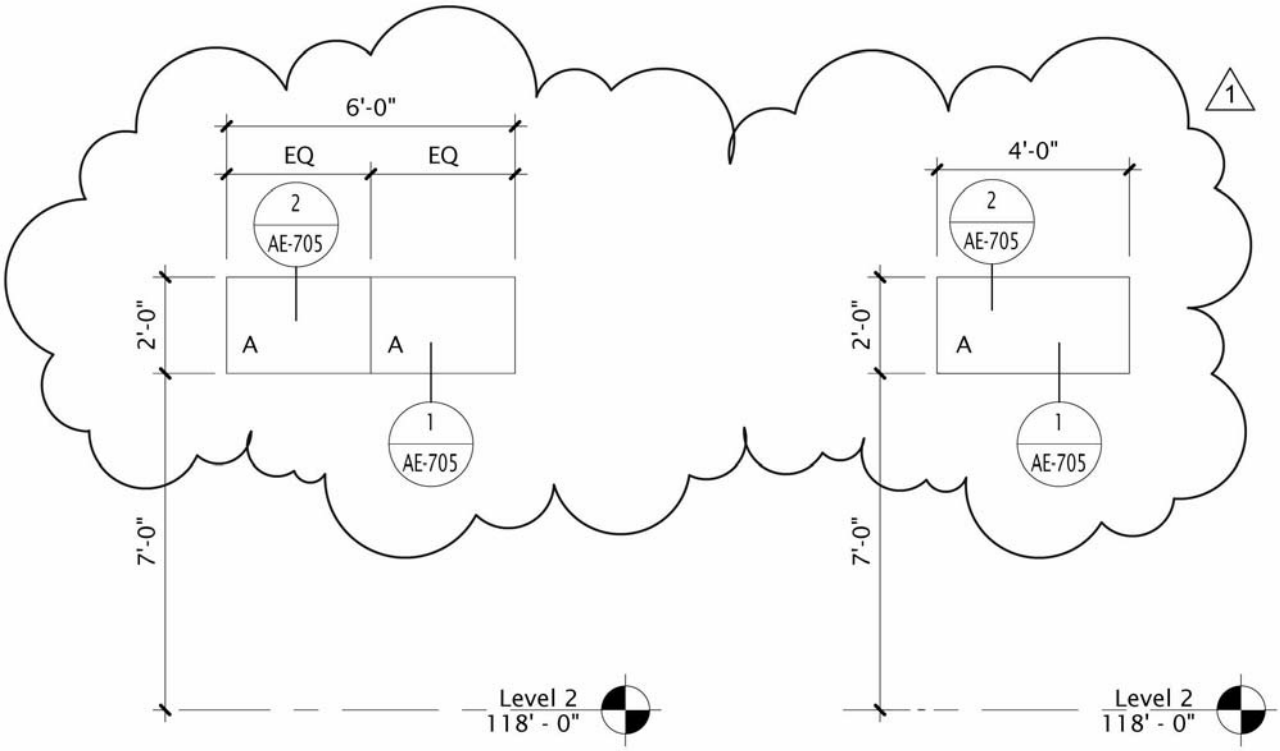
6/ AE-622

AD5-A126

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE: 05.26.2010



W28



W34a

W34

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:26:41 PM

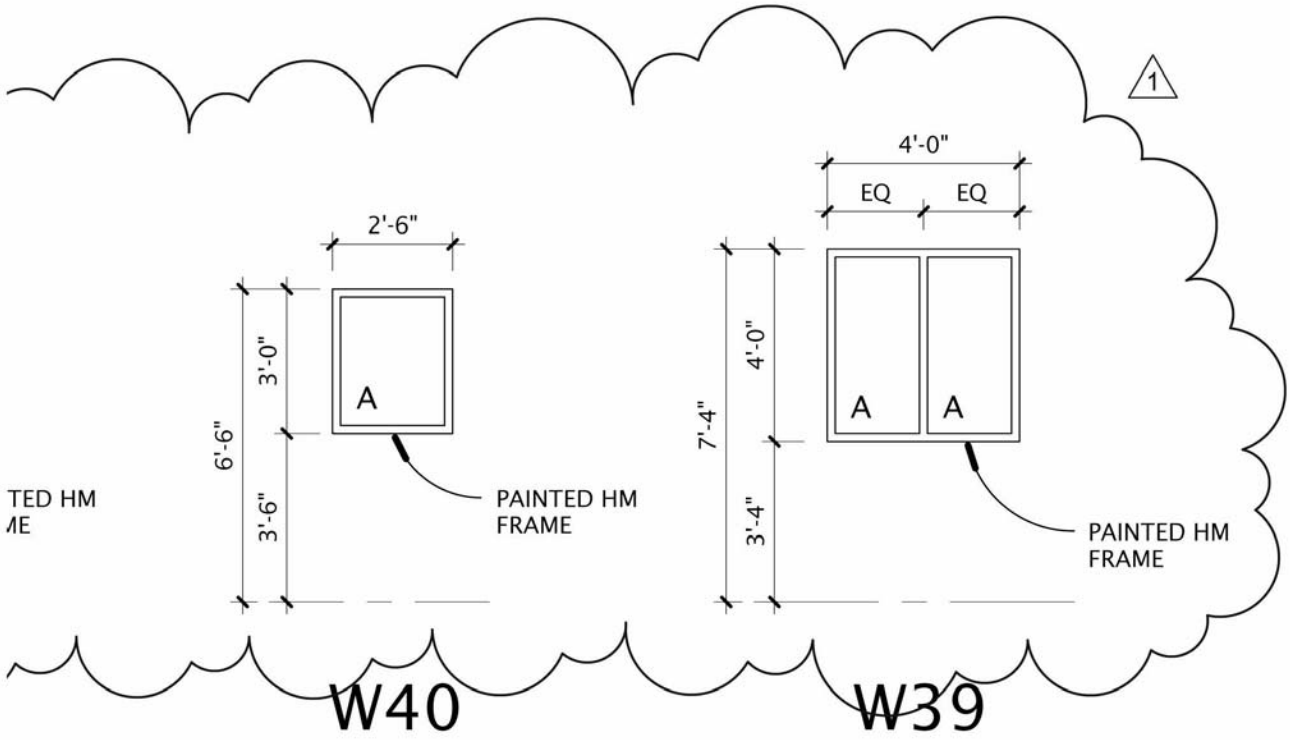
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

W28 W34 / AE-701

AD5-A128

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:26:27 PM

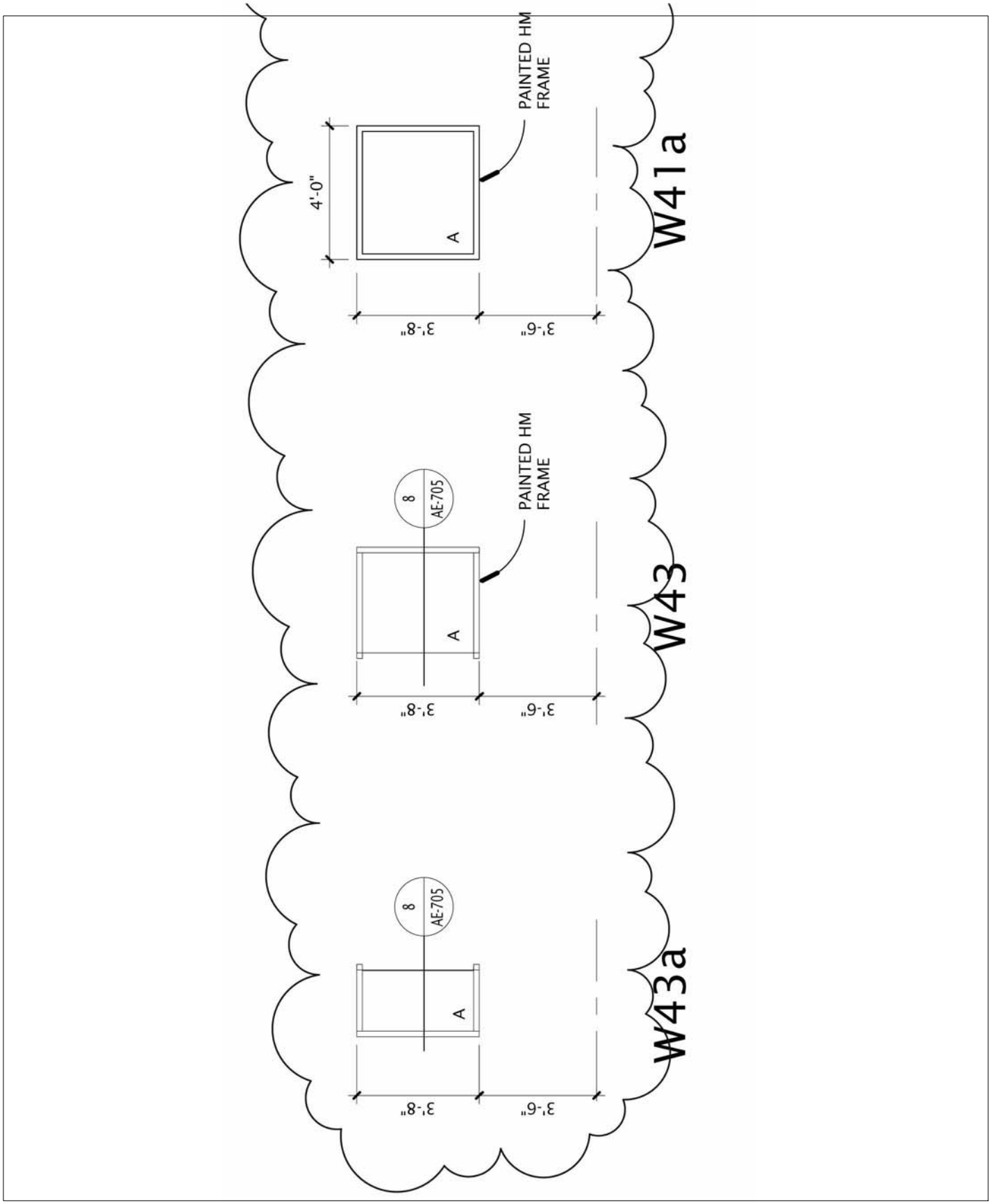
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

W39 W40 / AE-701

AD5-A129

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:26:14 PM

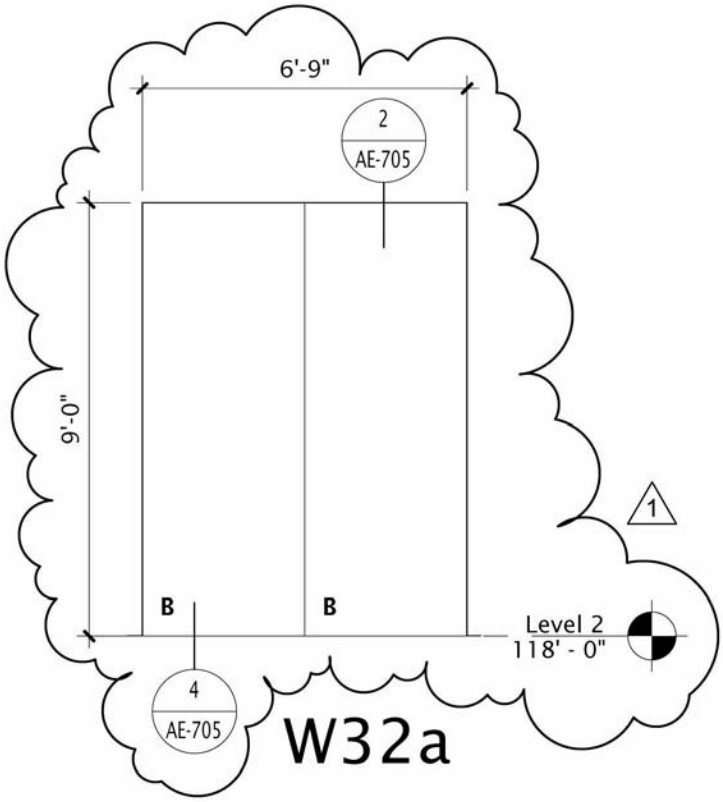
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

W41a W43 / AE-701

AD5-A130

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:25:58 PM

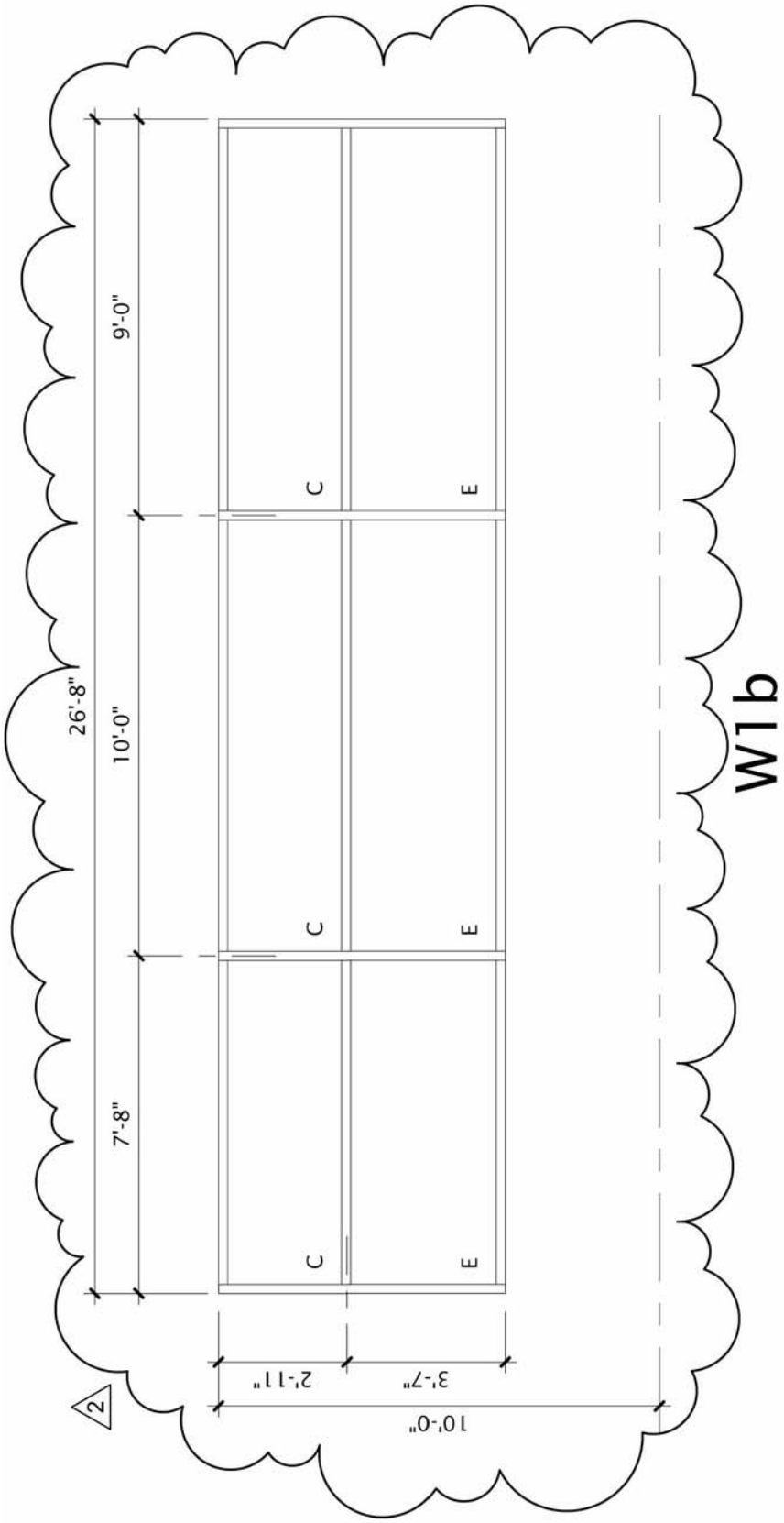
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AE-701

AD5-A131

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:25:20 PM

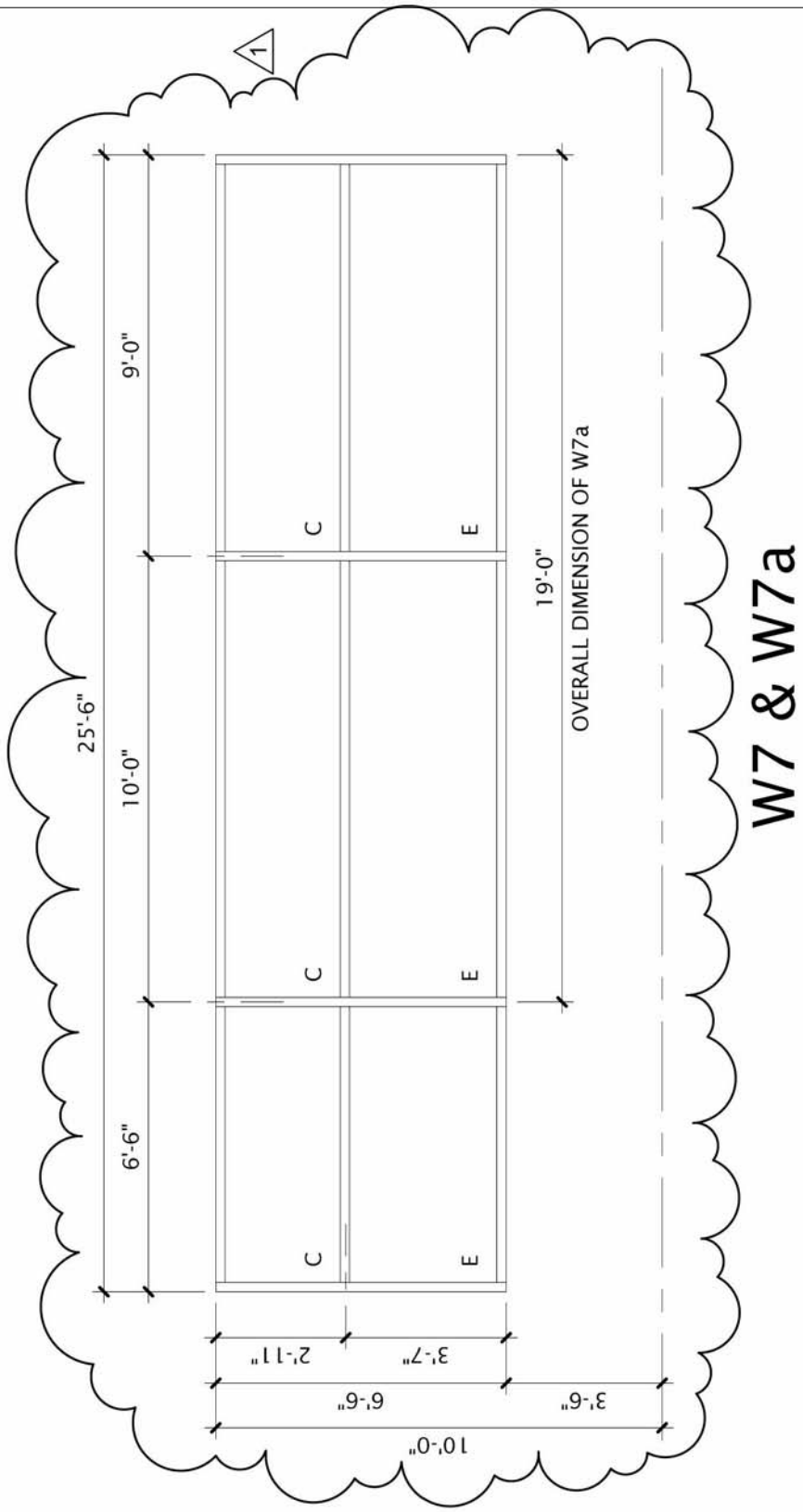
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

W1b / AE-702

AD5-A132

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



W7 & W7a

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:25:02 PM

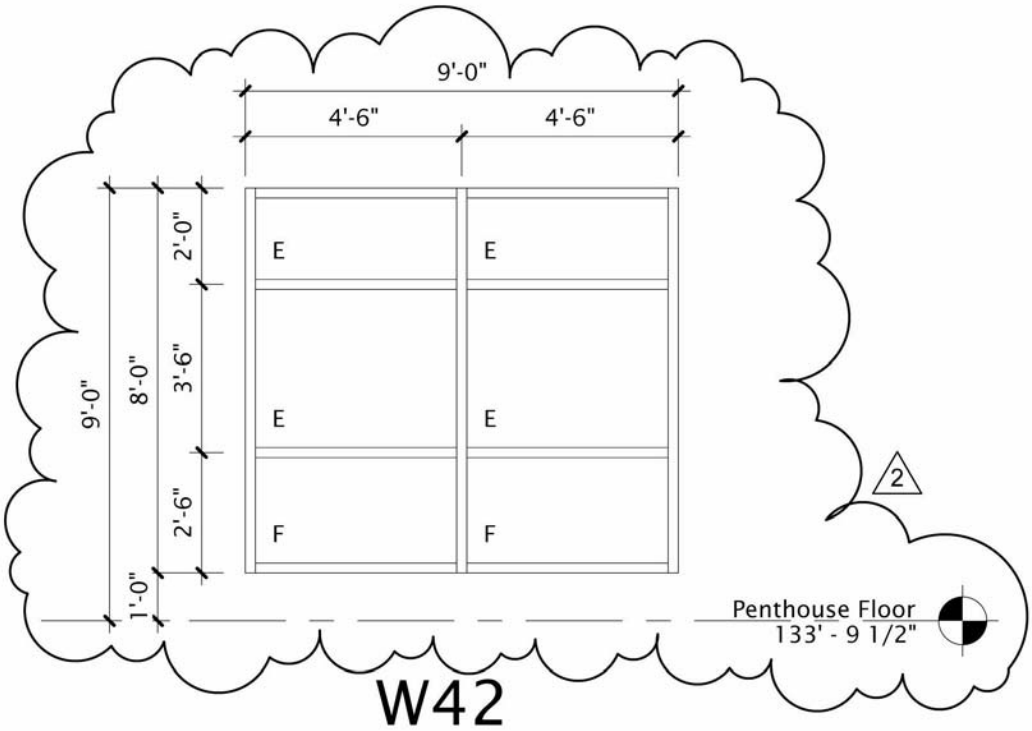
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

W7 /
AE-702

AD5-A133

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:24:46 PM

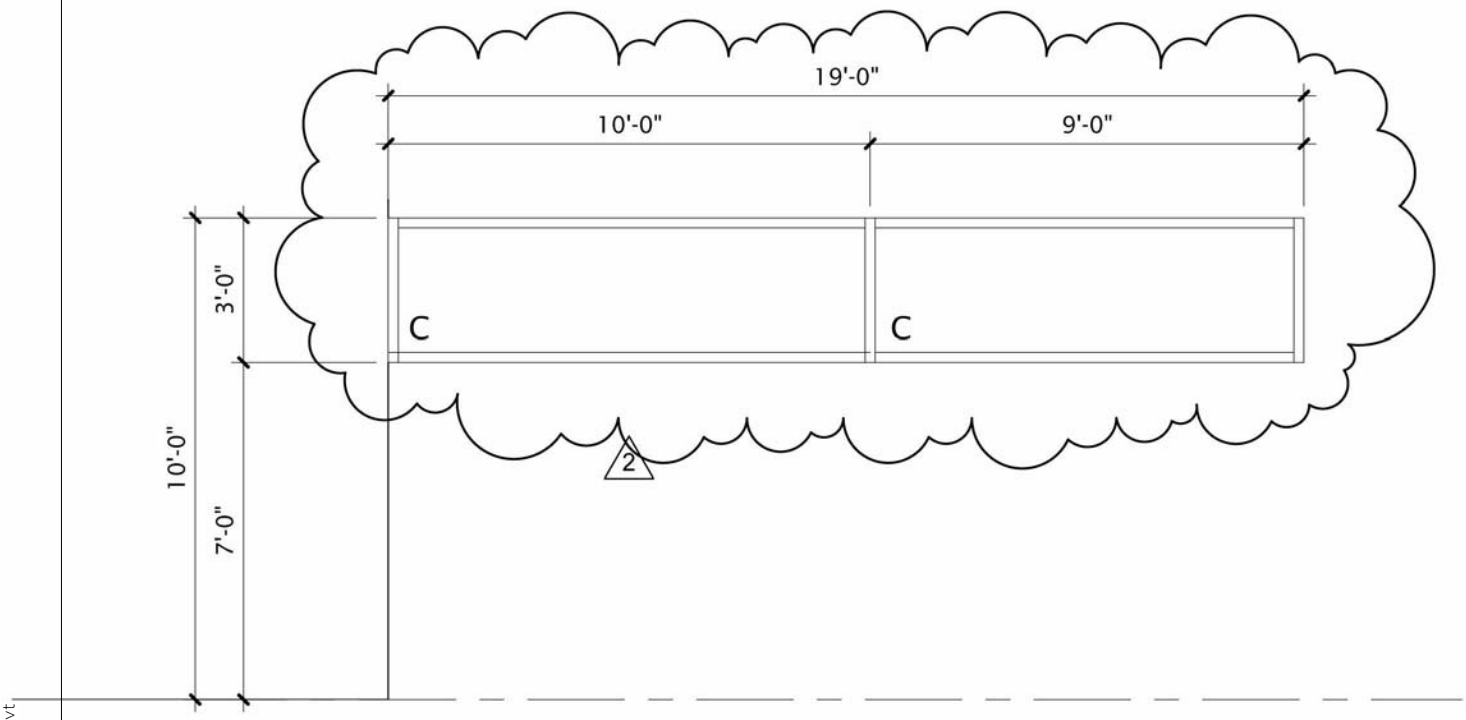
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AE-702

AD5-A134

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



W2b

C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:24:28 PM

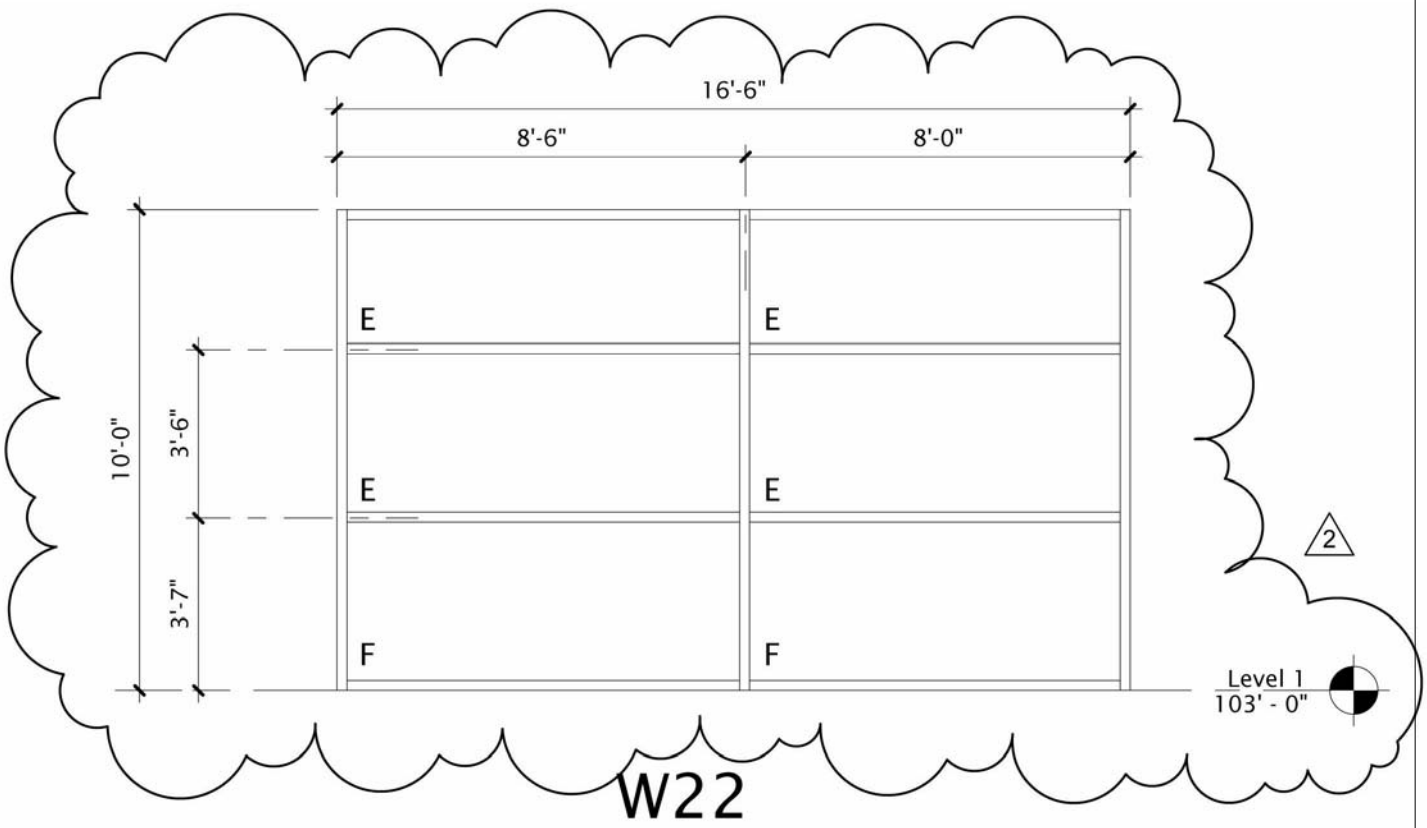
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AE-702

AD5-A135

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

5/26/2010 4:24:11 PM

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

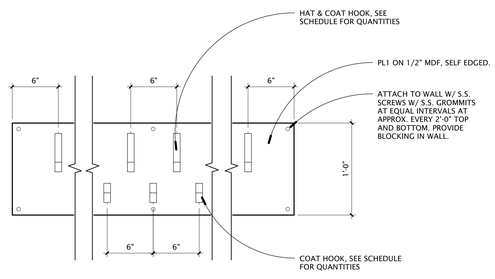
AE-702

AD5-A136

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010

COAT HOOK SCHEDULE			
CODE	WALL PLATE SIZE	HOOK QUANTITY	COMMENTS
H66	66" W X 12" H	11 HAT & COAT HOOK	SEE TYPICAL AND SPECIFICATIONS
		10 COAT HOOK	
H48	48" W X 12" H	8 HAT & COAT HOOK	SEE TYPICAL AND SPECIFICATIONS
		7 COAT HOOK	
H42	42" W X 12" H	7 HAT & COAT HOOK	SEE TYPICAL AND SPECIFICATIONS
		6 COAT HOOK	
H36	36" W X 12" H	6 HAT AND COAT HOOK	SEE TYPICAL AND SPECIFICATIONS
		5 COAT HOOK	
H30	30" W X 12" H	5 HAT AND COAT HOOK	SEE TYPICAL AND SPECIFICATIONS
		4 COAT HOOK	

DIMENSIONAL LETTERING SCHEDULE							
LOCATION	INSTANCES	TEXT	SIZE	INSTALLATION	FINISH	FONT	COMMENTS
WOMENS TOILET ROOMS	4	WOMEN	12" H X 1"D	1" OFFSET	SATIN ALUMINUM	SAN-SERIF FONT TO BE SELECTED	MOUNTED VERTICALLY ON TILE AT ENTRY
MENS TOILET ROOMS	4	MEN	12" H X 1"D	1" OFFSET	SATIN ALUMINUM	SAN-SERIF FONT TO BE SELECTED	MOUNTED VERTICALLY ON TILE AT ENTRY
AUDITORIUM	2	AUDITORIUM	9" H X 1"D	1" OFFSET	SATIN ALUMINUM	SAN-SERIF FONT TO BE SELECTED	ABOVE ENTRY DOORS
RECYCLE CENTER	3	RECYCLE CENTER	9" H X 1"D	1" OFFSET	SATIN ALUMINUM	SAN-SERIF FONT TO BE SELECTED	
RECYCLE CENTER	3	GLASS	3" H X .5" D	SURFACE MOUNT	SATIN ALUMINUM	SAN-SERIF FONT TO BE SELECTED	
RECYCLE CENTER	3	METALS	3" H X .5" D	SURFACE MOUNT	SATIN ALUMINUM	SAN-SERIF FONT TO BE SELECTED	
RECYCLE CENTER	3	TRASH	3" H X .5" D	SURFACE MOUNT	SATIN ALUMINUM	SAN-SERIF FONT TO BE SELECTED	
RECYCLE CENTER	3	PLASTIC	3" H X .5" D	SURFACE MOUNT	SATIN ALUMINUM	SAN-SERIF FONT TO BE SELECTED	
RECYCLE CENTER	3	PAPER	3" H X .5" D	SURFACE MOUNT	SATIN ALUMINUM	SAN-SERIF FONT TO BE SELECTED	



1 / AE-801 COAT HOOK TYPICAL
1 1/2" = 1'-0"

FINISHES						
Code	Description	Manufacturer	Product Name / Number	Color / Finish	Size	Comments
	WALLS					
P1	WALL PAINT	ICI PAINTS	41YY 70/112 IVORY SILK	Eggshell	n/a	General Paint - Gyp. Board Walls
P2	WALL PAINT	ICI PAINTS	30YY 50/176 HISTORIC TAN	Eggshell	n/a	Accent Paint - Gyp. Board Walls
P3	WALL PAINT	ICI PAINTS	30YY 36/185 SURREY BEIGE	Eggshell	n/a	Accent Paint - Gyp. Board Walls
P4	WALL PAINT	ICI PAINTS	30YY 27/226 KHAKI MOSS	Eggshell	n/a	Accent Paint - Gyp. Board Walls
P5	WALL PAINT	ICI PAINTS	90YY 33/062 HEATHER GREY	Eggshell	n/a	Accent Paint - Gyp. Board Walls
P6	WALL PAINT	ICI PAINTS	20YY 40/337 COGNAC BRANDY	Eggshell	n/a	Accent Paint - Gyp. Board Walls
P7	WALL PAINT	ICI PAINTS	70BG 28/060 GENTRY BLUE	Eggshell	n/a	Accent Paint - Gyp. Board Walls
P8	WALL PAINT	ICI PAINTS	70YY 26/137 PALO VERDE	Eggshell	n/a	Accent Paint - Gyp. Board Walls
P9	WALL PAINT	ICI PAINTS	80YR 17/406 BURIED TREASURE	Eggshell	n/a	Accent Paint - Gyp. Board Walls
P10	WALL PAINT	ICI PAINTS	10GG 26/046 THUNDERCLOUD	Eggshell	n/a	Accent Paint - Gyp. Board Walls
P11	WALL PAINT	ICI PAINTS	40YY 20/081 PLATEAU GREY	Eggshell	n/a	Accent Paint - Gyp. Board Walls
PW	PAINTED PLYWOOD	REFER TO FINISH PLAN		Semi-gloss	UP TO 4'-0" A.F.F.	
EP	EPOXY PAINT	SEE SPECIFICATIONS		MATCH P1	n/a	
FRP	FIBERGLASS REINFORCED PANEL	SEE SPECIFICATIONS		BY SUBMITTAL	UP TO 4'-0" A.F.F.	
CT1	CERAMIC WALL TILE	Daltile	Ceramic Wall Tile	0166 ELEMENTAL TAN	4" x 4"	Restroom Wall Tile
Grout		Mapei	Unsanded	BY SUBMITTAL		
CT2	CERAMIC WALL TILE	Daltile	Ceramic Wall Tile	ALMOND	4" x 4"	Restroom Wall Tile
Grout		Mapei	Unsanded	BY SUBMITTAL		
CT3	CERAMIC WALL TILE	Daltile	Ceramic Wall Tile	BISCUIT	4" x 4"	Restroom Wall Tile
Grout		Mapei	Unsanded	BY SUBMITTAL		
CHR	CHAIR RAIL	SOLID WOOD	STAIN GRADE	SEE SPECIFICATIONS		SEE DETAILS ON AE-641 AND ELEVATIONS. LOCATED IN CLASSROOMS, LECTURE HALLS AND IN COMMON AREAS OF THE OFFICE SUITE.
WD	WOOD VENEER PANELING	CUSTOM	SEE SPECIFICATIONS	SEE SPECIFICATIONS	VARIES	
WDA	ACOUSTIC WOOD PLANKING	SEE SPECIFICATIONS	SEE SPECIFICATIONS	SEE SPECIFICATIONS	VARIES	
	FLOORING					
CP1	CARPET TILE	INTERFACE	HAPPENING 1463202500	2957 RETROSPECTIVE	50CM X 50CM	MONOLITHIC INSTALLATION - SEE FINISH PLAN
CP2	CARPET TILE	INTERFACE	ON BOARD 123630250H	100746 OAK	50CM X 50CM	MONOLITHIC INSTALLATION - SEE FINISH PLAN
CP3	CARPET TILE	INTERFACE	ON BOARD 123630250H	100740 WALNUT	50CM X 50CM	MONOLITHIC INSTALLATION - SEE FINISH PLAN
WT	WALK-OFF CARPET TILE	INTERFACE	ENTRY LEVEL	7187 BLACK	50CM X 50CM	NON-DIRECTIONAL
EF	COVED EPOXY FLOOR	SEE SPECIFICATIONS		BY SUBMITTAL		
VS1	SHEET VINYL	JOHNSONITE	MELODIA	623 DARK SHADOWS		SEE FINISH PLANS
PT1	FLOOR TILE	DALTILE	PORCELAIN MOSAIC TILE	TBD - PRICE GROUP 3	2"x2"	SEE FINISH PLANS
PT2	FLOOR TILE	DALTILE	PORCELAIN MOSAIC TILE	TBD - PRICE GROUP 3	2"x2"	SEE FINISH PLANS
VT1	VCT	MANNINGTON COMMERCIAL	BRUSHWORK	703 ECRU	12" x 12"	SEE FINISH PLANS
VT2	VCT	MANNINGTON COMMERCIAL	SOLIDPOINT	319 SUEDE	12" x 12"	SEE FINISH PLANS
VT3	VCT	MANNINGTON COMMERCIAL	BRUSHWORK	713 FLORENTINE	12" x 12"	SEE FINISH PLANS
VT4	VCT	MANNINGTON COMMERCIAL	SOLIDPOINT	340 BLUE RIDGE	12" x 12"	SEE FINISH PLANS
VT5	VCT	MANNINGTON COMMERCIAL	SOLIDPOINT	345 SILVER LEAF	12" x 12"	SEE FINISH PLANS
VT6	VCT	MANNINGTON COMMERCIAL	SOLIDPOINT	338 CHERRYWOOD	12" x 12"	SEE FINISH PLANS
VT7	VCT	MANNINGTON COMMERCIAL	SOLIDPOINT	363 ITALIAN STRAW	12" x 12"	SEE FINISH PLANS
SC	SEALED CONCRETE	SEE SPECIFICATIONS				
WF	HARDWOOD WOOD FLOORING	SEE SPECIFICATIONS		SEE SPECIFICATIONS	3-1/8" WIDE STRIPS	
	BASE					
RB1	RUBBER BASE	ROPPE	PINNACLE	193 BLACK BROWN	4"	
WB	WOOD BASE	SOLID WOOD	STAIN GRADE	SEE SPECIFICATIONS	4"	SEE DETAILS ON AE-641 AND ELEVATIONS
VB	COVED VINYL BASE	MATCH VS1		MATCH SHEET VINYL FLOOR	6"	
EB	EPOXY COVED BASE	EPOXY BASE		MATCH FLOOR EPOXY	6"	
CB	CERAMIC TILE BASE	DALTILE		MATCH CT1	6"	SEE DETAILS AND ELEVATIONS
	CEILINGS					
CLP	CEILING PAINT	ICI PAINTS	TBD	FLAT	-	GYPSUM BOARD CEILINGS, SOFFITS, ETC.
DFP	DRYFALL PAINT	SEE SPECIFICATIONS		BLACK - TBD	-	AUDITORIUM STRUCTURE
	MISCELLANEOUS					
PL1	PLASTIC LAMINATE	WILSONART		7941K-18 TAN ECHO	-	VERTICAL SURFACES
PL2	PLASTIC LAMINATE	FORMICA		3698-58 BELUGA BEIGE	-	WORKSURFACES
PL3	PLASTIC LAMINATE	FORMICA	MICRO DOT FINISH	463-MC SAIL WHITE	-	DISPLAY CASE INTERIOR
SCT	STONE COUNTERTOP	ICE STONE		HEIRLOOM GREY		SEE ELEVATIONS
SS	STAINLESS STEEL					
CG	CORNERGUARD	SEE SPECIFICATIONS		STAINLESS STEEL	4'	CORNERGUARDS UNDER INTERIOR WINDOWS ARE TO BE TRIMMED TO FIT.

NOTE: SEE SPECIFICATIONS FOR WHITEBOARD AND TACKBOARD SCHEDULE AND INFORMATION

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

STATE OF UTAH 116302 LICENSED ARCHITECT

REVISIONS:

1	05.26.2010	Addendum 5

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

FINISH SCHEDULE

CONSTRUCTION DOCUMENTS

AE-801

GREAT BASIN ENGINEERING INC

Garth Shaw
GSBS Architects
375 West 200 South
Salt Lake City, UT 84101

May 25, 2010

RE: Utah Valley University – New Science Building Addendum 5

Garth,

The following are the civil responses to questions regarding the Utah Valley University New Science Building Addendum 5.

Plumbing/Mechanical Coordination:

> **The Acid Neutralization line & components on the north side and the south side of the building were updated to coordinate with the plumbing plans. Roof drain lines on the south side of the building were updated to coordinate with the plumbing plans. (See sheets CU-301-C2 & CU-301-C3 attached.)**
>
> **On sheet CU-306, the ventilation for the tunnel that was drawn and not noted on the east end of the tunnel profile view was removed. A note was added at the north end of the tunnel profile view to "See Mech. Plans for Tunnel Ventilation."**
>
> **Erroneous alignment text on the plan view regarding the location where the sewer penetrates the tunnel wall was removed from sheet CU-305 & sheet CU-306.**

Response to Comments/Questions from Jason Howard, McCarthy Building Companies, to Dave McKay May 18, 2010:

40 - Sheet CS-101 has a note near the area for assisted rescue that states "for handrail, stair and guard rail detail, see sheet A101". Please confirm this should refer to sheet AS101, not A101.

> **The note on sheet CS-101 should read "For Handrail, Stair & Guardrail Detail, See Sheet AS101."**

41 - Refer to sheets CU-305 and SB101A. There appears to be a discrepancy between retaining walls drawn on these two sheets between the utility tunnel and stairs north of the tunnel. Please clarify which drawing depicts the correct layout.

> **The retaining wall design that is shown on sheet CG-205 is correct. The wall on sheet SB101A will be updated to show the correct wall as well as a note to see sheet CG-205 for details.**

Response to Group 06 Questions and Comments from Michael Sant, Big-D Construction, to Dave McKay May 19, 2010:

1 - Sheet CD-001 identifies the trees to be removed as "demo tree". Yet there is a note that states "Retain and protect trees where possible in staging area. Contractor to replace trees where trees are removed". Please clarify which trees or the quantity of trees to be replaced.

> **An approximate outline of the staging area was added to sheet CD-001. All trees in that area should be removed for use of the staging area. These trees will be replaced after staging area is no longer needed – see Landscape plans. (See sheet CD-001-C1 attached.)**

TEL (801) 394-4515 • FAX (801) 392-7544 • 5746 South 1475 East • Ogden, Utah 84403 • www.greatbasinengineering.com

2 - Sheet CD-002: please confirm whether or not the storm drain lines in this view are to be removed and how this relates with the line to be abandoned and grouted. On Sheet CU-302 these lines appear to be new.

> **The storm drain line in question should be demolished. The existing storm drain line is sloped toward the abandoned storm drain section (see sheet CD-002). A new storm drain line should be constructed in the same location with the slope of the pipe going the opposite direction toward the new storm drain system to be constructed (see sheet CU-302).**

3 - Sheet CS-101 and AS100 have a note that refers to Sheet A101 yet this sheet does not exist in the set. Please advise.

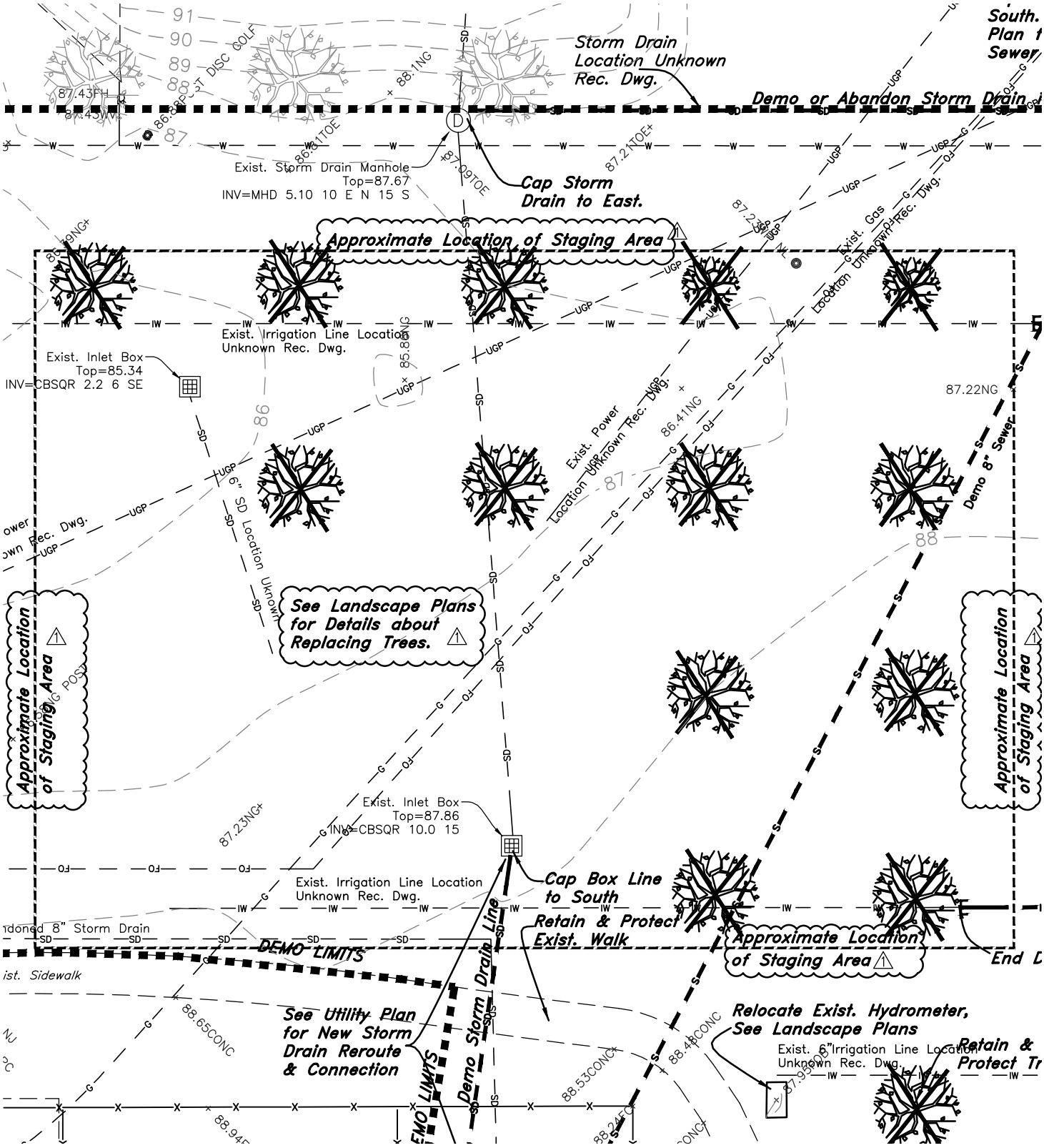
> **The note on sheet CS-101 should read "For Handrail, Stair & Guardrail Detail, See Sheet AS101."**

4 - Sheet CG-200A: there is a note stating "Dewatering is a deferred design. A full design submittal is required prior to beginning any excavation". Does this note refer to temporary dewatering during construction or permanent dewatering systems?

> **The note is referring to temporary dewatering. Temporary dewatering is required to put in the tunnel and until the land drain system is in place.**

If you have any questions, please call. Thank you.

Heather Avner, EIT
Great Basin Engineering



GREAT BASIN ENGINEERING

5746 South 1475 East Ogden, Utah 84403
Main (801)394-4515 S.L.C (801)521-0222 Fax (801)392-7544
www.greatbasinengineering.com

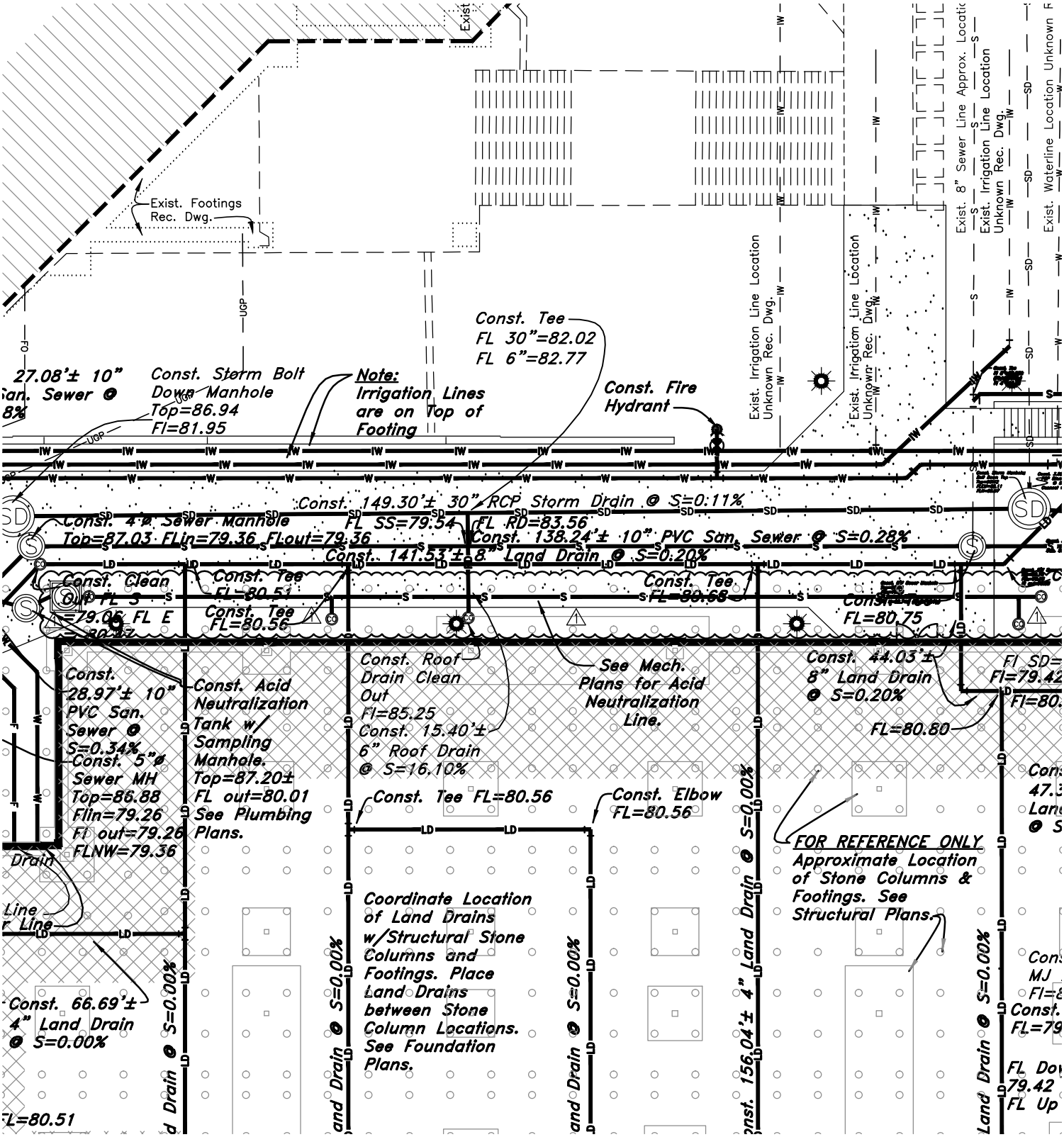
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

CD-001-C1

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010

W:\09n220-UVU Pope\DWG\09N220S6.DWG, 5/25/2010 12:59:48 PM, heathera



GREAT BASIN ENGINEERING INC

5746 South 1475 East Ogden, Utah 84403
Main (801)394-4515 S.L.C (801)521-0222 Fax (801)392-7544
www.greatbasinengineering.com

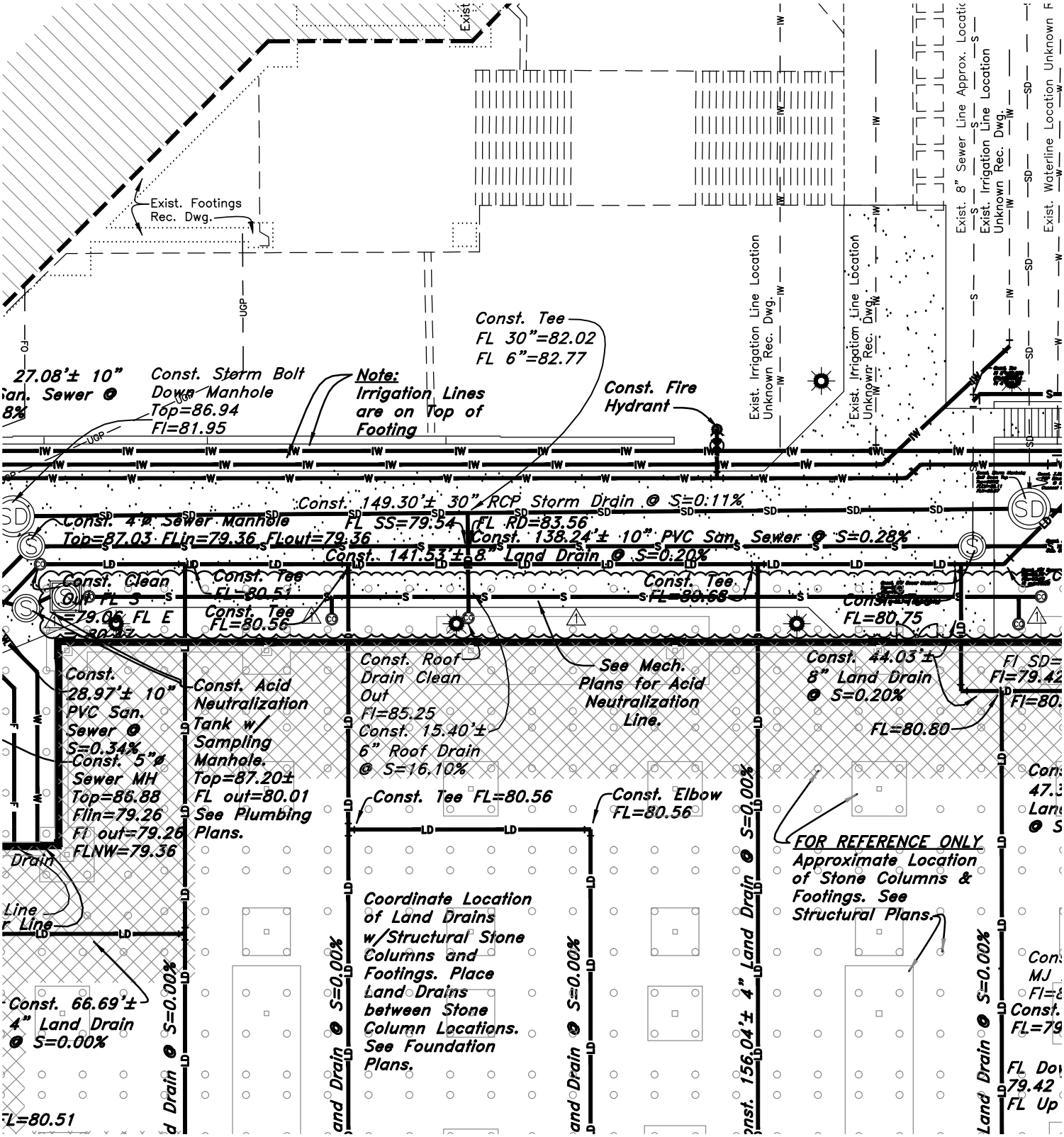
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

CU-301-C2

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE: 05.26.2010

W:\09n220-UVU Pope\DWG\09N220S6.DWG, 5/25/2010 1:16:28 PM, heathera



GREAT BASIN ENGINEERING INC

5746 SOUTH 1475 EAST OGDEN, UTAH 84403
MAIN (801)394-4515 S.L.C (801)521-0222 FAX (801)392-7544
WWW.GREATBASINENGINEERING.COM

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

CU-301-C3

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE: 05.26.2010

W:\09n220-UVU Pope\DWG\09N220S6.DWG, 5/25/2010 1:17:44 PM, heathera

New Science Building

UTAH VALLEY UNIVERSITY

LABORATORY

ADDENDUM NO. 5

May 26, 2010

This addendum consists of the following:

Attachments:

AD5-LF01 Drawing Sheet LF-101D

Size of the vestibule, going into Field Storage Room 036, was modified by the Architect pocketing the entry doors. Per the attached sketch, the size of the floor spray down area has been adjusted. This included reducing the curb width from 6" to 3"Wx4"H, and also included providing a location for OFOI steel racks.

Also added note to Bacteria Research Room 037 to Circuit the UV light to OLC3-36 for the Pass-Through,

AD5-LF02 Spec Section 115310 page 53

Removed 2.10 B and added 2.10E Built-in UV light

AD5-LP01 Drawing Sheet LP-101A

Gas shut-off valve relocated to avoid conflict with electrical panel.

AD5-LP02 Drawing Sheet LP-101A

Gas shut-off valve relocated to avoid conflict with electrical panel.

AD5-LP03 Drawing Sheet LP-101B

Gas shut-off valve relocated to avoid conflict with electrical panel.

AD5-LP04 Drawing Sheet LP-101C

Gas shut-off valve relocated to avoid conflict with electrical panel.

AD5-LP05 Drawing Sheet LP-101C

Gas shut-off valve relocated to avoid conflict with electrical panel.

AD5-LP06 Drawing Sheet LP-111A

Gas shut-off valve relocated to avoid conflict with electrical panel.

AD5-LP07 Drawing Sheet LP-111A

Gas shut-off valve relocated to avoid conflict with electrical panel.

AD5-LP08 Drawing Sheet LP-111A

Gas shut-off valve relocated to avoid conflict with electrical panel.

AD5-LP09 Drawing Sheet LP-111B

Gas shut-off valve relocated to avoid conflict with electrical panel.

AD5-LP10 Drawing Sheet LP-111B

Gas shut-off valve relocated to avoid conflict with electrical panel.

AD5-LP11 Drawing Sheet LP-121C

Gas shut-off valve relocated to avoid conflict with electrical panel.

2.9 OVERHEAD SERVICE CARRIERS

A. Materials:

1. Support Framing: Slotted channel framing as specified elsewhere on this Section.
2. Brake-formed metal: 16 gauge (1.6 mm) galvanized steel with epoxy powder-coated finish.

B. Fabrication: Fabricate and assemble components as detailed on the drawings.

C. Coordination: Carefully coordinate location of supports with the work of other Sections.

D. Finish: As specified for slotted channel framing. Color shall be selected by the Architect.

2.10 PASS-THROUGH CHAMBER

A. Manufacturers: Products complying with this specification may be provided by the following manufacturers. All products specified in this section shall be the provided by a single manufacturer.

1. Terra Universal Inc., 700-T N. Harbor Blvd., Anaheim, CA 92805 Tel: 1 800 767-0100.
2. Approved substitution.

~~B. Units shall be constructed of a fiber core with a white nonconductive plastic laminate fused and sealed to all exposed sides. Doors shall be clear acrylic.~~

C. Units shall be constructed of electrochemical passivated stainless steel suitable for areas of stringent particle requirements. Doors shall be stainless steel with static-dissipative PVC view panels.

D. Doors shall be fitted with an interlocking device to prevent both doors being open at the same time.

E. Built-in UV light

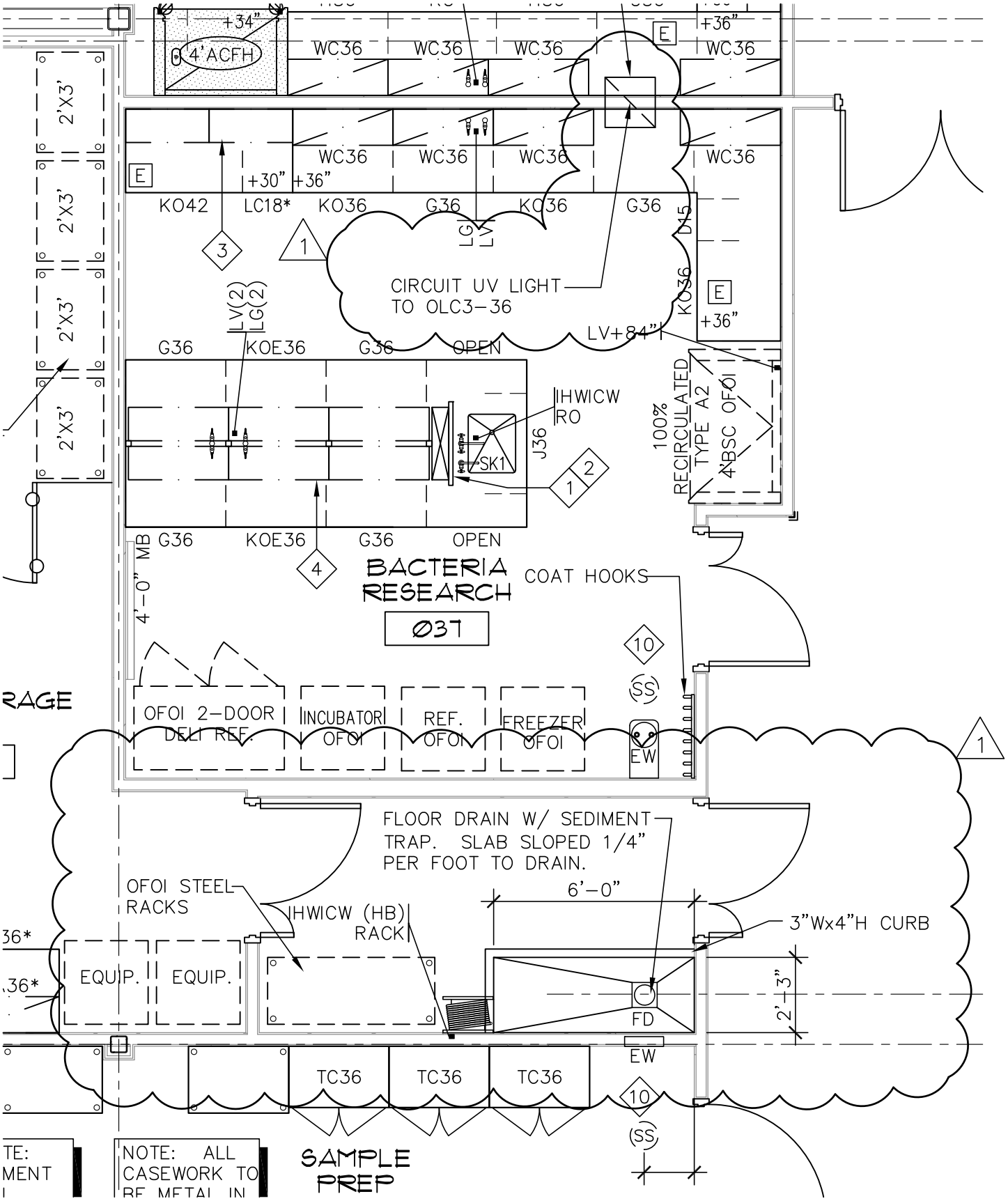
1. (2) UV lamps, flush mounted inside top of unit. Lamps activated by door switch when in closed position. Provide manual override switch on either side.
2. 115Vac, 60Hz, hardwired.

2.11 PIPE DROP ENCLOSURE

A. Fabricate pipe drop enclosures from minimum 18 gauge (1.3 mm thick) galvanized steel, per details shown on the Laboratory Furnishing drawings, except as noted.

1. Pipe drop enclosures at the following locations shall be fabricated of 18 gauge, Type 304 stainless steel with a #4 finish:

a. At scullery sinks.
b. At stainless steel counters.



C:\Users\mthiessens\Documents\2009.115 - UVU PSBA_mthiessens.rvt

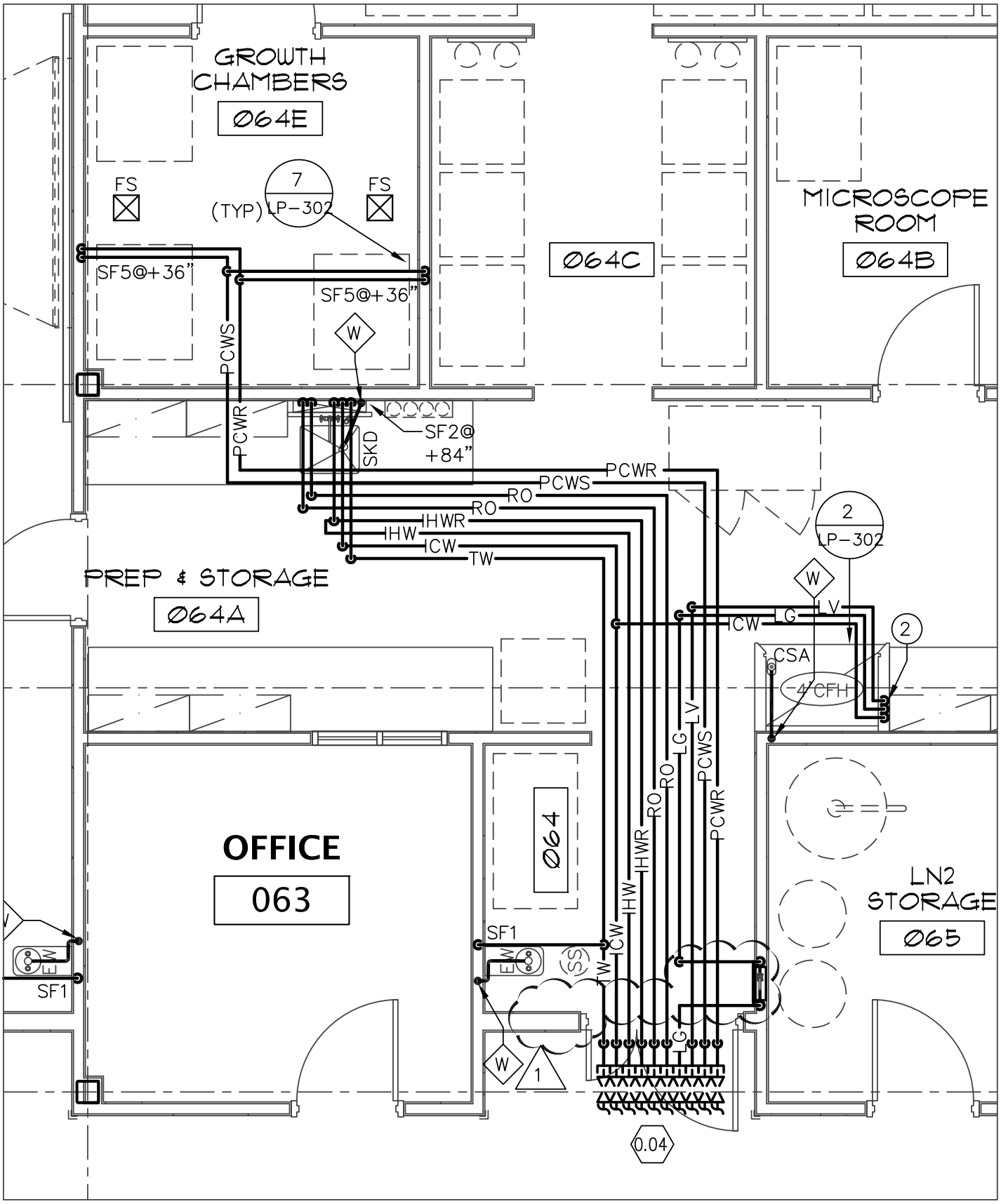
5/24/2010 12:57:33 PM

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD5-LF01

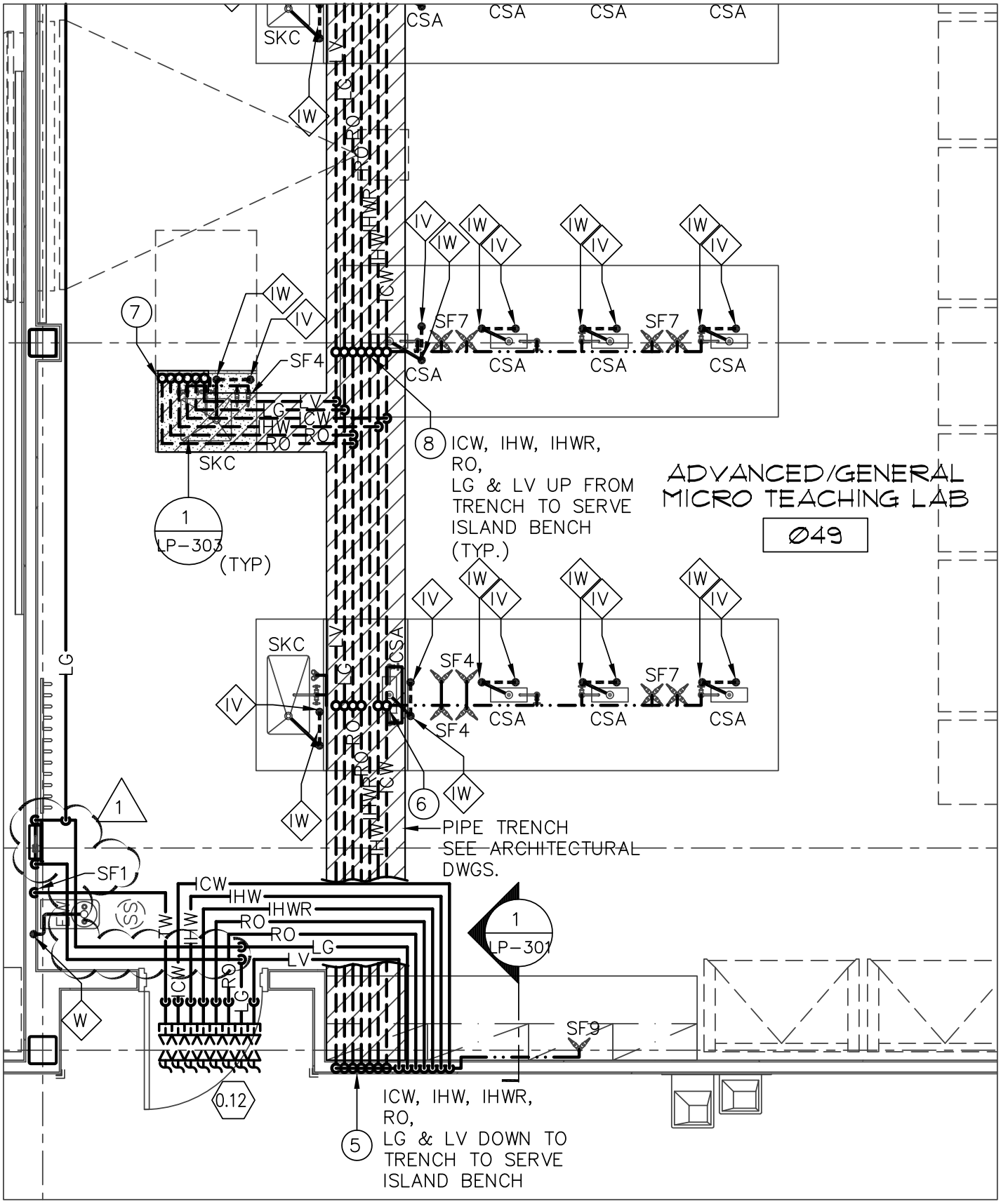
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD5-LP01

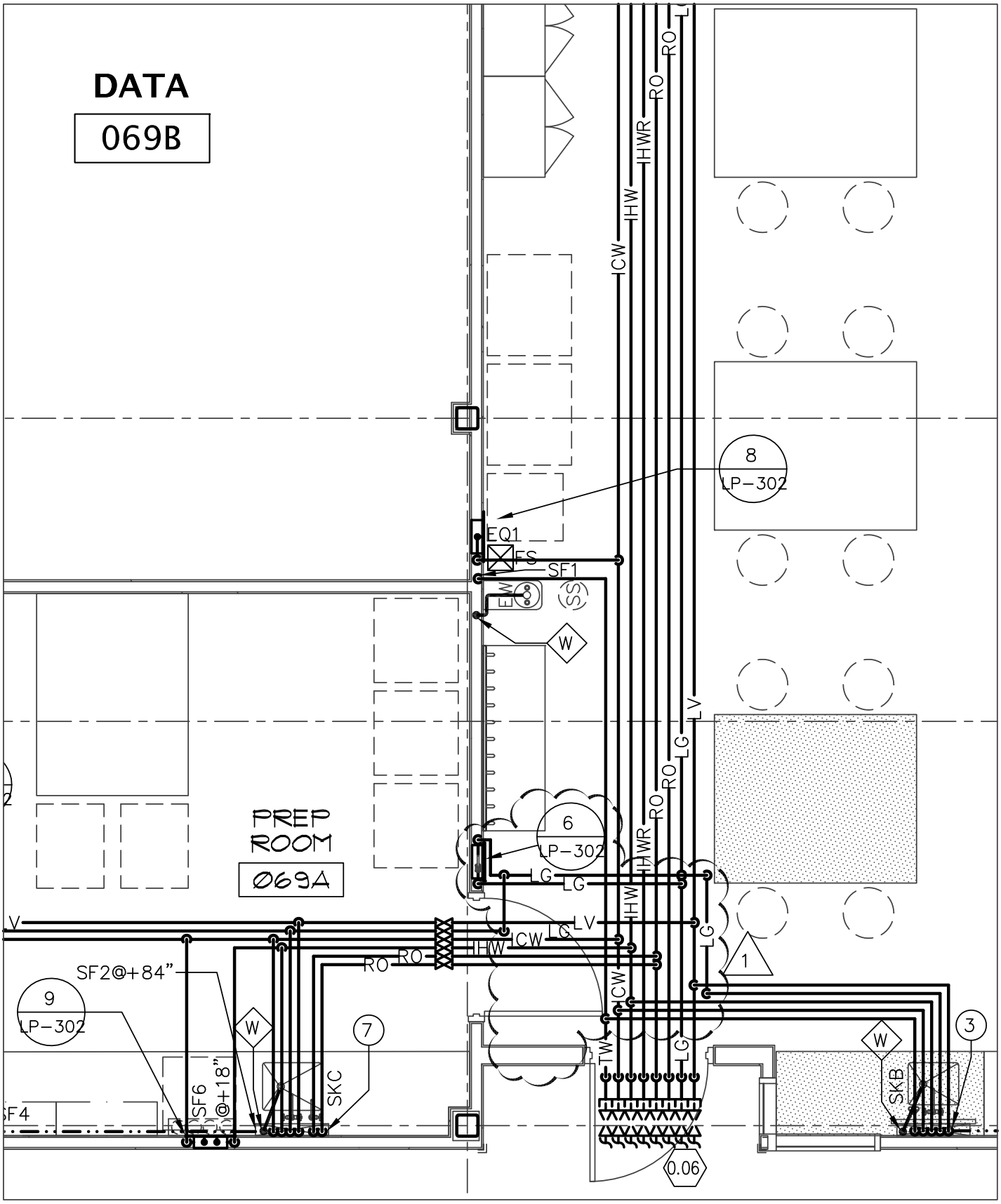
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD5-LP02

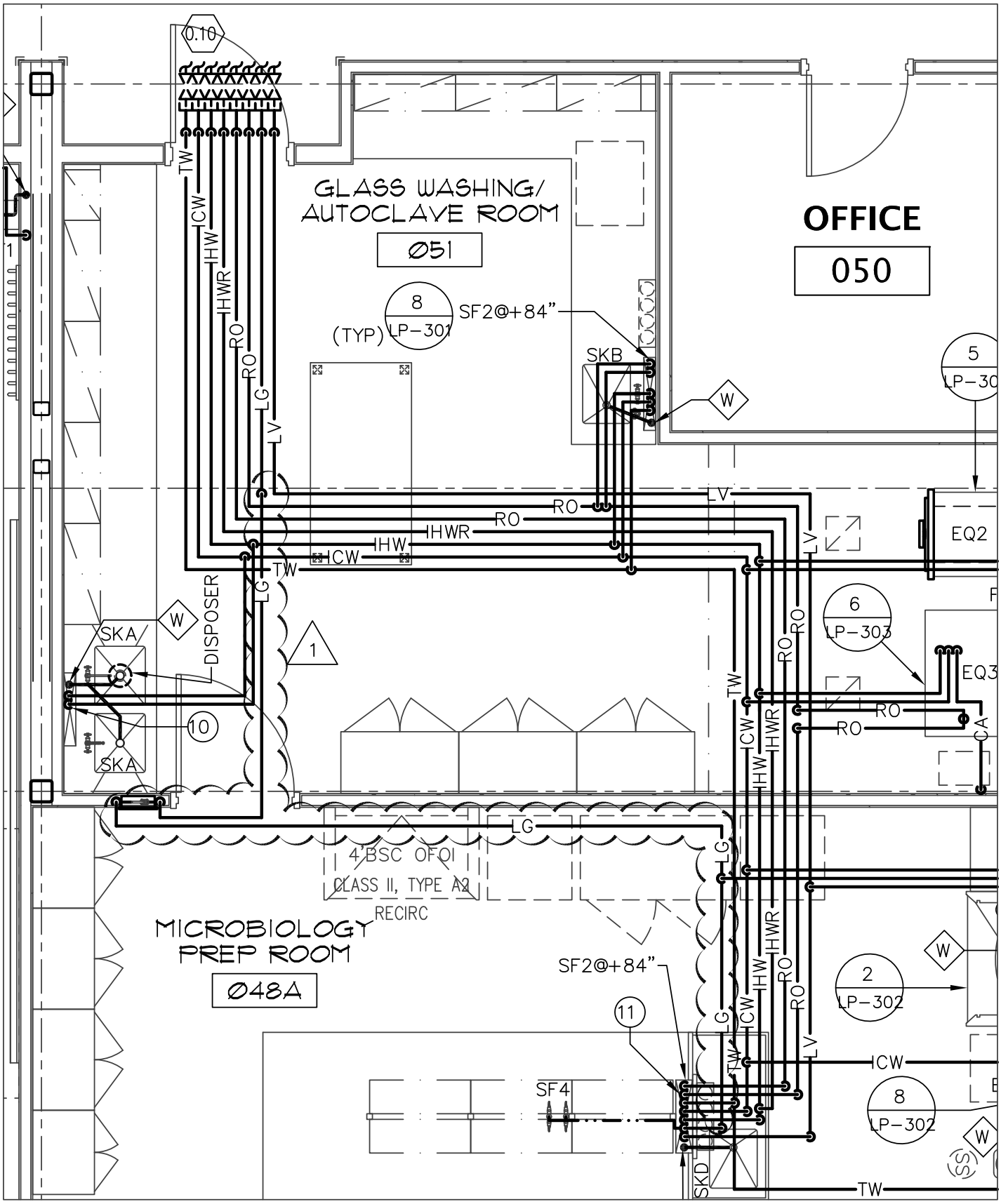
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD5-LP03

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE: 05.26.2010

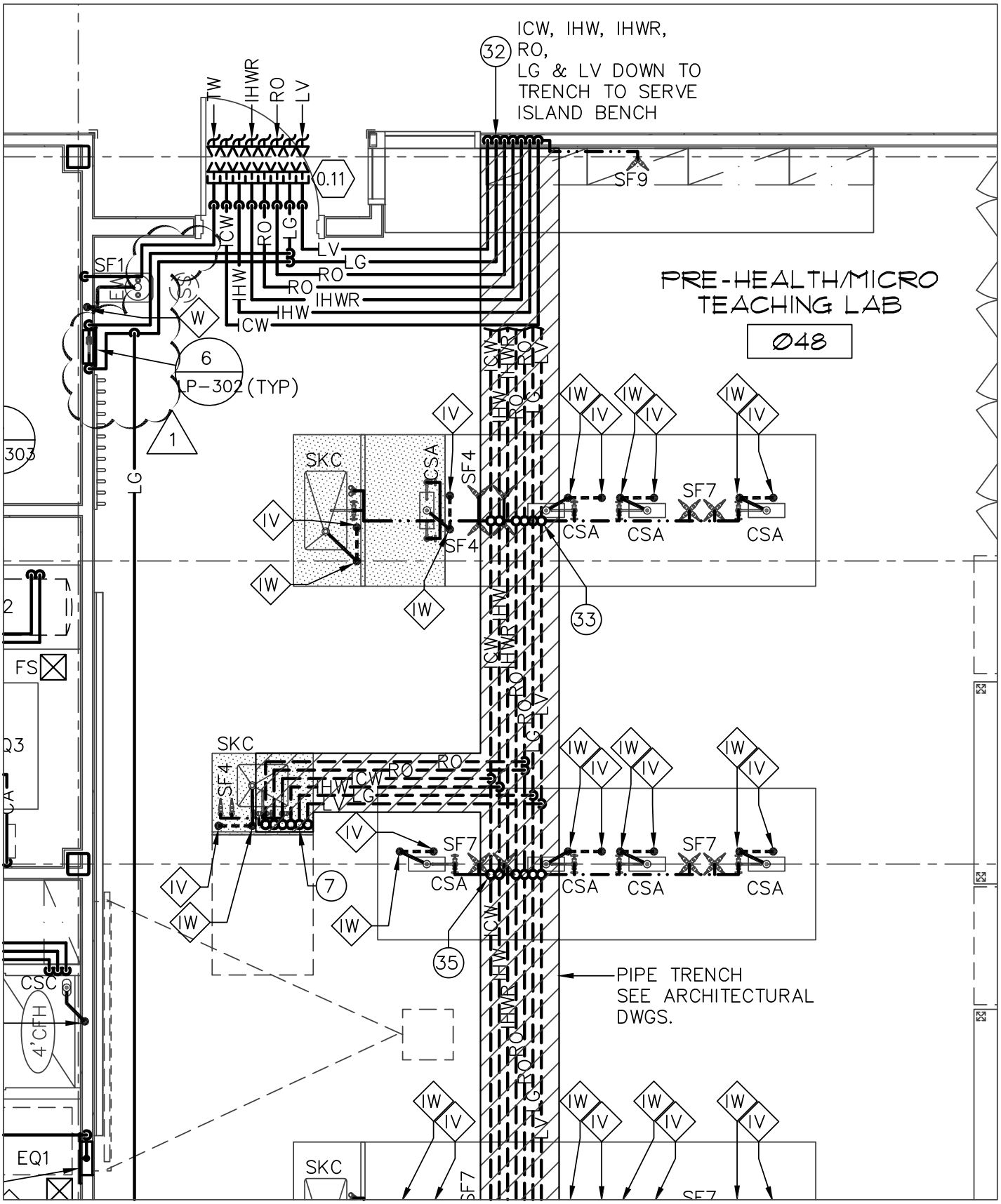


GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD5-LP04

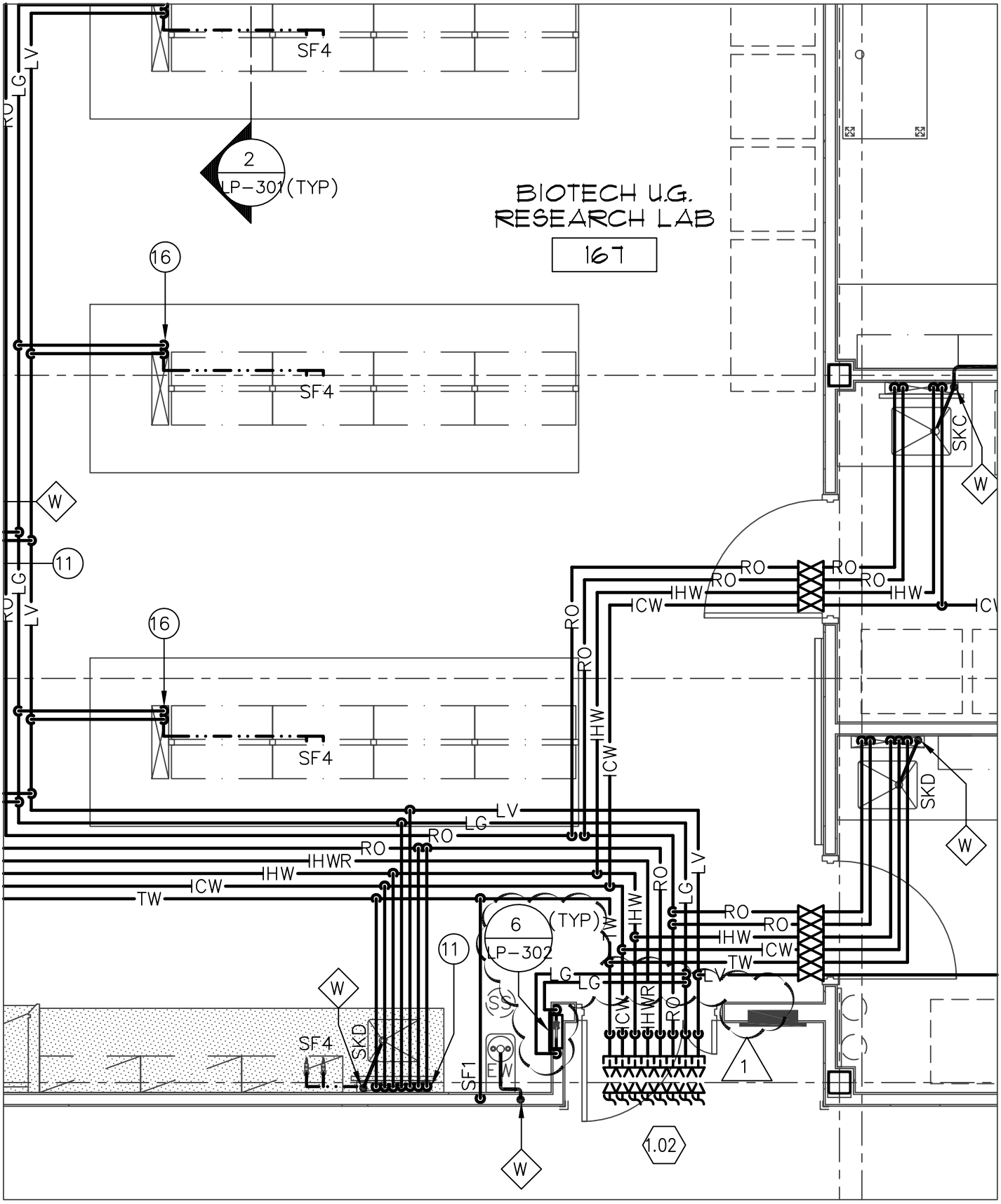
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD5-LP05

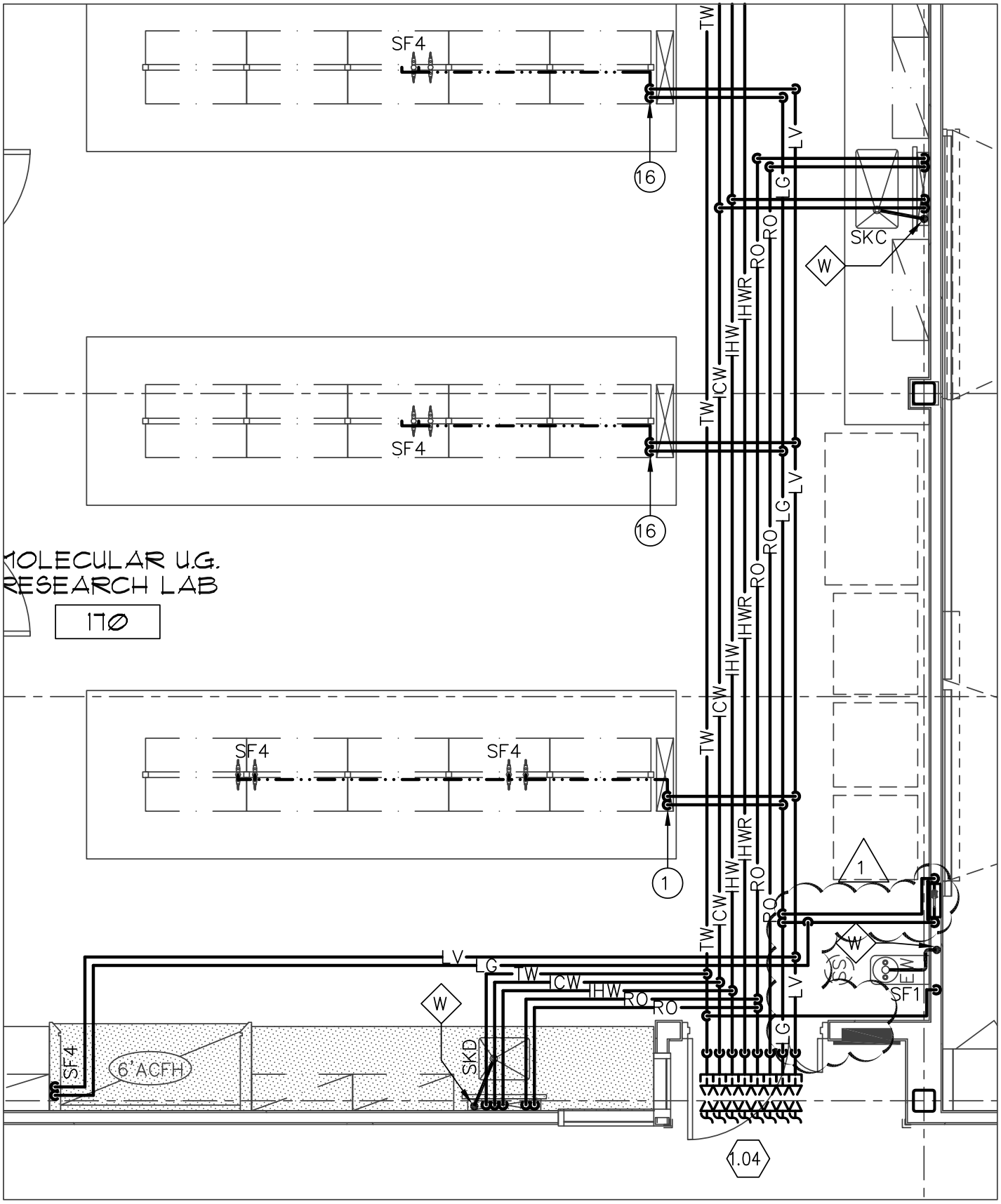
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD5-LP06

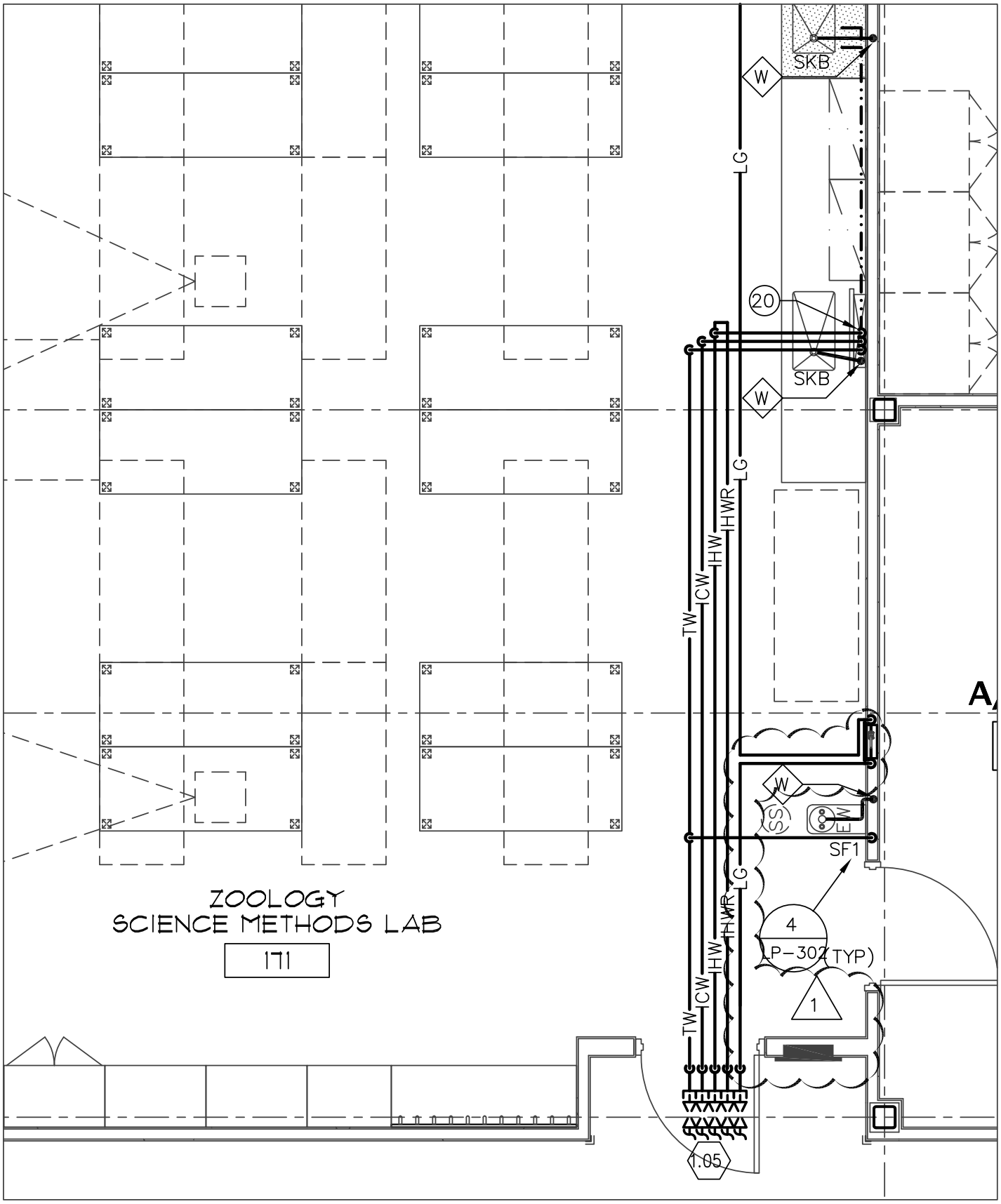
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD5-LP07

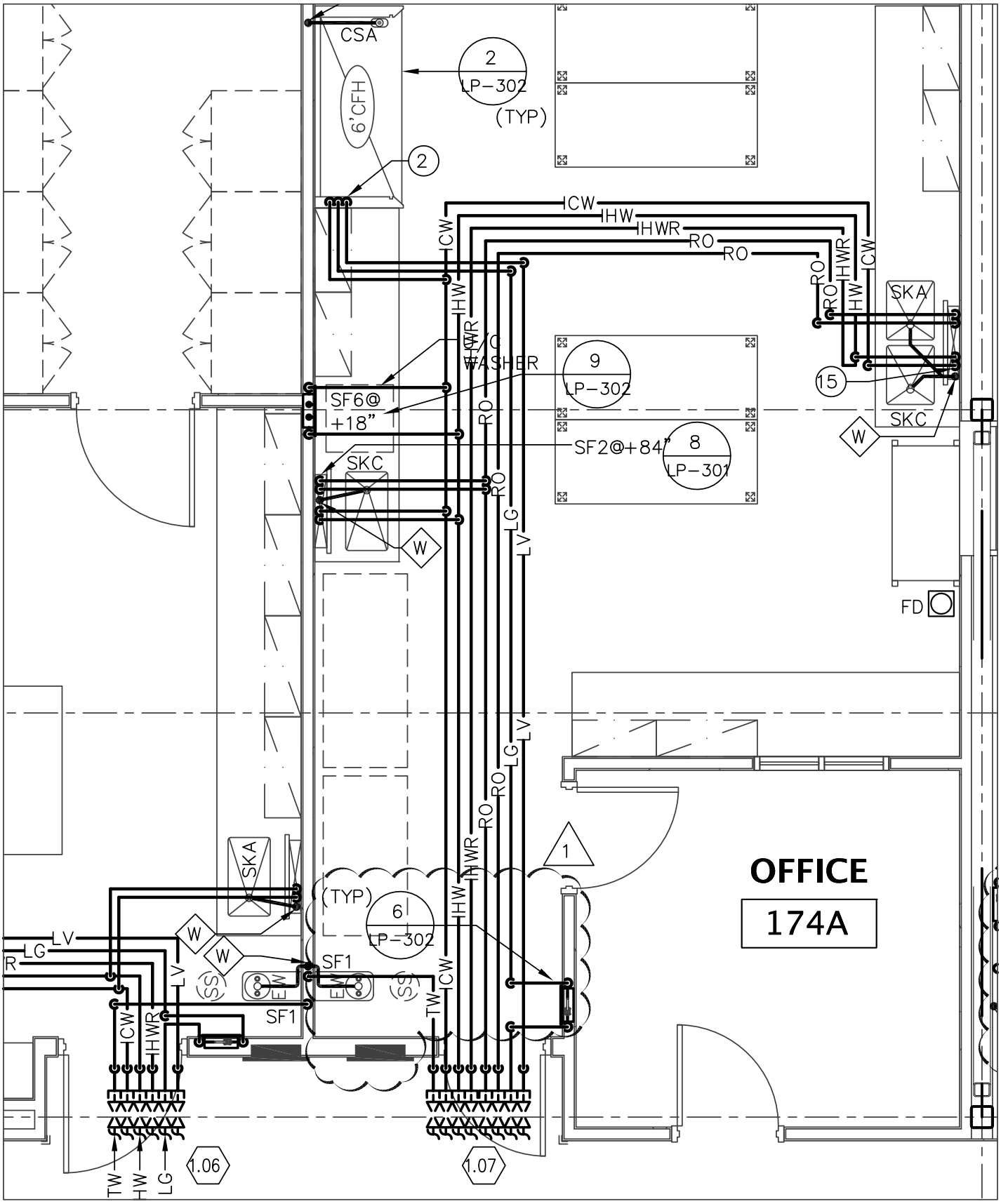
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD5-LP08

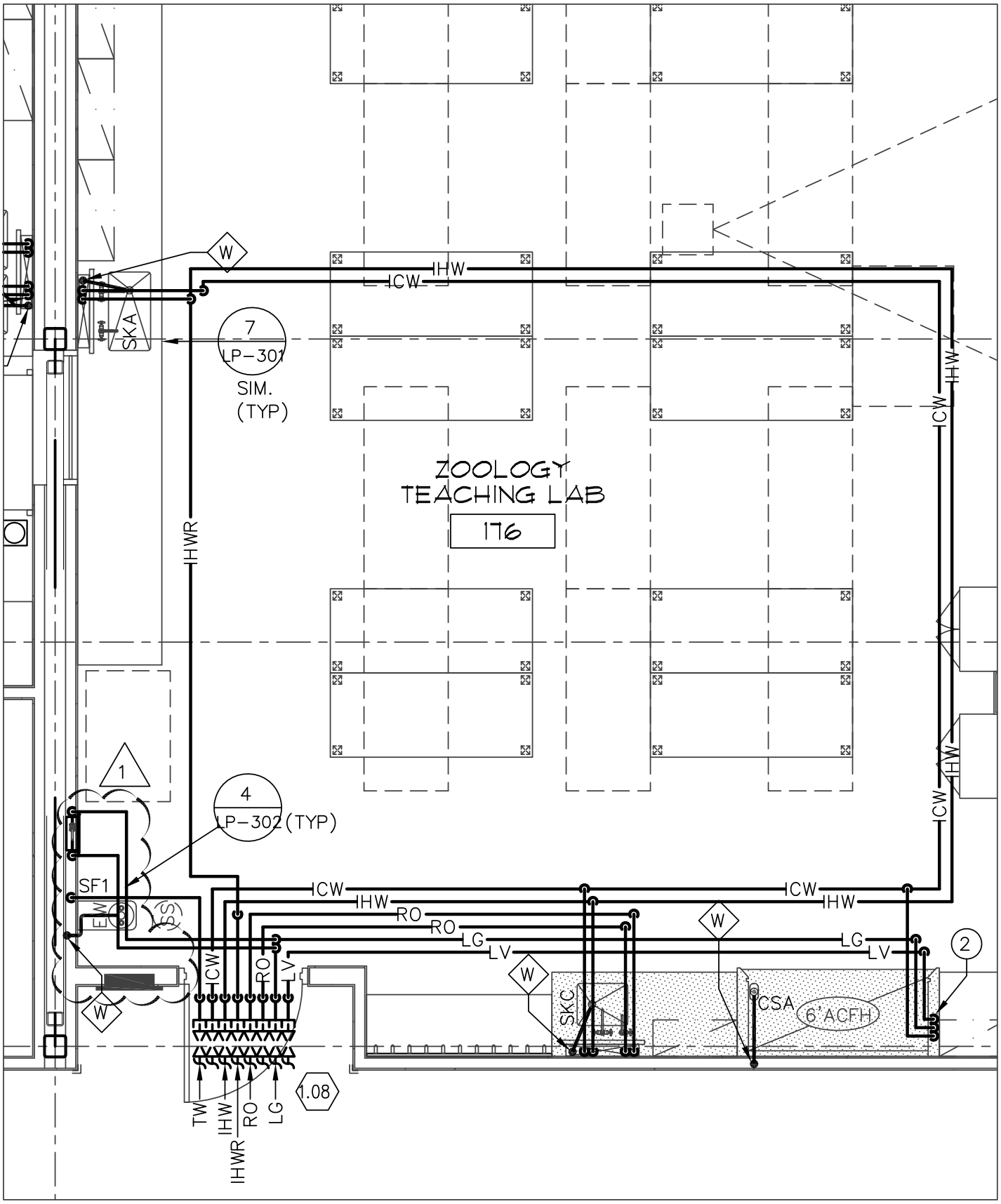
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD5-LP09

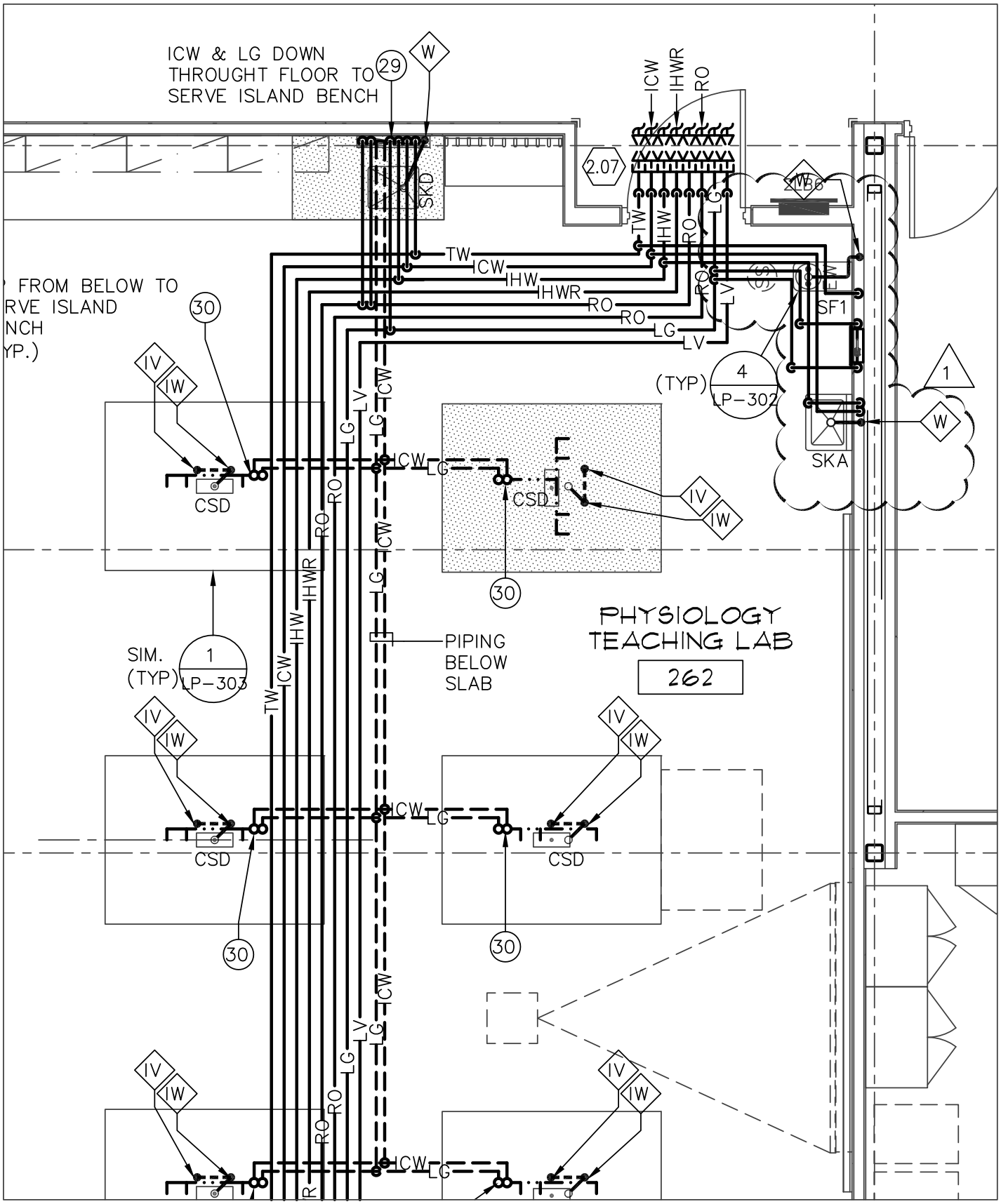
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD5-LP10

GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.26.2010



GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD5-LP11

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE: 05.26.2010

REAVELEY
ENGINEERS + ASSOCIATES
Consulting Structural Engineers

MEMORANDUM

Date	May 25, 2010
To	Justin Jacobs, GSBSA
From	Reggie Harris, Fan Xiao
Subject	Utah Valley University New Science Building

SUMMARY DESCRIPTION OF DRAWING CHANGES FOR ADDENDUM 5:

SHEET: SE001

1. Revise section III.A to read: Materials shall comply with the Standards specified in American Concrete Institute (ACI) 318-08, "Building Code Requirements for Structural Concrete."

SHEET: SB101A

1. See AD05-S01 for revisions to the retaining walls North of grid 6.8.
2. See AD05-S02 for additional utility trench.
3. See AD05-S03 for an additional slab depression at room 046.
4. The continuous concrete footing under the CFW-2 along grid E8, between grids 6.7 & 6.8 shall be FC2.5.

SHEET: SB101B

1. At grid 6.2 & E8, change the note “3-MICROPILES” to “4-MICROPILES”.
2. Near grid F1 & 6.48, change the note “SHORING WALL BY OTHERS” to “SHORING WALL SHALL BE DESIGNED AND CONSTRUCTED BY SHORING CONTRACTOR, TYPICAL”
3. The concrete pier at grid F3 & 6.4 shall be marked as CP-7.
4. See AD05-S04 for concrete foundation wall to concrete retaining wall changes at grids F5 & 6.6.
5. See AD05-S05 for foundation wall & pier locations due the stair revision.

SHEET: SB101C

1. The slab depression (dashed ‘x’) at grid 6.2 between grids E7 & E8 shall be noted as “DEPRESS SLAB AT FLOOR SINK”

SHEET: SB502

1. Revise detail A4 per AD05-S25.

SHEET: SB506

1. Revise detail B2 per AD05-S06.

SHEET: SB601

P: 801.486.3883
F: 801.485.0911

675 E. 500 S. Suite 400
Salt Lake City, Utah 84102
www.reaveley.com

1. Revise CRW-2 in the concrete retaining wall schedule (A4/SB601) to: ‘HT’=7’-0” and ‘B’=5’-6”.
2. Delete CRW-3 from the concrete retaining wall schedule (A4/SB601)

SHEET: SF111A
1. Revise framing between grids E6-E7 & 6.31-6.44 per attached AD05-S07.
2. The concrete wall along grid 6.8 between grids E6 & E7 shall be marked as CFW-7.
3. The concrete wall along grid 6.8 west of grid E6 shall be marked as CFW-8.
4. Revise the extents of the fire proofed area per AD05-S26.

SHEET: SF111B
1. Revise framing between grids E8-E9 & 6.31-6.44 per attached AD05-S08.
2. Revise framing between grids F0-F1 & 6.31-6.5 per attached AD05-S09.
3. Move SC-91 to be located on Grid F1 as shown on AD05-S09.
4. Revise concrete foundation wall and pier locations per attached AD05-S10.
5. Revise “Floor Framing Plan Legend” per attached AD05-S11.

SHEET: SF111C
1. Provide 2 rows of horizontal bridging for open web steel joists between grids E5-E5.4.
2. Add fire proofed area between grids E7-E8 & 6.0-6.3 per attached SF111C.

SHEET: SF121B
1. Add Double shear connection symbol to both ends on W30x99 on grid E9 between grids 6.48 & 6.6.
2. Revise framing between grids F0-F1 & 6.31-6.4 per attached AD05-S12.
3. Move SC-91 to be located on Grid F1 as shown on AD05-S12.
4. Revise stair landing framing at grid F3-6.4 per attached AD05-S13.
5. Revise framing and column locations per attached AD05-S14.
6. Revise “Floor Framing Plan Legend” per attached AD05-S11.

SHEET: SF131B
1. Revise framing and column locations per attached AD05-S15.
2. Add L6x4x5/16 at additional mechanical unit/pad per AD05-S24.

SHEET: SF203
1. Add L4x4x1/4 supports for horizontal tube per attached AD05-S16.

SHEET: SF213
1. Add detail A4 per attached AD05-S17.

SHEET: SF502
1. Detail B2, Revise note “CONCRETE SLAB OVER GEOFOAM” to “4” CONC. SLAB OVER RIGID CONC. VOID FILLER SEE G.S.N.”

SHEET: SF503
1. Details B5, A2, A3, A4 & A5. Revise note “4” L.W. CONC. SLAB OVER RIGID…….” To “3” L.W. CONC. SLAB OVER RIGID……”
2. Detail A1. Revise note “L.W. CONC. SLAB OVER RIGID…….” To “3” L.W. CONC. SLAB OVER RIGID……”

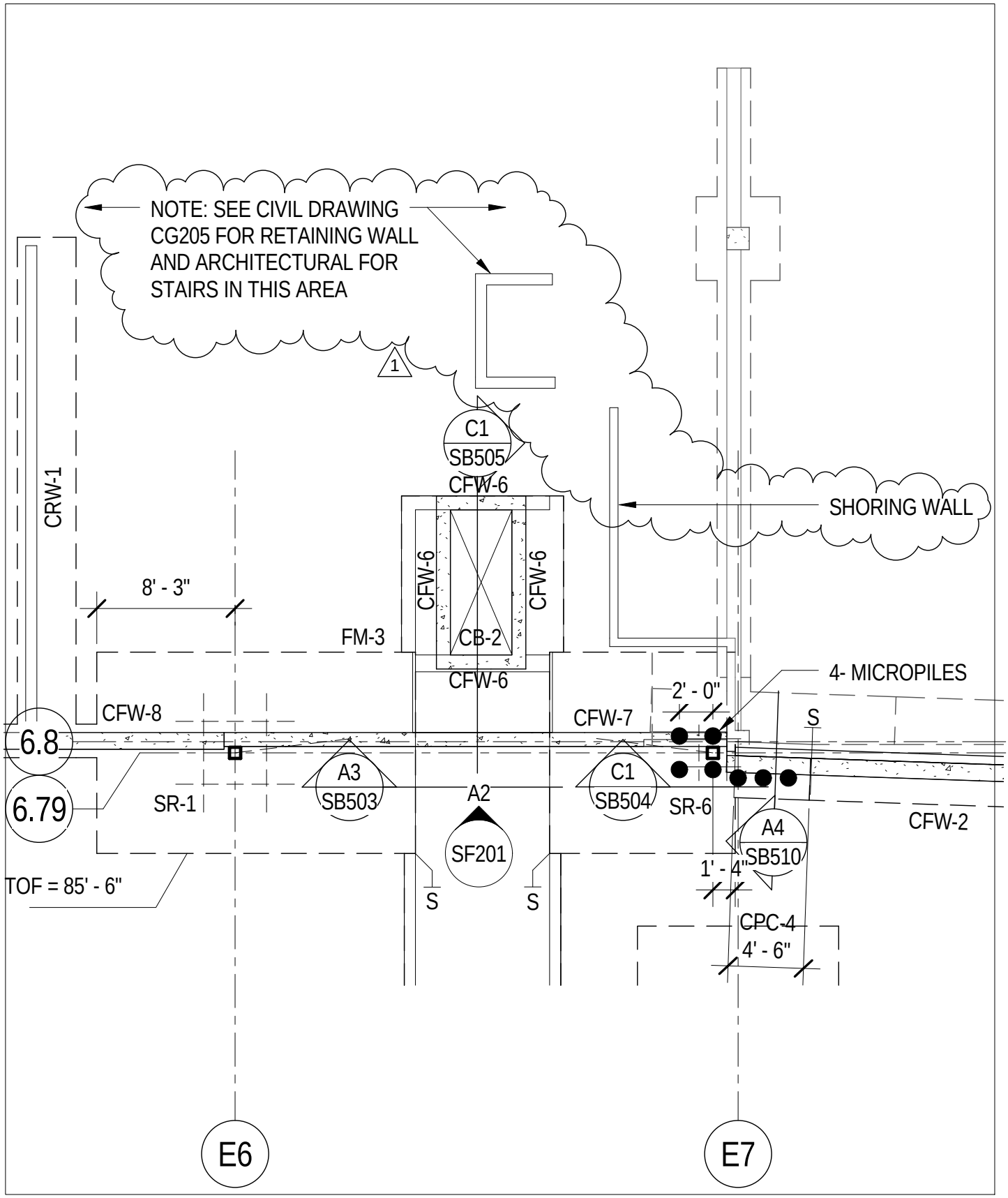
3. Detail B4. Revise the detail reference D1/SF601 at the connection plates to D4/SF601.

SHEET: SF505
1. Add detail B2 per attached AD05-S18.
2. Add detail B3 per attached AD05-S19.
3. Add detail B4 per attached AD05-S20.

SHEET: SF522
1. Revise detail D1 per attached AD05-S21.
2. Revise detail C5 per attached AD05-S22.

SHEET: SF525
1. Detail A1. Revise note “L6x4x5/16 x CONT W/……” to “1/4” BENT PLATE x CONT (4” VERT LEG) W/……”
2. Detail A2. Revise note “L6x4x5/16 x CONT W/……” to “1/4” BENT PLATE x CONT (4” VERT LEG) W/……”
3. Revise detail A3 per attached AD05-S23.

End of Revisions



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

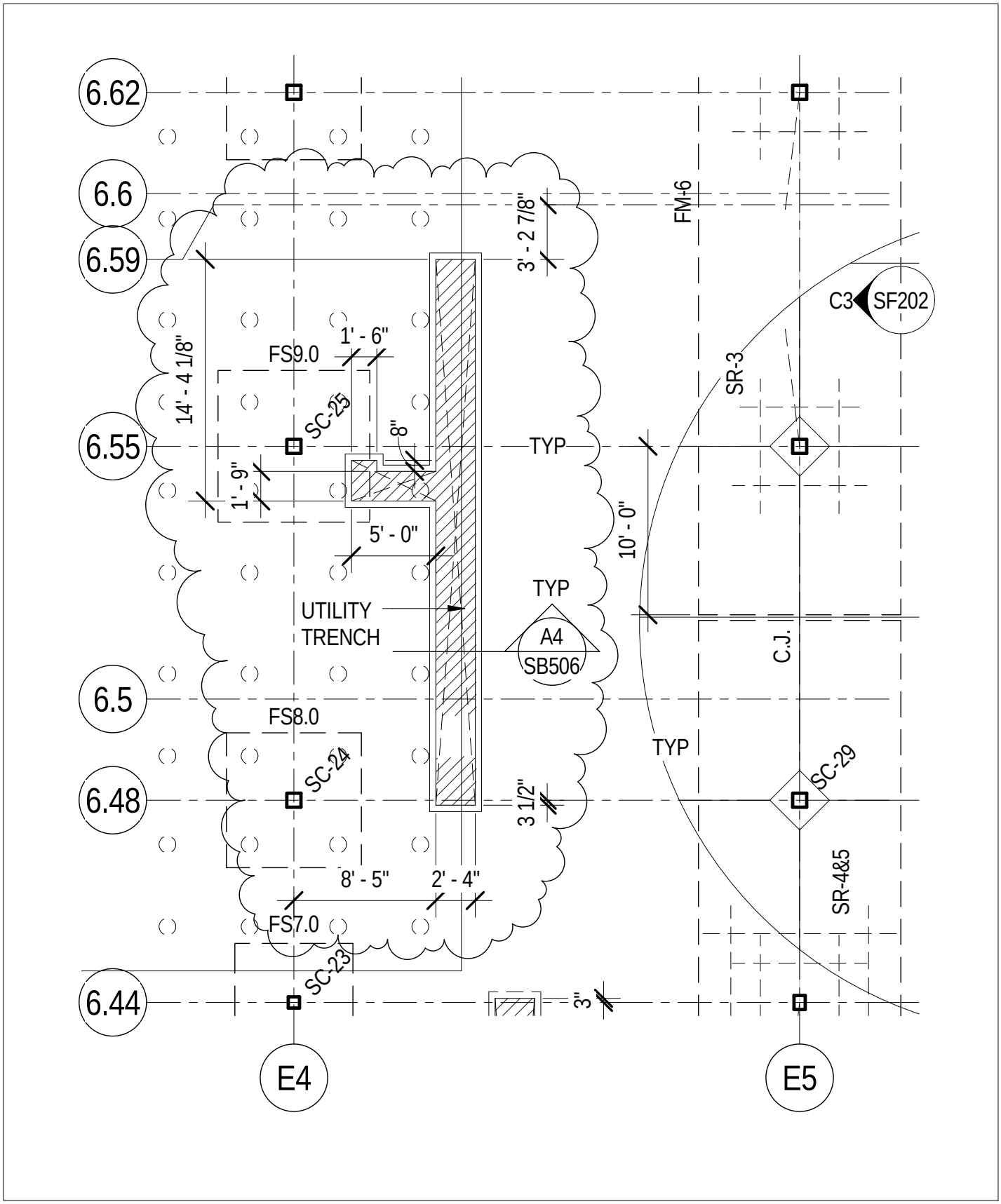
5/25/2010 6:00:53 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S01

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:00:54 PM

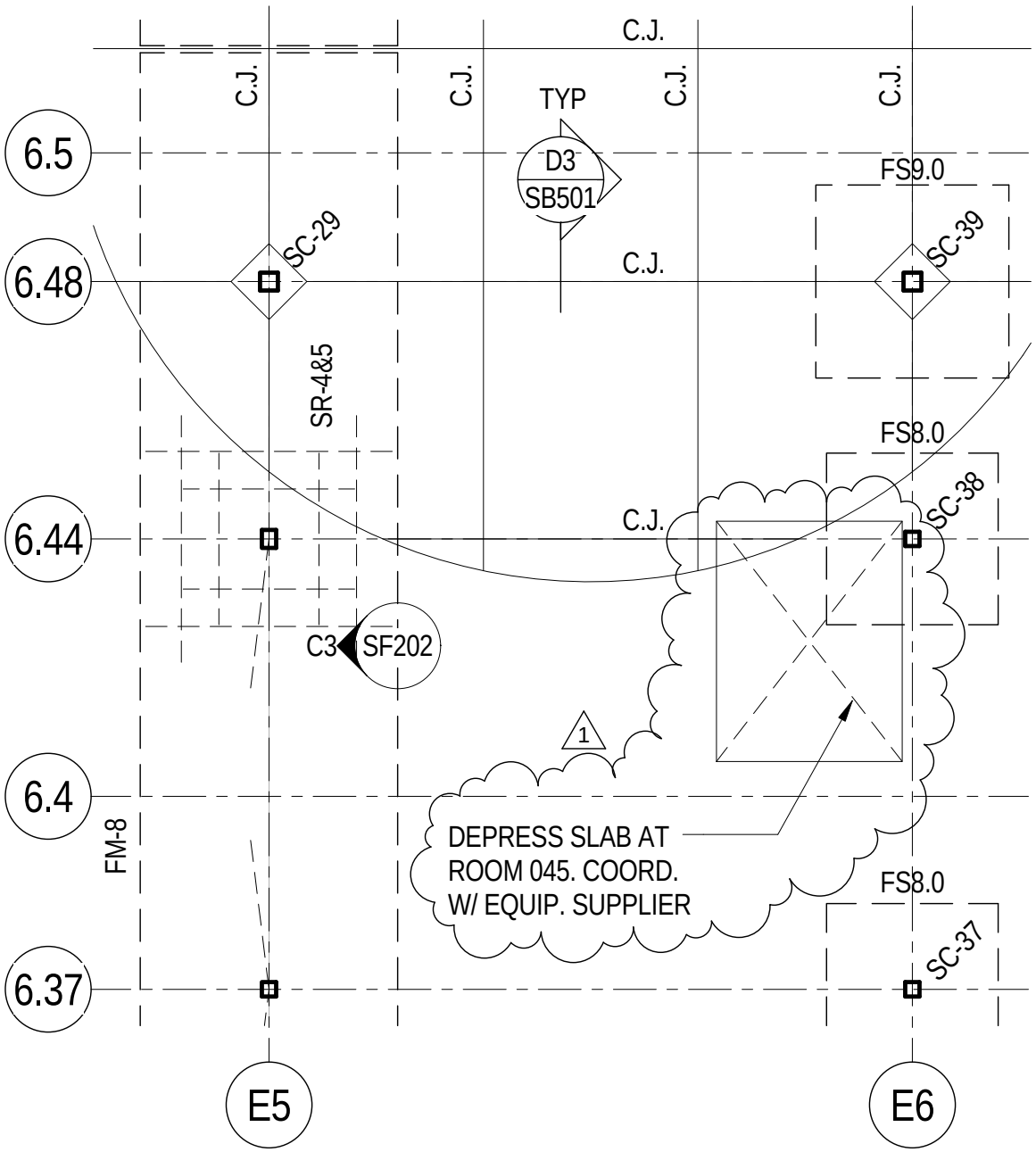
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S02

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

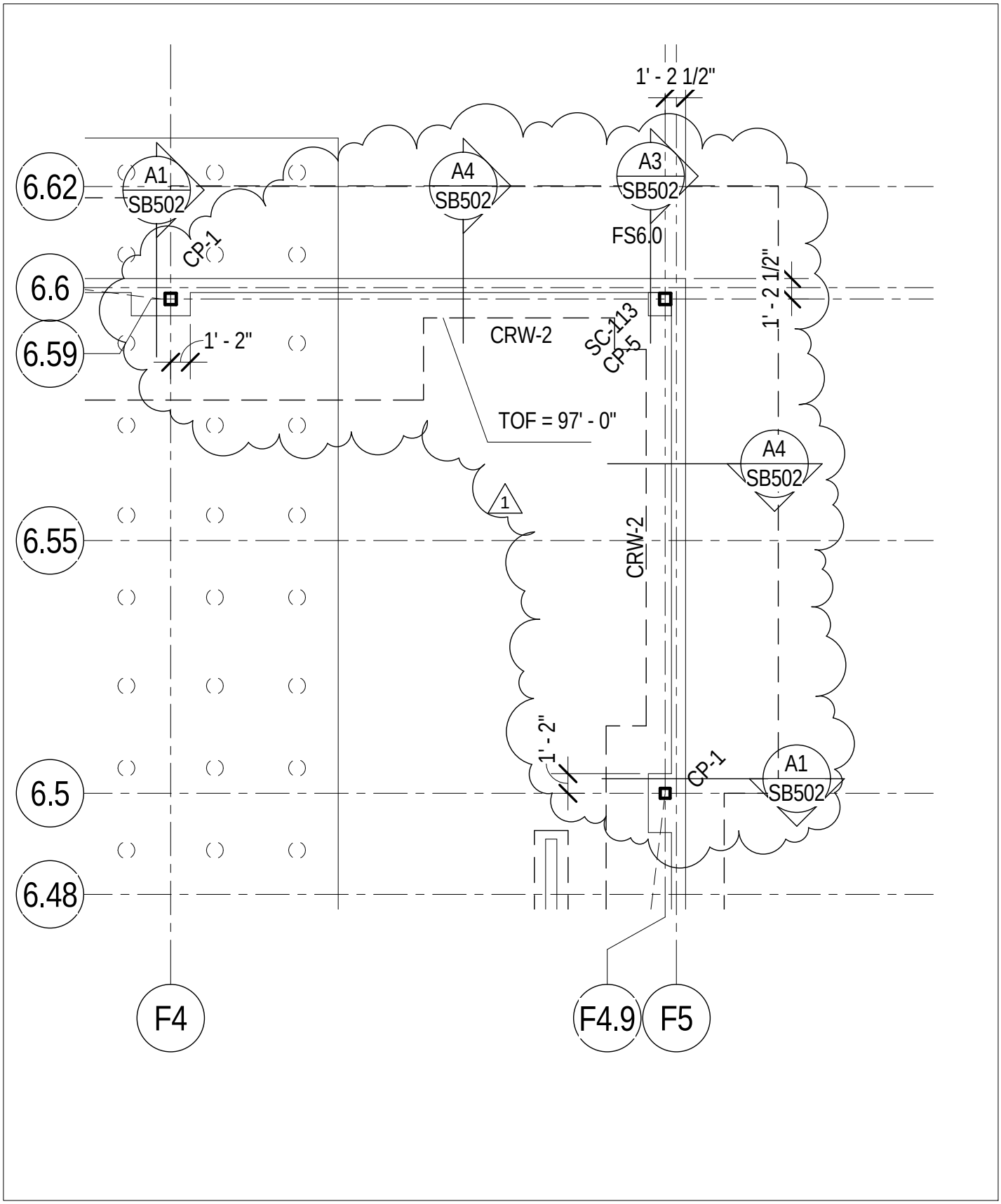
5/25/2010 6:00:54 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S03

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:00:55 PM

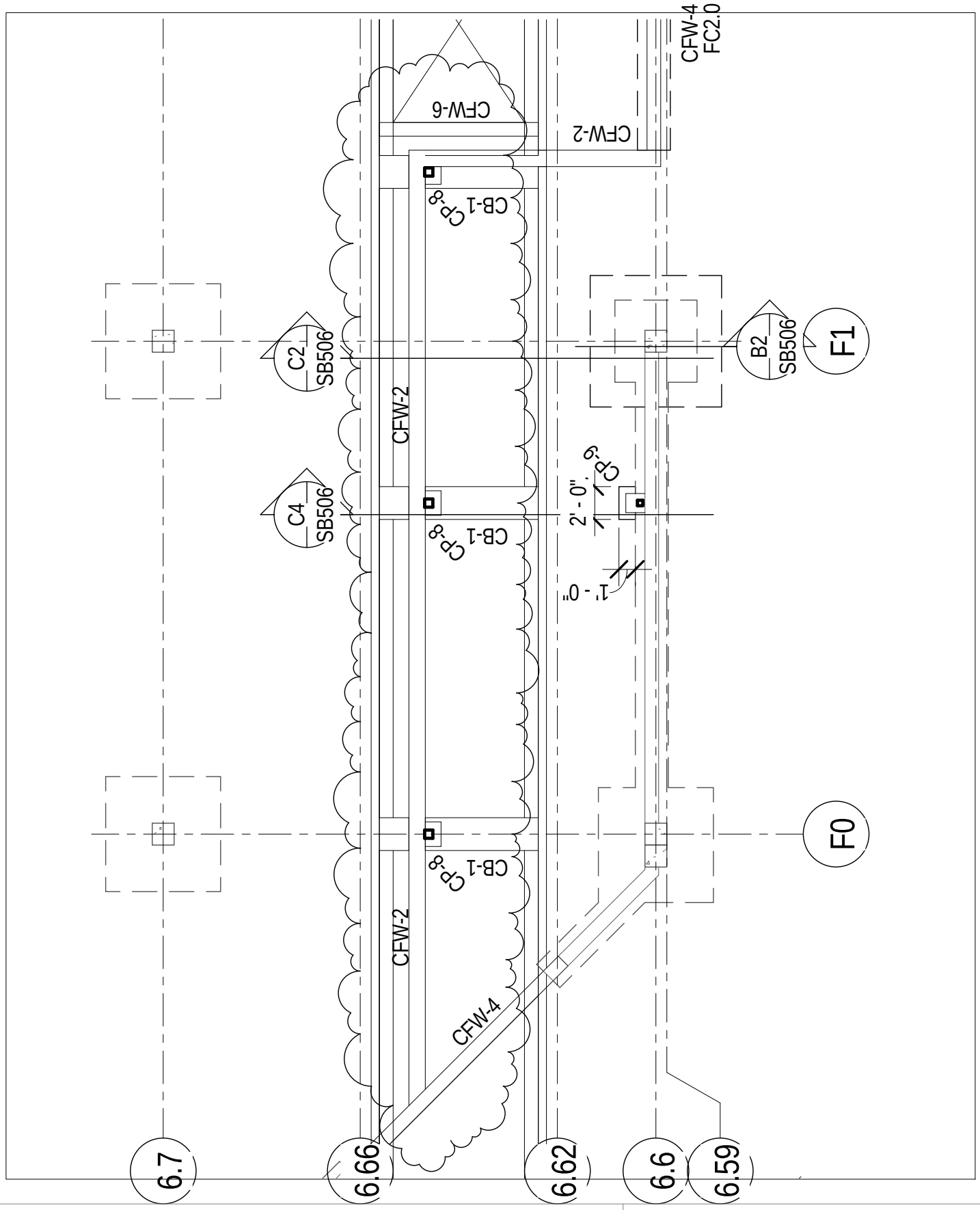
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S04

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:00:56 PM

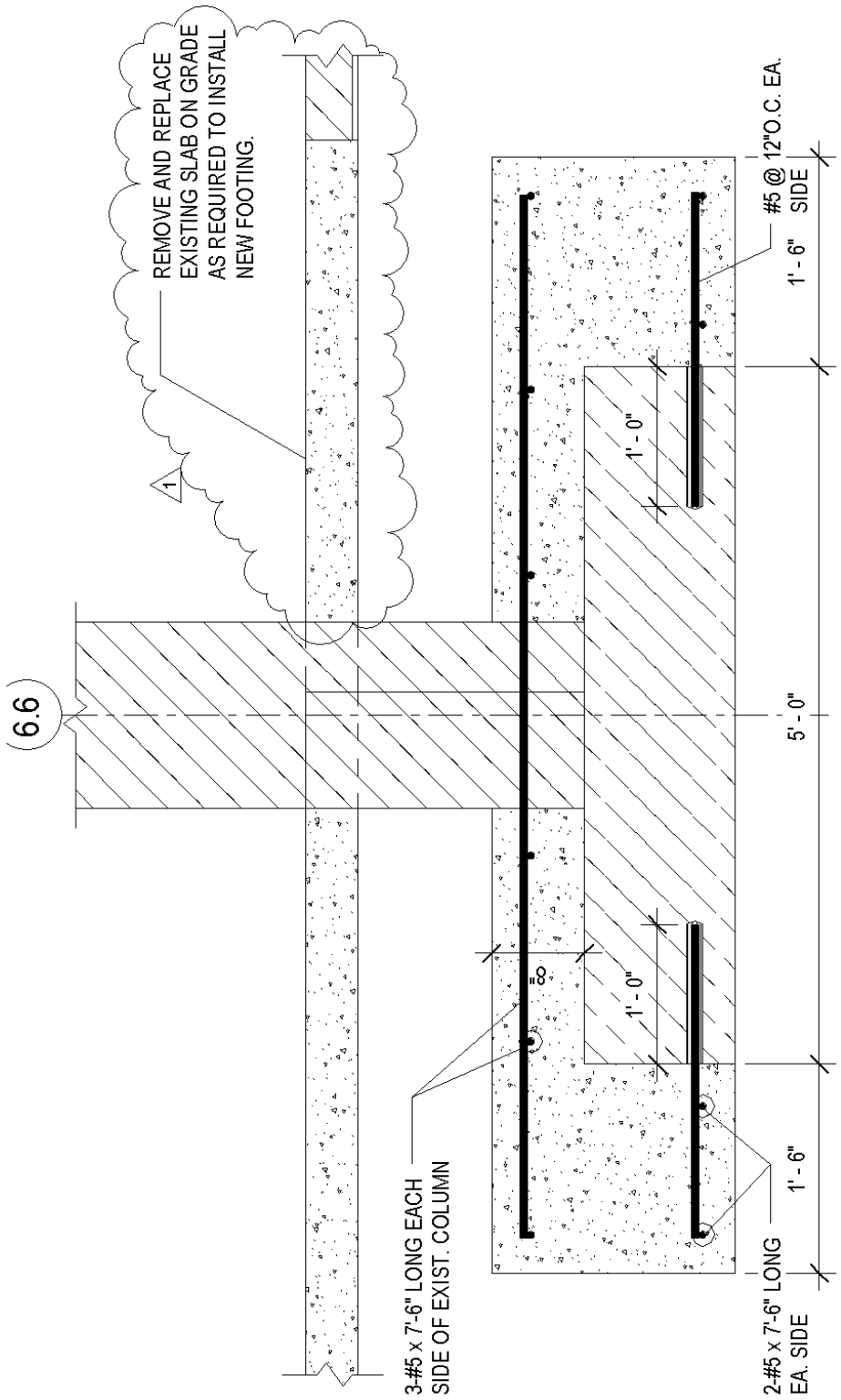
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S05

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



B2 / SB506 NEW CONCRETE FOOTING AT EXISTING

NO SCALE

C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:00:56 PM

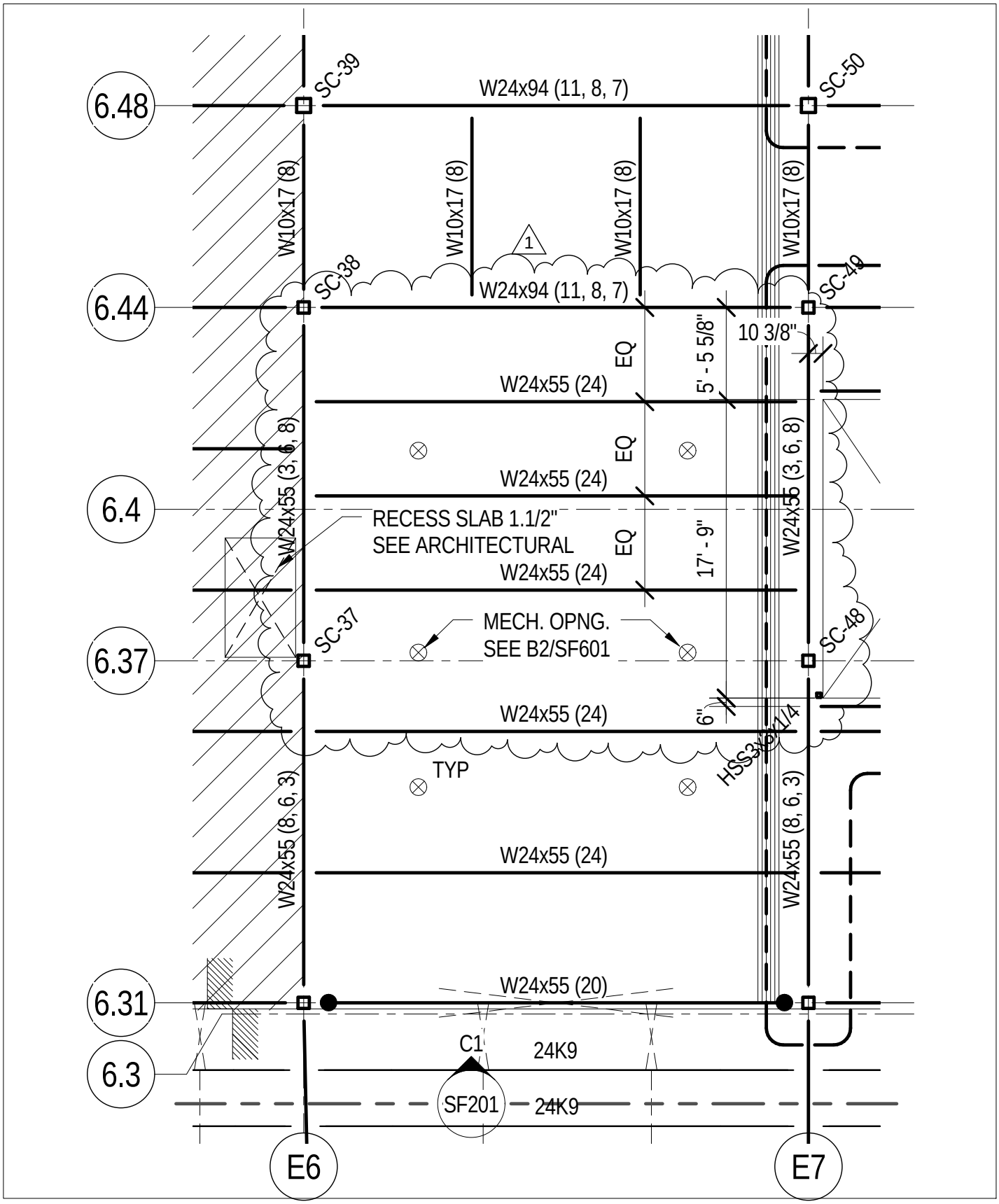
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S06

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:00:57 PM

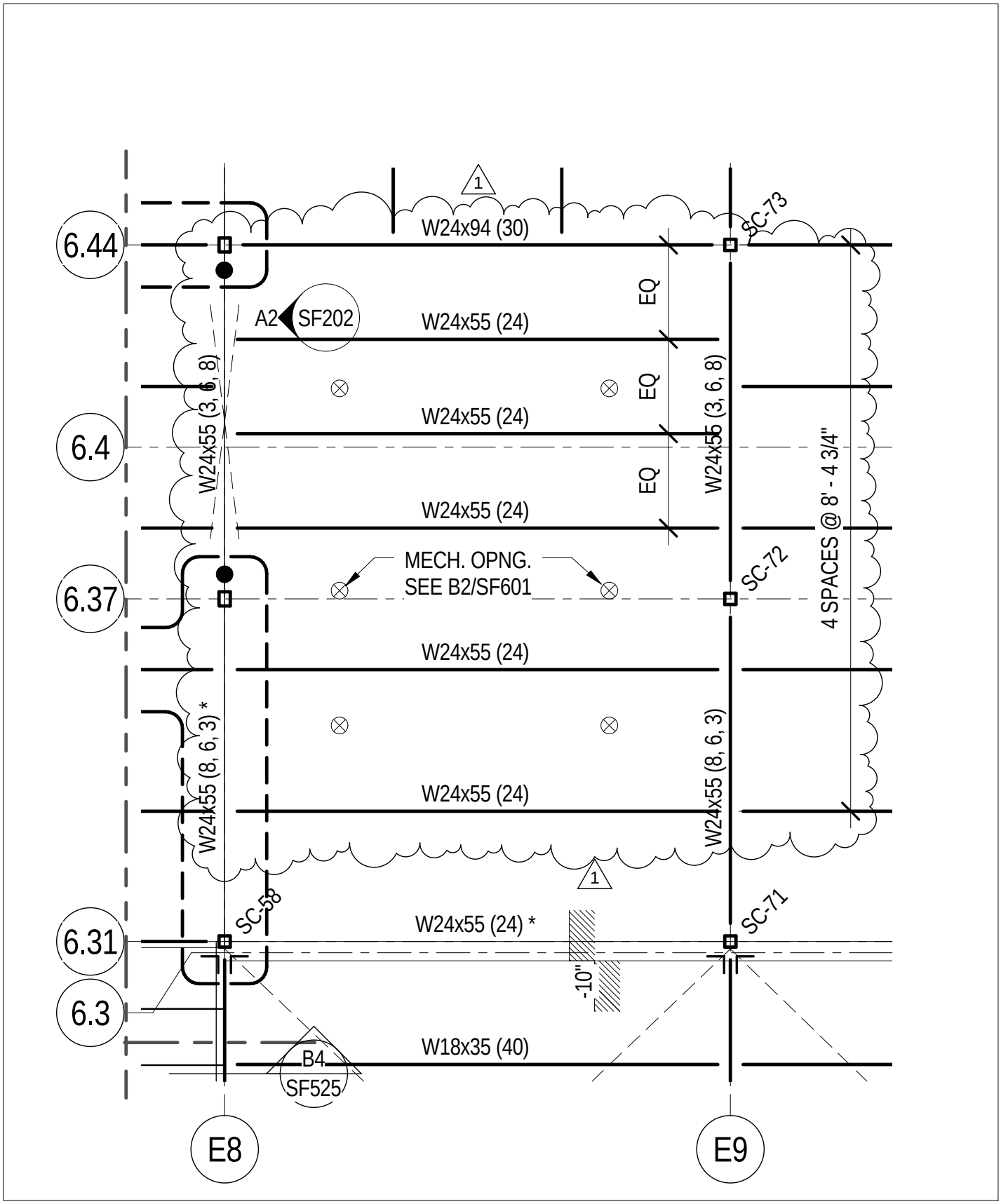
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S07

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

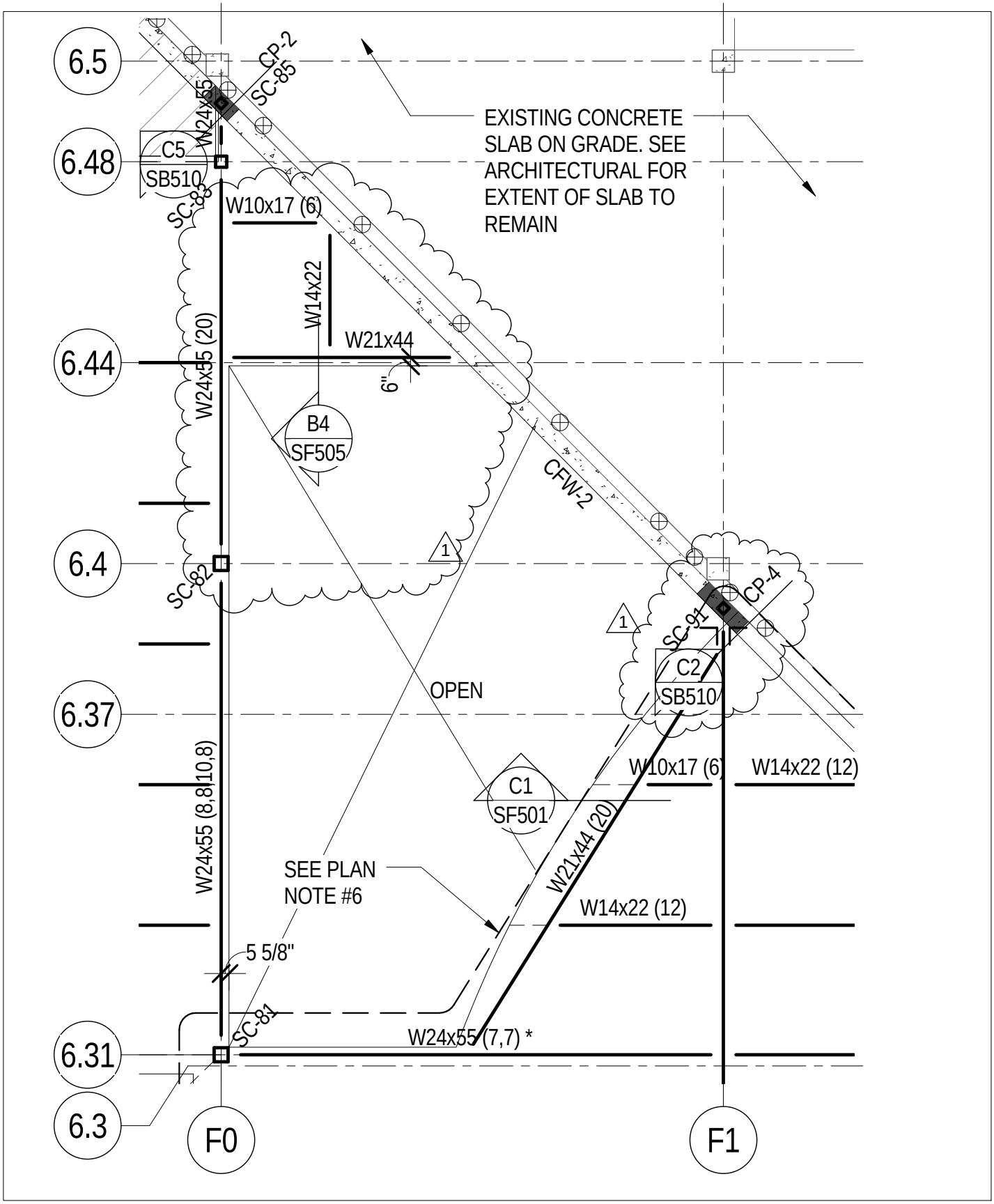
5/25/2010 6:00:58 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S08

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

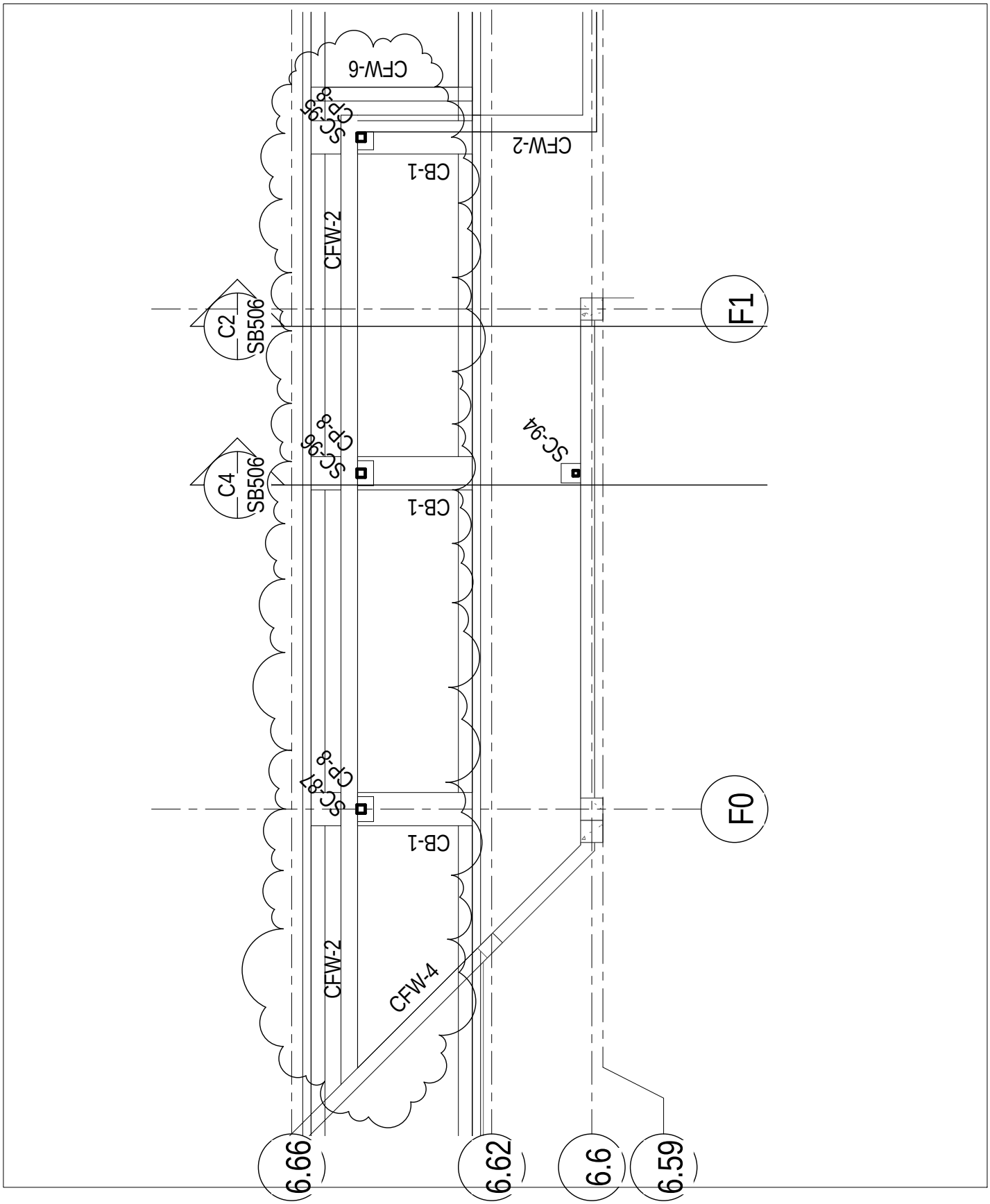
5/25/2010 6:00:58 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S09

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:00:59 PM

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S10

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:

FLOOR FRAMING PLAN LEGEND

LEG-FLOOR

HELICAL PIER 1

CONCRETE WALL

CONCRETE LINTEL IN CONCRETE WALL

CONCRETE COLUMN IN CONCRETE WALL

CONCRETE COLUMN

CONCRETE JAMB COLUMN POURED MONOLITHIC WITH CONCRETE WALL

MASONRY WALL

MASONRY LINTEL IN MASONRY WALL

MASONRY COLUMN IN MASONRY WALL

C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:00:59 PM

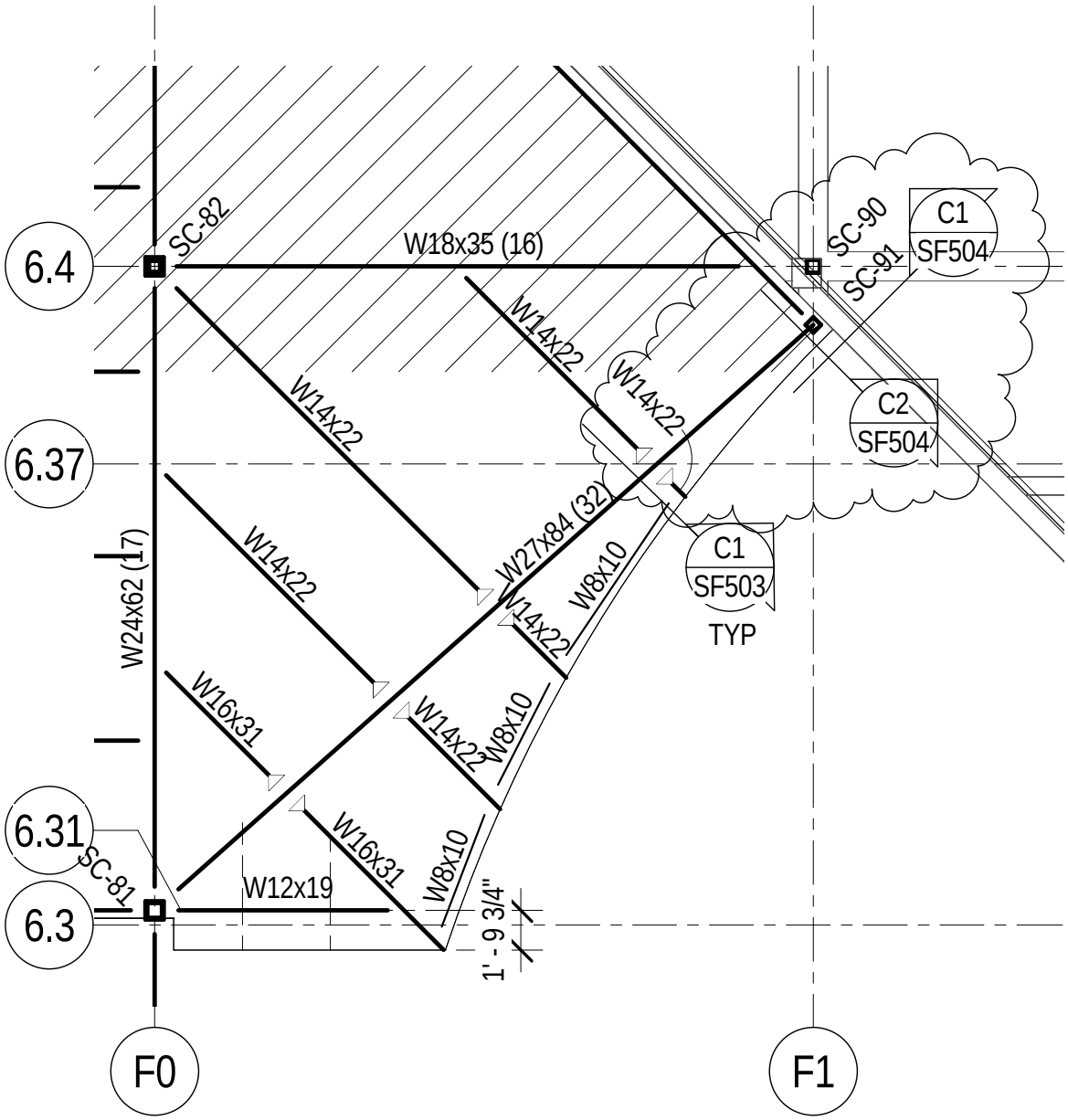
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S11

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:01:00 PM

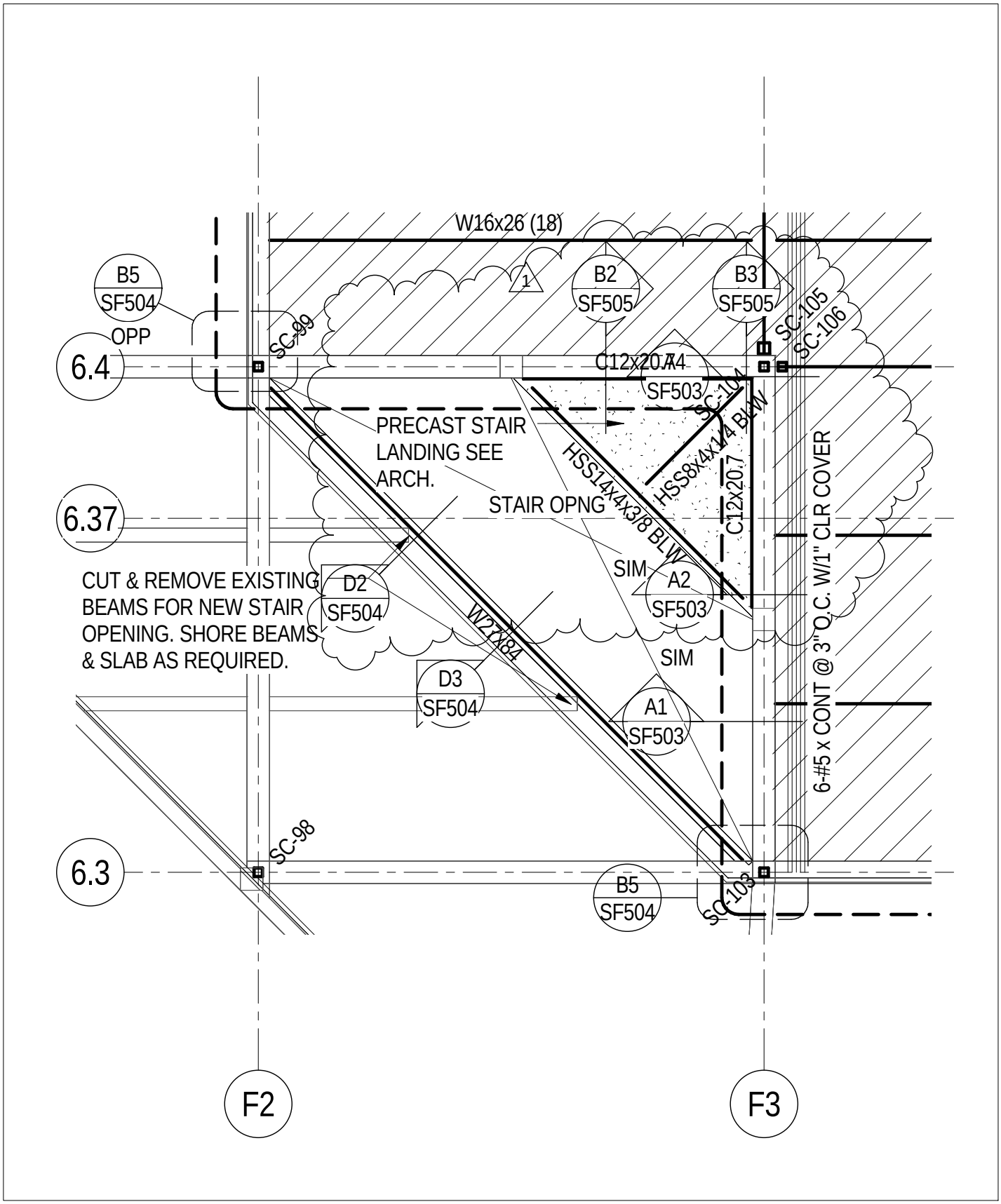
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S12

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

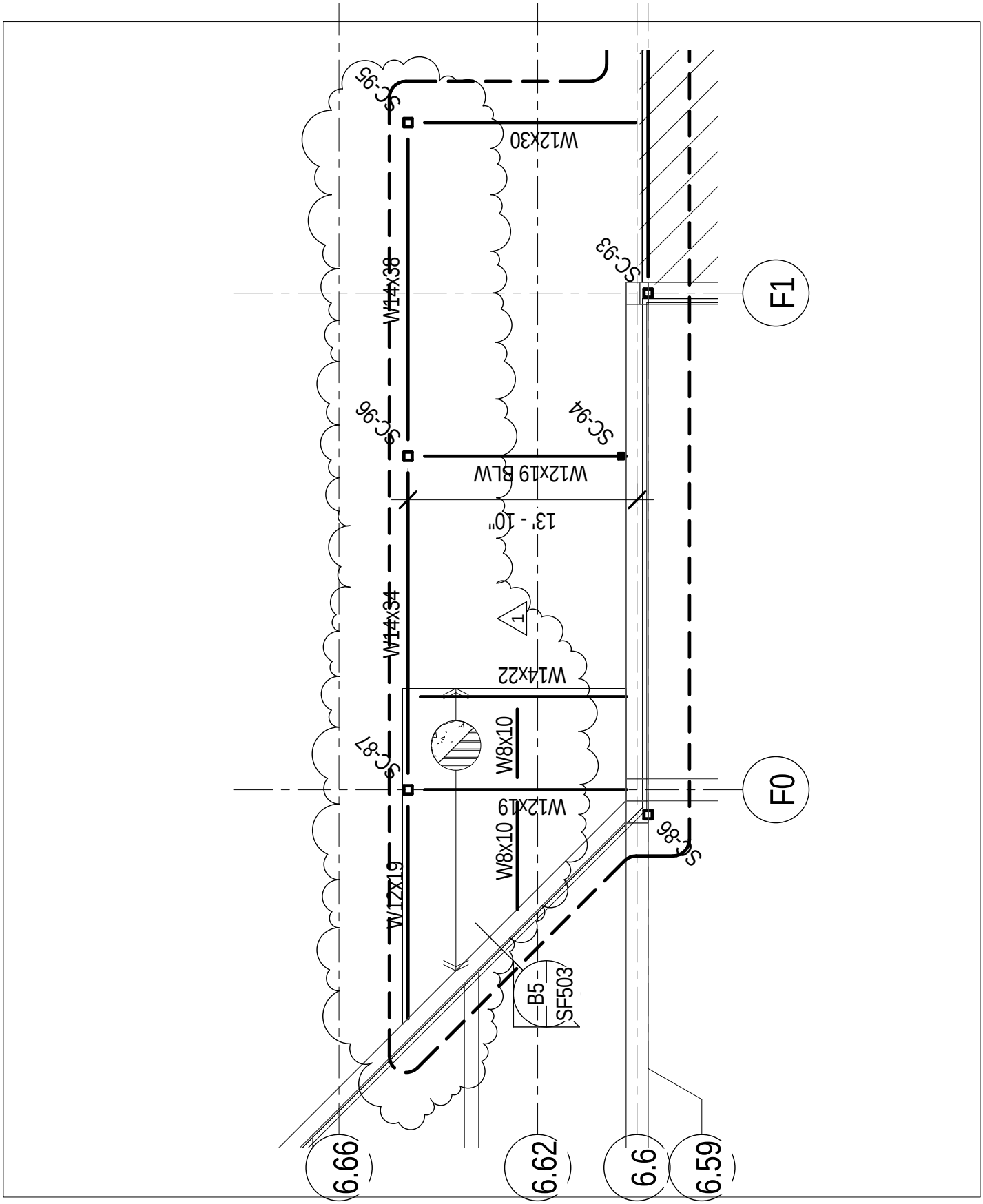
5/25/2010 6:01:00 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S13

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:01:01 PM

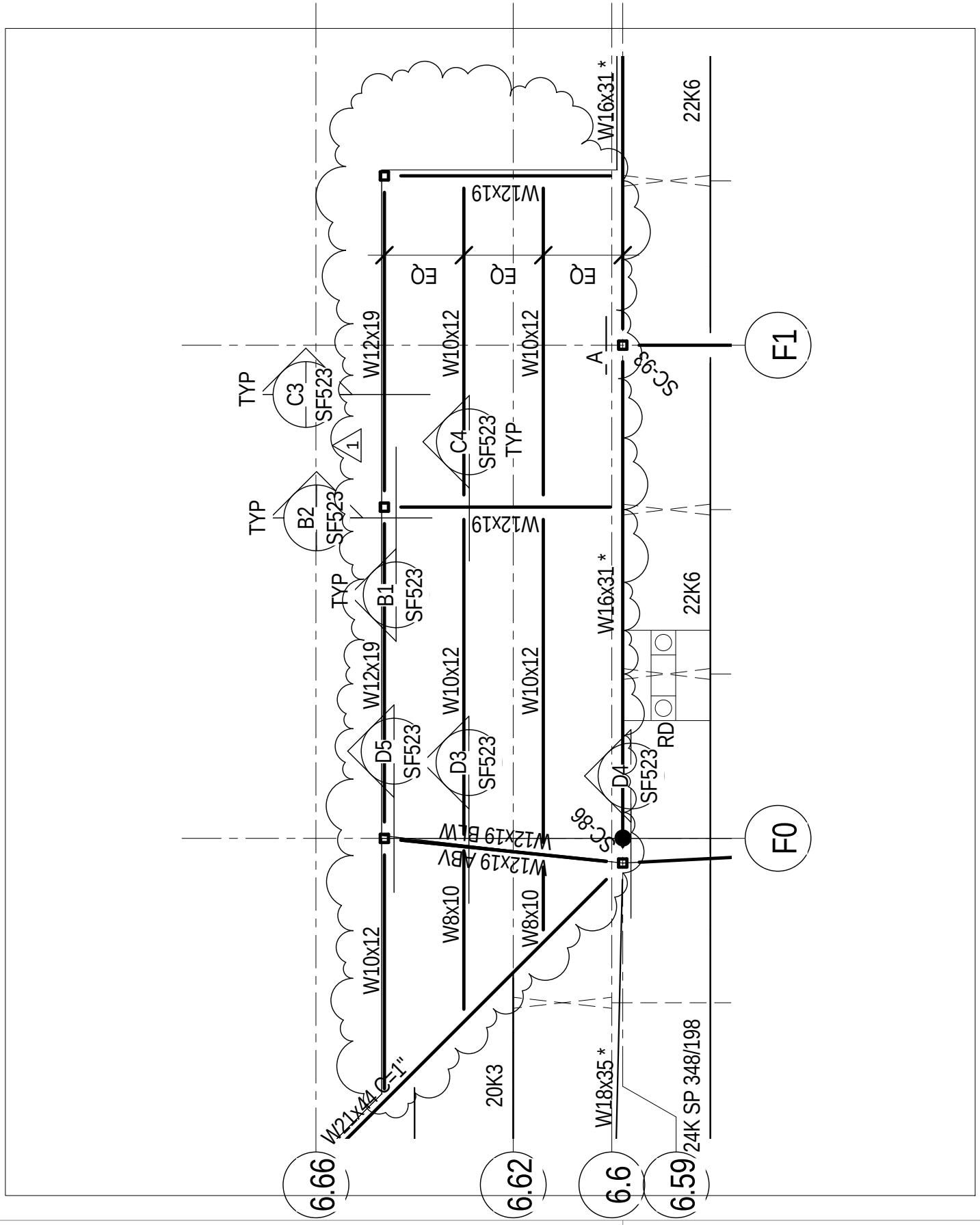
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S14

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:01:02 PM

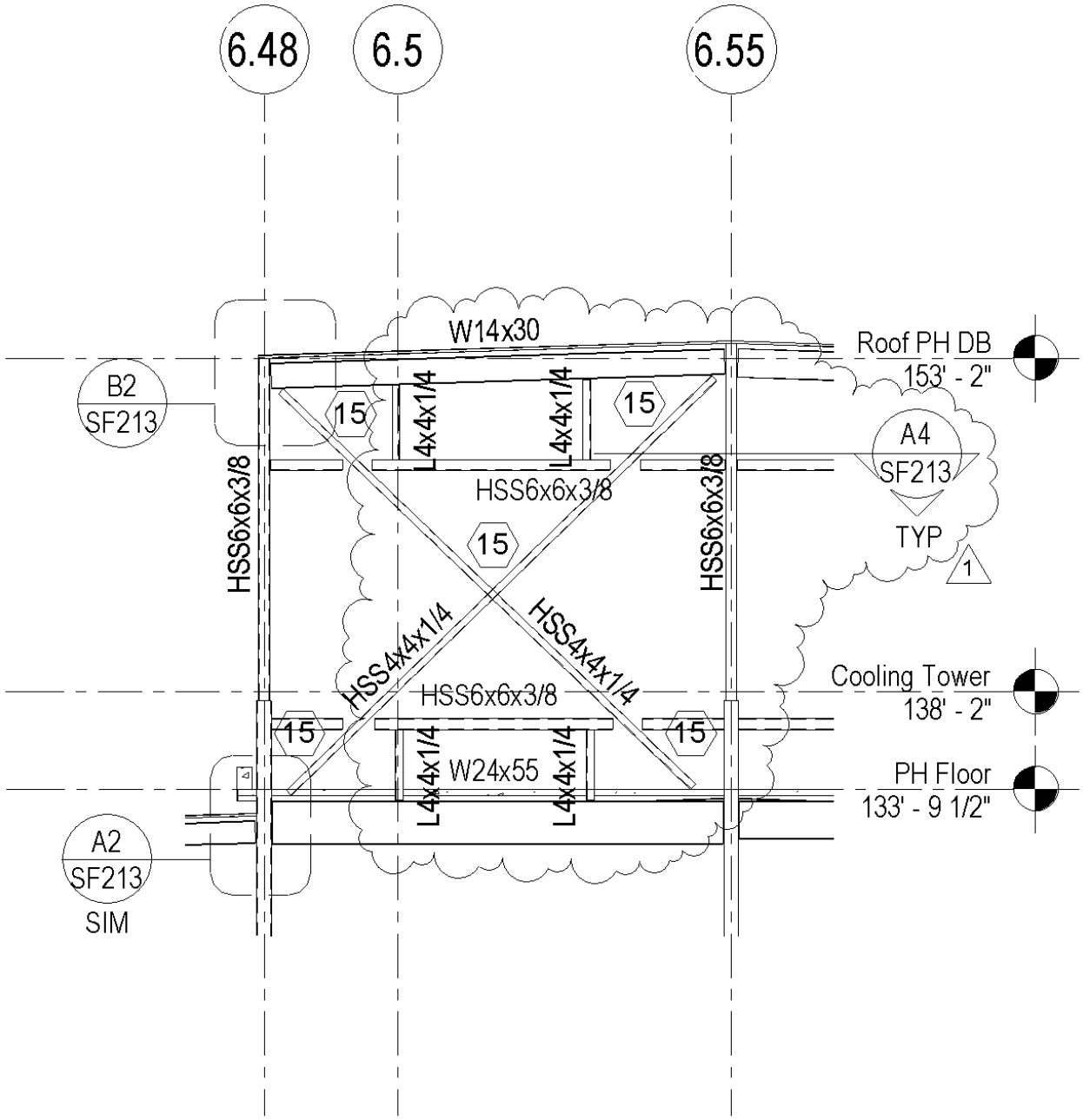
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S15

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



D3
SF203

BRACED FRAME ELEVATION ALONG GRID E4

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

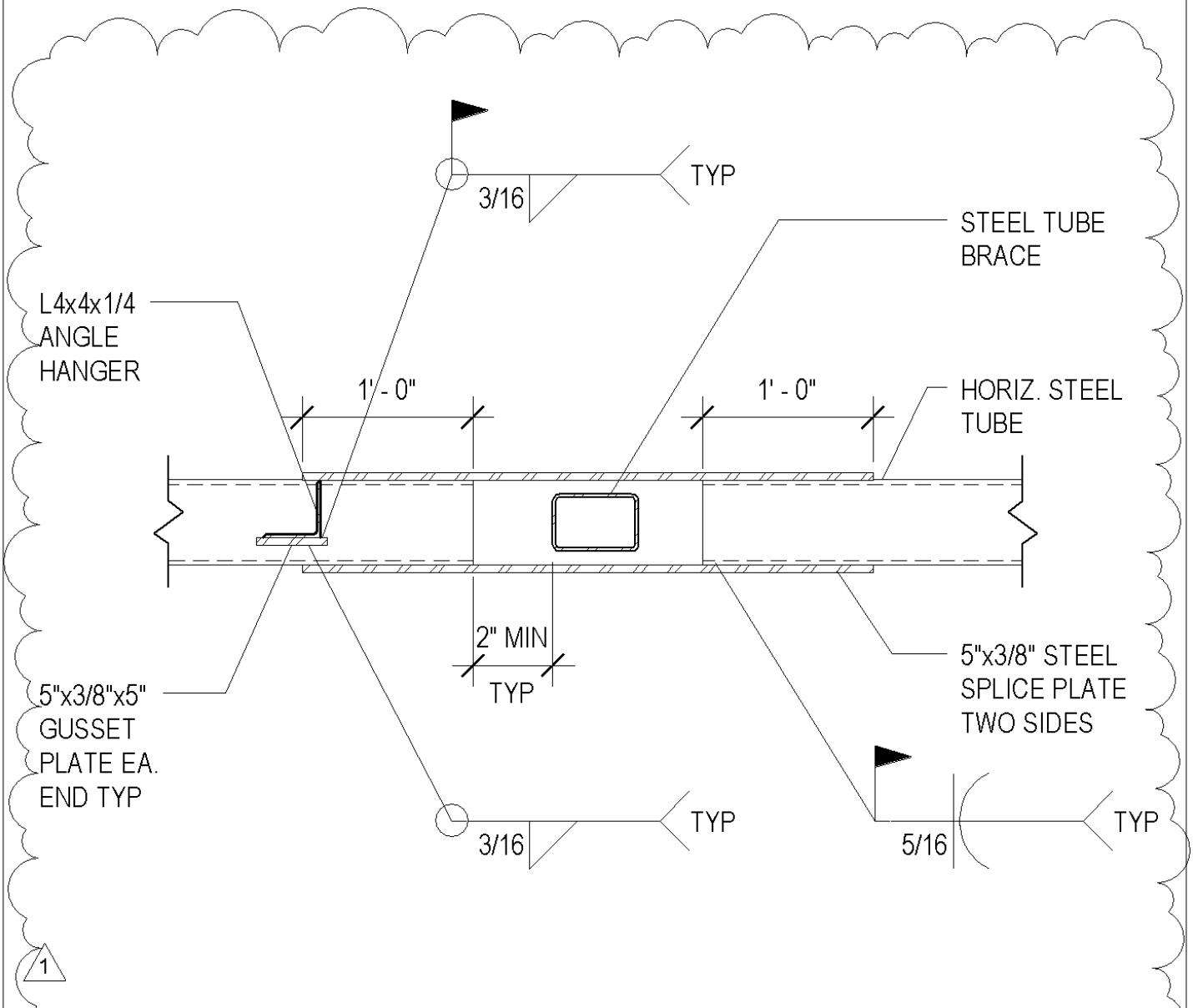
C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:01:02 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S16

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE:



A4

SF213

TYPICAL TUBE SPLICE AT BRACE MEMBER

NO SCALE

C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:01:02 PM

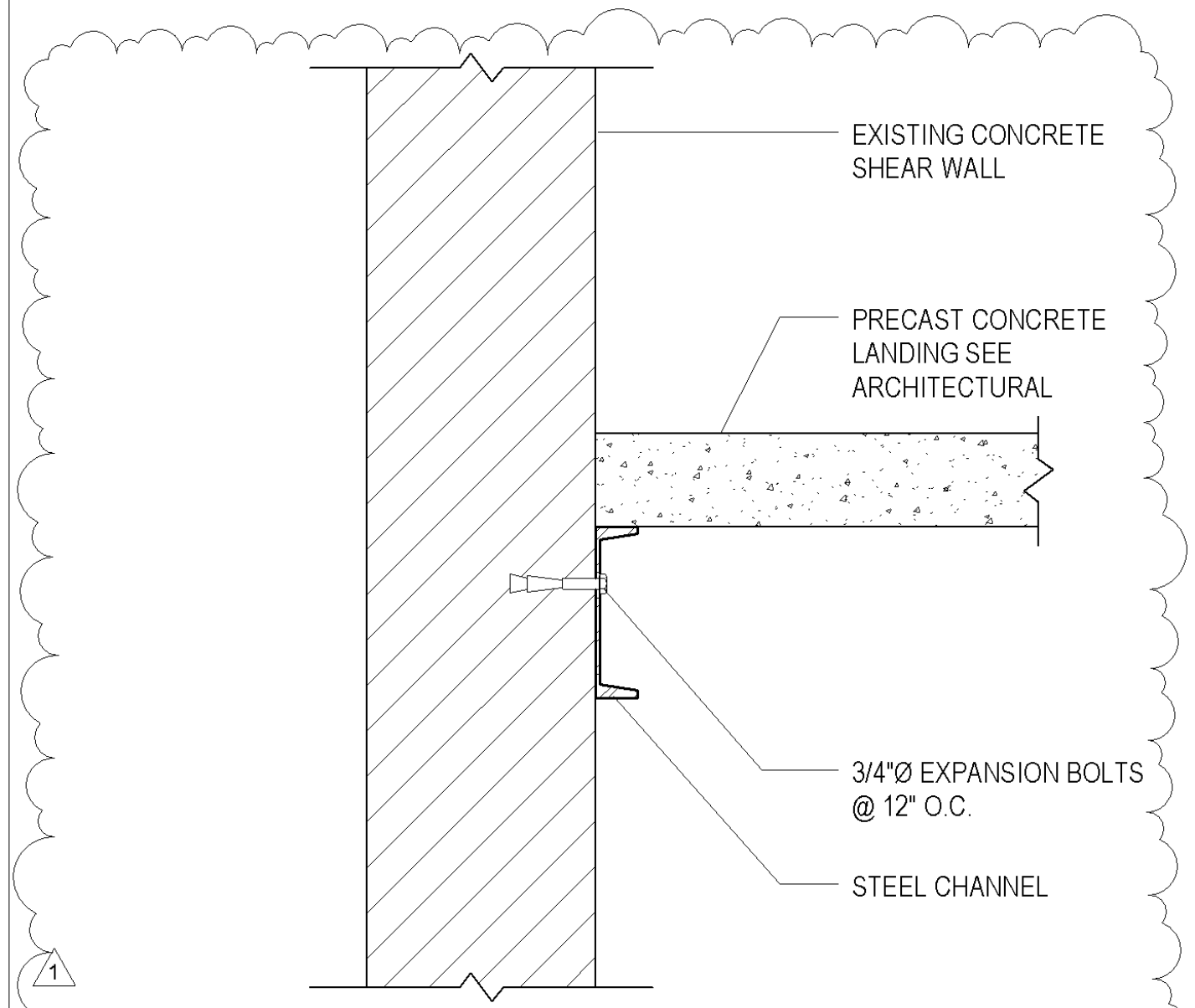
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S17

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



B2
SF505

NEW STEEL CHANNEL AT EXISTING WALL

NO SCALE

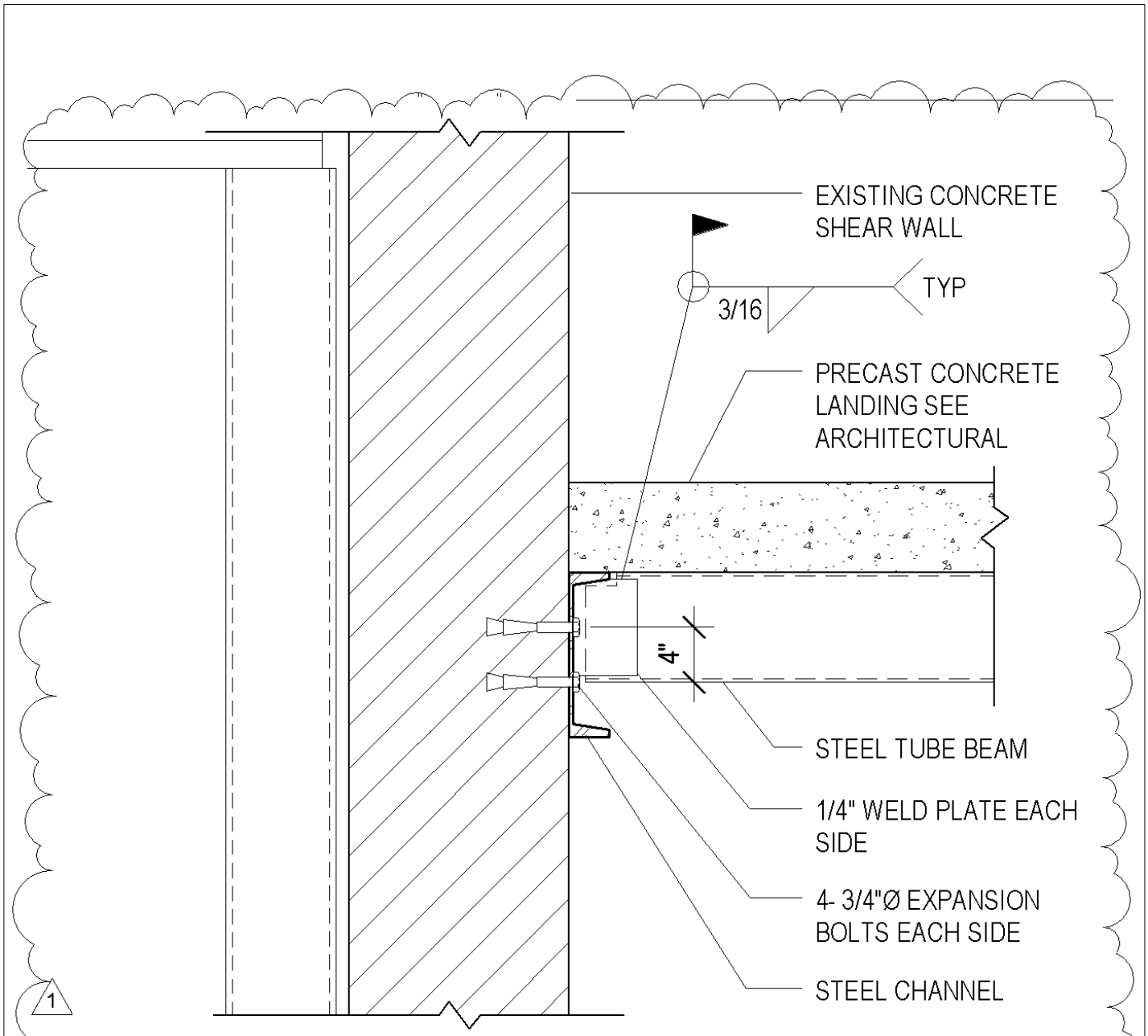
C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:01:02 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S18

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE:



B3
SF505

STEEL TUBE CONNECTION TO STEEL CHANNEL AT EXIST WALL

NO SCALE

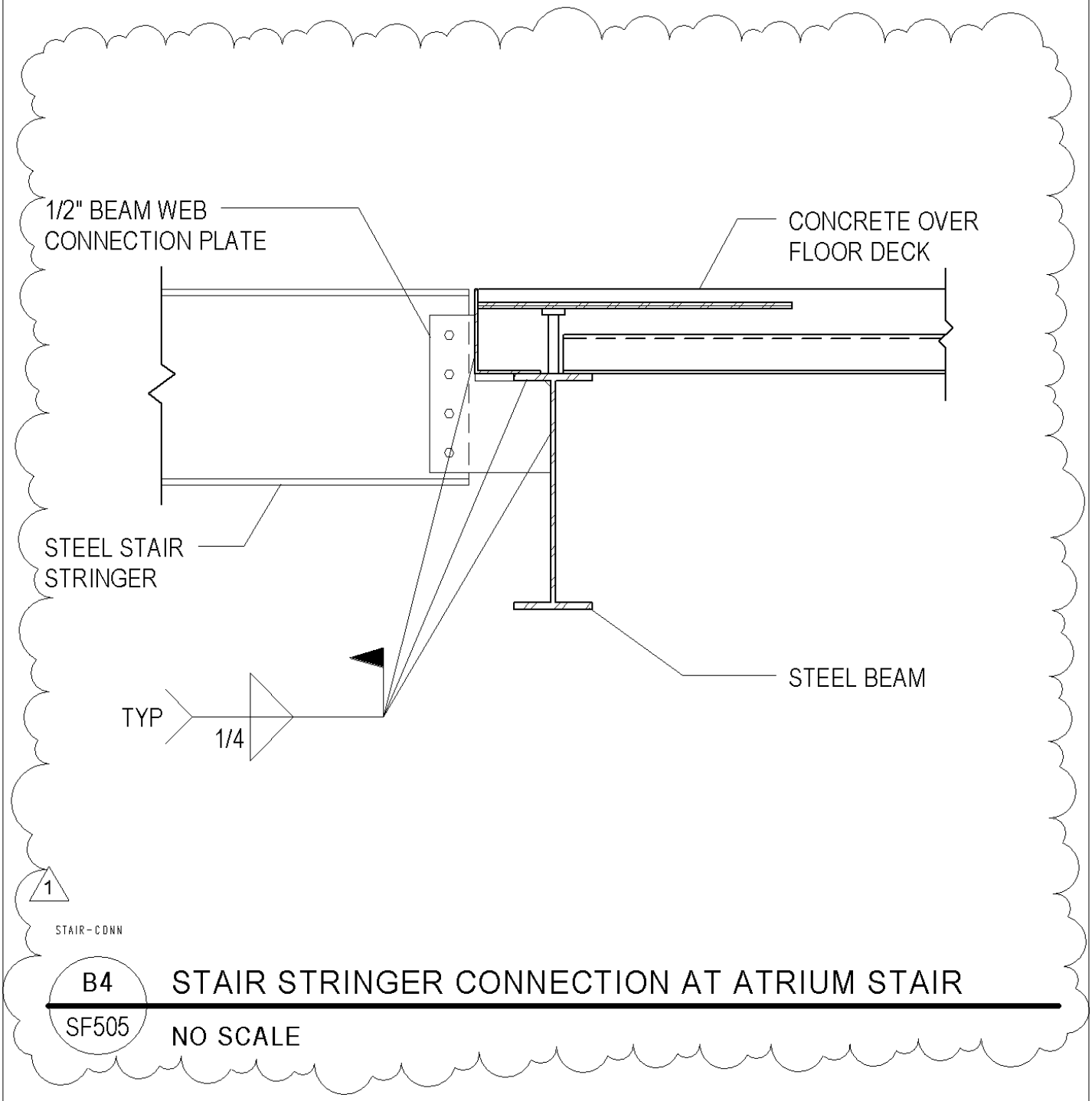
C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:01:02 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S19

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE:



B4 SF505

STAIR STRINGER CONNECTION AT ATRIUM STAIR

NO SCALE

C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:01:03 PM

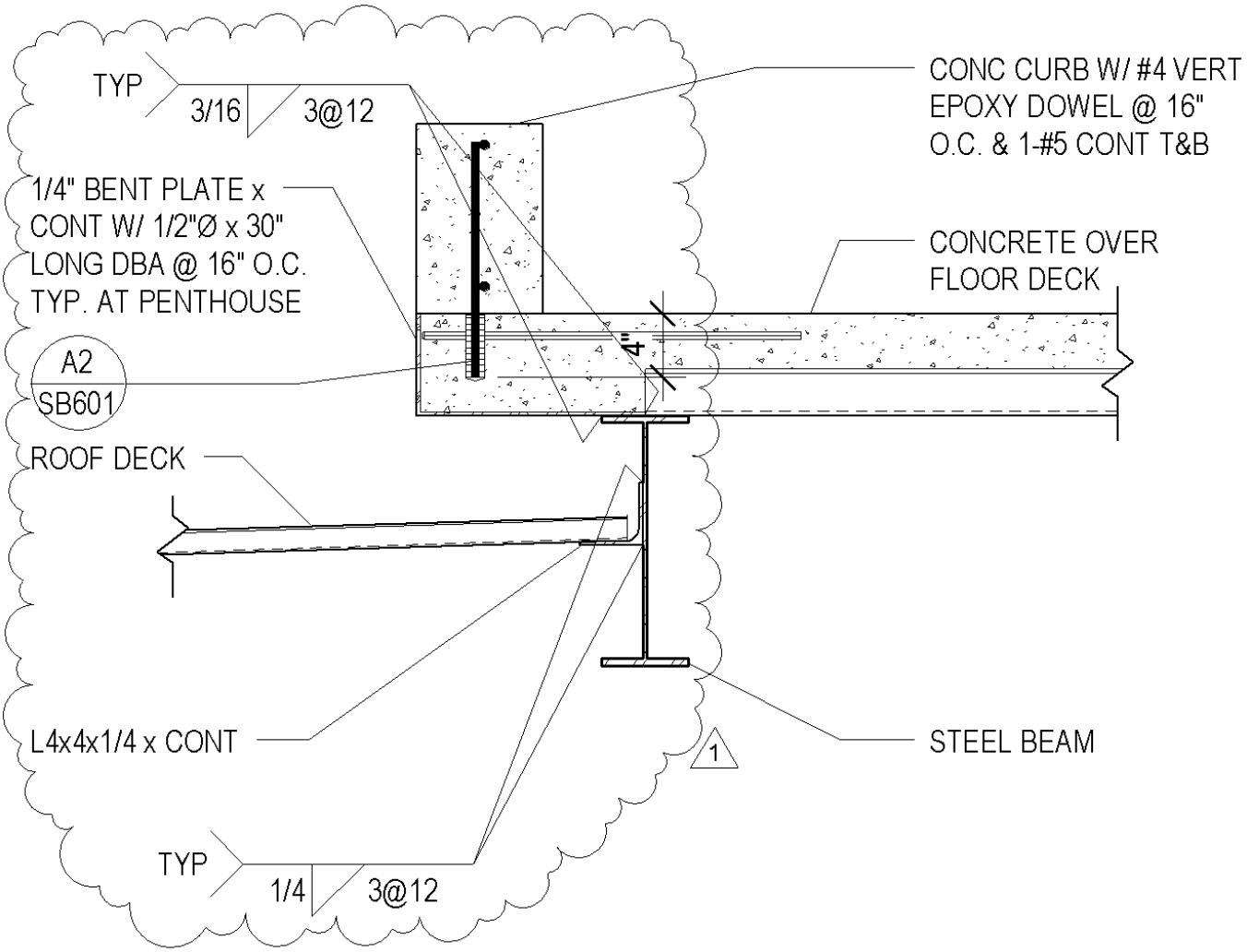
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S20

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



D1
SF522

TYPICAL ROOF DECK BEARING AT STEEL BEAM AT SOUTH EDGE OF PENTHOUSE

NO SCALE

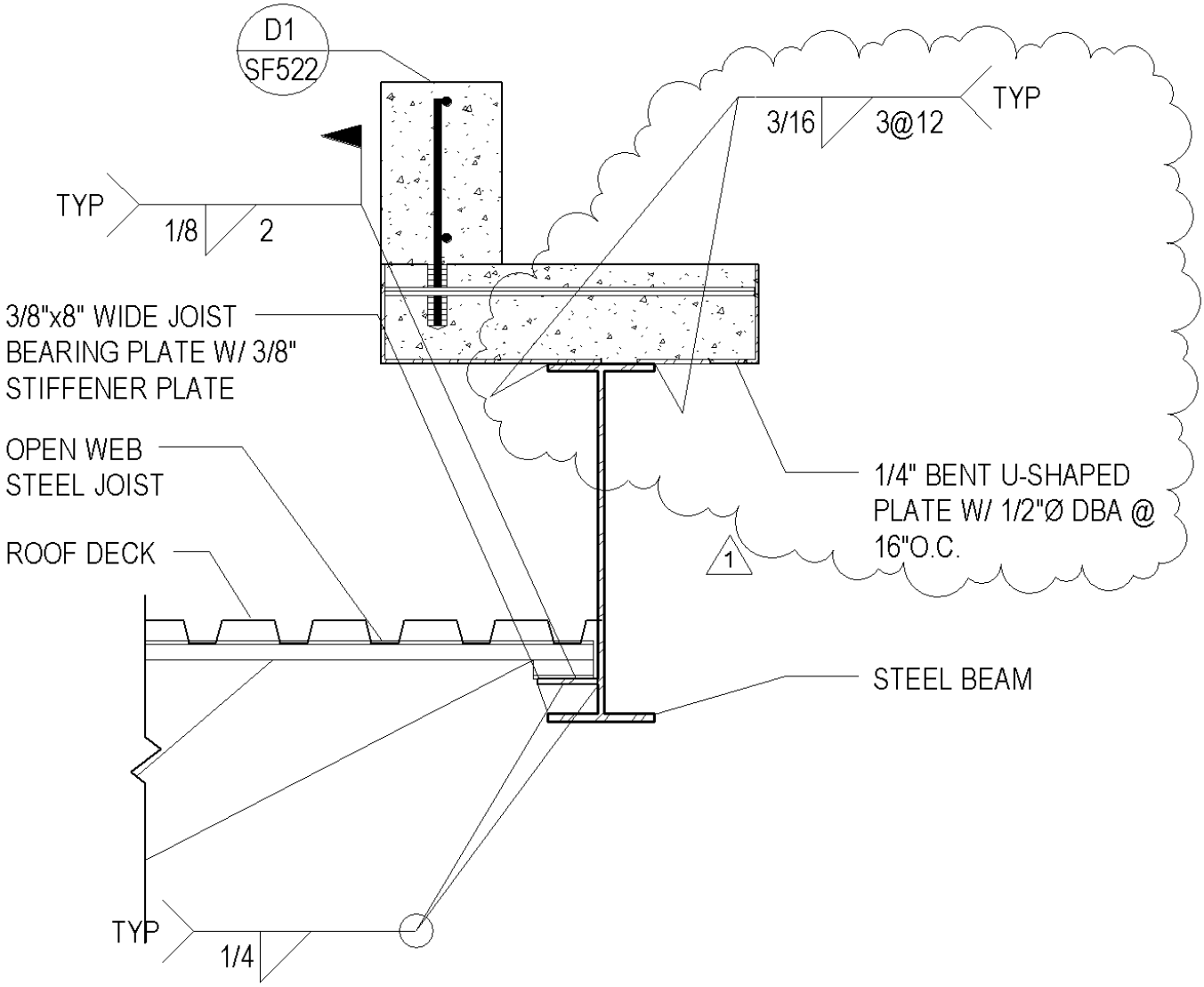
C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:01:03 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S21

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE:



C5
SF522

JOIST BEARING AT STEEL BEAM

NO SCALE

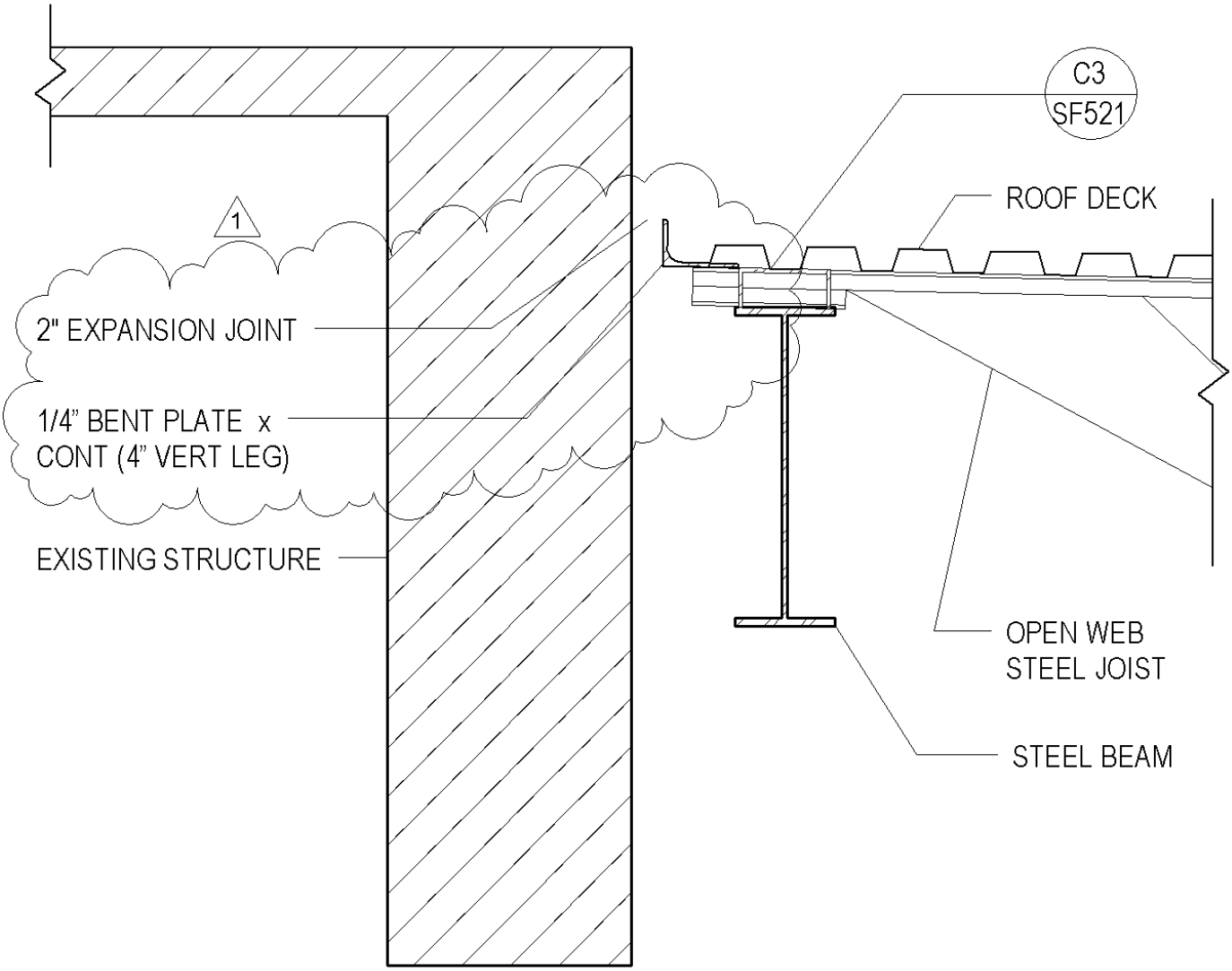
C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:01:03 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S22

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE:



A3
SF525

TYPICAL EXPANSION JOINT AGAINST EXISTING

SCALE: 1" = 1'-0"

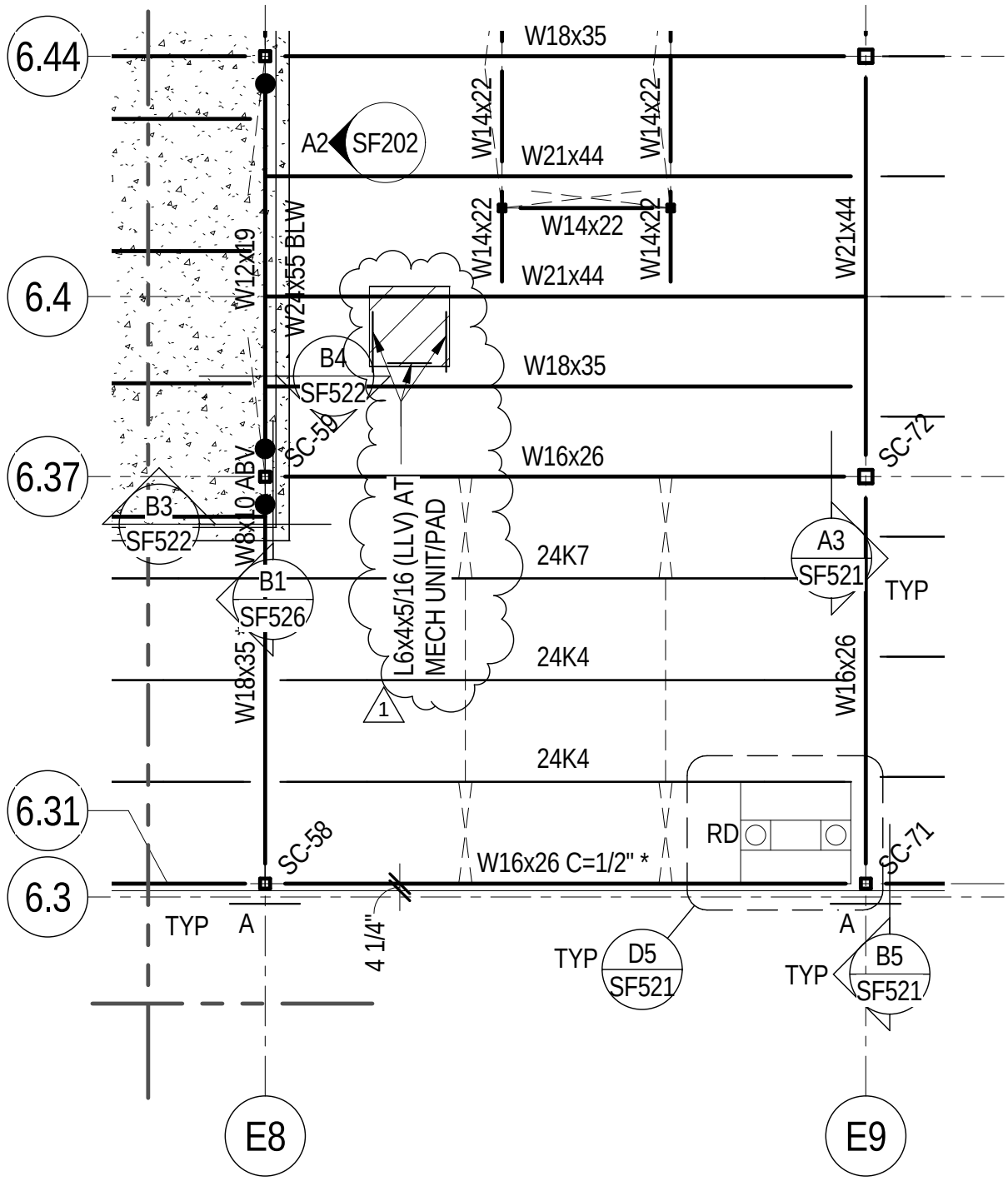
C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:01:03 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S23

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE:



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:01:04 PM

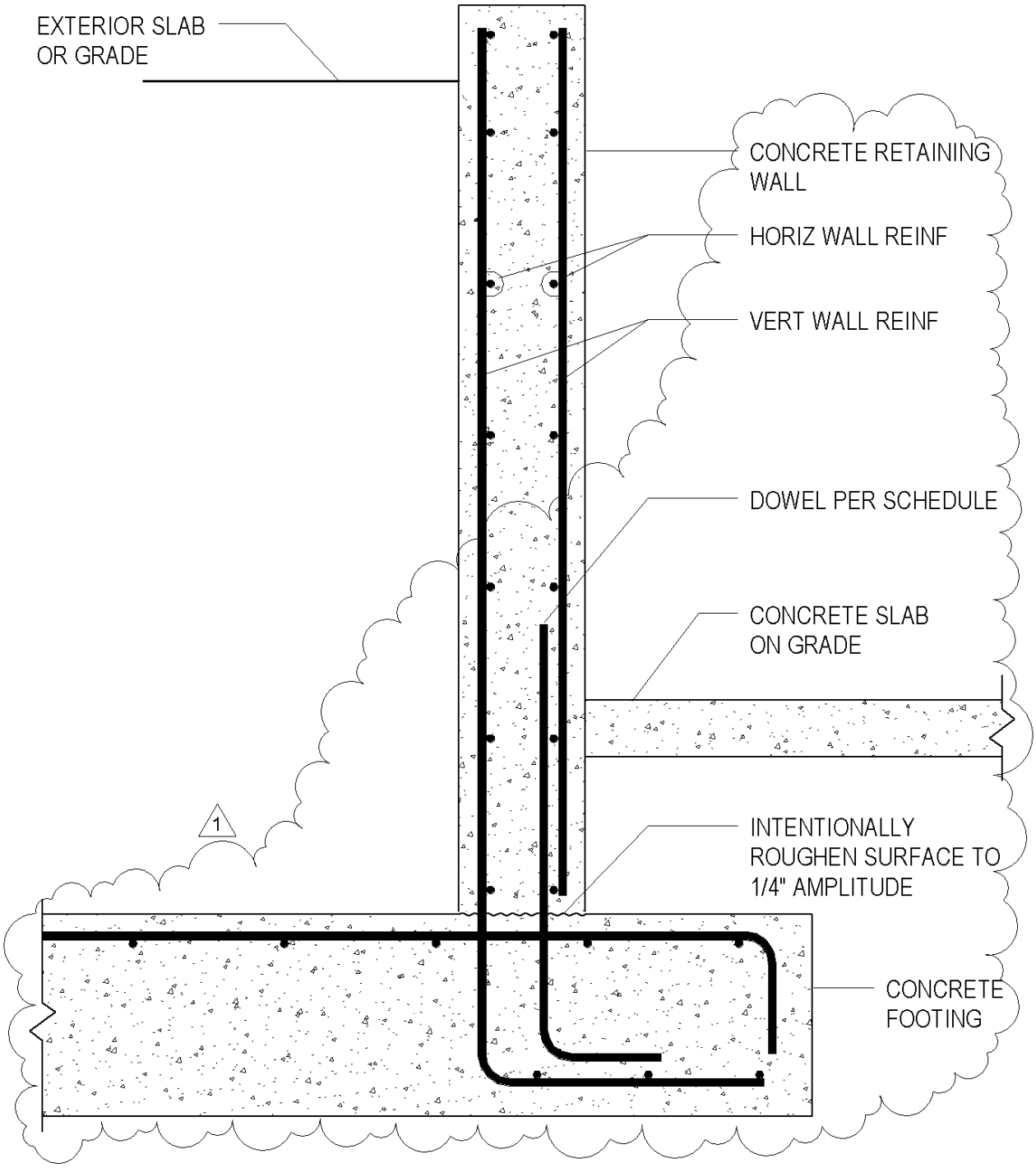
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S24

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



A4
SB502

TYPICAL CONCRETE FOUNDATION WALL DETAIL

NO SCALE

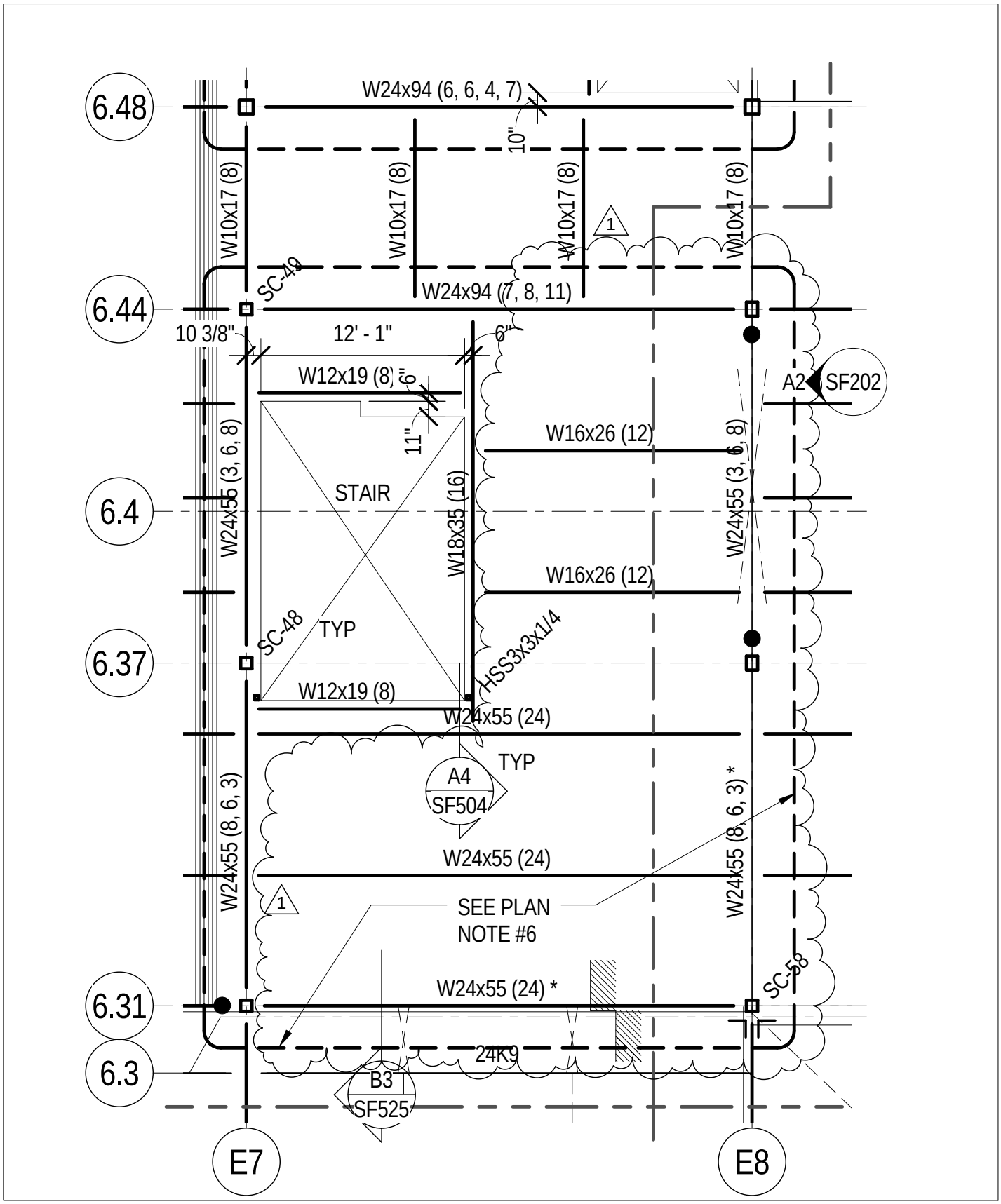
C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

5/25/2010 6:01:04 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S25

GSBS PROJECT NO.: 2009.115.00
ISSUED DATE:



C:\Revit Models\2009-222-UVU-Pope\2009-222-PSBA-RH.rvt

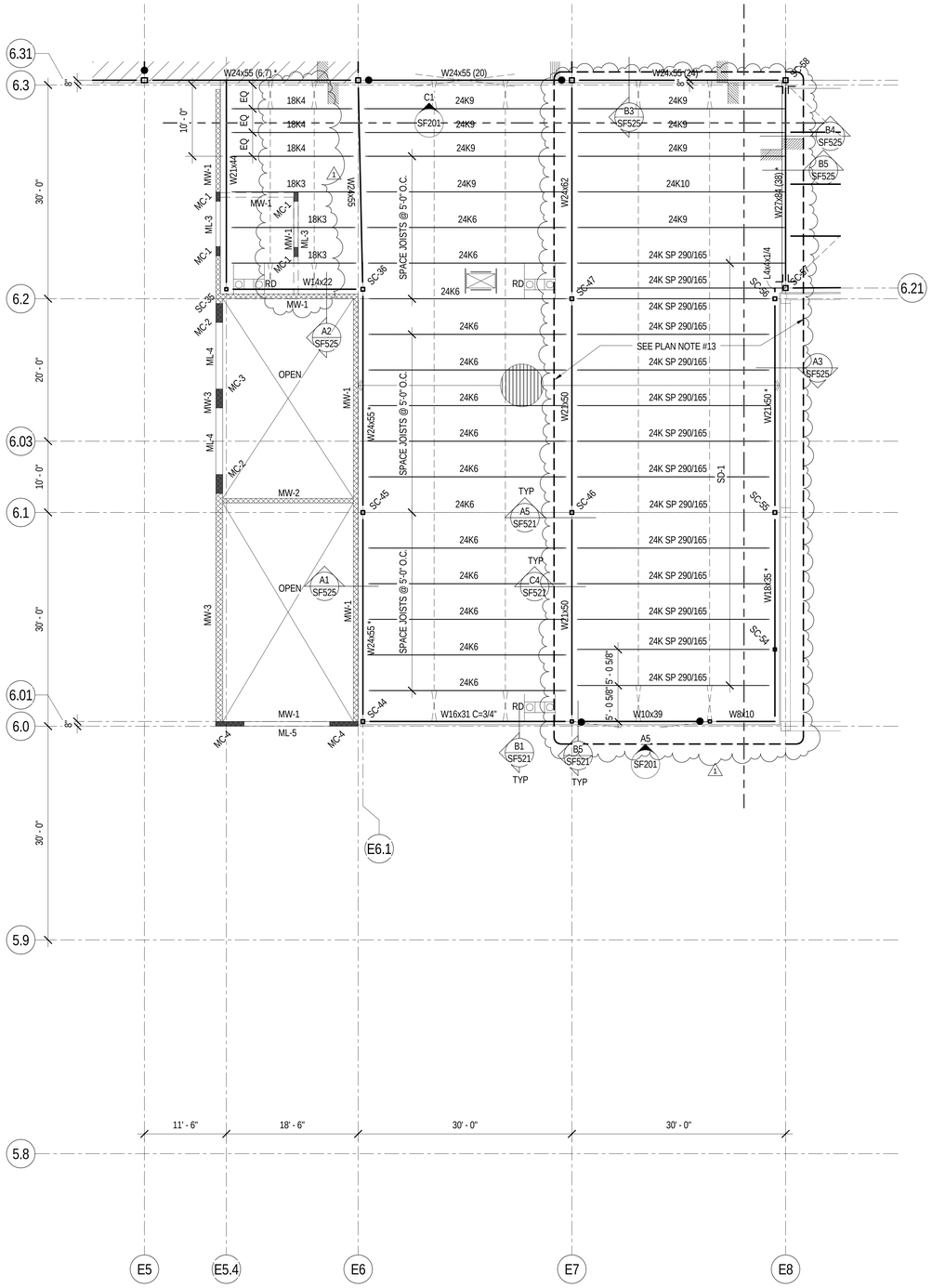
5/26/2010 11:46:29 AM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

AD05-S26

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



1 / SF111C PARTIAL LEVEL 1 FLOOR FRAMING PLAN - AREA C

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

ROOF FRAMING PLAN LEGEND

- CONCRETE WALL
- CONCRETE LINTEL IN CONCRETE WALL
- CONCRETE COLUMN IN CONCRETE WALL
- CONCRETE COLUMN
- CONCRETE JAMB COLUMN POURED MONOLITHIC WITH CONCRETE WALL
- MASONRY WALL
- MASONRY LINTEL IN MASONRY WALL
- MASONRY COLUMN IN MASONRY WALL
- STEEL COLUMN - TUBE
- STEEL COLUMN - WIDE FLANGE
- STEEL COLUMN - PIPE
- STEEL BRACED FRAME
- MOMENT CONNECTION
- COLLECTOR CONNECTION SEE B1/SF601
- COLLECTOR/CHORD CONNECTION AT BEAMS PARALLEL TO MARK. SEE A4/SF603
- DOUBLE SHEAR CONNECTION SEE B4/SF601
- STEEL BEAM OR GIRDER
- STEEL JOIST OR PURLIN
- CROSS BRIDGING
- HORIZONTAL BRIDGING
- STEEL STUD WALL - STRUCTURAL
- STEEL HEADER IN STEEL STUD WALL
- CHANGE IN ELEVATION
- CONCRETE ON METAL DECK
- ROOF DECK
- SPECIAL DECK AREA
- RECESSED/DEPRESSED SLAB ON METAL DECK
- OPENING

ROOF FRAMING PLAN NOTES

1. VERIFY SIZE, WEIGHT, LOCATION AND CONFIGURATION OF ALL ROOF TOP EQUIPMENT WITH ARCHITECT AND MECHANICAL ENGINEER. PROVIDE STEEL FRAMES FOR SUPPORT OF ROOF TOP EQUIPMENT AS INDICATED IN DETAIL D3/SF521 COORDINATE OPENINGS WITH MECHANICAL AND ELECTRICAL AND GENERAL CONTRACTORS.

2. ALL ROOF OPENINGS SHALL BE FRAMED AS INDICATED IN DETAIL D2/SF521. FOR ROUND OPENINGS WHICH ARE LESS THAN 12" DIA. SEE DETAIL C1/SF521.

3. SEE ARCHITECTURAL FOR ROOF SLOPES AND DRAINS. SEE D4&D5/SF521 FOR ROOF DRAIN OPENING FRAME.

4. OPEN WEB STEEL JOISTS AND JOIST GIRDERS SHALL BE DESIGNED BY THE MANUFACTURER TO SUPPORT THE MECHANICAL AND LATERAL LOADS SHOWN ON THE ROOF FRAMING PLANS IN ADDITION TO THE UNIFORM AND POINT LOADS SHOWN.

5. ±#.#K ADD - INDICATES ADDITIONAL UPLIFT / DOWNWARD FORCE ON STEEL JOIST IN ADDITION TO REGULAR LOADS.

6. T/C=##K - INDICATES ADDITIONAL TOP CHORD AXIAL FORCE ON STEEL JOIST OR GIRDER IN ADDITION TO REGULAR LOADS. THIS FORCE IS A SEISMIC LRFD LOAD THAT SHALL BE CONSIDERED IN BOTH TENSION AND COMPRESSION; INCLUDES APPLICABLE OVERSTRENGTH FACTORS FROM IBC SECTION 1613 AND ASCE 7 SECTION 12.10. STEEL JOISTS AND GIRDERS WITH T/C FORCE SHALL BE DESIGNED AS COLLECTOR ELEMENTS PER IBC SECTION 1613 AND ASCE 7 SECTION 12.10 WITH STRENGTH TO RESIST APPLICABLE LOAD COMBINATIONS OF IBC SECTION 1605.4 AND ASCE 7 SECTION 12.4.

7. ALL LOADS SUPPORTED BY OPEN WEB STEEL JOISTS AND GIRDERS SHALL BE LOCATED WITHIN 6" OF JOIST OR GIRDER PANEL POINT OR THE JOIST OR GIRDER SHALL BE REINFORCED PER DETAIL D1/SF521.

8. SEE DETAIL C5/SF525 FOR SUPPORT OF HANGING MECHANICAL UNITS.

9. HORIZONTAL AND CROSS BRIDGING SHALL BE SIZED AND SUPPLIED BY THE JOIST MANUFACTURER. CONNECT TO WALLS AS INDICATED IN DETAILS.

10. WHERE SKYLIGHTS OR MECHANICAL UNITS INTERRUPT HORIZONTAL BRIDGING PROVIDE CROSS BRIDGING AT JOIST SPACES ON EACH SIDE. TYPICAL.

11. * INDICATES STRUCTURAL MEMBERS THAT ARE SEISMIC COLLECTORS AND/OR CHORDS. BOLTED CONNECTIONS OF THESE MEMBERS SHALL HAVE SLIP CRITICAL BOLTS PER GENERAL STRUCTURAL NOTES SECTION V.E.2

12. SD-# INDICATES ADDITIONAL SNOW DRIFT ON STEEL JOIST PER THE SNOW DRIFT SCHEDULE. SEE A5/SF601.

13. DASHED LINES INDICATE EXTENT OF STRUCTURAL STEEL FRAMING TO RECEIVE FIRE-PROOFING (DOES NOT INCLUDE EXISTING CONCRETE BEAMS AND COLUMNS). REFER TO ARCHITECTURAL DRAWINGS FOR FURTHER DEFINITION OF FIRE-PROOFING TYPE AND ASSEMBLY NUMBERS.

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

LICENSED CERTIFIED STRUCTURAL ENGINEER
NO. 144210
RONALD JAMES REAVELEY
UTAH

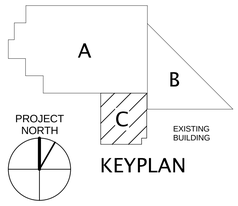
REVISIONS:

1	05/26/10	Addendum #5

REAVELEY ENGINEERS + ASSOCIATES
Consulting Structural Engineers

P: 801.486.3883
F: 801.485.0911

675 E 500 S, Suite 490
Salt Lake City, Utah 84102
www.reaveley.com



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Managment

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.10

PARTIAL LEVEL 1 FLOOR FRAMING PLAN - AREA C

CONSTRUCTION DOCUMENTS

SF111C

Colvin Engineering Associates, Inc.
HIGH PERFORMANCE DESIGN

MECHANICAL ADDENDUM NO. 5
(CEA Issued no Information as Part of Addenda 1 Through 4)

UVU Pope Science Addition

CEA PROJECT NO. 2009-053.02

May 26, 2010

All contractors submitting proposals for this project shall be governed by the following addendum, changes, and explanations to the bidding documents. Bids shall be submitted in accordance with the following:

Item No.	Add, Delete or Clarify	Specification Section or Drawing No.	Reference / Description:
5.1	Clarify	233300	-Pressure relief doors serving air handler AH-1 to be set for 6" relief pressure. -Pressure relief doors serving the laboratory exhaust system fan plenum in the penthouse to be set for 5" relief pressure. -Medium pressure supply air ductwork shall be 1.5" double-wall with perforated inner liner from the point of connection to AH-1, down the shaft, and out each floor to the pair-of-pants fitting north and south of the main shaft. The transitions downstream of the pair-of-pants fittings shall be single-wall. -Medium pressure exhaust ductwork shall be 1.5" double-wall with solid galvanized liner from the shaft on each floor out to the end of the main ducts that run north and south. Medium pressure lab exhaust ducts that run east/west along the north and south sides of the building to be single-wall. -Exhaust duct stacks off laboratory exhaust fans to be constructed of minimum 1 0 gauge type 316 stainless steel with brushed finish. -Pressure test AH-1 walls and the laboratory exhaust fan plenum.
5.2	Add	224450	-A specification for the laboratory vacuum pump has been added. See text at the end of the mechanical portion of this addendum. -Add rail removal system to the sump pumps.

HVAC / Energy Efficient Solutions / CFD Modeling / Air Pollution Control
244 West 300 North, Suite 200 / Salt Lake City, Utah 84103-1147 / 801.322.2400 / FAX 801.322.2416

Item No.	Add, Delete or Clarify	Specification Section or Drawing No.	Reference / Description:
5.3	Add	230900	-Provide wall mounted CO2 sensors in the 38 rooms listed in revised specification section 230900, part 3.7 R. Generate an alarm for the particular zone when CO2 readings exceed 999 parts per million. -Interface with lighting controls, generator controls, and transfer switch have been defined. -Multiple sequences of control have been modified or added.
5.4	Clarify/Delete	230900	-Specification for airflow measuring stations has been modified. -Specification for minimum outside air dampers has been removed. -Room temperature sensors now required to have room occupant setpoint adjustments.
5.5	Clarify	221410	-RO water system is to be leak tested by the same method listed in the specifications for distilled and deionized water. -All ductile iron and cast iron pipe and fittings to be manufactured in the USA. -RO water piping must be plenum rated. -Eliminate brand names from specification for lab waste piping. Use only those materials listed.
5.6	Clarify	211000	-All pipe, fittings, and couplings for the fire sprinkler system shall be manufactured in the USA.
5.7	Clarify	232113	-All steel pipe, fittings, and couplings for the HVAC piping systems shall be manufactured in the USA.
5.8	Clarify	236400	-Ceramic cooling tower fill material reference has been clarified in paragraph 2.5 A 3. -Use Xypex additive in the concrete mix for the ceramic cooling tower basin so it is water-tight. -Provide an 8” equalizing opening between the cold water basin of the new ceramic tower and the southernmost existing ceramic tower. Equalizer to consist of a 8” schedule 40 PVC pipe and manual butterfly valve to allow for manual isolation. -Provide gaskets and water-stop on ceramic cooling tower in joints between the precast panels and the concrete basin, and between all precast panels. Water-stop to be present on both inner and outer surfaces. -Provide PVC louvers on air intakes of the ceramic tower to keep debris out of the cold water basin, and to minimize amount of water that splashes out of tower from cold water basin. -Ceramic tower precast panels are no longer required to be cast on-site. -The new chiller C-3 for the upper plant must use R134a refrigerant.

HVAC / Energy Efficient Solutions / CFD Modeling / Air Pollution Control
244 West 300 North, Suite 200 / Salt Lake City, Utah 84103-1147 / 801.322.2400 / FAX 801.322.2416

Item No.	Add, Delete or Clarify	Specification Section or Drawing No.	Reference / Description:
5.9	Add	231123 PL102B	-Provide an Asco series 313 natural gas seismic shut-off valve in the gas line serving the building addition. Include the –MS monitoring switch, and monitor valve position on the 230900 control system. Generate an alarm on the 230900 system when valve closes.
5.10	Clarify/Add	MP651	-Change control valve TMV-3 to a modulating valve. -Add variable frequency drive for fan in cooling tower CT-3. -All valve actuators for valves scheduled on sheet MP651 to be 120 volt. -Add control dampers CD-EX-7/8/9 to lab exhaust plenum. -Add revised control sequences.
5.11	Delete	MP251	-Delete the bypass line around the basket strainer upstream of pump CWP-3.
5.12	Add	MH601 MP104 MP201 MP202	-Add air separators AS-5 and AS-6. -Add expansion tanks ET-5 and ET-6. -Add pressure relief valves to main heating and chilled water systems. -Add ¾" fill fittings to main heating and chilled water systems.
5.13	Clarify/Add	PL101A	-Revised waste piping at fire riser room for clarity. -Added isolation/shut-off valves. -Added key note 15. -Revised NT-1, NT-2 locations. -Revised underground waste piping to coordinate with footings.
5.14	Clarify/Add	PL102A	-Added isolation/shut-off valves. -Added trap primers and drain callouts. -Added key notes 6, 7, & 8.
5.15	Add	PL102B	-Added key note 11.
5.16	Clarify/Add	PL103A	-Added pipe size. -Added trap primers. -Added key note 6.
5.17	Add	PL104	-Added exhaust pipe from vacuum pump VP-1.
5.18	Add	PL105	-Added vacuum exhaust pipe with gooseneck.
5.19	Clarify	PL201	-Added earthquake shut-off valve and isolation valves to gas piping schematic. - Added isolation valves to lab vacuum piping schematic. -Revised pipe sizes on lab vacuum piping schematic.
5.20	Add	PL401	-Added isolation valves. -Added key note 7.
5.21	Add	PL402	-Added isolation valves. -Added key note 5.

HVAC / Energy Efficient Solutions / CFD Modeling / Air Pollution Control
244 West 300 North, Suite 200 / Salt Lake City, Utah 84103-1147 / 801.322.2400 / FAX 801.322.2416

Item No.	Add, Delete or Clarify	Specification Section or Drawing No.	Reference / Description:
5.22	Clarify	PL601	-Revised plumbing fixture schedule.
5.23	Add	230529	-Specification section 230529, part 3.10, is expanded to include painting the new chilled, heating, condenser water, domestic hot, and circulating hot water piping in Campus Corridor 130, the Hall of Flags, and where exposed on Level 1 inside the existing Pope building, in the upper central plant, and in the lower central plant. Obtain color code numbers for exact color match from the UVU plant ops personnel.
5.24	Clarify	235700	-See revised specifications for brazed-plate heat exchanger and for the direct evaporative air washers.
5.25	Add	MH104	-Add control dampers CD-EX-7/ through 12 and plenum door. -Add Ruskin NRBD 100 backdraft damper to each fan LEF-1/LEF-2/LEF-3.
5.26	Add	233400	Add specification for air handling fans.
5.27	Clarify	PL101C	- Revised underground waste piping to coordinate with footings.
5.28	Add	MH101A	-Added louver in tunnel wall above grade.
5.29	Add	MH102B	-Added louver, exhaust fan, and duct work to exhaust tunnel at Stair 140U.
5.30	Clarify	230593	-Add R&S Analysis to the list of approved T&B contractors for the project.
5.31	Add	MH001	-Add Sheet MH301 to Drawing Index
5.32	Add/Clarify	MD102B	-See sheet for Modifications and Additions.
5.33	Add/Clarify	MH101A	-See sheet for Modifications and Additions.
5.34	Add/Clarify	MH101B	-See sheet for Modifications and Additions.
5.35	Add/Clarify	MH101C	-See sheet for Modifications and Additions.
5.36	Add/Clarify	MH102A	-See sheet for Modifications and Additions.
5.37	Add/Clarify	MH102B	-See sheet for Modifications and Additions.
5.38	Add/Clarify	MH103A	-See sheet for Modifications and Additions.
5.39	Add/Clarify	MH103B	-See sheet for Modifications and Additions.
5.40	Add/Clarify	MH104	-See sheet for Modifications and Additions.
5.41	Add/Clarify	MH105	-See sheet for Modifications and Additions.
5.42	Add/Clarify	MH301	-Added new sheet.
5.43	Add/Clarify	MH502	-See sheet for Modifications and Additions.
5.44	Add/Clarify	MH503	-See sheet for Modifications and Additions.
5.45	Add/Clarify	MH504	-See sheet for Modifications and Additions.
5.46	Add/Clarify	MH601	-See sheet for Modifications and Additions.
5.47	Add/Clarify	MH603	-See sheet for Modifications and Additions.
5.48	Add/Clarify	MH604	-See sheet for Modifications and Additions.
5.49	Add/Clarify	MH602	-See sheet for Modifications and Additions.
5.50	Add	MH604	-Schedule for humidifiers has been added.

HVAC / Energy Efficient Solutions / CFD Modeling / Air Pollution Control
244 West 300 North, Suite 200 / Salt Lake City, Utah 84103-1147 / 801.322.2400 / FAX 801.322.2416

Item No.	Add, Delete or Clarify	Specification Section or Drawing No.	Reference / Description:
5.51	Add	MH601 MP104 MP201 MP202	-Air separators AS-5/AS-6 and expansion tanks ET-5/ET-6 have been added.
5.52	Clarify	MH602	-Insulation has been deleted from Phoenix supply air valves. -Phoenix supply and exhaust air valves size 14LSV and 14EV have been revised.
5.53	Add/Clarify	211000	-The only fire sprinkler contractors approved for this project are those listed in section 1.8 B. -Campus Corridor 130 is protected by existing fire sprinkler piping and heads. This space will receive a ceiling as part of this project. Fire sprinkler contractor must modify existing sprinkler piping, remove existing sprinkler heads, and provide new white recessed heads with white escutcheon. Add additional sprinkler heads as necessary.
5.54	Add/Clarify	MH505	-Detail 9 added to sheet.
5.55	Add/Clarify	MP101A	-See sheet for Modifications and Additions.
5.56	Add/Clarify	MP102A	-See sheet for Modifications and Additions.
5.57	Add/Clarify	MP102B	-See sheet for Modifications and Additions.
5.58	Add/Clarify	MP102D	-See sheet for Modifications and Additions.
5.59	Add/Clarify	MP103A	-See sheet for Modifications and Additions.
5.60	Add/Clarify	MP103B	-See sheet for Modifications and Additions.

Note that only those pages of specifications modified in this addendum are included after this narrative. Entire specification sections are not being reissued, only those pages that have been modified. Additional approved manufacturers are listed below, but the affected specification pages listing the additional manufacturers are not being reissued.

PRODUCT SUBSTITUTIONS / PRIOR APPROVALS

Item No.	Specification Section	Product Type	Alternate Manufacturers
1	233713	Wall Registers and Grilles	Price
2	233300	Pressure Relief Doors	Greenheck PRAD, Kees, Pottorff
3	224450	Sump Pumps	Federal
4	235700	Unit Heaters, Cabinet Unit Heaters	Rittling
5	235700	Coils in Built-Up Systems and Duct Mounted Heating Coils	Rae Corp.

The above named alternate equipment manufacturers stand approved in name only. Approval here in no way relieves the supplier from complying with all other engineering, weight, spatial, and quality requirements of equipment indicated in the contract documents. Contractors using products from the above named alternate manufacturers shall refer to Specification Section 15010 for detailed contractor responsibilities related to the use of alternate brands not used as the Basis of Design.

HVAC / Energy Efficient Solutions / CFD Modeling / Air Pollution Control
244 West 300 North, Suite 200 / Salt Lake City, Utah 84103-1147 / 801.322.2400 / FAX 801.322.2416

END OF ADDENDUM NO. 5

HVAC / Energy Efficient Solutions / CFD Modeling / Air Pollution Control
244 West 300 North, Suite 200 / Salt Lake City, Utah 84103-1147 / 801.322.2400 / FAX 801.322.2416

O. Cooling tower shall be complete with the following:

1. Side outlet depressed sump.
2. Safety cage and ladder from roof to fan deck.
3. Internal walkway or external platform with safety rails at motor.
4. Electric basin heater with thermostat, low water level safety cutout, and contactors.
5. Air inlet screens.
6. Vibration cutout switch.
7. Extended lube and oil fill lines with sight glass or dipstick.
8. No safety railings on top of tower.
9. Electric water level control package (120/1/60) in each cell. Do not furnish fill valves.
10. Additional fittings for connection of 6” equalizer line between all cells. Do not provide an internal flume or equalizer between cells.
11. One removable motor davit to be shared between all 4 tower cells. Each cell to be constructed with brackets to receive davit to allow motor to be lowered to roof deck.

2.5 INDUCED DRAFT, COUNTERFLOW, CONCRETE COOLING TOWER

A. Cooling Tower:

1. Furnish and install all material, equipment and appurtenances, required for a complete counter flow induced draft cooling tower. This cooling tower shall include precast concrete structure, fill, drift eliminators, water distribution system, fan assemblies, speed reducers, fan drive motors, and all other materials and parts required to make this cooling tower complete. This tower will be third of a three-cell tower array, the first two cells of which were provided by Tower Engineering, Inc. in 2001. Provisions were made for installation of this third cell when the first two cells were installed in 2001. Provisions included: reinforced concrete foundation, condenser water supply and return water pipe stubouts, make-up water pipe stub-out, and others. The tower provided for this project must fit the existing foundation, match the dimensions and appearance of the two existing cells, and be configured to use all existing stubbed-out utilities. Manufacturers are recommended to visit the jobsite and two existing tower cells before submitting a bid.

2. The Cooling Tower Manufacturer shall also be responsible for furnishing all precast structure design calculations and construction drawings, approved by a registered professional structural engineer and shall be responsible for any coordination during erection of the pre-cast concrete tower structure. Pre-cast components shall be cast ~~on site~~ using a mix design test strength of 4,000 psi (28 days) compressive minimum.

3. Upon completion, the Tower Manufacturer shall issue a written guarantee duly signed, covering the following components, and if any of these components fail during the specified time, materials shall be replaced at no cost to the University.

   a. The ~~High Performance Ceramic (HPC)~~ **hard-burned clay tile** fill and supports shall be guaranteed against un-serviceability for a period of twenty-five (25) years.
   b. Hot Water Distribution System and Drift Eliminator System shall be guaranteed against un-serviceability for a period of five (5) years.
   c. Remaining internal components shall carry the manufacturer's standard warranty of one (1) year of service or eighteen months from date of shipment, whichever occurs first.

B. Foundation: Reinforced concrete foundation for this tower is existing. Dimensions of new tower must accommodate the dimensions of this existing foundation.

C. Basin:

1. The basin structure shall be a continuous pour of high density air-entrained concrete. **The concrete mix shall include Xypex additive to provide a water-tight basin.** The mix shall be of a test strength minimum of 4,000 psi (28 days) compressive. The structure shall contain the reinforcing steel as detailed on the tower manufacturer's construction drawings and shall be constructed to conform to the specifications of the American Concrete Institute. **All reinforcing steel to be epoxy coated.** Standard curing measures shall be carried out to protect the concrete while "green".
2. All exposed concrete shall be rub-finished to provide a smooth and uniform surface free of form marks and defects. Honeycomb concrete will not be permitted.
3. A continuous stripping of molded polyvinyl plastic water-stop (6 inch dumbbell or equal) shall be placed at all cold pour joints to prevent leakage. **Provide backer rod and water stop on interior and exterior facing surfaces of all joints between the basin and all precast panels, and between all vertical precast panels.**
4. The tower wall sections and roof deck panel shall be constructed of pre-cast concrete flat panels as detailed by the tower manufacturer on their construction drawings. Panel connections shall utilize embedded stainless steel weld plates and all joints shall be caulked inside and out with high quality urethane-type sealants. Wood, metal or fiberglass structures will not be considered.
5. **Provide an 8" PVC pipe, schedule 80, water level equalizing line between the cold water basins of the new tower and the southern existing ceramic tower. Include a line-size butterfly valve at the end of the line for manual isolation of the basin.**

D. The cooling tower shall be constructed where indicated on the drawings. Internals of 1 complete cooling tower cell shall be provided as indicated on contract drawings. The Cooling Tower Manufacturer shall consider these space limitations with regard to water cooling capacity and performance, fan air handling, and motor brake horsepower

requirements. The new tower will abut the two existing towers, and must match the size of the existing footing that was poured in 2001 for this tower. Height of this new tower must match the height of the two existing Tower Engineering towers

E. Tower Fill

1. Fill Support Lintels - Heavy duty pultruded FRV (Fiberglass Reinforced Vinylester) tee section lintels shall span the concrete fill support beams. Lintels shall be capable to support 400 lbs./ft. over a 6 ft. span of HPC fill material using a minimum safety factor of 3.
2. Fill Packing - Hard burned, non-flammable, clay tile fill material, arranged for use without mortar, shall be provided. The water absorption rate of the clay tile material shall be less than 3% by weight, when tested in a 1 hour boil test, to ensure durability and long term life of the fill pack. Each tile to have a minimum crushing strength of 2,000 psi over the gross area when load is applied parallel to the cells. All testing to be certified in accordance with ASTM C67 from traceable production runs made for this project.
3. **Provide paneled PVC cellular louvers to prevent objects from entering the water basin and to impede water splash-out. Louver panels shall be mounted to a FRP frame with all framework secured to the air inlet concrete opening with stainless steel hardware. Louver face shall be flush with the outside tower wall. The louvers shall be equal to Brentwood Industries CL-100.**

F. Drift Eliminators – Wave formed PVC type, UV protected and designed for cooling towers, conforming to ASTM D1784 Type 1, Grade 2, and with a flame spread rating no more than 15 in accordance with ASTM E84. Supports shall be of pultruded FRP structural shapes sufficiently sized and spaced to support the weight of maintenance workers on its surface without damage. Eliminator bundles to be easily removable for maintenance access. Allowable drift shall be limited to 0.0005% of circulating water flow.

G. Speed Reducers - Speed reducer shall be rated in accordance with practices of the American Gear Manufacturer's Association (AGMA), using a cooling tower service factor of 2. Rating shall also be in accordance with CTI STD-111. Gear reducers shall be of the spiral bevel, single reduction type. The gear reducer shall be bolted to a galvanized steel base plate which in turn is through-bolted and grouted to the concrete pad. All mounting hardware shall be series 300 stainless steel. Lube and vent pipes shall terminate outside the fan stack. Lube line shall terminate in a large oil level sight glass fabricated of type 304 stainless steel. Speed reducer shall be suitable for use on tower fan operating with a variable speed drive – lubrication of speed reducer must ensured when fan rotational speed is varied.

H. Controls:

1. A vibration switch with weatherproof housing and remote reset button shall be supplied by Tower Manufacturer to protect mechanical equipment against damage due to malfunction of rotating members. The vibration switch shall be

mounted on the gear reducer and powered by a 110 VAC circuit separate from that of the motor control circuit. Vibration switch shall be provided with a time delay device (manually adjustable) that ignores start-up and transient vibration shocks.

2. An oil level switch shall be provided by the Tower Manufacturer to provide protection for sudden loss of oil or low oil level in the gear reducer.
3. Electrical connection and wiring of the vibration switch and oil level switch, in series with the control circuit of the cooling tower fan motor shall be performed by the Controls Contractor.
4. A float switch shall be provided in the cold water basin to control the two-position motorized ball valve used to maintain proper water level in the cooling tower and to maintain correct water volume in the condenser water system. Float shall have adjustable height at which switch makes contact. The Division 230900 controls contractor will wire control voltage wiring to the float switch and use the signal to command the make-up water valve open and closed. 2-position make-up water valve also by 230900 contractor.

I. Fan Assembly - The complete fan assembly (fan and mounting) shall be designed to give maximum fan efficiency and long life when handling saturated air at high velocities. Fan shall be of an adjustable multi-blade design with a minimum of 5 blades. The fan blades shall be fiberglass reinforced epoxy (FRE). Fan hub shall be of HDG steel plate construction. Provide non-corrosive metal spacer sleeve to prevent fan from dropping onto gear reducer in the event of shaft bushing failure.

J. Drive Connection - The motor shall be close coupled to the gear reducer using a flexible neoprene coupling with stainless steel hubs. Drive shaft coupling shall be provided with a galvanized steel guard, to prevent damage to surrounding equipment in case of coupling failure.

K. Fan Motors - Motor shall be NEMA standard, TEFC enclosure, Class F insulation, corrosive duty and 1.15 SF at 40°C ambient. Motor shall be of capacity, voltage, and speed as shown on drawings, single speed, single winding, suitable for VFD operation. The motor shall be mounted to a galvanized steel base plate, through-bolted and grouted securely to the concrete pad. The fan drive motor(s) and base plate shall be supplied and installed by Cooling Tower Manufacturer.

L. Water Distribution System - The distribution system for each cell shall consist of a centrally located header, complete with side laterals, fittings and nozzles. Nozzle pressure shall be minimum 1 psig to maximum 5 psig. Nozzles to be large orifice type securely mounted to lateral pipe by threaded or bayonet connection for easy removal without tools for maintenance inspection. Nozzle connection to laterals shall utilize standard injection-molded pipe fittings (ASTM D2467).

1. All piping shall be Schedule 40 (Type 1 PVC 1120). Fittings shall be injection molded PVC. Lateral pipes shall be individually supported at the tower wall with FRP angles and stainless steel U clamps securely mounted to the concrete wall with stainless steel expansion bolts. All piping shall be sloped so all water drains from all piping when the condenser water pump is turned off – this tower will be

used during the winter in a cold climate, and water inside piping cannot be allowed to freeze.

2. Distribution system, including spray nozzles, pipe and fittings shall be supplied and installed complete to flange face located at a point 6 inches below the top of the fill support beam.
3. All external piping, including but not limited to distribution supply piping, make-up, overflow, drain and suction lines shall be supplied and installed complete by the Mechanical Contractor in coordination with Tower Manufacturer.
4. All penetrations through basin structure and pipe sleeves if required shall be installed in a manner to ensure a waterproof joint.

M. Fan/Roof Deck - Fan deck shall be constructed of precast concrete by the Tower Manufacturer, forming a rigid base for mounting the fan, speed reducer and motor.

N. Exhaust Fan Stacks - Exhaust fan stack shall be constructed of FRP sections by the Tower Manufacturer. An easily removable aluminum fan screen shall be provided in each cell for safety and aesthetics by the Cooling Tower Manufacturer. Screen to be bolted to fan stack with SS fasteners.

O. Tower Access

1. The two existing towers are equipped with a common access ladder with safety cage. Tower manufacturer shall design new tower so top of tower fan deck can be accessed from the top of the fan deck on the two existing towers. Modify the existing parapet at the south end of the existing towers to allow maintenance personnel to walk from the top of the fan deck of the two existing towers to the top of the fan deck of the new tower. Provide flashing/cap where part of the existing parapet is cut to protect from weather and freeze/thaw damage. Top deck elevation of new tower must match the top deck elevation of the two existing towers.
2. Provide a diamond plate, hot dipped galvanized steel roof deck access door in roof deck, with internal access ladder and 24” wide FRP catwalk over the drift eliminators. Locate internal catwalk to ensure safe maintenance access to the fan drive equipment.

P. Accessories

2. Provide basin heater of capacity shown on drawings. Include contactor and thermostat with high temperature and low-water level cut-out assembly for automatic start/stop of basin heater.

Q. Approved Manufacturers: Tower Engineering Inc., Evaptech, SPX Marley.

2.6 INLINE SOLIDS SEPARATOR

A. Approved Manufacturers: Griswold, Lakos, Puroflux.

2. The carrying bar shall be designed to support 1.5 times the weight of a flooded exchanger, movable cover, compression bolts, nuts, and nozzles.

H. Supports:

1. Supports shall be furnished at the fixed end frame and at the end support. A minimum of two support plates shall be provided at the fixed end frame with anchor bolt holes in each plate.

I. Plate Gaskets:

1. Gaskets shall be positioned in a groove around the heat transfer surface and around the port holes of the plate as required.
2. Gasket and gasket groove detail shall be designed to facilitate positioning of plates. Gaskets shall be compressed to achieve a metal-to-metal contact between plates. (Free-flow type plate exchangers are excepted from this provision).
3. An adhesive compound compatible with the gasket material and having a thickness to insure bond strength between plate and gasket shall be applied to the plate gasket groove surface.
4. Gasket plate surface shall be thoroughly cleaned by means of solvent cleaning and dried before the application of the adhesive. Emery cloth or abrasive powders shall not be used to clean out the gasket grooves.

5. All gaskets except between end plates and frames shall be identical. One-piece gaskets are preferred except when specific plate designs require otherwise.
6. Relieving grooves shall be provided in the outside gasket in those locations where an internal gasket is used. The relieving grooves should be located such that no gasket-caused cross contamination of liquids can occur without external evidence.
7. The compressed plate pack dimensions shall be given on the manufacturer's assembly drawing. This dimension shall also be shown on the permanent nameplate attached to each respective heat exchanger.

J. Suitable lifting means shall be included on the frame to facilitate installation and maintenance of the exchangers.

K. Frame: The frame material is to be carbon steel, SA515 or SA516 grade 70 material unless designated differently in the equipment schedule.

L. Plates: Plate material shall be type 316 stainless steel.

M. Gaskets: Gasket materials must be selected based on fluid and temperature compatibility.

N. Hydrostatic Test: After complete assembly and before shipment, the exchanger shall be hydrostatic tested. ASME code PHE's shall be tested in accordance with the requirements of ASME Section VIII, Division 1.

2.3 BRAZED PLATE HEAT EXCHANGER

A. Acceptable Manufacturers: Flat-Plate, ARV, Mueller, Alfa-Laval, Bell & Gossett, Armstrong, Patterson.

B. Construction:

1. Brazed plate construction with 316 L Stainless Steel ~~<Nickel Alloy>.~~
2. Plates shall be vacuum brazed with copper ~~<Nickel Alloy>~~ brazing material.
3. **Heat exchanger to be double-wall construction, suitable for heating domestic hot water with a non-potable water system.**

2.4 CABINET UNIT HEATERS

A. Acceptable Manufacturers: Dunham-Bush, Modine, Carrier, Trane, A.A.F., KHD Co., Airtherm, ITT-Nesbitt, York, McQuay, Sterling, Beacon Morris, Vulcan Inc., First Co., **Rittling.**

B. Type: Cabinet heaters shall be of the blow-thru cabinet type with hot water heating coil, capacities and model number as shown on the drawings.

C. Arrangement: Arrangement and cabinet type shall be as shown on the drawings.

D. Cabinet: Shall be constructed of 16 - gauge furniture grade steel. Metal surfaces shall be cleaned, phosphatized, prime coated, and all exposed surfaces shall be finished in a baked enamel, color to be selected by Architect.

E. Fans: Shall be all steel, multi-blade, forward curved, centrifugal-type fan which has been statically and dynamically balanced to eliminate vibration. Fans shall be two-speed direct-drive or driven by V-belt and cast-iron sheaves capable of 25% speed variation. Belts shall be oil and heat resistant.

F. Motor: Shall be of the split-phase, open-type, two-speed, sleeve bearing with resilient mount in the unit. Motor shall be suitable for current characteristics as shown on the drawings, with built-in automatic reset, thermal overload protection. Include all contactors/starters required for automatic operation.

G. Hot Water Heating Coil: Shall be serpentine connected and shall be of the finned copper-tubing type, and shall be hydrostatically tested to twice the working pressure.

H. Filters: Provide 1" thick, disposable filter located in a frame in the return air stream. Filters shall be easily removable by removing front access panel.

I. Control: Unit shall have automatic temperature controls as specified in Section 230900 - Electronic Controls, and shall in addition have internal unit mounted, pre-wired two-speed switch, and "off".

2.5 UNIT HEATER (HORIZONTAL BLOW)

F. Drain pans shall be integrally attached to coil casings and are complete with threaded pipe drain connection. All pans shall be galvanized for corrosion resistance and cover the entire coil length. Drain pans shall be waterproofed to prevent leakage.

G. Filters shall be provided on all units. Filters shall be two inch high efficiency throw-away type. Filter access shall be from the side of the unit.

H. Motors shall be as scheduled on the plans. Reference specification Section 230529 for additional requirements.

2.10 DIRECT EVAPORATIVE COOLING MEDIA

A. AirWasher shall consist of a stainless steel basin, casing top panel, and casing side panels, wetted surface fill, upper distribution pad, recirculating pump, water distribution pipe and header, fresh water make-up system, and overflow and drain pipe connections.

B. The basin shall be constructed of 16 gauge 304 stainless steel, formed and welded on both sides. The basin shall include continuous welded stainless steel supports for the fill material and 2-1/2" minimum threaded pipe connections for ~~overflow and~~ drain, **and 4" threaded pipe connection for overflow. Both drain and overflow shall exit side of basin**. **Provide threaded port in low point of overflow pipe for installation of a water detector by the div. 230900 contractor.** The basin shall be 12" deep and extend a minimum of 18" downstream of the leaving air side of **farthest downstream** media. Bottom of basin shall slope in ~~two directions~~ **one direction** to drain connection at ¼"/ft. Drain connection shall be at lowest point to allow all water to be drained.

C. The casing side panels and top panel shall be fabricated from 14 and 16 gauge 304 stainless steel with perforated angle flanges at panel edges and formed intermediate reinforcing ribs for rigidity. Perforated panel edges are required to allow airflow through edges of media to dry media after circulation pump is turned off. Joints between panels and between panels and basin shall be gasketed and caulked to be water and airtight. Removable panels, with stainless steel bolts and wing nuts, shall be furnished as necessary to provide access to all portions of the water distribution header/nozzles.

D. The wetted surface fill shall be Munter's Glasdek with ~~MI-T-EDG~~ **TUFedg** rubberized edge. Fill materials shall be formed and laid up using a cross fluted design to produce a highly turbulent mixing of air and water for optimum evaporation and heat transfer. Media fill sections shall not be more than 6 feet tall. Upper media shall be supported by horizontal stainless steel angles with intermediate vertical supports at 4 feet o.c. Design shall provide flushing during water circulation to minimize fouling due to mineral buildup, sand, or atmospheric dust. The upper section of the fill consists of a 2" thick distribution pad of the same material as the fill. Fill depth shall be as scheduled on drawings. Fill face area shall be sized to the nominal dimensions scheduled for operation at no greater than 500 fpm at full airflow to prevent water carryover.

E. The water recirculation system shall consist of a factory furnished and mounted vertical submersible pump, located in the basin. Pump manufacturer Ebara Model NO. EPD The

pump shall be protected against entry of debris by removable brass or stainless steel suction screens in stainless steel frames. Pump shall operate on 120v/1 ph./60 Hz power. Provide disconnect switch and low water cutoff to de-energize the pump if water level becomes low enough to damage the pump. Low water cut-off shall automatically reset when sufficient water is present for safe pump operation. Construction and flow rate for the pump discharge piping and distribution header shall be in accordance with Munter's recommendations. A balancing cock and rotometer/flowmeter with flow indication in GPM (King Series 7200 or equal, flow range 3-30.5 GPM) shall be furnished for adjustment of flow. Ports shall be furnished in the pump discharge pipe for use with bleed valve. Provide exposed ball valves with hose connections at both ends of header for periodic manual flushing of header piping. Provide bleed valve and ¼" copper tube to drain.

F. Make-up water flow is regulated by a ½" non-modulating float valve, Cla-Val 124-01A or equal by OCV Control Valve with float. A fitting and hose bib shall be furnished for use as a quick-fill means and for periodic flushing cleaning of sump. Provide balance valve with locking stop on makeup line. Adjust balance valve to limit maximum fill rate to less than overflow piping flowrate to prevent over-flowing basin if float valve fails. Overflow to be minimum Ø 4".

G. Water drain down/flush valves and controls shall be by 230900 Contractor.

PART 3 - EXECUTION

3.1 HUMIDIFIERS

A. Install humidifiers and steam dispersion panels per manufacturers' instructions.

B. Seal humidifier dispersion-tube duct penetrations with flange.

C. Install with required clearance for service and maintenance.

D. Install in strict conformance with manufacturers recommendations, level and plumb. Install controls with correct upstream clearance from the humidifier.

3.2 UNIT HEATERS (HORIZONTAL BLOW)

A. Unless noted otherwise, mount high as possible to give greatest headroom possible. Piping shall be as shown on the plans.

B. Protect the entire unit with a cover during construction.

C. Manufacturers data is to be observed before installation.

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards as indicated.

B. Review locations prior to fabrication.

C. Fabricate rigid and close-fitting doors of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, install minimum one inch thick insulation with sheet metal cover.

D. Provide two hinges and two sash locks for sizes up to 18 inches square, three hinges and two compression latches with outside and inside handles for sizes up to 24 x 48 inches. Provide an additional hinge for larger sizes.

E. Access doors with sheet metal screw fasteners are not acceptable.

2.15 PRESSURE RELIEF DOORS

A. Furnish and install in accordance with the following schedule, pressure relief doors that meet the following minimum specifications. Frames shall be Z-shape 12 gauge (2.8) galvanized steel. Door shall be 12 gauge (2.8) galvanized steel hinged on one side. Seal shall be around the door perimeter allowing no more than 7 CFM per square foot at 1.0 inch w.g. Leakage and relief volume information must be included in submittals. Door shall include stainless steel springs to close door upon pressure relief and system shutdown. Pressure relief settings available from 3" to 10" increments of 1" w.g. Pressure relief mechanism shall be factory calibrated in an AMCA Registered Laboratory. **Relief doors serving AH-1 to be set for 6” relief pressure, and doors serving the laboratory exhaust fan plenum to be set for 5” relief pressure.** Pressure relief doors shall be Ruskin PRD18, **Greenheck PRAD, or equal from Kees, Pottorff.**

B. Provide the following number of pressure relief doors in the fan inlet septum wall of the built-up fan system and in the lab exhaust plenum.

System Volume	Number of 18”x18” Doors Required
180,100 CFM - 200,000 CFM	10
106,000 CFM	6

PART 3 - EXECUTION

3.1 GENERAL SHEET METAL INSTALLATION

A. Duct sizes fall within the limiting dimensions indicated on the Drawings. Provide sheet metal duct systems, connections, dampers, duct turns, housings, hinged sheet metal doors and necessary removable access doors for the complete supply, return, and exhaust systems. Install accessories in accordance with manufacturer's instructions.

B. Conduct a complete duct leakage test of all medium pressure supply air mains and lab exhaust mains and vertical risers as outlined in the most current edition of the SMACNA Air Duct Leakage Test Manual. Unless specifically noted otherwise on Drawings, testing for medium pressure ductwork upstream of VAV boxes or lab supply air valves and downstream (between valve and exhaust fan) of VAV lab exhaust valves is defined as Leakage Class 6 for rectangular ductwork and Leakage Class 3 for round or oval ductwork.

C. Total leakage of each duct system not to exceed recommendations in SMACNA Air Duct Leakage Test Manual per Leakage Classifications defined above. If leakage rate exceeds maximum allowed, reseal ductwork until measured system leakage rate is less than the maximum allowable leakage rate.

D. **Perform a leakage test on AH-1 casings and on the lab exhaust fan plenum from the control dampers at the shaft up to the point of connection with LEF-1 through LEF-3. Leakage to be limited to 1% of design flow. Test AH-1 to 2" WC positive, and the lab exhaust fan plenum to 2" WC negative, and extrapolate values out to 6" WC positive and negative, respectively. Provide all necessary blank-offs to perform test. Seal plenums as necessary to not exceed the leakage rate limits.**

3.4 MANUFACTURED DUCT JOINTS

A. The installation of the manufactured duct joints shall be in accordance with the manufacturer's printed instruction and installation manuals. Apply multiple thicknesses of butyl gasket material at each corner of rectangular duct joints to assure air tightness.

3.5 LAB EXHAUST DUCTWORK

A. MIG or TIG weld all joints on 316 stainless steel branch ductwork from fume hoods to the rectangular galvanized medium pressure lab exhaust duct mains. Phoenix lab exhaust airflow control valves on these systems have flanged connections.

B. General room exhaust from labs and medium pressure lab exhaust main ducts are to be constructed of galvanized sheet metal. Low pressure general room exhaust shall be assembled using low pressure joint methods back to the Phoenix lab exhaust airflow control valve. Medium pressure galvanized lab exhaust ducts to use manufactured duct joints.

C. The exhaust stacks from lab exhaust fans LEF-1, LEF-2, LEF-3, and LEF-4 are to be ~~heavy~~ **minimum 10** gauge 316 stainless steel, longitudinal seams, installed with welded joints and a brushed finish on the outside. Field repair brushed finish once installed. The exhaust stack off LEF-4 can be strapped to the larger exhaust stack by using 316 stainless bands that has the same brushed finish.

D. The exhaust ducts from the cadaver tables to the Phoenix exhaust valves shall be 316 stainless with welded joints.

1.7 GLYCOL MAINTENANCE SERVICE

A. Provide the services of a fully qualified Field Superintendent and technical assistance for one year warranty period. Services and assistance shall include the following:

1. A training session for the Owner's operating personnel instructing them clearly and fully on the installation, maintenance and testing of the Glycol Systems.
2. A quarterly technical service visit to the jobsite to make glycol fluid concentration analysis on site with a refractive index measurement instrument. The Field Superintendent shall detail findings with the proper personnel in writing on proper practices and any corrective actions needed to protect the Glycol Systems with the proper concentrations of glycol and inhibitors.
3. Include in the analysis the amount of Inhibited Propylene Glycol to be added or diluted to obtain the correct concentration specified for each system containing glycol.

1.8 EXTRA STOCK

A. Glycol: Provide sufficient Inhibited Propylene Glycol to maintain specified concentrations in HVAC Piping Systems during one year warranty period.

PART 2 - PRODUCTS

2.1 HEATING WATER, CHILLED WATER, CONDENSER WATER PIPING (LESS THAN 90 PSIG)

A. Steel Pipe:

1. **All pipe, fittings, and couplings shall be manufactured in the USA**

2. Pipe:

2 Inch & Smaller	ASTM A53, Grade A, Schedule 40 black buttweld or continuous welded steel.
2-1/2 Inch & Larger	ASTM A53, Grade B, Schedule 40 black buttweld or continuous welded steel.

3. Fittings:

2 Inch & Smaller	ASTM A197, Class 150 black malleable iron screwed.
2-1/2 Inch & Larger	ASTM A234, Steel butt weld, standard weight forged fittings.

2. Size 2" and over:

Pipe: Schedule 40, ASTM A53, Type S Grade B
Fittings: Butt weld ASTM A 234
Unions: 150 lb. forged steel weld neck flange, ANSI B16.5 and ASTM A105.

B. Interior, concealed, non-accessible spaces and return air plenums, and all indoor gas piping operating with 5 psi gas pressure:

All pipe and fittings shall be welded per sub-paragraph A.2 above.

2.2 TENANT GAS METER

A. Tenant Gas Meter will be furnished by 230900 contractor for installation by the 231123 contractor. Refer to specification section 230900 for more information on the tenant gas meter.

2.3 GAS PRESSURE REGULATOR

A. General: Provide single stage, steel jacketed, corrosion-resistant gas pressure regulators with atmospheric vent, elevation compensator; with threaded ends for 2" and smaller, flanged ends for 2-1/2" and larger; for inlet and outlet gas pressures, specific gravity, and volume flow required.

B. Provide vent-limited or vented gas pressure regulators as required by appliance served. Vented regulators shall be piped to vent to outdoors per jurisdictional requirements.

2.4 FLEXIBLE HOSE GAS CONNECTORS AND QUICK COUPLERS

A. Manufacturers:

Flexible Connector: Thermo-Tech Products Co. or approved equal.
Quick Coupler: Hansen Manufacturing Co. "Gas Mate" or approved equal.

B. Description:

Flexible Connector: Corrugated type 304 stainless steel flexible pipe with stainless steel braid and heavy flexible armor shield.

Quick Coupler: One way quick coupler with gas rating in cubic feet per hour equal to equivalent gas appliance rating.

2.5 EARTHQUAKE SHUT-OFF VALVE

A. **<u>Install a KOSO Model No. 313 automatic shut-off valve with –MS electronic valve position monitor on the main gas line serving the building addition. Monitor the valve position on the 230900 control system.</u>**

PART 3 - EXECUTION

3.1 GENERAL

A. Welding, wiring, sleeves, plates and closures, foundations and pads, excavation and backfill, cutting and patching and installation of piping, valves, pipe hangers, supports, expansion compensators and identification shall be in accordance with Section 230529 - Basic Mechanical Materials and Methods.

B. Provide all fuel gas piping from source to each connection point of all gas fired equipment items listed in "Related Work" paragraph in Part 1. Provide drip leg and gas cock or valve for each equipment item. Make final connections in compliance with equipment manufacturer's instructions. Flexible connections will not be allowed except where explicitly specified.

3.2 PIPING

A. General:

1. Install fuel gas distribution piping in accordance with jurisdiction codes and local Utility Company requirements and in conformity with standards listed in "References" paragraph in Part 1.
2. Install "Tee" fitting with bottom outlet fitted with full size 6" long nipple and capped, at bottom of pipe risers or drops.
3. Use dielectric unions where dissimilar metals are joined together.
4. Use Teflon joint seal on metal gas piping threads, make up with 3 threads showing.
5. Remove cutting and threading burrs before assembling piping.
6. Do not install defective piping or fittings. Do not use pipe with threads which are chipped, stripped or damaged.
7. Plug each gas outlet, including valves, with threaded plug or cap immediately after installation and retain until continuing piping, or equipment connections are completed.
8. Connections to all gas-fired equipment shall include a union downstream of the manual gas shut-off valve.
9. For piping buried in building substrate, or below floor slabs, install in welded conduit, ventilated to outdoors on both ends, and tested to same requirements as gas piping.
10. For buried piping outside of building walls, piping shall rise out of ground 12” before penetrating building wall.

1.6 WARRANTY

A. Provide a one year warranty for all hardware, software, and labor for the installed control system. See sub-section 3.5 of this specification for information on when the warranty period is to begin.

B. Contractor shall provide full service for the temperature control system for a period of one year after the control system has been found free of defects and accepted in writing by the owner, not the date of substantial completion. Service shall include, but not be limited to, calibration of all sensors and other control devices, adjustments to setpoints, and modifications to control sequences or programming as required/desired to fine-tune an/or finalize all control sequences.

PART 2 - PRODUCTS

2.1 SENSORS

A. Unless indicated otherwise below, temperature sensors shall be of the thermistor (NTC) or RTD type, commercial grade, minimum accuracy of ±0.36ºF. Sensors shall be available for room, duct, outdoor, or well mounting. Room type sensors shall be blank face with no temperature readout display, ~~no built-in setpoint adjustment~~ **but shall include a user setpoint adjustment that can be remotely disabled on the BMS**, and no after-hours override button. Sensors shall be available in various ranges to properly suit the application. See item 4 below for heat pump thermostats/temperature sensors.

1. Sensors used in energy billing calculations shall be accurate to +/-0.10ºF over the application temperature range. Submit manufacturer's NIST-traceable calibration report.
2. Where thermowells are required, the sensor and well shall be supplied as a complete assembly. Mount in threadolet with adequate access for repair or replacement. Thermowells shall be constructed of brass for chilled and heating water systems, and 316 stainless steel for steam and condenser water systems.
3. Outdoor temperature sensor (combination dry bulb and humidity) shall be Vaisala Model HMP-233D with optional solar radiation and precipitation shield (Model DTR502B). Sensor output shall include both dry bulb temperature and relative humidity (with integral microprocessor capable of calculating wet bulb and/or dewpoint temperature). Sensor accuracy shall be within 1% (between 0 and 90% RH). The contractor shall adjust the atmospheric pressure setting in the microprocessor (utilizing the microprocessor's RS-232 port and a laptop computer with 'Hyper-terminal' software) as required to correct the device's output for the project altitude. Include a Vaisala RH sensor calibration kit for use by owner.

B. Relative Humidity Sensors to be of the capacitive film type, minimum accuracy +/- 2% in the range of 10% to 90% RH. Contractor to adjust RH values to account for jobsite elevation.

Indoor (duct-mounted) humidity sensor(s) shall be Vaisala Model HMD60U.
Indoor (wall-mounted) humidity sensor(s) shall be Vaisala Model HMW60U.
Provide owner with one Vaisala HMK15 calibration kit, in addition to the kit for the outdoor humidity sensor described above.

C. Duct-mounted averaging temperature sensors shall be of the continuous resistance type with a sensing element of 12 feet minimum length. Minimum range -40ºF to +220ºF, minimum accuracy ±0.36ºF. Provide longer sensor or multiple sensors as required to properly cover duct, coil, plenum openings, etc.

D. Pressure and differential pressure transmitters shall have an appropriate sensing range with a minimum accuracy of ±1% of full span. Analog output signal shall be appropriate for the receiving instrument.

1. Building static pressure sensors shall be Mamac Systems Model PR-274-R2 differential pressure sensor with a range of plus or minus 0.25" w.c. (at temperatures from 0ºF to 175ºF). Indoor and outdoor static pressure reference probe(s) shall be suitable for flush mounting, shall be constructed of 10 gauge brushed aluminum, and shall be capable of sensing static pressure to within 1% accuracy when subject to air velocities of up to 1,000 fpm. Indoor reference probe shall be 'Shielded Static Air Probe No. 3' as manufactured by Air Monitor Corporation (or equal by Paragon Controls).

E. ~~Air velocity sensor shall be capable of linear indication of the velocity of air in a duct from 300 to 3000 FPM, and shall vary its output voltage with a change in air velocity.~~ **Airflow measuring stations to operate by means of pressure measurements, anamometers, or vortex shedding, and shall have an accuracy of +/-3%. Airflow measuring station circuitry to automatically compensate for changes in atmospheric pressure and air temperature. Manufacturers to be Air Monitor Corporation or Ebtron.**

F. Liquid flow switch: Paddle type, snap switch, adjustable sensitivity, brass body. For flows too low to register with a paddle type switch, provide a thermal dispersion switch, Kurz 6100 series, or equal.

G. Watthour transducers shall be used for monitoring of watthour consumption and demand over the control network. Transducers shall have an accuracy of +/- 0.25% for kW and kWh outputs from full lag to full lead power factor, selectable input ranges.

H. Tenant Gas Meter: Provide Roots 8C175 (or equal) rotary gas meters with aluminum cases, temperature compensated, with internal corrosion-resistant components; threaded ends for 2" and smaller, flanged ends for 2-1/2" and larger; for gas working pressure of 5 psig, and volume flow indicated on the gas piping schematic. Include with IMC/W2 PTZ Digital Reader/Display to show corrected meter readings for 10 psig gas pressures, and an electronic pulse counter for connection to the TAC control system. Readout to be pressure and temperature corrected.

shall be not more than 42" in length between bearings. Damper sections shall be not more than 72" high. Dampers shall be Ruskin model CD60 (no substitutions), except where other models are specifically noted.

B. ~~Minimum outside air dampers shall have integral flow sensing and setpoint controller, damper actuator, and air straightener section, all factory installed inside a duct sleeve. Accuracy +/- 5% over range of 500 to 2000 fpm. Maximum pressure drop of 0.5 in.w.c. at 2000 fpm. Ruskin AMS 50. At contractor's option, a pressure sensing airflow measuring station from Air Monitor Corporation can be used in combination with a Ruskin CD60 damper, but contractor must verify adequate space for equipment, ductwork, and maintenance space will be present.~~

2.5 SMOKE DETECTORS

A. Provide smoke detectors where indicated on drawings and schematics. Smoke detectors shall be wired by Division 230900 Contractor.

2.6 BTU METERING

A. Ultrasonic flow meters, insertion type or bolt-on non-insertion, with supply and return pipe temperature sensors. Include local digital display with totalizing meter and output to the DDC system with a Modbus, Lon, or BACnet interface. Totalize flow and BTUH readings. Accuracy min. +/- 2%.
Manufacturers: GE, or Equal.
Provide metering in heating water system, cooling water system, and domestic hot water / circulating system.

2.7 EQUIPMENT CONTROLLERS

A. Select Lon controllers having the inputs, outputs, and control functions required to implement the sequences indicated. Provide custom-programmed control functions where required for the sequences indicated or required for proper system operation. Lon systems to use published functional Lon profiles as defined by the LonMark Interoperability Association . Controllers shall have non-volatile memory for storage of control programs, configuration, setpoints, time schedules, and historical log data. All data shall be retained in the event of power failure.

1. Terminal unit controllers and actuators to be field installed by the 230900 contractor. Any NEMA rated enclosures required for installation of any controllers in a return air plenum are the responsibility of the 230900 contractor.

3.7 SEQUENCE OF OPERATION

A. General:

1. All HVAC Systems shall be controlled with Direct Digital Control (DDC) according to the sequence contained in this section of the specifications and shall be stand-alone. Additional points or software programming not listed in the sequence or in the schematics but which are required to meet the following sequences of operation shall be provided.
2. Monitor all pumps and fans with adjustable setpoint current switches. Indicate equipment status, and generate an alarm if a motor fails or if an uncommanded change of status exists: i.e. control system sequence commands a pump to turn off, but it continues running because its starter has been locally set to the hand 'on' position, or vice-versa.
3. Alarms generated on the DDC system shall be classified as critical or non-critical. Review classification of each alarm with owner. Non-critical alarms generate a message on the operator workstation designated by the owner. Critical alarms will first generate a message on the operator workstation. If the alarm has not been manually cleared within 5 minutes (programmable), the system will automatically generate an email or text message alarm on a pager or mobile phone of the owner's choosing.
4. The term 'enabled', as used in these control sequences, means a piece of equipment is capable of being turned on by the BAS. It does not mean it has been turned on by the BAS.
5. All setpoints are programmable.
6. **The outdoor air temperature sensor being provided for this project shall be used by the campus-wide system as one of the designated sensors that is averaged for the outdoor air temperature used by all control systems on campus. Review details with UVU personnel.**

B. Cooling Towers Serving Air Handler AH-1 (CT-1 Cells 1, 2, 3):

1. Start cooling towers upon a call for condenser water from air handler AH-1. The three towers operate together at the same time.
2. Start tower fans at low speed and slowly ramp-up to satisfy discharge air temperature setpoint at air handler AH-1. Tower fan VFDs are located inside the penthouse. Disable tower fans when neither of the condenser water pumps are operating.
3. Factory installed tower sump water level sensors shall be used by 230900 Contractor to operate make-up water motorized ball valve located in the mechanical room. Include a totalizing water flow meter in the make-up water line and tie in to building control system.
4. Each tower fan includes a vibration cut-out switch (3 total). Indicate on building control system if tower is forced to switch off due to vibration switch. Also monitor each fan status with an adjustable setpoint motor current sensor and generate an alarm on the building control system and generate an automatic pager or e-mail notification as directed by the Owner.

C. Condenser Water System Serving AH-1:

1. The condenser water system shall operate upon a call for cooling from the air handler control sequence. The primary condenser water pump shall operate to circulate water through the cooling tower. Status of the condenser water pumps shall be monitored by adjustable setpoint motor current switches. Upon loss of flow/pump failure, an alarm shall be generated on an automatic pager or e-mail notification as directed by Owner, and the secondary pump shall start. The cooling tower fan speed shall modulate to maintain the discharge air temperature setpoint of air handler AH-1.
2. The condenser water conductivity controller shall be monitored by the control system. On a call for blowdown (closing a dry contact), the drain valve on the solids separator shall be opened. The volume of make up water shall be monitored and logged on the operator's workstation. Water treatment chemicals shall also be metered into the system based on the volume of water passing through the make up water meter. Interlock wiring between the conductivity controller contact and the motorized blow-down valve is the responsibility of the 230900 Contractor. Motorized blow-down valve will be provided by the 232500 Contractor.
3. Monitor the condenser water temperature in the sump of each cooling tower. The condenser water system is to be drained at the end of each cooling season. Generate an alarm if sump water temperature is 32 degrees for 5 hours. Do not generate an alarm if there is no water in the sump, as determined by the water level sensor. The purpose of the alarm is to remind the operator to manually drain the condenser water system before winter arrives.
4. Provide a dry contact for use by the water treatment contractor to determine when the condenser water pumps on this system are operating, and when they are not.

D. Glycol Fill Stations:

1. Control the glycol fill stations per the sequence indicated in detail 8 on sheet MH.502. Display system pressure on the DDC system. There are four of these systems: one for the chilled water system serving AH-1, one for the heating water system serving AH-1, one for the heat recovery runaround coil system, and one for the process cooling loop. Note that the system serving the process cooling loop only contains HVAC solution with corrosion inhibitor, not glycol.

E. Variable Frequency Drives:

1. All VFDs shall be connected to the control network via a LON interface. Each drive shall accept the following control inputs: start, stop, setpoint reset. Each drive shall provide the following monitoring outputs: speed (Hz), speed (% of full), status, alarm/fault, amps, integral controller setpoint value, integral controller setpoint reset value, status of each binary input, setpoint of each binary input, drive internal temperature, and two additional outputs to be selected by the owner.

F. Elevator Equipment Room Cooling (~~ACCU-1/DXFC-1~~ **RTU-1**)

~~1. Start condensing unit on the roof and the single DX fan coil unit it serves whenever space temperature rises above setpoint (85ºF, 5º deadband, off at 80ºF, all setpoints adjustable). Monitor DX fan coil fan motor and condenser on roof with adjustable setpoint motor current switches. Generate an alarm upon failure fan motor or condensing unit. Monitor pressure drop across filter in fan coil, and generate a filter change-out alarm when filter differential reaches 0.5" W.C. (adjustable). Generate an alarm if space temperature exceeds 90ºF for 15 minutes.~~ **RTU-1 is a packaged cooling-only DX rooftop unit. Provide a room temperature sensor inside the elevator machine room, and command the rootop unit to turn on when cooling is required. This unit includes an air-side economizer, and economizer controls are part of the factory packaged unit. Turn unit on when space temperature exceeds 85°F, and turn it off when space temperature drops below 75°F (all setpoints adjustable). Unit to operate with return air only during the hot summer months, no minimum outside air is required when unit is not operating in economizer mode.**

2. Monitor filter bank in RTU-1 with a differential pressure sensor. Generate a filter change alarm when filter differential pressure reaches 1" WC.

3. Monitor factory packaged control on RTU-1 for a common/summary alarm. Also monitor space temperature inside the elevator machine room, and generate an alarm if space temperature exceeds 90°F for 15 minutes.

G. Unit Heaters and Cabinet Unit Heaters:

1. Start unit fans when space temperature is below setpoint (initially 65°F, adjustable, with 5°F differential, on at 65°F and off at 70°F). Two position heating water valves open when fan is on, and close when fan is off. Unit heaters: generate an alarm when space temperature drops below 35°F for 15 minutes. Cabinet unit heaters: generate an alarm when space temperature drops below 50°F for 15 minutes.

H. In-Line Solids Separators (ISS-1):

1. The in-line solids separator is to run based on operation of the condenser water pumps. Run the pump on the in-line solids separator whenever either of the main condenser water pumps is operating. The units shall be disabled whenever the sump is empty (as sensed by the low water level electronic sensor - furnished with cooling tower).
2. The separator two-position motorized blow-down valve shall be interlocked with the TDS controller provided as part of the cooling tower water treatment package for its towers. A signal from the TDS controller will open and close the valve. Interlock valve with controller.
3. Monitor the solids separator pump with an adjustable setpoint current switch, and generate an alarm upon pump failure.

I. Domestic Hot Water System (CP-1/CP-2/CP-3):

1. Circulating pumps CP-1, CP-2, and CP-3 shall operate during occupied periods. The return water temperature to each pump shall be individually monitored during the occupied mode. Each pump will have its own individual operating schedule. The control system shall indicate an alarm when the return DHW temperature drops below a minimum setpoint (programmable). Monitor each circulating pump with an adjustable setpoint current switch. Generate and alarm upon pump failure.

J. Common Exhaust Fans EF-1, EF-2, EF-3:

1. Run continuously during scheduled occupied hours. These fans operate at a constant operating speed. Equip each fan with a two-position motorized damper at the point it connects to the exhaust duct system. Open damper when fan is in operation, and close the damper when the fan is off. Monitor fan motor status with an adjustable setpoint current switch. Fan failure or an uncommanded change of status is to generate an alarm.

K. Transfer Fan (TF-1):

1. The fan is enabled whenever the room temperature is above the room temperature setpoint (initially 85°F, with a 5°F deadband, fan off at 80°F). Both setpoint and deadband shall be adjustable for the fan. Note that this transfer fan provides ventilation and temperature control for the main electrical room. Monitor fan with an adjustable setpoint current switch and generate an alarm upon fan failure.

L. Heating Water System Serving Pope Addition:

1. Heating water for this building is provided by existing heat recovery chillers and boilers in the existing upper and lower central plants. Heating water pumps P-5/P-6 operate in a lead/lag configuration, and distribute heating water from the existing mains in the concourse on level 1, through the building, and back to the mains in the concourse. The lead pump is enabled whenever any one of the reheat coil control valves is 100% open or upon a call for heat from air handler AH-1 (return to disable condition only when all heating water control valves are fully closed or the air handler no longer calls for heat).
2. In the event that the lead heating water pump P-5/P-6 fails, the lag pump shall run and an alarm signal shall be initiated. When the lead pump re-starts, the lag pump shall be turned off. The lead secondary pump variable frequency drive shall be modulated from 15% to 100% of maximum speed (from 9 to 60 Hz) as required to maintain the heating water differential pressure setpoint (approximately 10 psi, adjustable - as determined by the test and balance contractor). Locate the differential pressure sensor in the heating water piping on Level 0 where shown on the drawings.
3. Monitor each heating water pump with an adjustable setpoint and generate an

alarm upon pump failure.

4. Heating water system heats glycol for preheat coils in AH-1 by flowing heating water through heat exchanger HX-2. Modulate valve V-1 to satisfy glycol supply temperature setpoint to AH-1 preheat coils.
5. Provide BTU meters in heating water mains where they enter the penthouse, and trend/log heating water energy consumption for building on the DDC system for remote viewing. Include totalizing and instantaneous BTU, flow, and temperature data.

M. Chilled Water System Serving Pope Addition:

1. Chilled water for this building is provided by existing heat recovery chillers and conventional chillers in the upper and lower central plants. Chilled water pumps P-3 and P-11 distribute chilled water from the existing mains in the concourse on level 1, through the building, and back to the mains in the concourse.
2. Pump P-3 serves the chilled water glycol system serving the chilled water coils in AH-1. This pump is equipped with a variable speed drive, and flows water through heat exchanger HX-1. Modulate the speed of P-3 to satisfy discharge air temperature off air handler AH-1.
3. Pump P-11 serves the process equipment cooling loop by flowing water through heat exchanger HX-3. Modulate the speed of pump P-11 to satisfy the supply water temperature setpoint of the process cooling loop.
4. Provide BTU meters in the chilled water mains where they enter the penthouse, and trend/log chilled water energy consumption for building on the DDC system for remote viewing. Include totalizing and instantaneous BTU, flow, and temperature data.
5. Monitor each chilled water pump with an adjustable setpoint current switch, and generate an alarm upon pump failure.

N. Process Cooling System:

1. This system consists of pump P-12 and heat exchanger HX-3, and provides cooling water to laboratory equipment on levels 0 through 2.
2. Pump P-12 is equipped with a variable frequency drive. Modulate pump speed to satisfy the piping system differential pressure setpoint. Pressure differential is measured on Level 0 where indicated on the drawings.
3. Process cooling loop temperature is maintained by modulating the speed of pump P-11.
4. Monitor pumps P-11/P-12 with adjustable setpoint current switches, and generate an alarm upon pump failure. Also monitor process cooling loop supply temperature, and generate an alarm when supply temperature exceeds setpoint by 5°F for 15 minutes. Initial supply water temperature setpoint is 60°F.

O. Heat Recovery Runaround Loop System:

1. This system consists of coils in the lab exhaust plenum and outdoor air plenum of AH-1, and circulating pumps P-9/P-10.
2. Pumps P-9/P-10 are constant speed and operate in a lead/lag configuration. In

the event that the lead heating water pump P-5/P-6 fails, the lag pump shall run and an alarm signal shall be initiated. When the lead pump re-starts, the lag pump shall be turned off.

3. Pumps P-9/P-10 circulate water from the coils in the lab exhaust plenum, through the coils in AH-1, and back to the coils in the exhaust plenum. Turn the pumps on whenever outdoor air temperature is less than 44° F, and turn them off when outdoor air temperature exceeds 46°F. Also measure the air temperature downstream of the heat recovery coils inside AH-1, and display it on the control system graphics. When system is operating, outside air injection fan OAF-1 inside AH-1 shall operate, and control dampers upstream of the coils shall open. Measure airflow through coils with an airflow measuring station, and modulate OAF-1 speed to match the airflow exhausted by lab exhaust fans EF-1/EF-2/EF-3. Also open the control dampers upstream of the heat recovery coils inside the lab exhaust fan plenum when pumps are operating. Control dampers in front of the supply and exhaust coils shall close when pumps shut down, and OAF-1 shall shut down. All supply and exhaust air then bypasses the coils in order to reduce system pressure drop.
4. Both sets of coils in the supply and exhaust plenums are protected by filter banks. Monitor the pressure differential across the filter banks with differential pressure sensors, and generate an alarm when filter pressure drop exceeds 1" WC.
5. Monitor pumps P-9/P-10 with adjustable setpoint current switches, and generate an alarm upon pump failure.
6. **Open 2-position dampers at OAF-1 and at filter bank FB-3 when the heat recovery system is operating. The lab exhaust dampers that bypass the coils are to be closed when the system is operating. Include a second set of 2-position motorized dampers downstream of the heat recovery coils inside the lab exhaust plenum. This second set of dampers is to close when a software switch is activated. The software switch closes both sets of dampers upstream and downstream of the coils/filters in the lab exhaust plenum, opens the bypass dampers in the plenum, and allows maintenance personnel to access the filter bank without being exposed to the lab exhaust airstream.**

P. Laboratory Ventilation and Temperature Control in Individual Rooms:

1. See sheets MI201/MI202 for sequences, design intent, and control diagrams.
2. Minimums set at all airflow control valves can be modified by the Aircuity system. Refer to airflow rates on sheet MH801.

Q. VAV Boxes with Reheat (Areas Not Served by Laboratory Exhaust System):

Occupied Mode

Occupied mode is determined by programmed occupied schedule. During scheduled occupied periods, the system operates with an occupied space temperature setpoint and a standby space temperature setpoint. Occupant sensors installed in each room by the Div. 26 contractor include an auxiliary contact for use by the 230900 controls system. If no people are detected in the room for minimum 15 minutes during programmed occupied periods, change to stand-by setpoints. Revert to occupied setpoints as soon as a room occupant is detected during programmed occupied periods. Do not revert to occupied

setpoints if outside programmed occupied periods. When the zone requires cooling, the air volume damper shall be modulated between the minimum and maximum cfm setpoints as required to maintain the current room temperature setpoint (initial occupied cooling setpoint @ 75°F, with a 3°F deadband, heating on @ 72°F; initial stand-by cooling setpoint @ 79°F, with a 12°F deadband, heating on @ 67°F). Upon demand for heating the reheat valve and airflow damper shall modulate in unison to maintain the current room temperature setpoint. Both the global room temperature setpoint and the global room temperature setpoint deadband shall be adjustable. Monitor VAV box discharge air temperature on control system graphics.

Unoccupied Heating Mode
Air handler AH- 1 provides supply air to laboratory spaces and office spaces. Because it serves laboratory spaces that require continuous ventilation, day and night, it is available to provide supply air to individual temperature control zones that are outside their space temperature setpoint ranges without requiring entire all VAV boxes on a given floor to be indexed open. Whenever any room temperature falls below the unoccupied mode heating setpoint (55°F setpoint with a 5°F differential, off at 60°F) open the VAV box damper and reheat coil valve to the design position to satisfy the space temperature setpoint. Fully close the valve and damper once setpoint has been satisfied.

Unoccupied Cooling Mode
As with unoccupied heating mode, the air handler is running constantly to serve laboratory spaces, and is available to serve office zones in which space temperatures exceed setpoint. If the space temperature of a zone rises above the unoccupied mode cooling setpoint (85°F setpoint with a 5°F differential, off at 80°F), index the VAV box damper to design flow rate and allow air to flow into the room until the space temperature has been satisfied. Once setpoint has been satisfied, close the VAV box damper.

Optimum Start Mode (Morning Warm-Up and Morning Cool-Down Modes)
During morning warm-up and/or morning cool-down modes the air handling unit shall operate in accordance with the appropriate unoccupied mode sequence (Unoccupied Heating Mode or Unoccupied Cooling Mode). The optimum start period shall be initially programmed to start 1 hour (adjustable) prior to the occupied time. Once space temperature setpoint has been satisfied in a zone, the equipment serving that zone shall revert to occupied mode operation.

Unoccupied Override Mode
There is no override mode available to room occupants. They must contact the plant operations staff in advance to arrange for system operation during after-hours.

R. Carbon Dioxide Sensing:

Provide a wall mounted carbon dioxide sensor located next to the room temperature sensor in each of the following 38 rooms: Digital Imaging 070, Lecture 031, Lecture 073, Computer Classroom 074, Computer Classroom 032, Rock Prep 034A, Group Study 056, Group Study 058, Classroom 136, Auditorium 134, Seminar 137, Classroom 132, Unprogrammed Space 131, Bioinformatics 070A, Necropsy Room 148A, Group

Study 165-1, Group Study 165-2, Seminar 172, Seminar 150, Seminar 149, Lecture 139, Plant Team Room 278, Collab 243 N, Office 242 S, Collab 242 H, Dry Teaching Lab 247, ADV. Cadaver Teaching Lab 248, Wet Teaching Prep Room 251, ADV Cadaver Teaching Lab 255, Dry Teaching Lab 257, Group Study 266, Group Study 267, Lecture 260, Classroom 259, Class 279, Lecture 246, Break 241M, Conference 241A. Generate an alarm for any individual zone in which the CO2 level exceeds 999 parts per million. Install CO2 sensors at same height as lights switches (not less than 36" above finished floor) in the room, next to the thermostats. All aspects must comply with the requirements of LEED credit IEQ 1.

S. Central Laboratory Exhaust System (LEF-1/LEF-2/LEF-3):

1. **This system consists of the three lab exhaust fans, heat recovery coils, control dampers at the heat recovery coils, and air filters. It interfaces with the controls for the Phoenix airflow control valves.**
2. **The three fans operate continuously to provide laboratory exhaust to spaces served by Phoenix lab exhaust valves. The fans are equipped with variable frequency drives, and modulate fan speed to maintain duct static setpoint as measured at the location indicated on the sheet metal drawings for Level 0.**
3. **Monitor all fans with adjustable setpoint current switches. In the event a fan fails, generate an alarm. All three fans have been selected so two fans can speed up to provide design airflow, so if a fan fails, the two operational fans are to increase fan speed to satisfy duct static pressure setpoint. Backdraft dampers installed at the outlet of each fan prevents recirculation of air across the fan that is not operating.**
4. **Monitor the total airflow rate exhausted by the fans by use of airflow monitoring stations. Use the airflow number determined by the airflow station to compare to the total laboratory exhaust airflow calculated by the Phoenix system. Generate an alarm if the two numbers differ by more than 10% (adjustable setpoint).**
5. **Two of the three lab exhaust fans are served with backup power from the generator. In the event of a power outage, one of the fans is to remain operating, with the Phoenix exhaust valves operating in the building at a reduced airflow rate. The lab exhaust fan should provide approximately 20,000 cfm in this mode (adjustable setpoint, modify to provide negative pressure in labs and hoods, but not so much that doors into labs and the building cannot be opened). Note that no supply air will be available in the building during power outages.**

T. Radio-Isotope Hood Exhaust (LEF-4):

1. **The radio-isotope hood is a bypass hood, and is served by a dedicated exhaust fan, LEF-4. The fan runs continuously. Provide Phoenix valves in the supply and exhaust airstream serving the room – note that all exhaust from the room is drawn through the hood. Monitor LEF-4 motor with an**

adjustable setpoint current switch, and generate an alarm upon fan failure.

2. **Monitor the differential pressure across each of the two filters in the exhaust filter housing FH-1 located above the hood in the room by using differential pressure sensors. Generate a filter change notification on the DDC system when the differential pressure across a filter bank exceeds setpoint.**
3. **See sheet MI201 for additional controls requirements.**

U. Tunnel Ventilation:

1. **Tunnel ventilation fan is to be interlocked with the light switch for the tunnel, so fan operates whenever lights in tunnel are on, and stops whenever lights in tunnel are off. Include a two position motorized damper at the tunnel exhaust fan, and one at the tunnel air intake. Open both dampers when the fan is on, and close them when the fan is off. Monitor the fan with an adjustable setpoint current switch, and generate an alarm upon fan failure.**

V. Air Handler AH-1:

1. **Air handler is a field erected medium pressure VAV system with outside air economizer, three variable speed supply fans, one minimum outside air injection fan for use with the laboratory ventilation heat recovery coil system, three airflow measuring stations (one for the minimum outside air injection fan, one for the economizer outside air dampers, and one for the supply air leaving the air handler), two variable speed relief fans, pumped heat recovery coils, pumped preheat coils, indirect evaporative cooling coils, pumped chilled water cooling coils, and direct evaporative cooler / air washer. This air handler serves both laboratory spaces and non-laboratory spaces.**

2. **The air handler shall operate continuously to meet the ventilation requirements of the laboratory spaces and all telecom/data rooms. The following hard-wired safety interlocks shall disable the air handler: Smoke detectors in supply and return air streams, duct static pressure high limit switch, freeze stat, and fire alarm system interlocks. Note that while one of the lab exhaust fans will operate on back-up power, the air handler will shut down during power outages.**

3. **All 3 supply fans shall start together at low speed. Fan speed of all supply fans shall modulate together to maintain the programmed setpoint at the duct static pressure sensor. The sensor is to be located on Level 0. The control system shall poll a total of 6 terminal units (combination of conventional VAV boxes and Phoenix supply air control valves) throughout the building to determine the greatest demand for cooling. The six terminal units to be selected based on distance from the air handler and/or their abnormally large static pressure demands necessary to obtain design cfm and to satisfy space temperature setpoints. The cooling demand shall reset**

the duct static pressure so that the minimum static pressure is used to maintain the greatest demand for cooling.

4. The control system shall sequence all cooling and heating devices in the air handler to maintain discharge air temperature at 54°F (programmable) throughout the year. The system will be sequenced as follows:

a. Use outside air to cool when possible. However, the air handler serves both lab spaces and non-lab spaces and building pressurization during cold weather when the building is not operating with evaporative cooling will be dependent on the amount of outside air and return air brought into the building. During cold winter months when indirect evaporative cooling is not being used, provide 10% more outside air than is being exhausted by all lab exhaust fans LEF-1 through LEF-4, and make up the difference with return air. Measure the amount of outside air flowing through the air handler by use of airflow measuring stations at the heat recovery plenum/OAF-1 and at the outside air dampers that bypass OAF-1 and the heat recovery coils. Also provide an airflow measuring station at the supply air discharge off the air handler and calculate the amount of return air being moved through the air handler by subtracting the amount of outside air from the total amount of supply air.

b. Leave outside air dampers 100% open and return air dampers 100% closed. Start condenser water pump to supply the indirect cooling coils, and start the cooling tower fan on low speed. Use cooling tower fan VFD to modulate tower fan speed to satisfy discharge air temperature setpoint of the air handler.

c. Start the fill cycle of the direct evaporative coolers (two cooler modules in the air handler) then start its recirculation pumps (four pumps in the air handler, only operate when the air washer sump is full). Continue to modulate tower fan speed to maintain discharge air temperature.

d. Continue to operate the direct evaporative cooler recirc pumps. Start chilled water pump P-3, chilled water pump P-4, and modulate P-3 pump speed based on discharge air temperature off the air handler. Outside air dampers to remain 100% open, cooling tower fans operate at full speed, direct evaporative air washer pumps continue to circulate water.

e. Also see the tabular summary of the sequence at the end of this specification section.
(Note that discharge air temperature off AH-1 shall never be allowed to rise above 54°F when the direct evaporative media is being used. This is to prevent objectionable humidity levels from occurring in the occupied spaces.)

f. If the discharge air temperature drops below setpoint, the above cooling sequence shall be reversed. If the discharge air temperature

continues to be below setpoint after the modulating outside air control dampers have been shut (minimum outside air being provided), start the lead heating coil circulation pump P-7 or P-8 (alternate lead/lag designation every 1,000 hours) and modulate the two-way heating water injection valve V-1 to maintain discharge air temperature setpoint of the air handler.

g. The direct evaporative cooler media must be allowed to dry out for two hours each night. If the direct evaporative cooler circulating pumps are found to be running at 11:00 PM, shut them down for two hours and stage air-side economizer, indirect evaporative cooling, and chilled water to meet discharge air temperature setpoint. Start the normal cooling sequence again (includes use of direct evaporative cooler) at 1:00 AM.

h. Direct evaporative cooler shutdown at the end of 5 programmed occupied periods during which the sump was full of water (programmable) will result in a evaporative media rinse cycle as follows:

1) Close the solenoid valve leading to the direct evaporative cooler make-up water float valve.

2) Open the motorized ball valve at the evaporative cooler sump drain.

3) 5 minutes later (after sump has drained, programmable) open the make-up water solenoid valve in the water line leading to the direct evaporative cooler sump flush nozzle and evaporative media flush. Allow valve to remain open for 5 minutes (programmable) before shutting.

4) Close motorized ball valve at sump drain 10 minutes (programmable, after media has dried) after sump flush/media flush solenoid valve has closed. Because the air handler operates continuously, the supply fans will continue moving air across the direct evaporative cooler, aiding in drying out the media.

5) There are a total of two evaporative air washers, each with two pumps, in the air handler. Execute the flush portion of the sequence individually for each air washer (portion of sequence where solenoid valve to flush nozzle is open). This allows the size of the make-up water line to be reduced.

6) Direct Evaporative Cooler Sump Overflow Monitoring: Provide a cable leak detector across the width of the air handler just downstream of the evaporative air washers, and a water detector in each overflow pipe of each air washer. Upon detection of water at any of these devices, close the fill solenoid valves on all air washers and generate an alarm. Air handler can continue operating with indirect evaporative cooling and chilled water. A manual reset is required to open the fill valves serving the direct evaporative air washers.

Direct evaporative cooler start-up for the first time during an occupied period will proceed as follows:

1) Verify that direct evaporative cooler sump drain motorized ball valve is fully closed.
2) Open the solenoid valve leading to the direct evaporative cooler make-up water float valve.
3) 5 minutes later (programmable, after sump has filled) enable the direct evaporative cooler Recirculation pump.

The 230900 Contractor is referred to Detail 2/Sheet MH504 to review valve layout and piping of the direct evaporative cooler.

5. The control system shall monitor the pressure drop across the filter bank in the air handler. The instantaneous pressure drop shall be indicated on the control system graphical interface Generate an alarm calling for filters to be changed once the pressure drop measured across the filters exceeds 0.8" W.C. (adjustable)

6. Modulate relief fan speed to maintain building pressurization as measured at four locations on the exterior of the building on level 1 (one on each side of the building) and the indoor reference pressure on level 1 – operate the two fans together. Maintain building at positive 0.05" WC (programmable). Open and close relief dampers as first stage of pressure control, then start all three relief fans at low speed and modulate for the second stage of pressure control.

7. Monitor operation of supply fans, relief fans, coil circulating pumps, and evaporative cooler circulating pumps with adjustable setpoint current switches. Generate an alarm on the operator's work station and generate an email or pager notification whenever a failure is detected.

W. Lab Waste Neutralization Basins:

1. Monitor the two basins for leakage in their interstitial spaces. These units include a leak detection system. Simply monitor the leak detection device for an alarm status, and generate an alarm on the control system.

X. Humidifiers:

Humidifiers are located in eight rooms. Measure relative humidity in each room with a wall mounted sensor. Input analog signal to the humidifier serving the room, and modulate humidifier output to satisfy space RH setpoint. Monitor humidifier for common alarm, and generate an alarm on the BMS when an alarm is detected. Also display the real-time %RH in the space, and generate an alarm if space RH is below setpoint by 15% for 15 minutes or longer (adjustable setpoints). Also include a humidity limit in

the control software to shut down the humidifier if space RH exceeds the limit, and also limits the RH setpoint that can be selected on the BMS system. Space humidity sensor shall have no room occupant inputs or adjustments.

Y. Interface with Division 26 Systems:

1. **Interface with the lighting controls system specified in specification section 260943 by means of a LonMark compliant connection. Perform all programming and setpoint adjustment of the lighting control system as described in specification section 260943 and by the relay schedules and tables on sheet EL501. All lighting control system inputs/outputs are to be present on the same remote user interface as used for the HVAC controls, and all remote programming and adjustments shall be possible by using the same remote user interface.**
2. **Interface with the generator controls specified in specification section 263213 by means of a LonMark compliant connection. Monitor generator controls for status (on/off), summary alarm, fuel level, and 12 additional points that will be selected from the generator manufacturer's list of available points by UVU.**
3. **Interface with each transfer switch specified in specification section 263600 by means of a LonMark compliant connection. There are two transfer switches on the project. Monitor each switch for normal power available, emergency power available, transfer switch position = normal power, and transfer switch position = emergency power.**

Z. Upper Central Plant Modifications:

1. **Upper plant receives a new chiller, cooling tower with VFD, constant speed condenser water pump, and constant speed chilled water pump. Both new pumps are dedicated to the new chiller. A condenser water bypass valve can direct condenser water from the chiller back to the condenser water pump, bypassing the cooling tower. See sheet MP251 for sensors and additional equipment.**
2. **The new tower/chiller/pump system will be the third chiller system in the upper plant. Operate the new chiller/tower system the same as the existing chillers/towers. The existing chilled water distribution pumps are currently configured to serve two chillers operating at a time, so the third chiller/tower system will be a back-up system. Configure the plant so the two operational chillers/towers and redundant system rotate their designations after every 1,000 hours of plant operation. Begin with the new chiller/tower (C-3/CT-3) being designated as the lead system. Automatically start the redundant chiller/tower system in the event an active system fails, and generate an alarm. Include the ability to operate all 3 chillers/towers simultaneously in the future (will require future modifications to main chilled water distribution pumps, which are not part of this project).**
3. **Monitor all temperatures and flows on the new system and display on the**

DDC system as done with the existing chiller/tower systems. Chiller includes a LON controls interface, enable same inputs/outputs on the 230900 system as are possible when standing at the chiller control panel. Add graphics for new equipment to existing upper plant controls graphics.

AA. Lower Central Plant Modifications:

1. **Lower central plant modifications include replacement of two existing boilers with four new condensing boilers, replacement of the side-stream heating water pumps that circulate heating water through the boilers, and the addition of a new heat recovery chiller.**
2. **New boilers to operate as a last stage of heating (after the heat recovery chillers) to satisfy heating water system supply water temperature setpoint. Include a new supply water temperature sensor in the main leaving the plant well downstream of the point the new boilers discharge heating water back into the main. Boilers include a modulating sequencer for operation of all four boilers. Input system setpoint from the 230900 system, and allow boiler sequencer to modulate boilers as necessary to satisfy the heating water system setpoint when heat recovery chillers cannot meet demand. Each boiler has a dedicated pump. Start pump when the boiler is running, and turn pump off when its boiler is off. Monitor all pumps with adjustable setpoint current switches and generate an alarm upon pump failure. Also monitor boiler sequencer for errors/alarms, and report on the 230900 system. Coordinate digital interface standard with boiler vendor – sequencers are allowed to communicate with the 230900 system with a LON or BACnet interface. Include a high-temperature limit on the heating water system to shut down boilers if the temperature in the heating water main exceeds setpoint (120°F, adjustable). Generate an alarm if high-temperature limit is activated.**
3. **Provide an emergency shut-down switch at each boiler room exit, (as required by the ASME Code) to disconnect the power to all controls on all boilers. Switches shall be break-glass type. Provide plastic nameplate to read "Boiler Emergency Shut-Off".**
4. **New heat recovery chiller being added to the central plant is to be operated the same as the two existing Trane heat recovery chillers. Program the system to alternate the lead chiller position every 1,000 hours of plant operation. Begin with the new chiller in the lead heat recovery chiller position. Note that this new chiller CH-5 cannot operate at the same time as existing York chiller CH-2, as they share a common electrical service that uses a transfer switch to only serve one unit at a time. Condenser barrel and evaporator barrel isolation valves located in the piping to the chiller are to be closed when the chiller is off, and open when the chiller is operating. Modulating bypass valves in each set of piping to the chiller are to be controlled the same as the bypass valves serving the two existing Trane heat recovery chillers. The new chiller includes a LON interface on the chiller control panel for connection to the 230900 control system. Use this interface, and enable all inputs/outputs that can be seen when standing at**

the chiller control panel.

END OF SECTION 230900

Sequence of Operation for IDEC Systems:
In general, the mechanical equipment is controlled by the building automation system. The supply fans operate subject to the building automation system and ionization detectors. Building warm-up and life safety modes of operation have not been addressed here. All time periods and setpoints shall be "programmable".

Mode	OSA Temp.	DAT Setpoint	Sensor Used for Control	Mode Description			
				Mode Switch	Equipment Action	Economizer Action	Relief Fan(s) Action
Economizer	Below DAT	53°	Discharge Air Sensor	Operate in Economizer Mode when outside air is below DAT	All chilled and condenser pumps "off". Supply fan speed controlled by duct static pressure setpoint. No condenser water flow thru chiller.	Modulate economizer to maintain discharge air temperature.	Relief fan VFD's modulate in unison to maintain building static pressure differential setpoint.
Indirect Evap	Above DAT	53°	Discharge Air Sensor and OSA Sensor	START (Indirect) When outside air is above DAT for 15 minutes STOP When outside air is 3°F below DAT for 30 minutes. Minimum mode run time: 30 minutes.	Run the lead condenser water pump. No condenser water flow thru chiller. Modulate cooling tower speed to maintain discharge air temperature.	Modulate cooling tower speed to maintain discharge air temperature. OSA dampers 100% open. RA dampers 100% closed.	Relief fan VFD's modulate in unison to maintain building static pressure differential setpoint.
Indirect Evap plus Direct Evap	Above DAT	53° **or less**	Discharge Air Sensor	START (Direct) When discharge air is above setpoint for 15 minutes and Indirect evap mode is operating. STOP Do not turn off direct evap until the air handler shuts down at the end of the day, even if DAT is far below setpoint.	Indirect evap mode continues to run. Modulate cooling tower speed to maintain discharge air temperature. Run evap media pump(s).	Modulate cooling tower speed to maintain discharge air temperature. OSA dampers 100% open. RA dampers 100% closed.	Relief fan VFD's modulate in unison to maintain building static pressure differential setpoint.
Indirect Evap plus Mechanical Cooling (Chiller)	Above DAT	53°	Disharge Air Sensor	START (Chilled water pumps P-3 and P-4) When discharge air is above setpoint for 15 minutes and Indirect Evap mode and Direct Evap mode is operating. STOP At end of daily occupied period.	Start chilled glycol pumps P-3 and P-4. Modulate pump P-3 speed to maintain discharge air temperature setpoint. Indirect mode continues to run. Direct mode continues to run. Lead condenser water pump continues to run.	OSA dampers 100% open. RA dampers 100% closed.	Relief fan VFD's modulate in unison to maintain building static pressure differential setpoint.

3.10 PAINTING

A. Surfaces of ~~exposed~~ **mechanical/plumbing** equipment and materials **required to be painted are** to be thoroughly cleaned and ~~left ready for painting~~ **painted** in accordance with Architectural Painting Specifications.

B. Duct interiors visible through registers, grilles and diffusers shall be painted flat black.

C. Exposed gas piping to be cleaned, primed and painted 2 coats (grey).

D. **Paint all new mechanical and plumbing piping where exposed to view in the concourse, Hall of Flags, Campus Corridor 130, existing Pope building, upper central plant, and lower central plant. Colors to match color schedule used on existing piping, obtain exact color codes from UVU plant operations personnel. Paint to be applied after insulation has been installed on pipes that require insulation.**

~~D~~E. All other painting of mechanical equipment and piping, unless otherwise noted, shall be performed under other divisions of the work with the exception of identification of piping and equipment which will be the responsibility of the Division 23 Contractor.

3.11 IDENTIFICATION OF PIPING AND EQUIPMENT

A. General: Provide pipe identification, valve tags, stencils, or engraved nameplates to clearly identify the mechanical equipment, piping and controls of the various mechanical systems and direction of flow in piping.

B. Methods for identification shall be as follows:

1. Metal Tags: Stamp tags with letter prefixes to indicate service, followed by a number for location in system.
2. Engraved Nameplates: Attach nameplates with brass screws. Pressure-sensitive embossed labels are not acceptable. Nameplates shall bear the same identifying legend used on the Contract Documents.
Size of Legend and Letters for Labels:

Insulation or Pipe Diameter	Length of Color Field	Size of Letters
¾" to 1-1/4"	8"	1/2"
1-1/2" to 2"	8"	3/4"
2-1/2" to 6"	12"	1-1/4"
8" to 10"	24"	2-1/2"
over 10"	32"	3-1/2"
Ductwork and Equipment	NA	2-1/2"

2.3 SUMP PUMPS

A. Acceptable Manufacturers:

1. Enpo-Cornell
2. Hydromatic
3. Kenco
4. Weil Pump Company
5. Grundfos
6. Paco
7. Liberty Pumps
8. Bell & Gossett
9. **Federal**

B. Submersible Type:

1. Provide cast iron construction submersible duplex sump pumps, power cord of length required, mercury float switches, strap mounted, for pump on, pump off 2 pump on high water alarm, remote mounted duplex pump panels with H.O.A. switch for each pump, power to pump indicating light, push to test buttons, 24 VAC control circuit, alternator, necessary relays, starters, disconnect for each pump, high water audible and visual alarm, phase protection for three phase motors two pump control and NEMA 12 enclosure.
2. **Include rail removal system and necessary fittings.**
3. Schedule: See Drawings.

2.4 VACUUM PUMP SYSTEMS

A. Approved Manufacturers: Becker Pumps Corp., Busch Manufacturing (sold by Compressor Pump & Service), Squire Cogswell/Aeros Instruments, Travaini Pumps, Tuthill Corp.

B. **Description: Factory-assembled, -wired, -piped, and -tested; electric-motor-driven; air-cooled; continuous-duty central laboratory vacuum pump system. Unit to be skid mounted, with all piping, wiring, starters, controls, and drains factory mounted on the skid. Duplex unit with two vacuum pumps that can operate in a lead/lag configuration or simultaneously, sized piped and wired for future expansion to a triplex and quad system with the future installation of one and two additional vacuum pumps on the skid, respectively.**

C. **Control Panels: Automatic control station with load control and protection functions. Comply with NEMA ICS 2 and UL 508.**

1. Enclosure: NEMA ICS 6, Type 12 control panel unless otherwise indicated.
2. Motor Controllers: Full-voltage, combination-magnetic type with undervoltage release feature and motor-circuit-protector-type disconnecting means and short-circuit protective device.

3. **Control Voltage: Provide control voltate using integral control power transformer with primary and secondary fuses.**
4. **Power distribution block for single-point electrical connection.**
5. **Motor Overload Protection: Overload relay in each phase.**
6. **Starting Devices: Hand-off-automatic selector switch in cover of control panel, plus pilot device for automatic control.**
7. **Automatic control sequence lead-lag and multiple pump operation for multiplex vacuum pumps. Lead pump shall be time alternated, and shall operate on a pressure-activated basis. The lag pump(s) shall come on line in a pressure controlled cascading sequence.**
8. **Instrumentation: Include vacuum pump inlet and receiver vacuum gages, hour meter, vacuum pump discharge-air and coolant temperature gages, and control transformer.**
9. **Alarm Signal Device: Dry contact for connection to 230900 control system to indicate when a vacuum pump has failed and when system vacuum setpoint cannot be maintained.**
10. **Motor control center and controls shall be configured for future expansion to a triplex and a quad system.**

D. **Receivers and Piping:**

1. **Receiver shall be vertical steel tank constructed according to ASME Boiler and Pressure Vessel Code, Section VIII, Division 1; bearing appropriate code symbols, rated to min. 200 psig and full vacuum.**
2. **Receiver Interior Finish: Corrosion-resistant coating.**
3. **Pumps shall be connected to a common manifold and piped to the vertical receiver. Each vacuum pump shall include a vacuum gauge, an automatic ball-type isolation valve, an auto-purge assembly, a flexible connector between the pumps and inlet and outlet manifolds, and manual isolation valves at pump inlet/outlet to allow for removal of an individual pump without requiring full shutdown of system. Each pump shall be equipped with a 10 micron inlet filter for removal of particulates, and a manifolded flanged exhaust adapter to permit piping of the exhaust gases to a remote point.**
4. **Each pump is equipped with an automatic purge system to flush any gases from the pump to prevent condensation as the pump cools when turned off. Purge system shall incorporate the electric actuated automatic isolation valve, auto-purge assembly with solenoid bleed valve, and controls to operate a 15-minute shutdown purge.**
5. **Accessories: Receiver to include vacuum relief valve, vacuum gage, manual drain valve, vacuum transmitter to remotely monitor vacuum pressure inside receiver.**
6. **Piping on skid shall be type L copper or schedule 40 type 316 stainless steel.**

E. **Mounting Frame: Fabricate base and attachment to pressure vessel with reinforcement strong enough to resist packaged equipment movement during a seismic event when base is anchored to building structure. Size for future addition of two pumps, for a total of four pumps. All pumps to be horizontally mounted on vibration isolators.**

F. **Vacuum Pumps: Nonpulsating, oil-sealed, rotary vane type.**

1. **Cleanable inlet screens.**
2. **Outlet silencers and oil-mist separators on discharge connections.**
3. **Pumps skid mounted in horizontal arrangement. Pumps shall be direct-driven through a shaft coupling by a NEMA C-face, foot-mounted, TEFC electric motor. Belt drives are not allowed.**
4. **Pumps are air-cooled.**
5. **Each pump shall have a minimum end vacuum of minimum 29.3" Hg based on a barometric pressure of 29.92" Hg.**
6. **Lubrication provided by an integral, fully recirculating oil supply that is filtered by an automotive-style spin-in oil filter. Non-recirculating or partial recirculating sealant/lubrication systems are not allowed. Each pump shall be equipped with an oil drain valve and high discharge temperature switch. Each pump is capable of operation with standard SAE 30 weight semi-synthetic oil. The oil separation system shall be integral and consist of no less than 3 stages of internally installed oil and smoke eliminators through which the exhaust gas stream must pass. The system shall consist of bulk separation, oil mist elimination, and smoke elimination, and shall remove minimum 99.9% of all oil and smoke particles from the exhaust gas stream.**
7. **Each pump shall include a built-in anti-suck-back valve mounted at the pump inlet, and each pump shall be equipped with minimum three non-metallic/non-asbestos vanes, each having a minimum life of 30,000 hours. The pumps shall be mounted on vibration isolators fastened to the unit skid, and supplied with an initial charge of R590 semi-synthetic oil.**

PART 3 - EXECUTION

3.1 DOMESTIC HOT WATER CIRCULATING PUMPS

A. Coordinate wall mounted "on-off" toggle switch for pump and electrical power requirements with Division 26 Contractor in accordance with Section 230529 - Basic Mechanical Materials and Methods.

B. Set pump level, plumb and square where indicated on contract documents on vertical pipe leg extended to and supported by floor, provide floor plate and capped leg at floor.

C. Provide drain valve on pump support leg at 18" above floor.

D. Anchor vertical pump leg pipe so as to prevent movement and vibration.

3.2 SUMP PUMPS

A. Coordinate electrical power and control wiring, panel mounting and remote and local alarm systems wiring with Division 26 Contractor in accordance with Section 230529 - Basic Mechanical Materials and Methods.

B. All openings thru basin or cover to be gas tight, provide unions, valves and checks as appropriate. Note: pump discharge check valves to be non slam type, tilting disc or pilot operated 45 degree swing design. Lift type or spring operated types will not be allowed.

C. Operating floats shall be tied to vertical float rod and shall not swing free in basin.

D. Provide pump power cords of sufficient length to exit basin and connect to power source above floor outside of basin area.

E. Mount control panel and alarm panel, on walls secured tightly and permanently.

3.3 VACUUM PUMP SYSTEM

A. Equipment Mounting: Install vacuum pump system on concrete inertia base.

B. Orient equipment so controls and devices are accessible for servicing.

C. Maintain manufacturer's recommended clearances for service and maintenance.

D. Install the following devices on vacuum equipment:

1. Thermometer, Vacuum Gage, and Pressure Relief Valve: Install on each vacuum pump receiver.
2. **Drain Valves: Install on receivers. Discharge receiver condensate over nearest floor sink.**

E. Provide startup service by factory authorized technician. Provide copy of start-up report in O&M manuals. Start-up services to include start-up list provided by factory, plus the following items:

1. Complete installation and startup checks according to manufacturer's written instructions.
2. Check for lubricating oil in lubricated-type equipment.
3. Check belt drives for proper tension.
4. Verify that vacuum producer outlet piping is clear.
5. Check for equipment vibration-control supports and flexible pipe connectors and verify that equipment is properly attached to substrate.
6. Check safety valves for correct settings.
7. Check for proper seismic restraints.
8. Drain receiver tank.

F. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.

G. **Test and adjust controls and safeties.**

H. **Verify that vacuum equipment is installed and connected according to the Contract Documents.**

I. **Verify that electrical wiring installation complies with manufacturer's submittal and written installation requirements in Division 26 Sections.**

J. **Prepare written report documenting testing procedures and results.**

END OF SECTION 224450

G. Section 224440 – Plumbing Fixtures.

H. Section 224450 – Plumbing Equipment.

I. Section 224460 - Special Plumbing Equipment Systems.

1.4 SUBMITTALS

A. Submit Product Data for the following items under provisions of the General Conditions of the Contract:

1. Water Piping, Fittings, and Joints.

PART 2 - PRODUCTS

2.1 WATER PIPE, TUBE, FITTINGS AND JOINTS

A. Exterior Buried:

1. Copper Tube, Fittings, and Joint Material:

a. Copper tube ASTM B88 Type K shall be brazed to wrought or cast fittings using AWS class BCuP brazing filler metal.
b. Wrought copper and bronze solder joint fittings shall conform to ANSI B16.22.
c. Cast bronze solder joint fittings shall conform to ANSI B16.18.

2. Cast Iron Pipe Fittings and Joints:

a. Gray cast iron pipe, centrifugally cast, 18/40 physicals, cement lined, mechanical joint, thickness class 23 minimum. 300 psi minimum working pressure "laying condition A" as designated by USA Standard A21.1 and 8 foot bury.
b. Mechanical joints and fittings shall be furnished with set screw retaining glands and shall conform to ANSI/AWWA C110/A21.10 and ANSI/AWWA C111/A21.11.
c. Mechanical joint fittings shall be Ductile Iron, 350 psi working pressure up to 24" size.
d. All cast iron pipe, fittings, and joints to be manufactured in USA.

3. Ductile Iron Pipe Fittings and Joints:

a. Class 150, ductile iron pipe centrifugally cast, thickness class 2, cement lined, mechanical joint, 350 psi minimum working pressure "laying condition A" as designated by USA Standard A21.51 and 8 foot bury.

b. Mechanical joints and fittings shall be furnished with set screw retaining glands and shall conform to ANSI/AWWA C110/A21.10 and ANSI/AWWA C111/A21.11.

c. All ductile iron pipe, fittings, and joints to be manufactured in USA.

B. Interior Buried:

1. Provide type K annealed (soft) copper water tube conforming to ASTM B-88 with 95% tin 5% antimony solder joints using wrought fittings. No joints below grade. Provide continuous tube for all buried tubing using tube bends in lieu of fittings. Exterior tube may be coupled where requirements are in excess of standard mill lengths by using wrought pressure couplings with stops and silver solder brazed Joints. Lengths coupled in this manner, where necessary and acceptable to the Engineer, will meet the intent of the no fitting requirement of this Specification. Interior buried tube shall meet the same criteria and requirements.

C. Interior Tube Supported by Hangers and Clamps:

1. Provide ASTM B88 Type L hard drawn copper tube for all water distribution piping inside building/structure, with wrought copper fittings and couplers up to 6", cast brass or bronze fittings and couplers for sizes 6" and larger. Joints shall be 95-5 Class SnSb solder or Victaulic CTS roll-grooved couplers and fittings for 3” and larger tube.

2.2 SOIL DRAIN WASTE, VENT AND STORM PIPE FITTINGS AND JOINTS

A. General:

1. Cast iron pipe centrifugally cast service weight (SV) soil pipe with cast iron drainage fittings conforming to ASTM A 74. Joint materials and systems may be hub and spigot with neoprene gaskets and lubricant conforming to ASA-021 and ASTM C-564 SV pattern. Gaskets shall be equal to U.S. Pipe Company Veri-tite conforming to ASTM-C564 and/or CISPI HSN75 and be certified in writing to the Engineer that the following criteria has been met, thru testing by a recognized independent testing laboratory. Cast iron hubless pipe and fittings conforming to ASTM A 888 or CISPI 301. Hubless couplings shall conform to ASTM C 1277 for standard and ASTM C 1540 for heavy duty or CISPI 310. **All cast iron pipe, fittings, and joints to be manufactured in USA.**
   Criteria: Sizes 2" thru 6" shall withstand 15 psig hydrostatic pressure for 10 minutes with unrestrained joints, and no leakage, and using restrained joints must be able to withstand 25 psig air pressure and 40 psig hydrostatic pressure with no leakage. Offset joints shall withstand 1056 pounds of horizontal force without joint separation or detectable leakage.
2. Cast iron pipe is only allowed to serve branch soil drain waste and vent lines serving restrooms, janitor’s closets, and mechanical penthouse. Use acid resistant drain, waste, and vent piping for all other spaces and for common lines serving

any space not a restroom, janitor's closet, or mechanical penthouse. All storm drainage piping to be cast iron.

B. Buried Pipe:

1. Provide SV hub and spigot cast iron pipe and fittings for branch lines only serving toilet rooms, mechanical penthouses and janitor's closets, and acid resistant piping per this spec for all spaces serving labs, to 5'-0" beyond building excavation line, continue past this point with SV cast iron or XS vitrified clay to termination points with hub and spigot joints. At Contractor's option and where approved by local jurisdiction, No-Hub standard weight cast iron pipe with either M-G couplings or heavy-duty stainless steel shielded couplings may be used in lieu of hub and spigot with Ty-Seal neoprene gaskets on lines not serving labs. The heavy-duty shielded couplings shall comply with ASTM C1540, with ASTM C564 neoprene gaskets, minimum 0.008" stainless steel shields with transverse corrugations across longitudinal corrugations, standard 304 stainless steel clamps and 305 stainless steel screws. Entire assembly shall be suitable for direct burial, be corrosion resistant, and accommodate pipe deflection.

C. Interior Pipe Supported By Hangers and Clamps:

1. Provide hubless cast iron pipe using hubless cast iron soil pipe couplings certified to withstand a minimum of 50 psi internal pressure. Where stack pressures may theoretically exceed 50 psi, use clamp all or heavy-duty couplings with restrained joints horizontal and vertical up to 80 psig. For pressures above 80 psi, use Schedule 40 ASTM A-120 galvanized steel pipe with threaded cast iron drainage fittings. Roll grooved schedule 40 pipe with Victaulic Style 77M galvanized couplers may be used on horizontal and vertical stacks and mains. Use Teflon tape or compound for all threaded joint make-up.
2. Sump pump discharge from the pump to the point the waste stream flows continuously via gravity shall be Schedule 40 galvanized steel pipe with NPT threaded joints and fittings.
3. Copper Waste, Vent and Soil Pipe and Fittings shall be prohibited on this project.

2.3 ACID RESISTANT DRAIN, WASTE AND VENT

A. Polypropylene:

~~1. Acceptable Manufacturers: Sloan Fuseal, Enfield, Orion, Spears, Simtech Inc., Harrington Plastics.~~
2. Provide polypropylene pipe and DWV fittings, Schedule 40, ASTM D2122 Section 4 and 7, with electrically induced fusion joints.

B. PVDF:

~~1. Acceptable Manufacturers: Sloan Fuseal, Enfield, Orion, Spears, Simtech Inc., Harrington Plastics.~~

2. Provide PVDF pipe and DWV fittings, Schedule 40, ASTM ASTM D3222, ASTM D3311, and ASTM F1673, with heat fusion joints per ASTM 2657 or ASTM 1290.

2.4 COMPRESSED AIR

A. Provide Type L Copper tubing and wrought copper fittings with "95-5" Class Sn Sb, soldered joints or Schedule 40 black steel piping with welded joints. Threaded joints may be used on piping under 4" diameter.

2.5 LABORATORY VACUUM

A. Provide Type L Copper tubing and wrought copper fittings with "95-5" Class Sn Sb, soldered joints.

2.6 RO WATER

A. Provide Schedule 80 PVDF pipe and fittings, meeting ASTM D3222 and ASTM D2447, having no pigments or plasticizers. Pipe and fittings to be joined using socket fusion joints per ASTM D2657. Material must demonstrate compliance with ASTM E84 for flame and smoke spread rates **and be rated for use in air plenums**.
B. PVDF ball valves to be tested to 150 psi at a water temperature of 73°F.

PART 3 - EXECUTION

3.1 WATER TUBE, FITTINGS AND JOINTS

A. General:

1. All copper tube and fittings shall be reamed and buffed prior to soldering or brazing.
2. The use of lead solder of any class, for joint make-up or back-up for finishing is prohibited.
3. Refer and conform to the Copper Development Association instructions for proper preparation and actual installation practice for all soldered and brazed joints.
4. Support water tube in accordance with Section 230529.
5. Pull tee (T-drill) fittings are forbidden.

3.2 CLEANING

A. Remove temporary coverings and protection of adjacent work areas.

3.8 RO WATER

A. Hang piping at not more than four foot centers or in continuous trough support using eight foot hanger spacing.

B. Pitch piping to low (drain) points. Provide true union ball valves at all low points.

C. Provide recirculating piping as required. Include a bypass valve the branch into each lab or room to allow system to continue circulating when the piping inside a particular room must be isolated. Complete with non contaminating recirculating pump.

D. Provide proper zone, sectional drain down, and shut off valves as per standard piping specification and as shown on drawings, and of appropriate materials compatible with ultra pure water handling.

3.9 TESTING

A. Schedule of Testing:

Service	Allowable Test Methods H_2O	CA	N_2	V	Minimum Test Pressure (psig)	Minimum Test Period (minutes)	Allowable Pressure Variance (psig)
1. Potable Water Pipe Valves & Fittings	X	 X			125 100	60 60	-0- +1/2
2. Sanitary, Storm & Acid Waste and Vent System:							
*Stack Height:							
0-23 FT.	X				10	30	-0-
24-34 FT.	X				15	30	-0-
35-46 FT.	X				20	20	-0-
47-57 FT.	X				25	20	-0-
58-69 FT.	X				30	10	-0-
70-80 FT.	X				35	10	-0-
81-92 FT.	X				40	10	-0-
93-103 FT.	X				45	10	-0-
Over 104 FT.	X				50	10	-0-
3. Vacuum:				X	-7.4 (15"Hg)	30	-0-
4. Distilled**, RO,** and Deionized			X		60	30	-0-

B. Testing connections for hydrostatic tests shall be made at the base of the system, CA, N2 and vacuum testing can be made from connections anywhere in the system tested.

PART 2 - PRODUCTS

2.1 PRODUCT LISTINGS AND APPROVALS

A. All system components for which UL listings categories exist shall be listed by Underwriters Laboratories (UL) or Factory Mutual Research (FM).

1. All components shall be listed in the current edition of the UL Fire Protection Equipment Directory. Components shall be delivered to the project site with factory applied UL stickers.
2. Components for which UL listing approvals are “pending” are not acceptable.

B. All system components shall be used in accordance with the manufacturer’s recommendations and their listing.

C. All system components are subject to the approval of the engineer with regard to their fitness for the intended application.

2.2 UNDERGROUND EXTERIOR PIPING

A. Pipe, Fittings and Joints, Exterior and Buried:

1. **All pipe, fittings, and joints shall be manufactured in the USA.**

2. General: The use of cast-iron, asbestos cement, steel, or other piping materials and systems is prohibited, unless specifically accepted by the Engineer.

3. Pipe Fittings and Joints:

a. Ductile iron pipe with mechanical joint fittings. Joints to be provided with set screw retainer glands.

Make:	U.S. Pipe Company
Size:	2" thru 48"
Laying Condition:	Type 1
Thickness Class:	50 or 51 as required by U.S. Pipe.
Standards:	ANSI A21.SD/A21.51 AWWA C-150/151, U.L., F.M., NSF.
Pressure Rating:	250 psi
Fittings:	Ductile iron conforming to ANSI A21.10/A21.16 and AWWA C-110/111.
Retaining Glands:	Set screw type ductile.
Hydrant Connections:	Tee DI rotatable x MJ Hydrant Connector. DI rotatable 13" long x MJ

connecting pieces to provide plumb and true hydrant, valve and service riser settings.

B. Tapping Tees and Valves:

1. Where the water utility does not install its own service tap, provide tapping tees and valves for wet taps. Provide service saddle, valve, and service box with indexed cover in accordance with the utility's standards.

C. Backflow Preventer: Provide backflow preventer in heated room shown in drawings, in accordance with Section 230529.

1. Reduced pressure assembly, U.L. Classified, FM Approved, with shut-off valves. Ames C400, or approved equal.

D. Thrust Blocks - Tie Rods:

1. Provide 3000 lb type II concrete thrust blocks with soil contact area based on not more than 2000 psf horizontal soil bearing quality, and enveloping 1/2 of pipe, fitting, or valve. Provide saddle reinforcing as required.
2. Submit calculations for each thrust block and dead man provided.
Provide 1/2" minimum machine thread rods and clamps (felt padded clamps for plastic pipe) on all service entries from last joint underground to riser elbow or wall entry and to first joint in the building. All rods, clamps, and bolts double coated with "ZRC" brand cold galvanizing coating after installation and draw up. Provide 1 coat of coal tar coating over galvanizing. NOTE: Clamps and rods to not preclude the requirements for thrust blocks or deadmen.

2.3 SOLVENTS FOR PLASTIC PIPING

A. Solvents for plastic piping joints shall be certified to meet SCAQMD Rule 1168/316A. This includes but is not limited to PVC, CPVC, and ABS piping, all grades and sizes.

2.4 INTERIOR AND EXTERIOR ABOVE-GROUND PIPING

A. Pipe and Joints:

1. **All pipe, fittings, and joints shall be manufactured in the USA.**
2. Black steel and galvanized steel threaded or roll grooved schedule 40 conforming to ASTM A-135 or A-53. Light wall (Schedule 10) conforming to ASTM A-135 or ASTM A-795, where prior approval is obtained from Owner and jurisdiction having authority. All pipe shall conform to NFPA #13, Chapter 3 and Jurisdictional Authorities and Insurance Agency.

SECTION 233400 - AIR HANDLING FANS

PART 1 - GENERAL

1.1 WORK INCLUDED

A. Cabinet Fans
B. Exhaust Fans (Utility Set Type)
C. In-Line Centrifugal Fans
D. Propeller Type Ventilation Fan
E. Power Roof Ventilators
F. Exhaust Fans (Ceiling Type)
G. Plug Fans
H. Mixed Flow Fans

1.2 RELATED WORK

A. The General Conditions, Supplementary Conditions and Division 1, General Requirements apply to this section and Contractor shall review and adhere to all requirements of these documents.

1. Section 230500 - Basic Mechanical Requirements.
2. Section 230529 - Basic Mechanical Materials and Methods.
3. Section 230540 - Mechanical Sound and Vibration Control.
4. Section 230548 - Mechanical Seismic Control.
5. Section 230593 - Testing, Adjusting and Balancing.

1.3 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Firms regularly engaged in manufacture of specified fans with characteristics, sizes, and capacities required, whose specified fan has been in satisfactory use in similar service for not less than 3 years.

1.4 SUBMITTALS

A. Submit shop drawings and product data for the following items under provisions of the General Conditions of the Contract:

1. Shop Drawings: Submit assembly-type shop drawings showing unit dimensions, weight loadings, required clearances, construction details, and field connection details for each fan.
2. Product Data: Submit manufacturer's technical product data for all fans showing dimensions, weights, capacities, ratings, fan performance curves

with operating point clearly indicated, motor electrical characteristics, gages and finishes of materials. Provide multiple-speed performance curves for fans with variable speed drives.

B. Submit printed Operating Instructions and Maintenance Data for the following items under provisions of Operating and Maintenance Data paragraph in Section 230500:

1. All fans.

1.5 **DELIVERY, STORAGE AND HANDLING**

A. Deliver fans with factory-installed shipping skids and lifting lugs; pack components in factory-fabricated protective containers.

B. Handle fans carefully to avoid damage to components, enclosures, and finish. Do not install damaged components; replace and return damaged components to fan manufacturer.

C. Store fans in clean dry place and protect from weather and construction traffic.

D. Comply with Manufacturer's rigging and installation instructions for unloading fans and moving them to final location.

1.6 **EXTRA STOCK**

A. Provide one spare set of belts for each belt-driven fan.

PART 2 - PRODUCTS

2.1 **CABINET FANS**

A. **Acceptable Manufacturers: Subject to compliance with requirements, provide cabinet fan of one of the following: Loren Cook, Greenheck, Twin City, Trane, New York Blower, ACME, Peerless, Barry, Penn, Breidert.**

B. **Furnish and install cabinet fans of size and capacity shown on drawings.**

C. **Cabinet shall be constructed of steel with removable panels for access to all internal parts.**

D. **Fan shall be double width, double inlet multi-blade centrifugal type with V-belt drive and adjustable speed sheave, or direct drive with solid state speed controller.**

E. **Fans shall be statically and dynamically balanced and shall run on permanently lubricated bearings.**

F. **Motor shall be provided per requirements of "Motors" in Section 230529.**

2.2 CENTRIFUGAL FANS, UTILITY SET

A. **Acceptable Manufacturers: Subject to compliance with requirements, provide utility set type exhaust fan of one of the following: Loren Cook, Greenheck, Twin City, New York Blower, ACME, Peerless, Barry, Penn.**

B. **Type: To be of the centrifugal type, completely assembled with fan, fan scroll, motor, belt drive, motor mount and motor housing.**

C. **Capacity: To be as shown on the Drawings. Arrangement of discharge to be as shown on the drawings.**

D. **Construction: To be constructed of steel sheet and parts to be bonderized and then coated with baked primer-finish. All parts exposed to the exhaust airstream of LEF-4 to be phenolic coated.**

E. **Fan Wheels: Shall be of the airfoil type. Include a drain in bottom of fan housing.**

F. **Motor and Drive: To be belt drive with adjustable motor sheave. Belts to be of the oil-resistant type. Motor to be especially designed for quiet operation and in accordance with "Motors" in Section 230529.**

G. **Units to be factory assembled and tested prior to shipment.**

2.3 PROPELLER TYPE VENTILATION FAN

A. **Acceptable Manufacturers: Subject to compliance with requirements, provide propeller type ventilation fan of one of the following: ACME, Aerovent, Cook, Penn, Greenheck, Twin City, Barry.**

B. **Type: Shall be of the direct drive type.**

C. **Fan Blades: Shall be constructed of cast aluminum. Fan blades shall be quiet in operation and shall be statically and dynamically balanced at the factory.**

D. **Motor: Shall be either sleeve or ball bearing types; 1750 RPM with adjustable sheaves in accordance with "Motors" in Section 230529. Note that these fans will run with VFDs.**

E. **Accessories: Belt guard, safety screen enclosure, and as indicated on Drawings.**

F. **Size and Capacity: As scheduled on Drawings.**

2.4 POWER ROOF VENTILATORS

A. **Acceptable Manufacturers: Subject to compliance with requirements, provide Power Roof Ventilator of one of the following: ACME, Jenn-Air, Penn, Greenheck, Cook, Powerline, Carnes, Twin City Fans, Breidert.**

B. **Furnish and install upblast Power Roof Ventilators of model, size and capacity as shown on Drawings.**

C. **Housings shall be of contour, type, and material as shown on drawings.**

D. **Fan: Shall be the backwardly inclined type with centrifugal wheel that has been statically and dynamically balanced at the factory.**

E. **Motor: Shall be installed in a totally enclosed weatherproof housing outside of the air stream and in accordance with "Motors" in Section 230529.**

F. **Drive: Units shall be belt driven or direct drive. Belt shall be oil resistant. An adjustable sheave on the motor shall be provided to allow changes in the fan speed. Direct drive units to include a solid state speed controller.**

G. **Installation: Ventilators shall be installed on the roof on a nominal 12-inch high, pre-fabricated, self-flashing aluminum curb with 2" fiberglass insulation and metal liner, furnished with the fan.**

H. **Disconnect Switch: A factory wired non-fused disconnect switch shall be located under the hood of the unit.**

I. **Motorized Backdraft Dampers: Shall be installed on the curb of the unit.**

J. **Bird Screen: Entire air outlet of the fan shall be protected by a 1/2" x 1/2" aluminum mesh securely installed in place.**

2.5 EXHAUST FANS (CEILING TYPE)

A. **Acceptable Manufacturer: Subject to compliance with requirements, provide ceiling type exhaust fan of one of the following: Penn Co. (Zephyr Model), ILG, Pace, Cook, Jenn-Air, Greenheck, ACME, Carnes, Twin City Fan, Broan, Breidert.**

B. **Type: Shall be of the centrifugal fan, integral grille and housing type, all completely self-contained.**

C. **Capacity: Capacity and model number of the units shall be as shown on drawings, and shall be certified by AMCA.**

D. **Motor and Drive: Fan shall be of the direct drive type, and maximum fan motor speed shall be 1150 RPM. Motor shall be of the permanently lubricated ball bearing type, and shall be directly coupled to the fan. The motor and fan shall be easily removable thru the intake grille for service. Direct drive fans to include solid state speed controllers.**

E. **Housing: Shall be constructed of heavy gauge steel, and shall be completely insulated internally with acoustical insulation material to deaden sound.**

F. **Backdraft Damper: Each fan shall be equipped with a nonmetallic backdraft damper constructed of neoprene and shall be shatterproof under all conditions.**

G. **U.L. Label: Each fan shall be approved by the Underwriters' Laboratories, Inc. and shall carry the U.L. Label.**

H. **Intake Grille: Shall be constructed of steel frame and woven steel grille with a minimum free area of 85%. Intake grille shall have a white, factory baked enamel finish.**

2.6 PLUG FANS

A. **Manufacturers: Pace, Greenheck, Acme, Twin City, Barry, Chicago, Cook, Carnes, New York Blower.**

B. **Provide centrifugal plug type fans of size and capacity as scheduled on the drawings.**

C. **The fan shall be of the centrifugal plug type and be of the non-overloading die formed reinforced airfoil shape, backward inclined blades, fully welded to the solid backplate and inlet shroud.**

D. **The fan shall be designed without an involute housing.**

E. **Fan and motor shall be mounted on an integral steel frame or inertia base. Fan shall be direct drive.**

F. **Fan bearings shall be oversized for B-10 minimum life of 100,000 hours.**

G. **Fan performance ratings shall be based on tests made in accordance with AMCA Standard 210.**

H. **The fan motor shall be wired with a flexible conduit of adequate length so that it will not affect the vibration isolation to any appreciable degree. The maximum allowable velocity in the vertical direction on top of the bearing is 0.075 inches per second as compared to the base on which the fan and motor are mounted. In case of vibration problems, it shall be the fan manufacturer's responsibility to verify this criterion.**

I. **The shafting of the fan shall be sized not to exceed 75% of the first critical speed under the specified operation conditions and the lateral static deflection of the shaft shall not exceed 0.003 inches per foot of the length of the shaft. The shaft and fan wheel shall be dynamically balanced in two planes as a complete unit to a maximum residual unbalance of 0.15 oz. at 95% of the fan wheel radius in each plane.**

J. **Motor shall be of the Standard NEMA frame, ball bearing rigid mounted open drip-proof construction. Heavy steel motor adjusting bases shall be provided. Motor speeds shall not exceed 1750 RPM. Motor shall be in accordance with "Motors" in Section 230529.**

K. **Provide variable frequency drives where indicated on drawings, in accordance with Section 230810.**

L. **Provide inlet safety screen, outlet safety cage with access door, and safety enclosure around belt drive.**

2.7 MIXED FLOW FANS

A. **Acceptable Manufacturers: Greenheck, Cook, Twin City.**

B. **The housing shall be constructed of continuously welded heavy gauge steel. Housing shall have inlet and outlet collars for slip fit duct connections. The motor support shall be constructed of structural steel members to prevent vibration. Welded steel vanes shall straighten the flow of air from the fan discharge. Housing to include a drain though inside to catch all rain water that comes down vertical duct to fan in vertical position. Through to discharge at a single drain point on side of housing.**

C. **The wheel shall be of the mixed flow type. Wheels shall have a wheel cone, spherical back plate and single thickness cambered blades. Wheels shall be statically and dynamically balanced to balance grade G6.3 per ANSI S2.19. The wheel cone and fan inlet cone shall be carefully matched and shall have precise running tolerances for maximum performance and operating efficiency.**

D. **Each assembled fan shall be test run at the factory at the specified fan RPM and vibration signatures shall be taken on each bearing in three planes; horizontal, vertical, and axial. The maximum allowable fan vibration shall be 0.080 in./sec peak velocity, filter-in reading as measured at the fan RPM. This report shall be provided upon request.**

E. **Inlet and outlet sound power levels shall be provided for each of the eight octave bands at the point of operation.**

F. **Motors are belt drive, size as shown on schedules. Motor to sit outside fan housing.**

G. **All fan and housing components in contact with airstream to be phenolic coated.**

PART 3 – EXECUTION

3.1 INSTALLATION OF FANS

A. Install fans where indicated, in accordance with equipment manufacturer's installation instructions, and with recognized industry practices, to ensure that equipment complies with requirements and serves intended purposes.

B. Coordinate with other work, including ductwork, floor construction, and electrical work as necessary to interface installation of air handling equipment with other work.

C. Access: Provide access space around fans for service as indicated, but in no case less than that recommended by manufacturer.

D. Do not operate fans for any other purpose, temporary or permanent, until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.

E. Support: Install floor-mounted fans on 4" high reinforced concrete pad, 6" larger on each side than unit base in accordance with Section 230529.

F. Mounting: Mount fans on vibration isolators, in accordance with manufacturer's instructions and Section 230540.

G. Seismic Restraint: Provide seismic restraints in accordance with Section 230548.

H. Electrical Wiring: Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to Electrical Installer.

1. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division 26 sections. Do not proceed with equipment start-up until wiring installation is acceptable to equipment installer with rotation in direction indicated and intended for proper performance. If there is no rotation arrow supplied by the manufacturer, install a correct rotation arrow.

I. Duct Connections: Refer to Division 23 Air Distribution sections. Provide ductwork, accessories, and flexible connections as indicated.

3.2 FIELD QUALITY CONTROL

A. Upon completion of installation of air handling equipment, and after motor has been energized with normal power source, test equipment to demonstrate compliance with requirements. Where possible, field correct malfunctioning

equipment, then retest to demonstrate compliance. Replace equipment which cannot be satisfactorily corrected.

3.3 **EXTRA BELTS**

A. Deliver one spare set of belts for each belt-driven fan unit, obtain receipt from Owner that belts have been received.

END OF SECTION 233400

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

DRAWING INDEX

#	SHEET NAME
MH001	MECHANICAL LEGEND, SYMBOLS & ABBREVIATIONS
MH101A	LEVEL 0 MECHANICAL FLOOR PLAN - AREA A
MH101B	LEVEL 0 MECHANICAL FLOOR PLAN - AREA B
MH101C	LEVEL 0 MECHANICAL FLOOR PLAN - AREA C
MH102A	LEVEL 1 MECHANICAL FLOOR PLAN - AREA A
MH102B	LEVEL 1 MECHANICAL FLOOR PLAN - AREA B
MH103A	LEVEL 2 MECHANICAL FLOOR PLAN - AREA A
MH103B	LEVEL 2 MECHANICAL FLOOR PLAN - AREA B
MH104	PENTHOUSE MECHANICAL PLAN
MH105	MECHANICAL ROOF PLAN
MH301	MECHANICAL SECTION
MH502	MECHANICAL DETAILS
MH503	MECHANICAL DETAILS
MH504	MECHANICAL DETAILS
MH505	MECHANICAL DETAILS
MH601	MECHANICAL SCHEDULES
MH602	MECHANICAL SCHEDULES
MH603	MECHANICAL SCHEDULES
MH604	MECHANICAL SCHEDULES
MP101A	LEVEL 0 MECHANICAL PIPING FLOOR PLAN - AREA A
MP102A	LEVEL 1 MECHANICAL PIPING FLOOR PLAN - AREA A
MP102B	LEVEL 1 MECHANICAL PIPING FLOOR PLAN - AREA B
MP102D	LEVEL 1 MECHANICAL PIPING FLOOR PLAN - AREA D
MP103A	LEVEL 2 MECHANICAL PIPING FLOOR PLAN - AREA A
MP103B	LEVEL 2 MECHANICAL PIPING FLOOR PLAN - AREA B
MP104	PENTHOUSE MEHCANICAL PIPING PLAN
MP201	CHILLED/CONDENSER WATER SCHEMATIC
MP202	HEATING WATER PIPING SCHEMATIC
MP251	UPPER PLANT PIPING SCHEMATIC
MP651	MECHANICAL PLANT SCHEDULES
PL101A	LEVEL 0 PLUMBING FLOOR PLAN - AREA A
PL101B	LEVEL 0 PLUMBING FLOOR PLAN - AREA B
PL101C	LEVEL 0 PLUMBING FLOOR PLAN - AREA C
PL102A	LEVEL 1 PLUMBING FLOOR PLAN - AREA A
PL102B	LEVEL 1 PLUMBING FLOOR PLAN - AREA B
PL103A	LEVEL 2 PLUMBING FLOOR PLAN - AREA A
PL103B	LEVEL 2 PLUMBING FLOOR PLAN - AREA B
PL104	PENTHOUSE PLUMBING PLAN
PL105	PLUMBING ROOF PLAN
PL201	PLUMBING SCHEMATICS
PL401	ENLARGED PLUMBING PLANS
PL402	ENLARGED PLUMBING PLANS
PL601	PLUMBING SCHEDULES

ABBREVIATIONS

ø	ROUND OR DIAMETER	LBS	POUNDS
AD	ACCESS DOOR	LWT	LEAVING WATER TEMPERATURE
AF	AIRFOIL	MAX	MAXIMUM
AFF	ABOVE FINISHED FLOOR	MBH	THOUSAND BRITISH THERMAL UNITS/HOUR
ALT	ALTERNATE	MECH	MECHANICAL
BI	BACKWARD INCLINED	MIN	MINIMUM
BOD	BOTTOM OF DUCT	NC	NOISE CRITERIA OR NORMALLY CLOSED
BOP	BOTTOM OF PIPE	NIC	NOT IN CONTRACT
BTU/H	BRITISH THERMAL UNITS PER HOUR	NO	NUMBER
CAP	CAPACITY	NOM	NOMINAL
CFM	CUBIC FEET PER MINUTE	NTS	NOT TO SCALE
CV	CONSTANT VOLUME	OA	OUTSIDE AIR
DB	DRY BULB	OBD	OPPOSED BLADE DAMPER
DN	DOWN	OD	OVERFLOW DRAIN
DIA	DIAMETER	OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
DCW	DOMESTIC COLD WATER	OFOI	OWNER FURNISHED, OWNER INSTALLED
DHW	DOMESTIC HOT WATER	PD	PRESSURE DROP
DHWC	DOMESTIC HOT WATER CIRC.	POC	POINT OF CONNECTION
DSN	DOWN SPOUT NOZZLE	PRV	PRESSURE REDUCING VALVE
DW	DISHWASHER	PSI	POUNDS PER SQUARE INCH
(E)	EXISTING	PSIG	POUNDS PER SQUARE INCH GAUGE
EA	EXHAUST AIR	RA	RETURN AIR
EAT	ENTERING AIR TEMPERATURE	RAD	RADIUS
EFF	EFFICIENCY	RD	ROOF DRAIN
ELEV	ELEVATION	RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
ENCL	ENCLOSURE	SA	SUPPLY AIR
ESP	EXTERNAL STATIC PRESSURE	SEN	SENSIBLE
ET	EXPANSION TANK	SIM	SIMILAR
EWC	ELECTRIC WATER COOLER	SL	SEA LEVEL
EWT	ENTERING WATER TEMPERATURE	SP	STATIC PRESSURE
FCO	FLOOR CLEANOUT	SQ.FT	SQUARE FEET
FD	FLOOR DRAIN	SS	SERVICE SINK OR STAINLESS STEEL
FO	FLAT OVAL	TOD	TOP OF DUCT
FPM	FEET PER MINUTE	TSP	TOTAL STATIC PRESSURE
FS	FLOOR SINK	TYP.	TYPICAL
FT	FEET	U	URINAL
FV	FACE VELOCITY	VAV	VARIABLE AIR VOLUME
GA	GAUGE	VD	VOLUME DAMPER
GAL	GALLON	VFD	VARIABLE FREQUENCY DRIVE
GD	GARAGE DRAIN	VOL	VOLUME
GPM	GALLONS PER MINUTE	VTR	VENT THROUGH ROOF
HP	HORSEPOWER	W/	WITH
HR	HOUR	W/O	WITHOUT
HT	HEIGHT	WB	WET BULB
IN	INCH	WC	WATER CLOSET
INWC	INCHES OF WATER COLUMN	MVD	MANUAL VOLUME DAMPER
INWG	INCHES OF WATER GAUGE	WCO	WALL CLEANOUT
L	LAVATORY OR LOUVER	WPD	WATER PRESSURE DROP
LAT	LEAVING AIR TEMPERATURE	WT	WEIGHT

MECHANICAL GENERAL NOTES

1. DO NOT SCALE DRAWINGS. SEE ARCHITECTURAL DRAWINGS AND REFLECTED CEILING PLAN FOR EXACT LOCATION OF DOORS, WINDOWS, CEILING DIFFUSERS, ETC. CLOSELY COORDINATE NEW MECHANICAL WITH ALL NEW AND EXISTING MECHANICAL, ELECTRICAL, ARCHITECTURAL AND STRUCTURAL MEMBERS. DUCTWORK AND PIPE ROUTING IS APPROXIMATE, DIAGRAMMATIC AND IS NOT TO BE SCALED. PROVIDE ALTERNATE ROUTING, OFFSETS AND TRANSITIONS AS REQUIRED FOR COORDINATION OF ALL WORK WITHOUT ADDITIONAL COST TO THE OWNER.
2. FIELD VERIFY ALL MECHANICAL AND PLUMBING ITEMS PRIOR TO COMMENCING NEW WORK. NO ADDITIONAL PAYMENT WILL BE ALLOWED FOR CONTRACTOR'S FAILURE TO BECOME FAMILIAR WITH EXISTING CONDITIONS.
3. ALL MECHANICAL WORK SHALL BE COORDINATED WITH THE WORK PERFORMED UNDER OTHER DIVISIONS TO AVOID INTERFERENCE.
4. DO NOT SHUT-OFF/PUT OUT SERVICE ANY SYSTEMS/SERVICES WITHOUT FIRST COORDINATING ALL DOWNTIME WITH THE OWNER'S PERSONNEL.
5. DUCT DIMENSIONS SHOWN ARE INSIDE CLEAR DIMENSIONS.
6. COORDINATE ALL FIRE SPRINKLER, DIFFUSER AND GRILLE LOCATIONS WITH REFLECTED CEILING PLAN AND ELECTRICAL DRAWINGS.
7. ALL PIPING INSULATION SHALL RUN CONTINUOUSLY THROUGH FLOOR, WALLS, AND PARTITIONS.
8. ALL PIPING SHALL BE SUPPORTED ADJACENT TO EQUIPMENT, TO PREVENT WEIGHT OF PIPING BEING PLACED ON EQUIPMENT.
9. DUCT INTERIORS VISIBLE THROUGH REGISTERS, GRILLES, AND DIFFUSERS SHALL BE FLAT BLACK.

MECHANICAL LEGEND

NOTE: ALL ITEMS MAY NOT APPEAR ON DRAWINGS

GATE VALVE
OS & Y PATTERN GATE VALVE
BALL VALVE
BUTTERFLY VALVE
MOTORIZED VALVE OPERATOR
GAS COCK
PLUG VALVE
CHECK VALVE (SWING OR LIFT AS REQ'D)
SOLENOID VALVE
AUTOMATIC CONTROL VALVE (2-WAY)
AUTOMATIC CONTROL VALVE (3-WAY)
PRESSURE REDUCING VALVE
P & T RELIEF VALVE
AIR VENT (AUTOMATIC)
CURB COCK
THERMAL EXPANSION VALVE
STRAINER
CALIBRATED BALANCE VALVE
VENTURI FLOW METER
REDUCER
PET COCK OR GAUGE COCK
PRESSURE GAUGE W/GAUGE COCK
THERMOMETER
TEMPERATURE & PRESSURE TEST PLUG
IN-LINE PUMP
FLOW SWITCH
AQUASTAT
TEMPERATURE SENSING WELL
HOSE BIBB OR SILLCOCK
YARD HYDRANT
FLOOR DRAIN
FLOOR SINK
MANHOLE
WALL CLEANOUT
FLOOR OR GRADE CLEANOUT
GRADE CLEANOUT W/ CONCRETE PAD
VENT THROUGH ROOF
POST TYPE FDC CONNECTION
WALL TYPE FDC CONNECTION
FIRE HOSE CABINET
FIRE DEPT. HORN & LIGHT
EXPANSION JOINT
FLEXIBLE PIPE CONNECTION
REDUCED PRESSURE BACKFLOW PREVENTER
DIRECTION OF FLOW
ELBOW DOWN
ELBOW UP
PIPE CAP
TEE DOWN
UNION
DOMESTIC COLD WATER
DOMESTIC HOT WATER
DOMESTIC HOT WATER CIRC.
TEMPERED WATER — TW
SANITARY (PLBG) VENT
SANITARY SEWER ABOVE GRADE
SANITARY SEWER BELOW GRADE
GREASE WASTE ABOVE GRADE — GW
GREASE WASTE BELOW GRADE — GW
DRAIN — D
ROOF DRAIN — RD
OVERFLOW DRAIN — OD
STORM DRAIN ABOVE GRADE — SD
STORM DRAIN BELOW GRADE — SD
FIRE SERVICE — F
NATURAL GAS — G
PROPANE — P
COMPRESSED AIR — CA
INDUSTRIAL WATER (NON-POTABLE) — IW
DEIONIZED WATER — DI
DEIONIZED WATER RETURN — DIR
INDUSTRIAL WATER — IW
INDUSTRIAL COLD WATER — ICW
INDUSTRIAL HOT WATER — IHW

PROCESS COOLING WATER SUPPLY (LAB) — PCWS
PROCESS COOLING WATER RETURN (LAB) — PCWR
INDUSTRIAL COLD WATER — ICW
INDUSTRIAL HOT WATER — IHW
INDUSTRIAL HOT WATER CIRC. — IHWR
LABORATORY VACUUM — LV
LABORATORY GAS — LG
REVERSE OSMOSIS — RO
HEAT TRACING
CHILLED GLYCOL SUPPLY — CHGS
CHILLED GLYCOL RETURN — PHGR
CHILLED WATER SUPPLY — CHS
CHILLED WATER RETURN — CHR
CONDENSER WATER SUPPLY — CS
CONDENSER WATER RETURN — CR
HEATING WATER SUPPLY — HWS
HEATING WATER RETURN — HWR
HEATING CLYCOL SUPPLY — HGS
HEATING GLYCOL RETURN — HGR
HEAT RECOVERY COOLING SUPPLY — HRS
HEAT RECOVERY COOLING RETURN — HRR
PROCESS COOLING SUPPLY — PCS
PROCESS COOLING RETURN — PCR
STEAM — S
STEAM CONDENSATE RETURN — SCR
WATER TREATMENT — WT
FUEL OIL SUPPLY — FOS
FUEL OIL RETURN — FOR
REFRIGERANT LIQUID — RL
REFRIGERANT SUCTION — RS
HOT GAS — HG
HOT GAS BYPASS — HGBP
DUCT SIZE (IN), FIRST FIGURE IS SIDE SHOWN — 18/12
BURIED OR UNDERFLOOR DUCT
DUCT W/ ACOUSTICAL LINING
FLEXIBLE DUCT (HELICAL)
SPIN-IN FITTING W/ MVD
FLEXIBLE DUCT CONNECTION
SUPPLY SLOT DIFFUSER
SUPPLY DIFFUSER
RETURN GRILLE
RADIAL SUPPLY DIFFUSERS
RETURN AIR DUCT SECTION
RETURN AIR DUCT UP
RETURN AIR DUCT DOWN
SUPPLY AIR DUCT SECTION
SUPPLY AIR DUCT UP
SUPPLY AIR DUCT DOWN
EXHAUST AIR DUCT SECTION
EXHAUST AIR DUCT UP
EXHAUST AIR DUCT DOWN
ACCESS PANEL
MANUAL VOLUME DAMPER
GRAVITY BACKDRAFT DAMPER
MOTORIZED DAMPER
AIR FLOW STATION
FIRE DAMPER
SMOKE DAMPER
COMBINATION FIRE/SMOKE DAMPER
DUCT TRANSITION
TEE W/ 45° ENTRY
WYE W/ 45° ENTRY
THERMOSTAT OR TEMP SENSOR
HUMIDISTAT OR HUMIDITY SENSOR
CARBON MONOXIDE SENSOR
CARBON DIOXIDE SENSOR
NITROGEN DIOXIDE SENSOR
POINT OF REMOVAL FROM EXISTING
POINT OF CONNECTION TO EXISTING
DETAIL TAG — DETAIL NO. / DRAWING NO.
KEYED NOTE — NOTE NO.
SECTION CUT LINE — SECTION NO. / DRAWING NO.

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

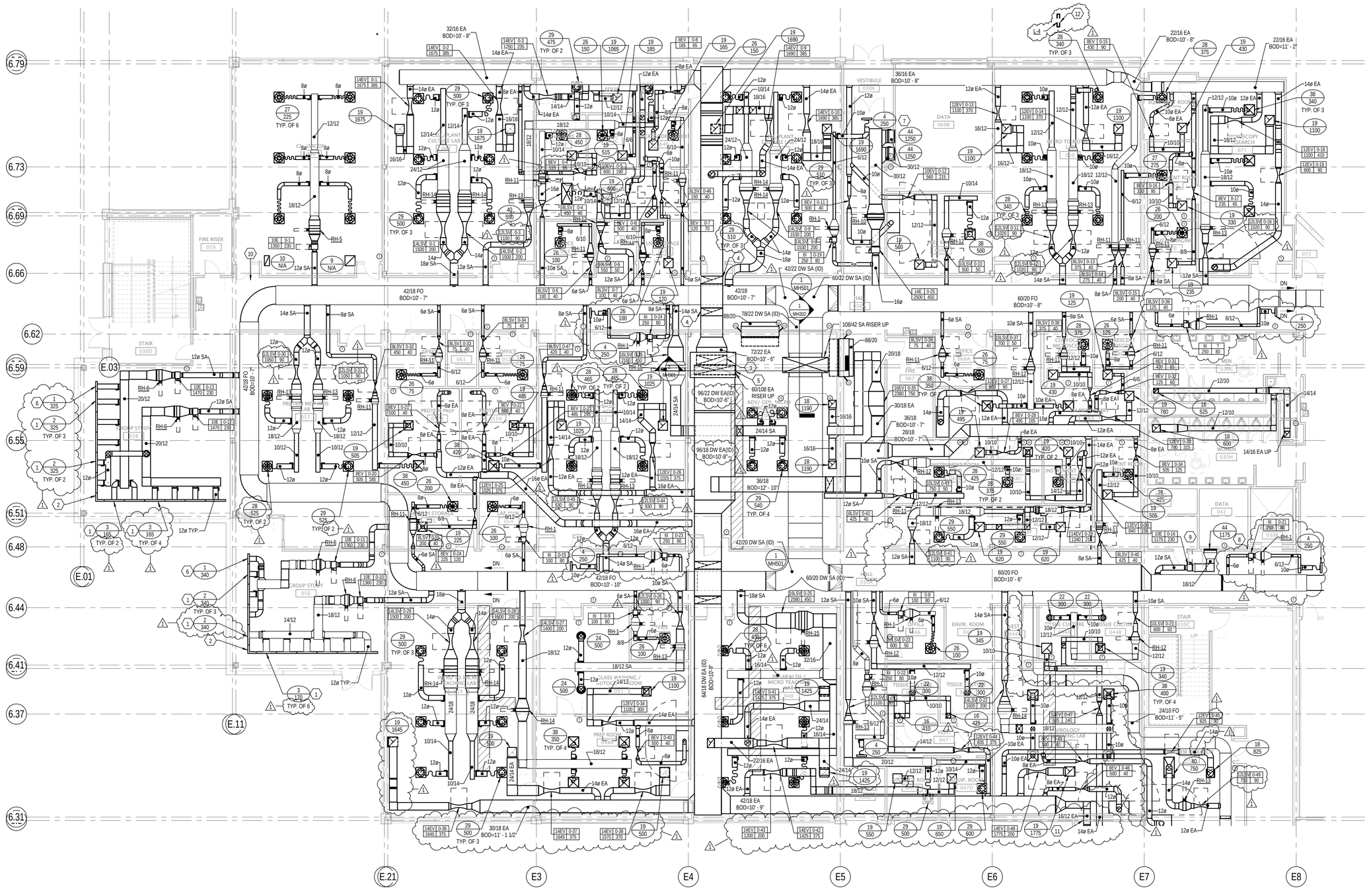
DRAWN BY:	-
CHECKED BY:	RLH
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

MECHANICAL LEGEND, SYMBOLS & ABBREVIATIONS

CONSTRUCTION DOCUMENTS

MH001

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.



1 LEVEL 0 MECHANICAL FLOOR PLAN - AREA A

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

GENERAL NOTES

A. DOUBLE-WALL SUPPLY AIR DUCT EXTENDS FROM DISCHARGE OF AIR HANDLER AH-1, DOWN THE MECHANICAL SHAFT, THROUGH FLOOR TAKE-OFF DUCTS, TO THE FAR END OF THE PAIR-OF-PANTS FITTING ABOVE EACH HALLWAY. TRANSITION TO FLAT-OVAL MEDIUM PRESSURE DUCT IS SINGLE-WALL.

B. SEE GENERAL NOTES ON MH001.

C. PROVIDE SOUND BOOT PER DETAIL 6 ON MH501 FOR ALL RETURN GRILLES.

KEYED NOTES

1 DIRECT SLOT DOWN TO BLANKET EXTERIOR WINDOW.

2 PROVIDE FAUX LINEAR DIFFUSER AND MITERED CORNER TO MATCH FUNCTIONAL LINEAR DIFFUSERS.

3 INSTALL 72/22 BRANCH LAB EXHAUST DUCT IN RISER IN A SUB DUCT CONFIGURATION. BRANCH DUCT MUST RISE UP A MINIMUM OF 22" INSIDE MAIN EXHAUST RISER.

4 RISE UP AT THIS LOCATION TO CLEAR 48/18 MEDIUM PRESSURE DUCT.

5 INSTALL 96/22 BRANCH EXHAUST DUCT IN RISER IN A SUB DUCT CONFIGURATION. BRANCH DUCT MUST RISE UP A MINIMUM OF 22" INSIDE MAIN EXHAUST RISER.

6 DIRECT EXTERIOR SLOT DOWN TO BLANKET WINDOW.DIRECT INTERIOR SLOT HORIZONTAL INTO ROOM FOR SURFACE EFFECT ACROSS CEILING.

7 PROVIDE RETURN AIR PATH FROM DATA ROOM INTO HALLWAY WITH TRANSFER DUCT AND GRILLE SIZE "G" PER DETAIL 4 ON SHEET MH505.

8 PROVIDE RETURN AIR PATH FROM DATA ROOM INTO HALLWAY WITH TRANSFER DUCT AND GRILLE SIZE "F" PER DETAIL 4 ON SHEET MH505.

9 PROVIDE TRANSFER AIR INTO ELECTRICAL ROOM FROM BELOW HALLWAY CEILING WITH A TRANSFER DUCT AND GRILLE SIZE"A" PER DETAIL 5 ON SHEET MH505. TRANSFER WARM AIR FROM ELECTRICAL ROOM TO PLENUM ABOVE HALLWAY CEILING WITH A DUCT SIZE "A" PER DETAIL 4 ON SHEET MH505. LOCATE BOTH DUCTS ABOVE THE DOOR.

10 PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "F" PER DETAIL 4 ON MH501.

11 MAINTAIN MINIMUM DISTANCE FROM WALL TO PROVIDE CLEARANCE FOR DUCT PASSAGE THROUGH STRUCTURAL BRACE FRAMING ALONG GRIDLINE 6.3. SEE BRACED FRAME ELEVATION C-SF-201.

12 INSTALL INTAKE LOUVER IN TUNNEL FACE ABOVE GRADE. PROVIDE WITH 2-POSITION MOTORIZED DAMPER. COORDINATE LOCATION WITH ARCHITECTURAL/CIVIL PLANS.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7915
www.gsbsarchitects.com

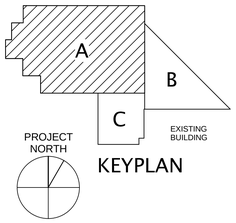
LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	-
CHECKED BY:	RLH
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 0 MECHANICAL FLOOR PLAN - AREA A

CONSTRUCTION DOCUMENTS

MH101A

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

1 LEVEL 0 MECHANICAL FLOOR PLAN - AREA B

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

KEYED NOTES

1. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "F" PER DETAIL 4 ON MH501.
2. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "G" PER DETAIL 4 ON MH501.

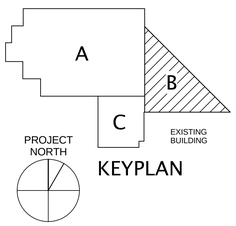
GENERAL NOTES

A. DOUBLE-WALL SUPPLY AIR DUCT EXTENDS FROM DISCHARGE OF AIR HANDLER AH-1, DOWN THE MECHANICAL SHAFT, THROUGH FLOOR TAKE-OFF DUCTS, TO THE FAR END OF THE PAIR-OF-PANTS FITTING ABOVE EACH HALLWAY. TRANSITION TO FLAT-OVAL MEDIUM PRESSURE DUCT IS SINGLE-WALL.

B. SEE GENERAL NOTES ON MH001.

C. PROVIDE SOUND BOOT PER DETAIL 6 ON MH501 FOR ALL RETURN GRILLES.

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.



KEYPLAN

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	-
CHECKED BY:	RLH
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 0 MECHANICAL FLOOR PLAN - AREA B

CONSTRUCTION DOCUMENTS

MH101B

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

KEYED NOTES

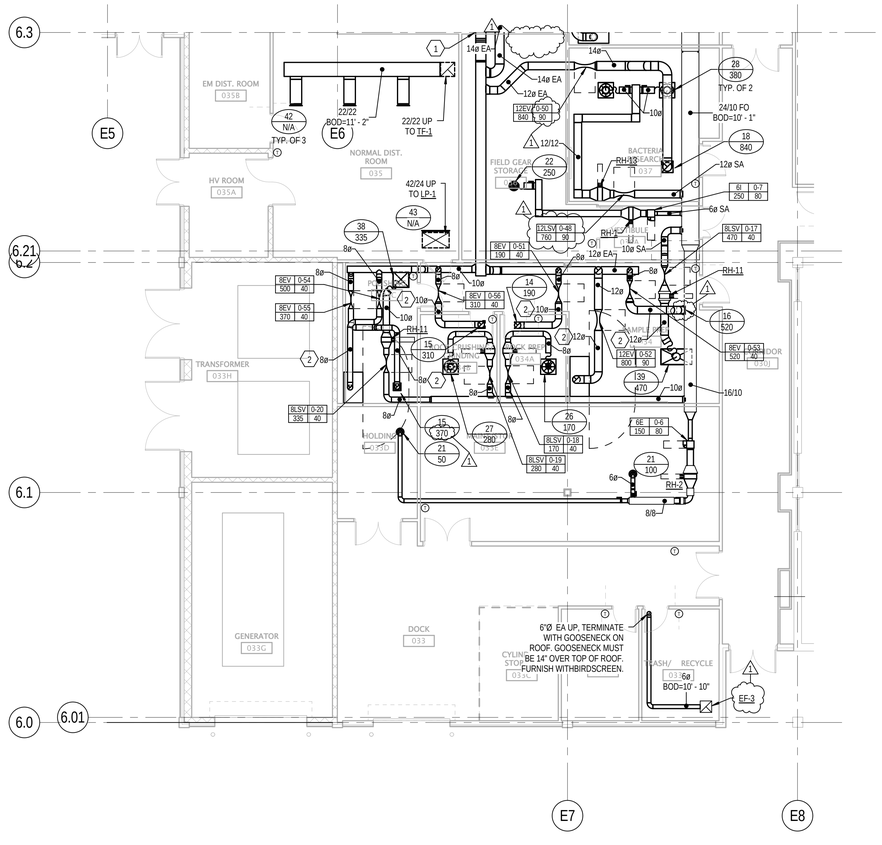
1. MAINTAIN MINIMUM DISTANCE FROM WALL TO PROVIDE CLEARANCE FOR DUCT PASSAGE THROUGH STRUCTURAL BRACE FRAMING ALONG GRIDLINE 6.3. SEE BRACED FRAME ELEVATION CI SF201.
2. ROUTE DUCT THROUGH JOIST WEB.

GENERAL NOTES

A. DOUBLE-WALL SUPPLY AIR DUCT EXTENDS FROM DISCHARGE OF AIR HANDLER AH-1, DOWN THE MECHANICAL SHAFT, THROUGH FLOOR TAKE-OFF DUCTS, TO THE FAR END OF THE PAIR-OF-PANTS FITTING ABOVE EACH HALLWAY. TRANSITION TO FLAT-OVAL MEDIUM PRESSURE DUCT IS SINGLE-WALL.

B. SEE GENERAL NOTES ON MH001.

C. PROVIDE SOUND BOOT PER DETAIL 6 ON MH501 FOR ALL RETURN GRILLES.



1 LEVEL 0 MECHANICAL FLOOR PLAN - AREA C

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

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

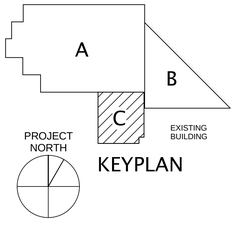
LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

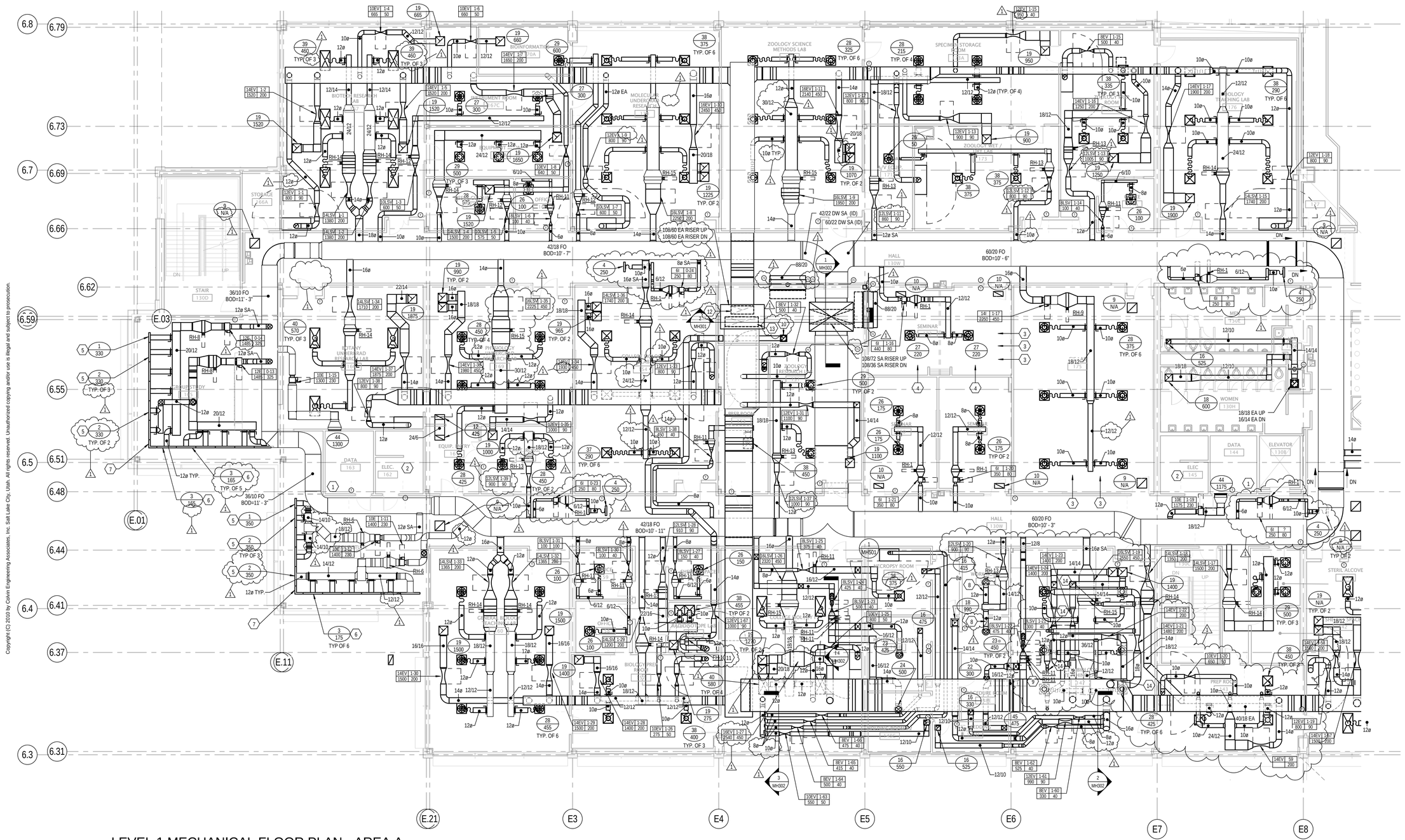
Division of Facilities Construction and Management

DRAWN BY:	-
CHECKED BY:	RLH
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 0 MECHANICAL FLOOR PLAN - AREA C

CONSTRUCTION DOCUMENTS

MH101C



1 LEVEL 1 MECHANICAL FLOOR PLAN - AREA A

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

GENERAL NOTES

A. DOUBLE-WALL SUPPLY AIR DUCT EXTENDS FROM DISCHARGE OF AIR HANDLER AH-1, DOWN THE MECHANICAL SHAFT, THROUGH FLOOR TAKE-OFF DUCTS, TO THE FAR END OF THE PAIR-OF-PANTS FITTING ABOVE EACH HALLWAY. TRANSITION TO FLAT-OVAL MEDIUM PRESSURE DUCT IS SINGLE-WALL.

B. SEE GENERAL NOTES ON MH001.

C. PROVIDE SOUND BOOT PER DETAIL 6 ON MH501 FOR ALL RETURN GRILLES.

KEYED NOTES

1. PROVIDE RETURN AIR PATH FROM DATA ROOM INTO HALLWAY WITH TRANSFER DUCT AND GRILLE SIZE "F" PER DETAIL 4 ON SHEET MH505.
2. PROVIDE TRANSFER AIR INTO ELECTRICAL ROOM FROM BELOW HALLWAY CEILING WITH A TRANSFER DUCT AND GRILLE SIZE"A" PER DETAIL 5 ON SHEET MH505. TRANSFER WARM AIR FROM ELECTRICAL ROOM TO PLENUM ABOVE HALLWAY CEILING WITH A DUCT SIZE "A" PER DETAIL 4 ON SHEET MH505. LOCATE BOTH DUCTS ABOVE THE DOOR.
3. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "G" PER DETAIL 4 ON MH501.
4. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "B" PER DETAIL 4 ON MH501.
5. AIM EXTERIOR SLOT DOWN TO BLANKET WINDOW AND AIM INTERIOR SLOT HORIZONTAL INTO ROOM FOR SURFACE EFFECT ACROSS CEILING.
6. AIM SLOT DOWN TO BLANKET EXTERIOR WINDOW.
7. FAUX LINEAR DIFFUSER AND MITERED CORNER TO MATCH FUNCTIONAL LINEAR DIFFUSERS.
8. CUT BILATERAL DUCTS TO SAME LENGTH FOR NATURAL BALANCING OF AIRFLOW ABOVE HARD CEILING WHERE BALANCING DAMPERS ARE INNACESSABLE.
9. SEE SECTION 4 ON MH302.
10. ROUTE DUCT UP TO LEF-4.
11. INSTALL FILTER HOUSING FH-1 ON HORIZONTAL DUCT, ABOVE THE RADIO-ISOTOPE FUME HOOD. DUCT RISERS ARE ABOVE CEILING DOWNSTREAM OF FILTER HOUSING.
12. INSTALL 56/20 BRANCH LAB EXHAUST DUCT IN RISER IN A SUB DUCT CONFIGURATION. BRANCH DUCT MUST RISE UP A MINIMUM OF 22" INSIDE MAIN EXHAUST RISER.
13. INSTALL 82/24 BRANCH LAB EXHAUST DUCT IN RISER IN A SUB DUCT CONFIGURATION. BRANCH DUCT MUST RISE UP A MINIMUM OF 22" INSIDE MAIN EXHAUST RISER.
14. STUB 6"Ø DUCT UP THROUGH LEVEL 2 SLAB FOR EXHAUST CONNECTIONS TO PEDESTAL AUTOPSY TABLES. SEE SHEET LF-121D AND DETAIL 8 ON LF-400 FOR LAB FURNISHING COORDINATION.

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

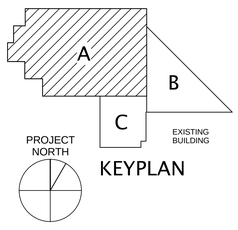
LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

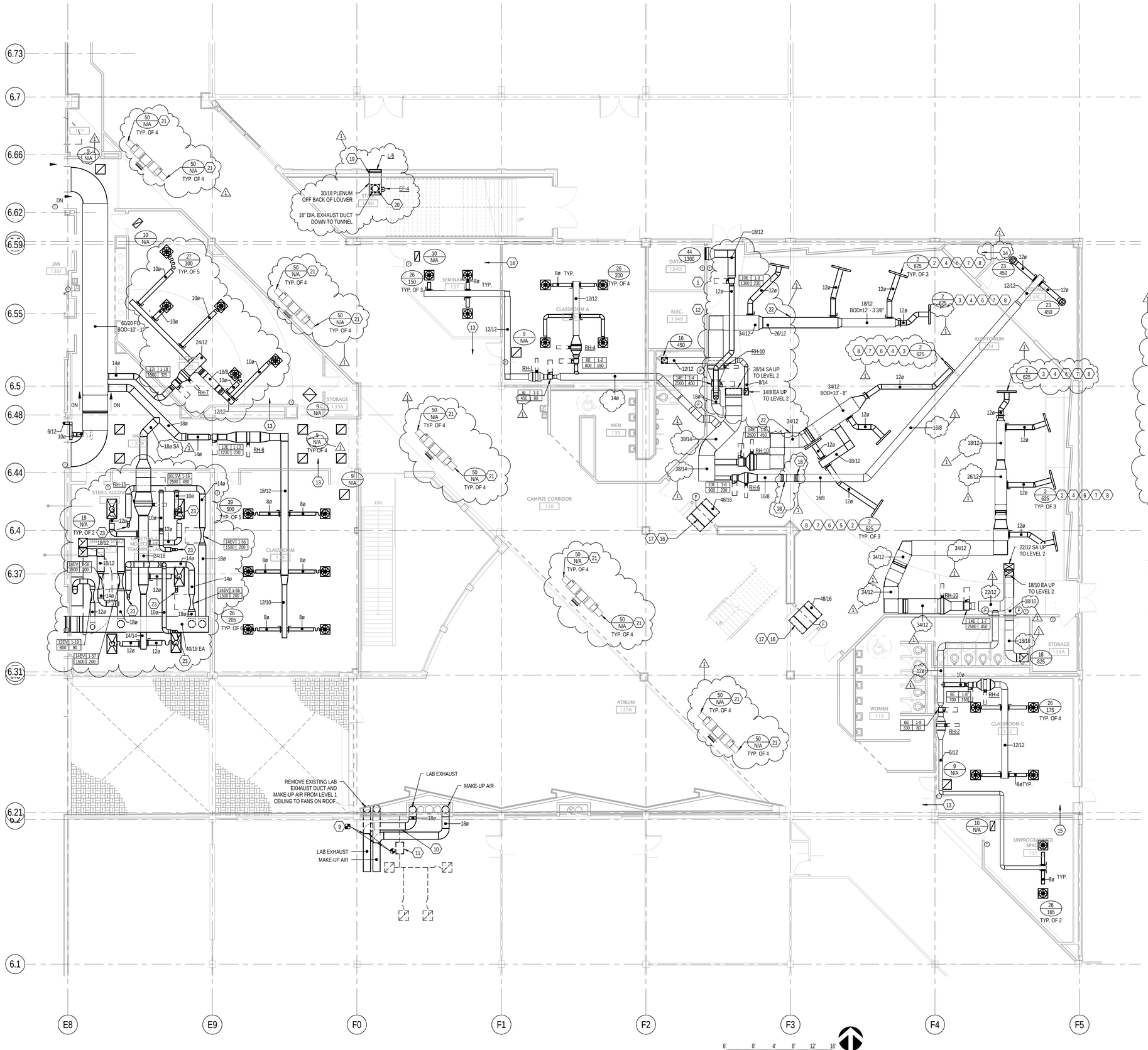
Division of Facilities Construction and Management

DRAWN BY:	-
CHECKED BY:	RLH
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 1 MECHANICAL FLOOR PLAN - AREA A

CONSTRUCTION DOCUMENTS

MH102A



1 LEVEL 1 MECHANICAL FLOOR PLAN - AREA B

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

KEYED NOTES

1. PROVIDE RETURN AIR PATH FROM DATA ROOM INTO HALLWAY WITH TRANSFER DUCT AND GRILLE SIZE "F" PER DETAIL 4 ON SHEET MH505.
2. MATCH DIFFUSER SLOPE TO CEILING CLOUD SLOPE. PLACE BOTTOM OF DIFFUSER 1" BELOW BOTTOM OF CLOUD.
3. PLACE DIFFUSER 1" BELOW BOTTOM OF CLOUD AND LEVEL WITH FRONT OF CLOUD.
4. AIM BOTH SLOTS HORIZONTALLY TOWARDS INTERIOR OF ROOM.
5. AIM BOTH SLOTS HORIZONTALLY IN OPPOSITE DIRECTIONS.
6. INSERT BALANCING DAMPER FOR EACH DIFFUSER TAKE-OFF IN ACCESSIBLE LOCATION THAT IS NOT COMPLETELY BLOCKED BY THE CEILING CLOUD. BALANCING DAMPER SHALL BE NO CLOSER THAN 24" FROM PLENUM BOX CONNECTION.
7. PROVIDE ACOUSTIC LINING BETWEEN DAMPER AND AIR DEVICE.
8. NO FLEX DUCT SHALL BE ALLOWED. ALL BRANCHES SHALL BE HARD DUCTED.
9. REMOVE EXISTING LAB EXHAUST DUCT AND MAKE-UP AIR DUCT FROM POINT ABOVE CEILING INSIDE EXISTING POPE BUILDING UP TO THE EXISTING LAB EXHAUST FANS ON ROOF. ROUTE NEW DUCTWORK FROM POINT OF DISCONNECTION TO EXISTING FANS ON ROOF. NEW LAB EXHAUST DUCTWORK TO BE 316 STAINLESS STEEL WITH WELD JOINTS. NEW MAKE-UP AIR DUCT TO BE GALVANIZED.
10. NEW ROUTING FOR 18"Ø DUCTS TO EXISTING FANS ON ROOF.
11. REMOVE EXISTING EXHAUST FAN AND ALL ASSOCIATED DUCTWORK AND CEILING GRILLES. ALSO REMOVE ASSOCIATED LOUVER IN EXTERIOR WALL. PATCH HOLES IN WALL.
12. PROVIDE TRANSFER AIR INTO ELECTRICAL ROOM FROM BELOW HALLWAY CEILING WITH A TRANSFER DUCT AND GRILLE SIZE"A" PER DETAIL 5 ON SHEET MH505. TRANSFER WARM AIR FROM ELECTRICAL ROOM TO PLENUM ABOVE HALLWAY CEILING WITH A DUCT SIZE "A" PER DETAIL 4 ON SHEET MH505. LOCATE BOTH DUCTS ABOVE THE DOOR.
13. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "F" PER DETAIL 4 ON MH501.
14. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "E" PER DETAIL 4 ON MH501.
15. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "B" PER DETAIL 4 ON MH501.
16. PROVIDE (PLENUM/PLENUM) TRANSFER DUCT PER DETAIL 4 ON MH501 WITH DUCT DIMENSIONS 48"x16". INCLUDE FULL SIZE OPENINGS.
17. PROVIDE FIRE DAMPER IN TRANSFER AIR DUCT.
18. ROUTE DUCT AT 45° ANGLE TO GO BELOW BEAM AT THIS LOCATION.
19. INSTALL EXHAUST LOUVER IN EXTERIOR WALL, 36" ABOVE FINISHED GRADE. PROVIDE PLENUM OFF BACK OF LOUVER. PROVIDE WITH 2-POSITION MOTORIZED DAMPER AND INLINE EXHAUST FAN. SEE SCHEDULES FOR FAN INFORMATION. DROP DUCT DOWN TO PENETRATE TUNNEL. ANY DUCT WORK THAT PASSES THROUGH SOIL SHALL HAVE BITUMASTIC COATING AND BE INCASED IN 4" OF CONTRETE.
20. PROVIDE LINK SEAL AT TUNNEL PENETRATION. PROVIDE GALVANIZED WIRE MESH SCREEN AT END OF DUCT.
21. EXISTING FAN COIL UNIT SUPPLIES AIR TO FOUR SLOT DIFFUSERS MOUNTED DIRECTLY IN THE FACE OF THE EXISTING ROUND SUPPLY DUCT. REMOVE ALL SUPPLY DIFFUSERS AND PATCH DUCT AIR-TIGHT. REPLACE EXISTING DIFFUSERS WITH 4 NEW SLOT DIFFUSERS INSTALLED IN THE GAP BETWEEN THE NEW SOFFIT ON THE FAR WEST EDGE OF CAMPUS CORRIDOR 130 AND THE WEST EDGE OF THE NEW CEILING IN CAMPUS CORRIDOR 130. SET DIFFUSERS FLUSH WITH BOTTOM OF NEW CEILING, AND SERVE OFF EXISTING SUPPLY AIR DUCT SERVED BY FAN COIL BY CONNECTING SLOT DIFFUSER PLENUM DIRECTLY TO SUPPLY DUCT, OR WITH SHORT SECTIONS OF ROUND DUCT. LIMIT HEADROOM. CUSTOM DIFFUSER PLENUMS REQUIRED. NO BALANCING DAMPERS REQUIRED.
22. ROUTE DUCT THROUGH BEAM PENETRATIONS.
23. STUB 6"Ø DUCT UP THROUGH LEVEL 2 SLAB FOR EXHAUST CONNECTIONS TO PEDESTAL AUTOPSY TABLES. SEE SHEET LF-121D AND DETAIL 8 ON LF-400 FOR LAB FURNISHING COORDINATION.

GENERAL NOTES

A. DOUBLE-WALL SUPPLY AIR DUCT EXTENDS FROM DISCHARGE OF AIR HANDLER AH-1, DOWN THE MECHANICAL SHAFT, THROUGH FLOOR TAKE-OFF DUCTS, TO THE FAR END OF THE PAIR-OF-PANTS FITTING ABOVE EACH HALLWAY. TRANSITION TO FLAT-OVAL MEDIUM PRESSURE DUCT IS SINGLE-WALL.

B. SEE GENERAL NOTES ON MH001.

C. PROVIDE SOUND BOOT PER DETAIL 6 ON MH501 FOR ALL RETURN GRILLES.

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.

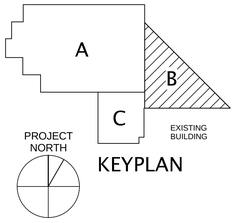
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. STATE OF UTAH

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	-
CHECKED BY:	RLH
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 1 MECHANICAL FLOOR PLAN - AREA B

CONSTRUCTION DOCUMENTS

MH102B

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

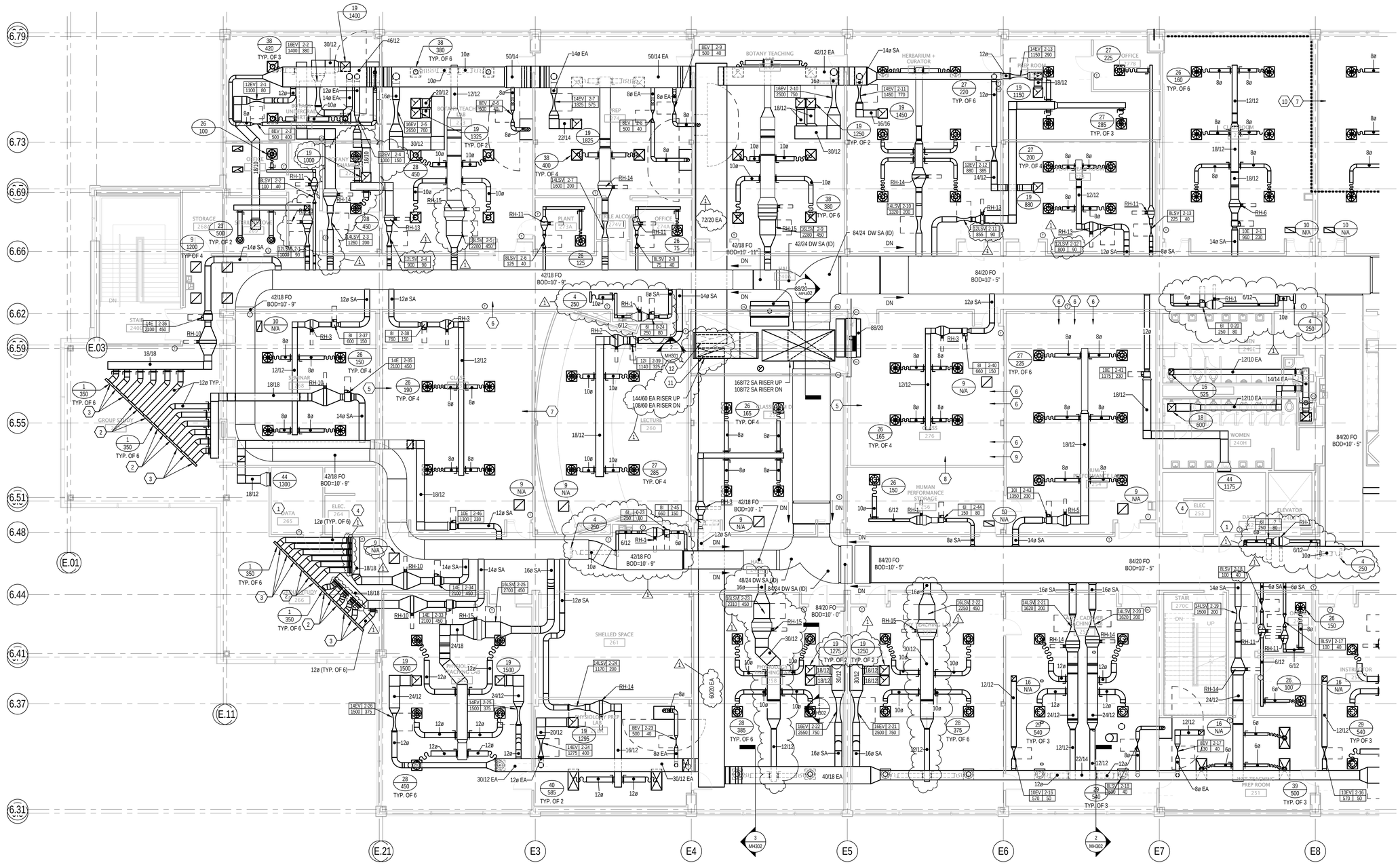
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7915
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

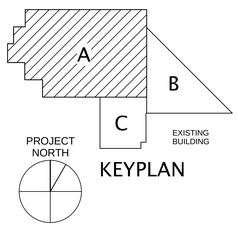
REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416



REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.



KEYPLAN

1 LEVEL 2 MECHANICAL FLOOR PLAN - AREA A

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

GENERAL NOTES

A. DOUBLE-WALL SUPPLY AIR DUCT EXTENDS FROM DISCHARGE OF AIR HANDLER AH-1, DOWN THE MECHANICAL SHAFT, THROUGH FLOOR TAKE-OFF DUCTS, TO THE FAR END OF THE PAIR-OF-PANTS FITTING ABOVE EACH HALLWAY. TRANSITION TO FLAT-OVAL MEDIUM PRESSURE DUCT IS SINGLE-WALL.

B. SEE GENERAL NOTES ON MH001.

C. PROVIDE SOUND BOOT PER DETAIL 6 ON MH501 FOR ALL RETURN GRILLES.

KEYED NOTES

1. PROVIDE RETURN AIR PATH FROM DATA ROOM INTO HALLWAY WITH TRANSFER DUCT AND GRILLE SIZE "F" PER DETAIL 4 ON SHEET MH505.
2. AIM SLOTS HORIZONTALLY TOWARD EXTERIOR.
3. AIM SLOT CLOSEST TO WINDOW TOWARDS THE EXTERIOR. AIM SLOT FURTHEST AWAY FROM WINDOWS TOWARD THE INTERIOR SPACE.
4. PROVIDE TRANSFER AIR INTO ELECTRICAL ROOM FROM BELOW HALLWAY CEILING WITH A TRANSFER DUCT AND GRILLE SIZE"A" PER DETAIL 5 ON SHEET MH505. TRANSFER WARM AIR FROM ELECTRICAL ROOM TO PLENUM ABOVE HALLWAY CEILING WITH A DUCT SIZE "A" PER DETAIL 4 ON SHEET MH505. LOCATE BOTH DUCTS ABOVE THE DOOR.
5. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "D" PER DETAIL 4 ON MH501.
6. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "G" PER DETAIL 4 ON MH501.
7. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "F" PER DETAIL 4 ON MH501.
8. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "A" PER DETAIL 4 ON MH501.
9. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "B" PER DETAIL 4 ON MH501.
10. PROVIDE FIRE DAMPER IN TRANSFER AIR DUCT.
11. INSTALL 60/20 BRANCH LAB EXHAUST DUCT IN RISER IN A SUB DUCT CONFIGURATION. BRANCH DUCT MUST RISE UP A MINIMUM OF 22" INSIDE MAIN EXHAUST RISER.
12. INSTALL 72/20 BRANCH LAB EXHAUST DUCT IN RISER IN A SUB DUCT CONFIGURATION. BRANCH DUCT MUST RISE UP A MINIMUM OF 22" INSIDE MAIN EXHAUST RISER.

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

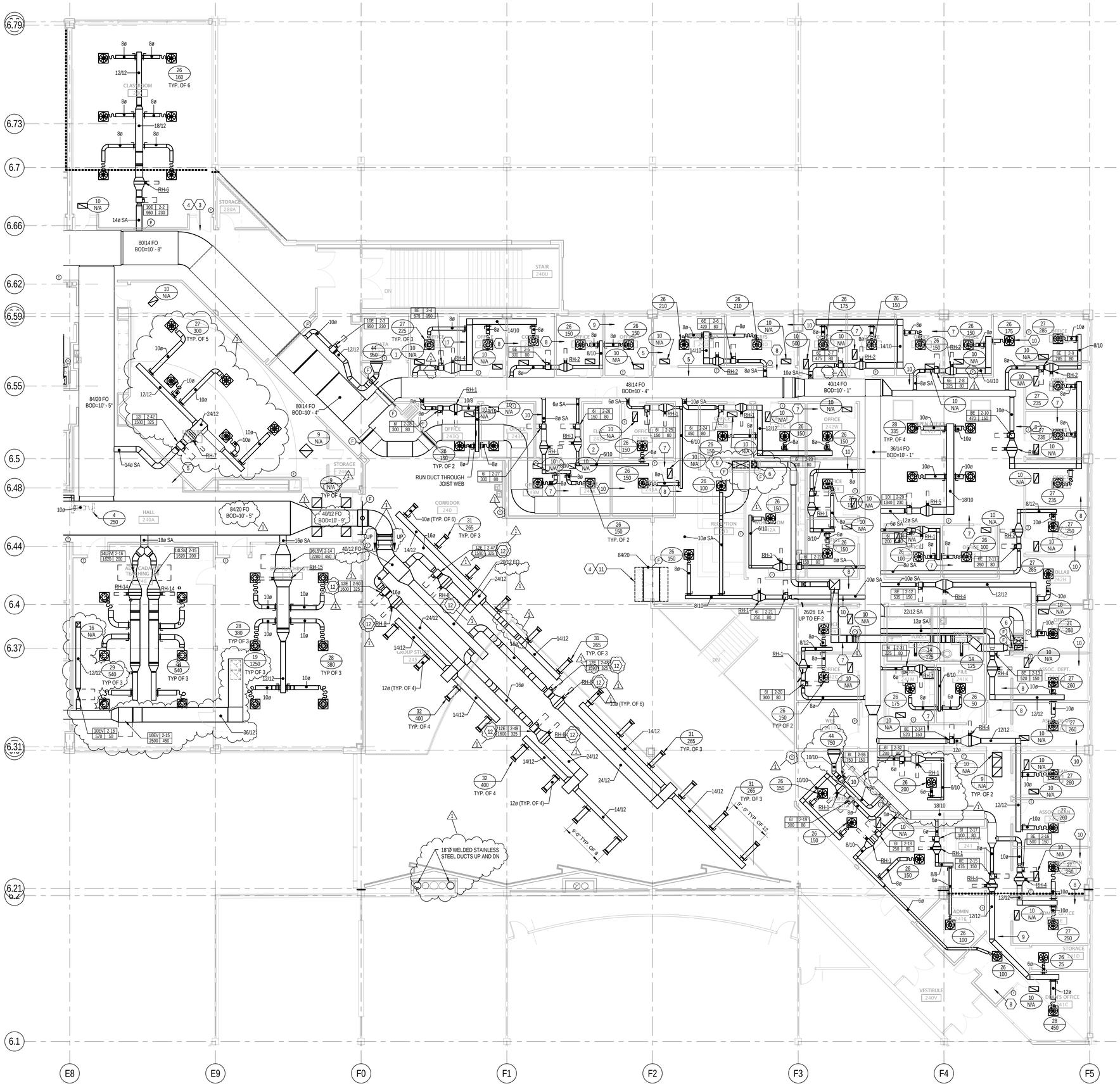
DRAWN BY:	RL
CHECKED BY:	RLH
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 2 MECHANICAL FLOOR PLAN - AREA A

CONSTRUCTION DOCUMENTS

MH103A

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.



1 LEVEL 2 MECHANICAL FLOOR PLAN - AREA B

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

KEYED NOTES

1. PROVIDE RETURN AIR PATH FROM DATA ROOM INTO HALLWAY WITH TRANSFER DUCT AND GRILLE SIZE "F" PER DETAIL 4 ON SHEET MH505.
2. PROVIDE TRANSFER AIR INTO ELECTRICAL ROOM FROM BELOW HALLWAY CEILING WITH A TRANSFER DUCT AND GRILLE SIZE"A" PER DETAIL 5 ON SHEET MH505. TRANSFER WARM AIR FROM ELECTRICAL ROOM TO PLENUM ABOVE HALLWAY CEILING WITH A DUCT SIZE "A" PER DETAIL 4 ON SHEET MH505. LOCATE BOTH DUCTS ABOVE THE DOOR.
3. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "G" PER DETAIL 4 ON MH501.
4. PROVIDE FIRE DAMPER IN TRANSFER AIR DUCT.
5. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "F" PER DETAIL 4 ON MH501.
6. COORDINATE WITH ARCHITECTURAL TO PROVIDE ACCESS DOORS TO HORIZONTAL FIREDAMPERS.
7. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "A" PER DETAIL 4 ON MH501.
8. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "D" PER DETAIL 4 ON MH501.
9. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "E" PER DETAIL 4 ON MH501.
10. PROVIDE (PLENUM/PLENUM) TRANSFER AIR DUCT SIZE "B" PER DETAIL 4 ON MH501.
11. PROVIDE (PLENUM/PLENUM) TRANSFER DUCT PER DETAIL 4 ON MH501 WITH DUCT DIMENSIONS 84"x22". INCLUDE FULL SIZE OPENINGS.
12. LOCATE VAV AND REHEAT COILS IN BETWEEN STRUCTURE.

GENERAL NOTES

A. DOUBLE-WALL SUPPLY AIR DUCT EXTENDS FROM DISCHARGE OF AIR HANDLER AH-1, DOWN THE MECHANICAL SHAFT, THROUGH FLOOR TAKE-OFF DUCTS, TO THE FAR END OF THE PAIR-OF-PANTS FITTING ABOVE EACH HALLWAY. TRANSITION TO FLAT-OVAL MEDIUM PRESSURE DUCT IS SINGLE-WALL.

B. SEE GENERAL NOTES ON MH001.

C. PROVIDE SOUND BOOT PER DETAIL 6 ON MH501 FOR ALL RETURN GRILLES.

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

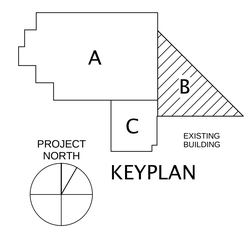
LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

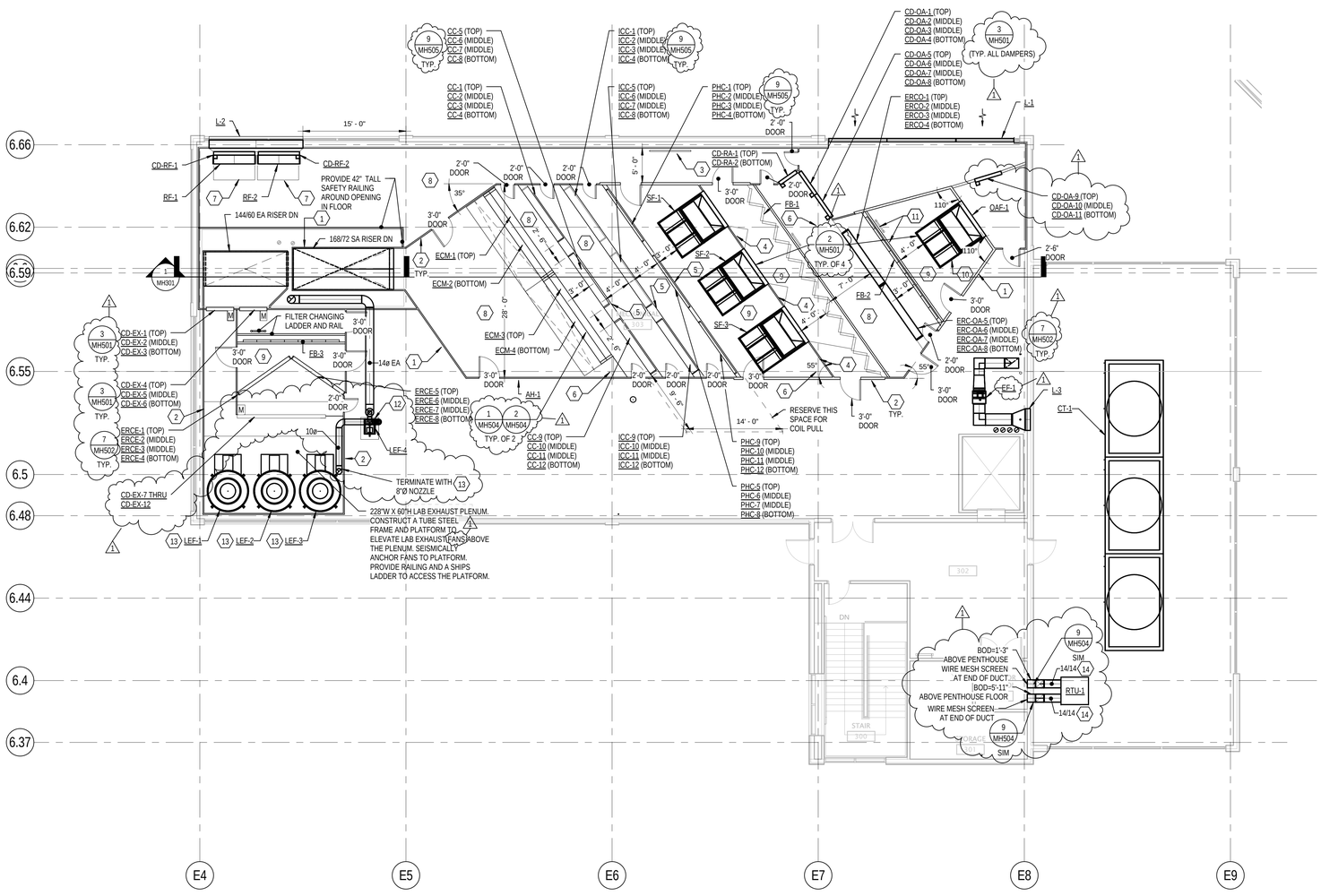
DRAWN BY:	
CHECKED BY:	RLH
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 2 MECHANICAL FLOOR PLAN - AREA B

CONSTRUCTION DOCUMENTS

MH103B

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.



1 ENLARGED PENTHOUSE MECHANICAL PLAN

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

6' 0' 4' 8' 12' 16'

KEYED NOTES

1. 2" STANDING SEAM, SINGLE WALL, SHEET METAL PANELS. LINE INSIDE OF PANELS WITH 2" THICK ACOUSTICAL PLENUM INSULATION. SUPPORT 2" AIR HANDLER UNIT WALLS WITH A CONCRETE CURB 8" WIDE BY 6" HIGH.
2. 4" DOUBLE WALL, PERFORATED SHEET METAL INTERIOR LINER, INSULATED, SHEET METAL PANELS. CEILING OF SAME CONSTRUCTION. CONSTRUCTION TYPE BEGINS 6" UPSTREAM OF FILTER BANK AND CONTINUES UNTIL 6" DOWNSTREAM OF PREHEAT COILS. SUPPORT 4" AIR HANDLER UNIT PANEL WALLS WITH A CONCRETE CURB 8" WIDE BY 6" HIGH.
3. PROVIDE A SINGLE BLANK-OFF PLATE WITH HANDLES, WHICH CAN BE MANUALLY PLACED ACROSS THE INLET OF A FAN THAT HAS FAILED, ALLOWING THE OTHER FANS TO CONTINUE OPERATION WITHOUT SHORT-CIRCUITING AIR. PLATE TO BE FASTENED ACROSS THE FAN INLET BY MEANS OF METAL STUDS PROTRUDING FROM FAN PLENUM WALL THAT PASS THROUGH HOLES IN ALL FOUR CORNERS OF THE PLATE. WING NUTS CAN BE USED TO HOLD THE PLATE IN PLACE. STORE PLATE ON AIR HANDLER WALL.
4. PROVIDE PRESSURE RELIEF DOORS IN FAN SEPTUM WALL, AS REQUIRED BY SPECIFICATION SECTION 233300. INSTALL ABOVE HEIGHT OF FAN INLETS.
5. POUR 6" HIGH CONCRETE CURBS TO SUPPORT COILS. CURBS SHALL BE 4" WIDER THAN THE GIVEN COIL IT SUPPORTS.
6. COORDINATE CLOSELY WITH STRUCTURAL ELEMENTS. ESPECIALLY VERTICAL MEMBERS, WHEN LOCATING MECHANICAL EQUIPMENT AND CONSTRUCTING THE AIR HANDLER CASING. THIS IS ALSO NECESSARY AS IT APPLIES TO LAYING OUT AND POURING THE SUPPORT CURBS AND HOUSEKEEPING PADS.
7. PROVIDE TUBE STEEL FRAME TO SUPPORT RELIEF FANS FROM PENTHOUSE FLOOR. SUPPORTS SHALL NOT INHIBIT ACCESS TO FANS FOR MAINTENANCE.
8. CEILING OF AIR HANDLER IN THIS SECTION SHALL BE PANELS. LINE INSIDE OF PANELS WITH 2" THICK ACOUSTICAL PLENUM INSULATION. CONSTRUCTION IS SIMILAR TO WALLS IN THIS SECTION. TOP OF AIR HANDLER CEILING = 16'-0" ABOVE FINISHED FLOOR.
9. CEILING OF AIR HANDLER IN THIS SECTION SHALL BE 4" DOUBLE WALL, PERFORATED SHEET METAL INTERIOR, INSULATED, SHEET METAL PANELS. CONSTRUCTION IS SIMILAR TO WALLS IN THIS SECTION. TOP OF AIR HANDLER CEILING = 17'-0" ABOVE FINISHED PENTHOUSE FLOOR TO PROVIDE A MINIMUM OF 1'-0" CLEAR BELOW PENTHOUSE ROOF STRUCTURE.
10. PROVIDE 6" HIGH CONCRETE HOUSEKEEPING PADS UNDER AIR HANDLER FANS. DIMENSIONS OF PADS SHALL BE 6" LARGER IN EACH DIRECTION FROM WHERE VIBRATION/SEISMIC ISOLATORS ARE ANCHORED TO PAD.
11. FILTER CHANGING LADDER AND RAIL.
12. INSTALL FAN ON INERTIA BASE. PROVIDE HOUSEKEEPING PAD.
13. PROVIDE 316 STAINLESS STEEL EXHAUST STACK FROM OUTLET OF FAN TO TERMINATION ABOVE WITH BRUSHED FINISH AND WELDED JOINTS. TOP OF STACK 10'-0" ABOVE TOP OF PENTHOUSE ROOF. SEE DETAIL 6 ON SHEET MH302. PROVIDE RUSKIN NRBD100 BACKDRAFT DAMPER AT DISCHARGE OF FAN.
14. OUTDOOR DUCTWORK TO BE PROTECTED WITH WEATHER PROOF METAL JACKET.

GENERAL NOTES

A. DOUBLE-WALL SUPPLY AIR DUCT EXTENDS FROM DISCHARGE OF AIR HANDLER AH-1, DOWN THE MECHANICAL SHAFT, THROUGH FLOOR TAKE-OFF DUCTS, TO THE FAR END OF THE PAIR-OF-PANTS FITTING ABOVE EACH HALLWAY. TRANSITION TO FLAT-OVAL MEDIUM PRESSURE DUCT IS SINGLE-WALL.

B. SEE GENERAL NOTES ON MH001.

C. PROVIDE SOUND BOOT PER DETAIL 6 ON MH501 FOR ALL RETURN GRILLES.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

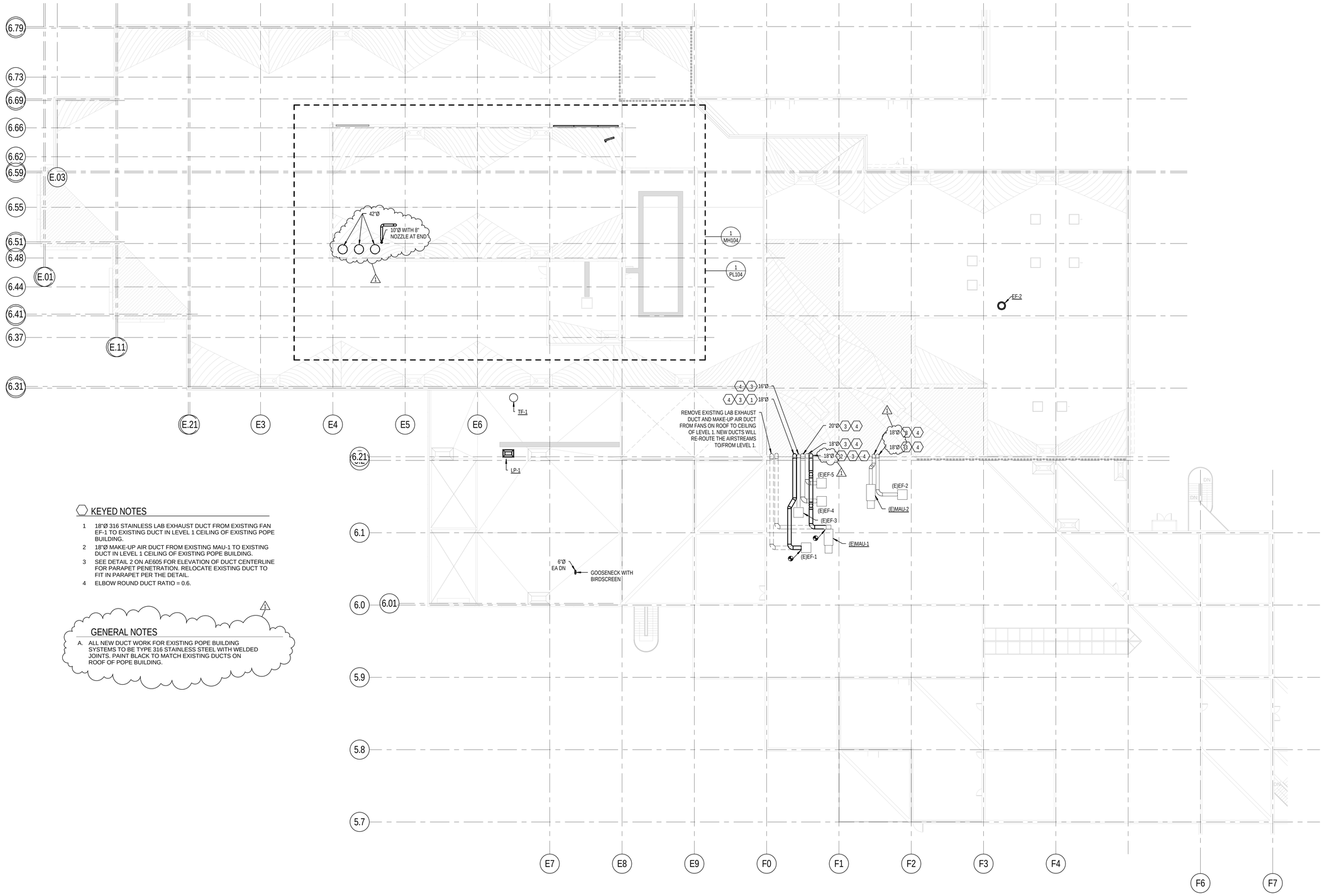
DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

PENTHOUSE MECHANICAL PLAN

CONSTRUCTION DOCUMENTS

MH104

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.



KEYED NOTES

1. 18"Ø 316 STAINLESS LAB EXHAUST DUCT FROM EXISTING FAN EF-1 TO EXISTING DUCT IN LEVEL 1 CEILING OF EXISTING POPE BUILDING.
2. 18"Ø MAKE-UP AIR DUCT FROM EXISTING MAU-1 TO EXISTING DUCT IN LEVEL 1 CEILING OF EXISTING POPE BUILDING.
3. SEE DETAIL 2 ON AE605 FOR ELEVATION OF DUCT CENTERLINE FOR PARAPET PENETRATION. RELOCATE EXISTING DUCT TO FIT IN PARAPET PER THE DETAIL.
4. ELBOW ROUND DUCT RATIO = 0.6.

GENERAL NOTES

A. ALL NEW DUCT WORK FOR EXISTING POPE BUILDING SYSTEMS TO BE TYPE 316 STAINLESS STEEL WITH WELDED JOINTS. PAINT BLACK TO MATCH EXISTING DUCTS ON ROOF OF POPE BUILDING.

1 MECHANICAL ROOF PLAN

SCALE: 1/16" = 1'-0"

12' 0' 8' 16' 24' 32'

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

PROJECT NORTH

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

MECHANICAL ROOF PLAN

CONSTRUCTION DOCUMENTS

MH105

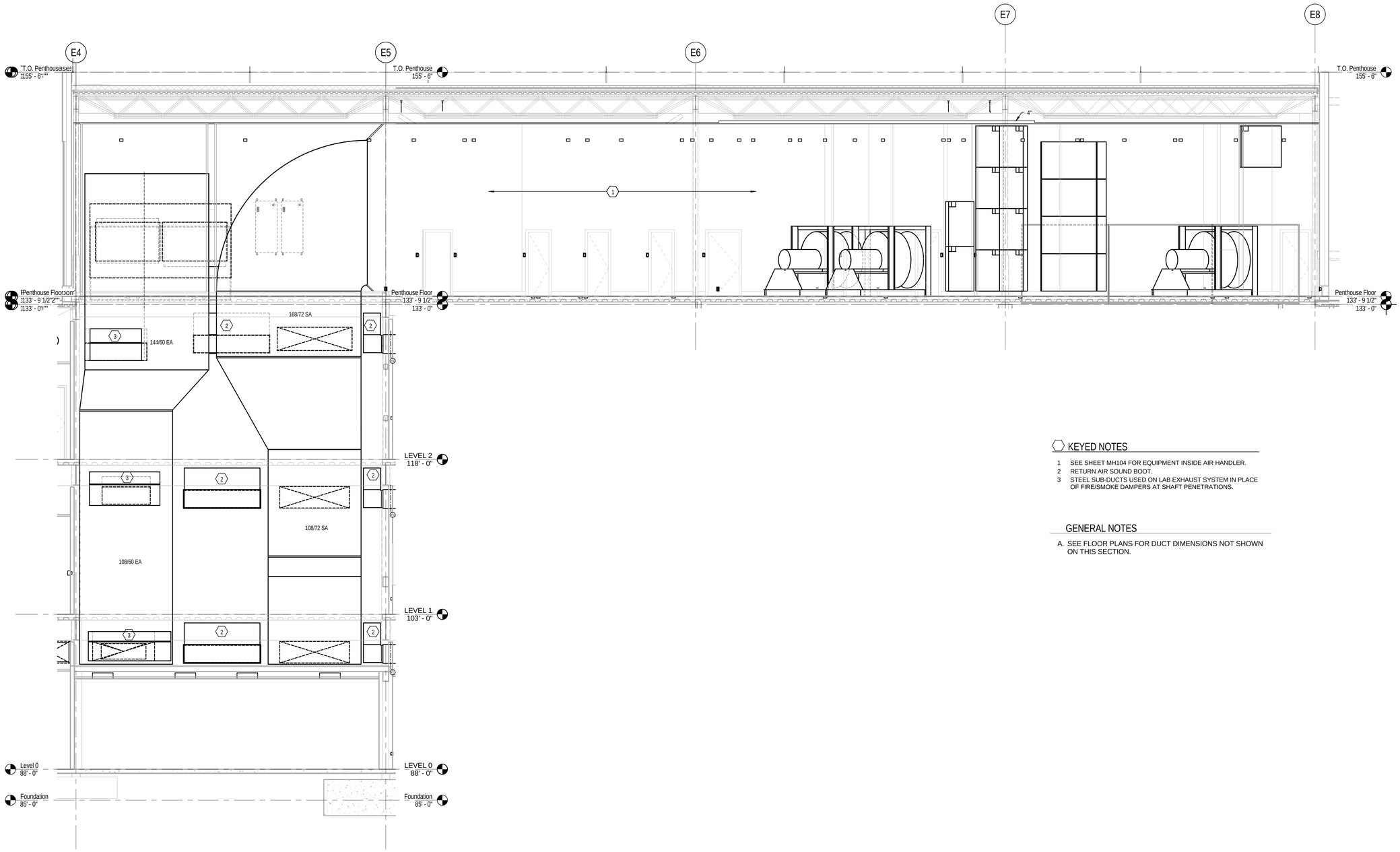
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416



KEYED NOTES

1. SEE SHEET MH104 FOR EQUIPMENT INSIDE AIR HANDLER.
2. RETURN AIR SOUND BOOT.
3. STEEL SUB-DUCTS USED ON LAB EXHAUST SYSTEM IN PLACE OF FIRE/SMOKE DAMPERS AT SHAFT PENETRATIONS.

GENERAL NOTES

A. SEE FLOOR PLANS FOR DUCT DIMENSIONS NOT SHOWN ON THIS SECTION.

1 MECHANICAL SECTION

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

3' 0' 2' 4' 6' 8'

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	06.07.2010

MECHANICAL SECTION

CONSTRUCTION DOCUMENTS

MH301

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

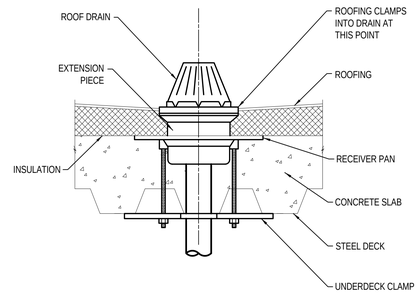
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7915
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

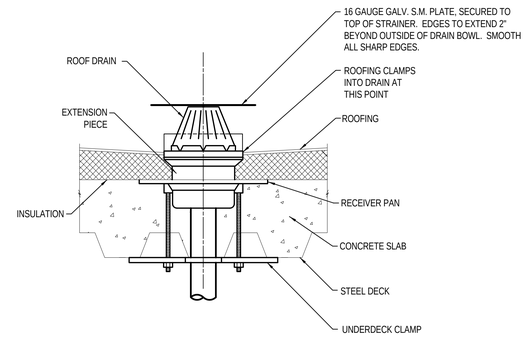
1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416



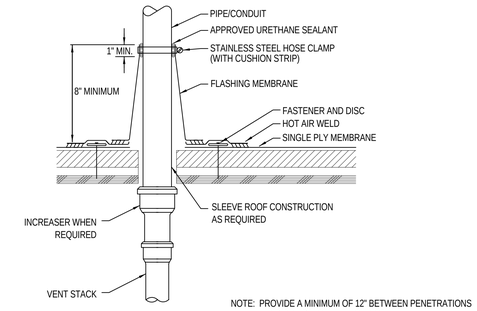
1 ROOF DRAIN DETAIL

NO SCALE



2 OVERFLOW ROOF DRAIN WITH HOOD DETAIL

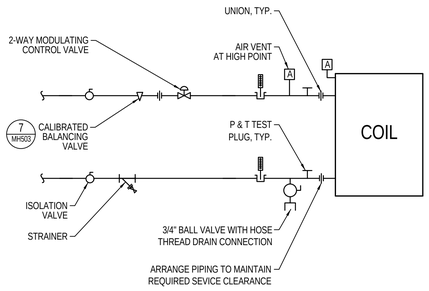
NO SCALE



NOTE: PROVIDE A MINIMUM OF 12" BETWEEN PENETRATIONS AND/OR ADJACENT FLASHINGS.

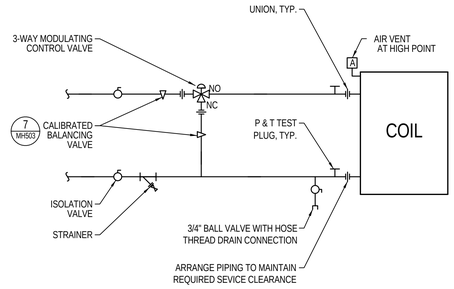
3 VENT THROUGH ROOF DETAIL

NO SCALE



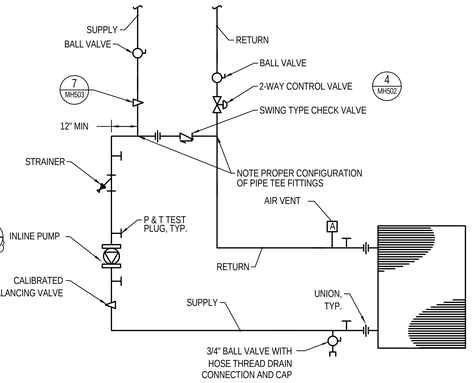
4 COIL PIPING DIAGRAM (2-WAY VALVE)

NO SCALE



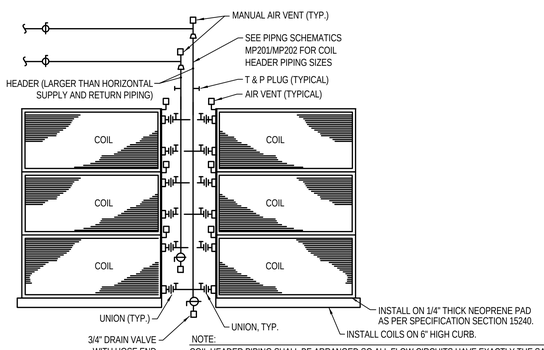
5 COIL PIPING DIAGRAM (3-WAY VALVE)

NO SCALE



6 PUMPED COIL CONNECTION SCHEMATIC

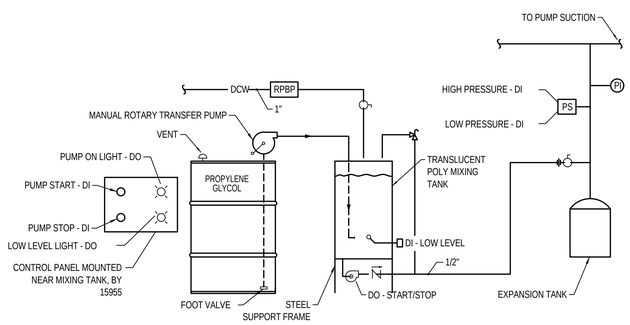
NO SCALE



NOTE:
COIL HEADER PIPING SHALL BE ARRANGED SO ALL FLOW CIRCUITS HAVE EXACTLY THE SAME NUMBER OF ELBOWS AND TEES FROM HEADER THROUGH COIL AND BACK TO HEADER. LOCATE CONTROL VALVE AND CIRCUIT SETTER OUTSIDE THE AIR HANDLER.

7 COIL BANK CONNECTION DETAIL

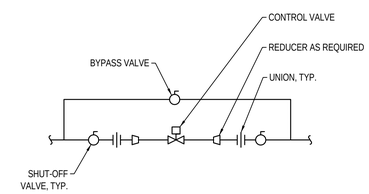
NO SCALE



CONTROL SEQUENCE: ADJUSTABLE LOW PRESSURE SWITCH SHALL INITIATE A SOFTWARE ALARM THROUGH THE DDC CONTROL SYSTEM. MOMENTARY PUSH BUTTON SHALL START MAKE-UP PUMP, PUMP SHALL BE STOPPED BY ADJUSTABLE HIGH PRESSURE SWITCH OR MOMENTARY PUSH BUTTON STOP SWITCH. FLOAT SWITCH IN MIXING TANK SHALL INITIATE A SOFTWARE ALARM AND TURN ON AN INDICATOR LIGHT ON THE PUMP CONTROL PANEL, WHEN LEVEL DROPS BELOW 1/4 FULL.

8 GLYCOL MAKE-UP SYSTEM DETAIL - DDC CONTROLS

NO SCALE



9 CONTROL VALVE INSTALLATION

NO SCALE

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

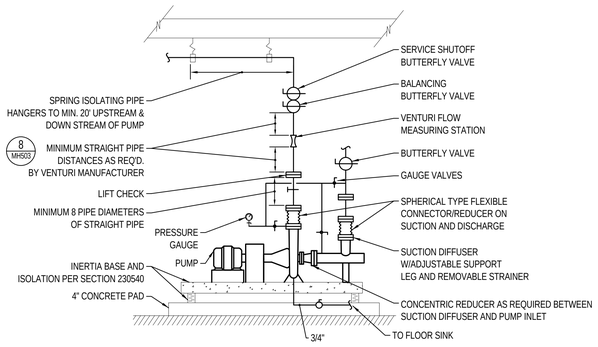
DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

MECHANICAL DETAILS

CONSTRUCTION DOCUMENTS

MH502

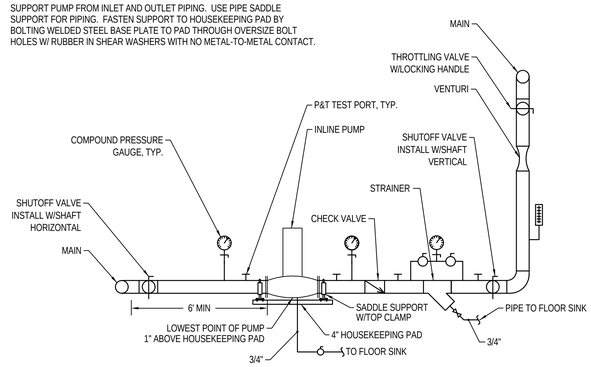
Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.



1 BASE MOUNTED PUMP INSTALLATION DETAIL W/INERTIA BASE

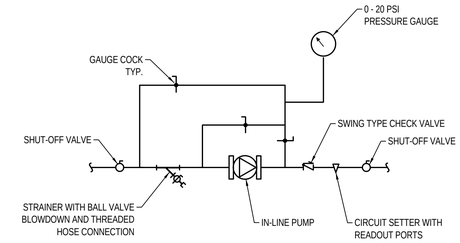
NO SCALE

SUPPORT PUMP FROM INLET AND OUTLET PIPING. USE PIPE SADDLE SUPPORT FOR PIPING. FASTEN SUPPORT TO HOUSEKEEPING PAD BY BOLTING WELDED STEEL BASE PLATE TO PAD THROUGH OVERSIZE BOLT HOLES W/ RUBBER IN SHEAR WASHERS WITH NO METAL-TO-METAL CONTACT.



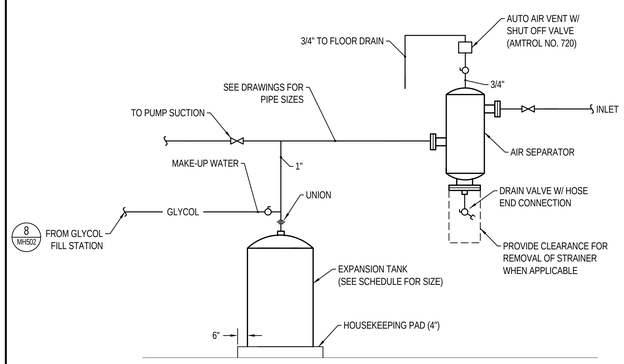
2 IN-LINE CONDENSER WATER PUMP DETAIL

NO SCALE



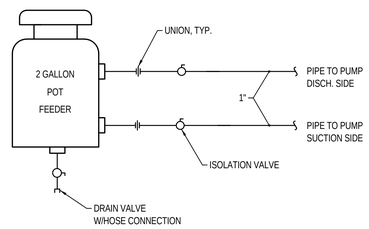
3 IN-LINE PUMP PIPING DETAIL

NO SCALE



4 AIR SEPARATOR/EXPANSION TANK PIPING DETAIL

NO SCALE

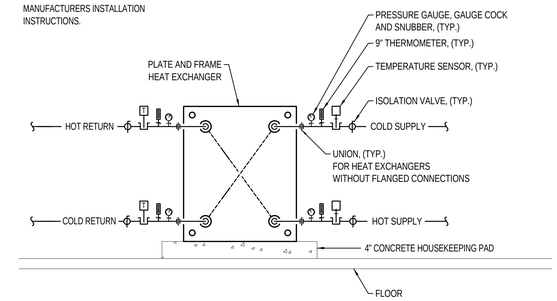


5 CHEMICAL POT FEEDER PIPING DETAIL

NO SCALE

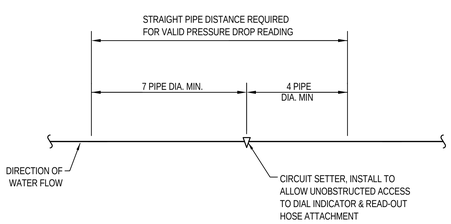
NOTE:

VERIFY PIPING CONNECTIONS WITH MANUFACTURERS INSTALLATION INSTRUCTIONS.



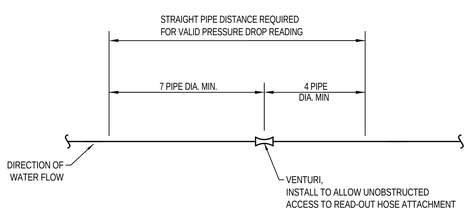
6 PLATE AND FRAME HEAT EXCHANGER DETAIL

NO SCALE



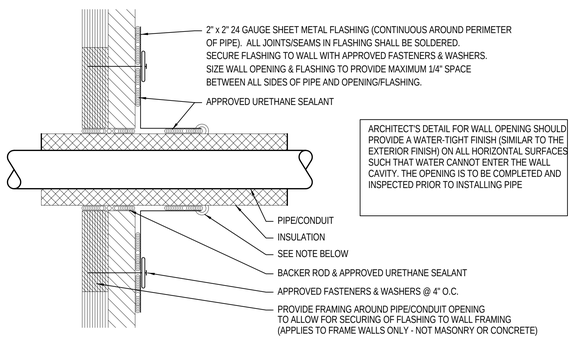
7 CIRCUIT SETTER DETAIL

NO SCALE



8 VENTURI INSTALLATION DETAIL

NO SCALE



NOTE: ALSO SEAL JOINT BETWEEN FLASHING AND PIPE WITH EXTERIOR WEATHER-PROOFING SEALANT. SEALANT SHALL BE DESIGN POLYMERICS DP-1020 FIBER-REINFORCED DUCT SEALANT. APPLY SEALANT IN STRICT CONFORMANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS.

9 PIPE SLEEVE FOR INSULATED PIPE THRU WALL

NO SCALE

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

MECHANICAL DETAILS

CONSTRUCTION DOCUMENTS

MH503

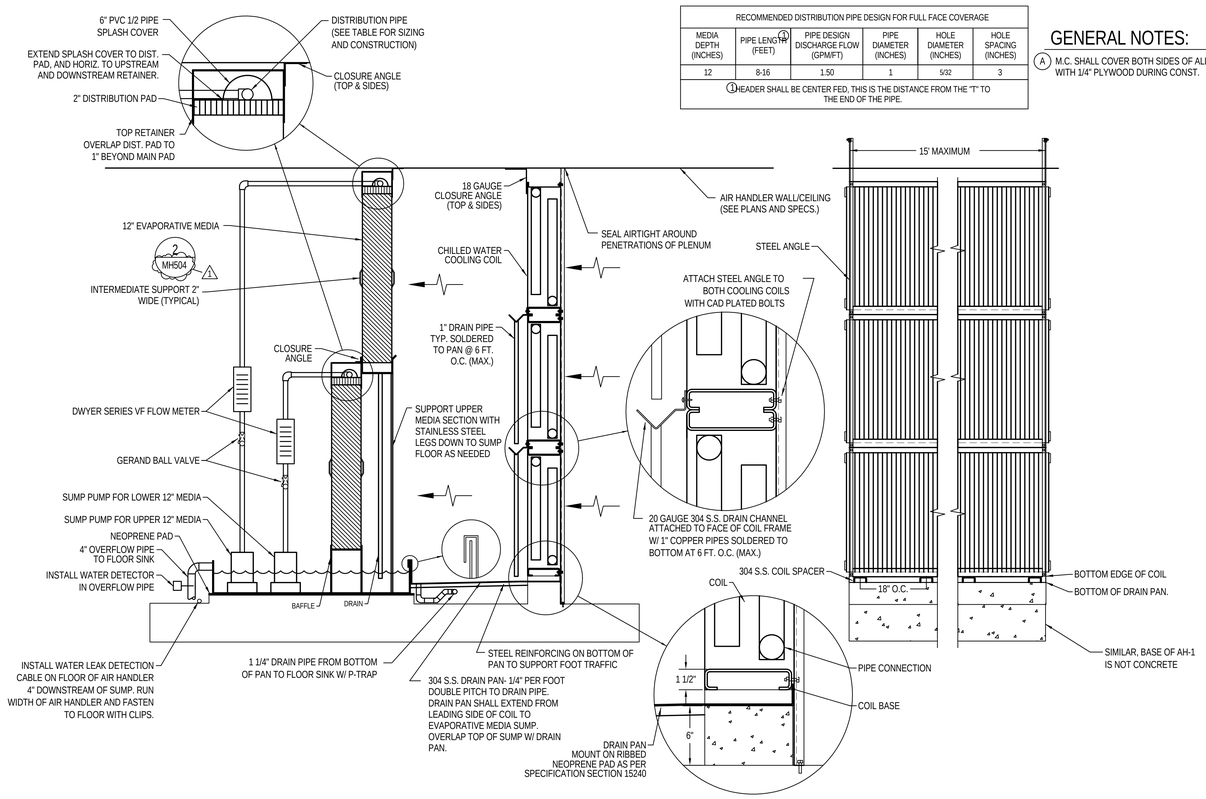
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7915
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416



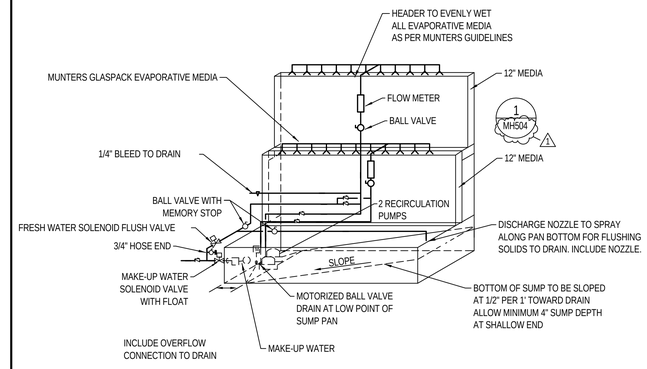
RECOMMENDED DISTRIBUTION PIPE DESIGN FOR FULL FACE COVERAGE					
MEDIA DEPTH (INCHES)	PIPE LENGTH (1) (FEET)	PIPE DESIGN DISCHARGE FLOW (GPM/FT)	PIPE DIAMETER (INCHES)	HOLE DIAMETER (INCHES)	HOLE SPACING (INCHES)
12	8-16	1.50	1	5/32	3
(1) HEADER SHALL BE CENTER FED, THIS IS THE DISTANCE FROM THE "T" TO THE END OF THE PIPE.					

GENERAL NOTES:

(A) M.C. SHALL COVER BOTH SIDES OF ALL COILS WITH 1/4" PLYWOOD DURING CONST.

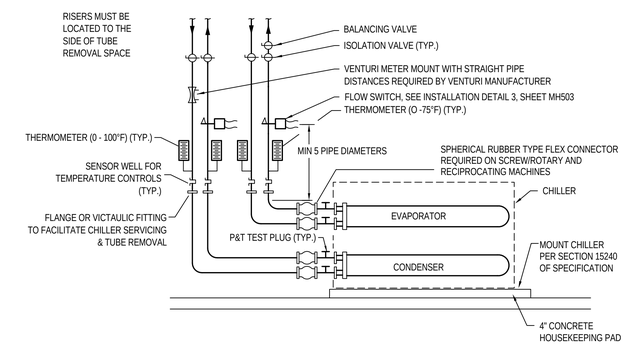
1 COOLING COIL AND EVAPORATIVE COOLER DETAIL

NO SCALE



2 PIPING OF DIRECT EVAPORATIVE COOLER

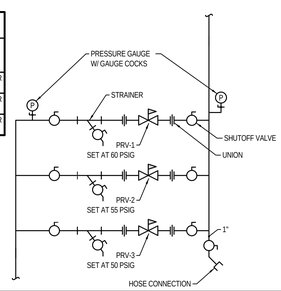
NO SCALE



3 CHILLER PIPING DETAIL

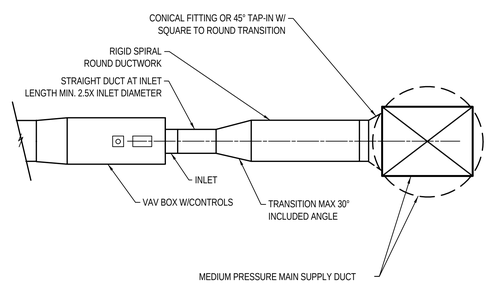
NO SCALE

PRV SCHEDULE			
PLAN CODE	SIZE	MAX GPM @ 10 PSI ΔP	MANUFACTURER & MODEL NO
PRV-1	4"	230	WATTS REGULATOR SERIES 127W
PRV-2	1 1/2"	80	WATTS REGULATOR SERIES 223S
PRV-3	1"	29	WATTS REGULATOR SERIES 223S



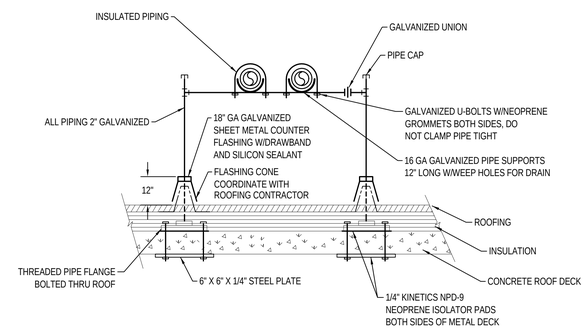
4 PRV STATION DETAIL

NO SCALE



5 TYPICAL MEDIUM PRESSURE TAKE-OFF VAV DETAIL

NO SCALE



6 ROOF TOP PIPE SUPPORT DETAIL

NO SCALE

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

MECHANICAL DETAILS

CONSTRUCTION DOCUMENTS

MH504

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

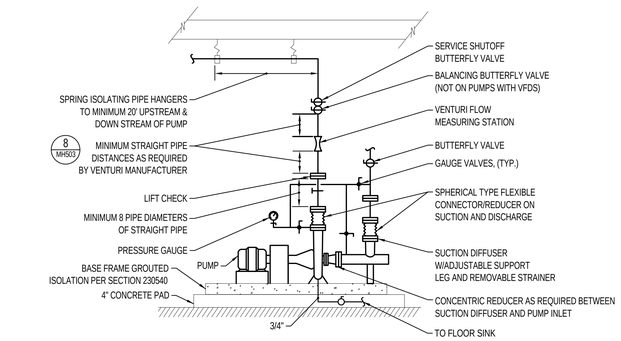
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7915
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

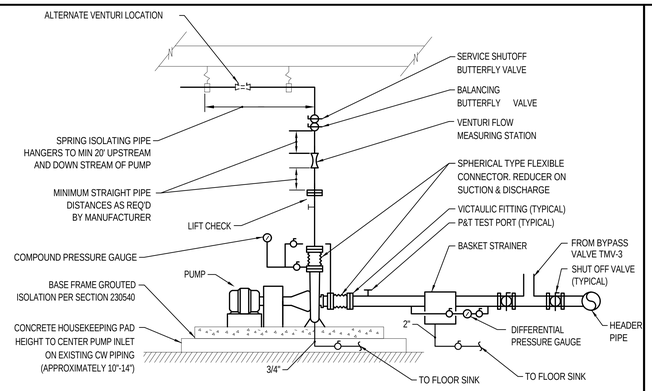
1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416



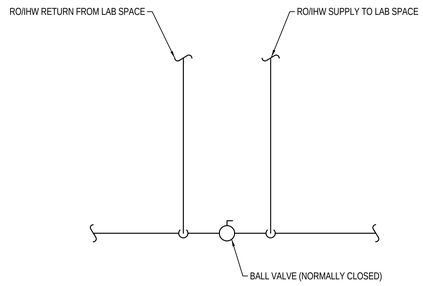
1 BASE MOUNTED PUMP: SLAB-ON-GRADE

NO SCALE



2 CONDENSER WATER PUMP DETAIL - UPPER PLANT

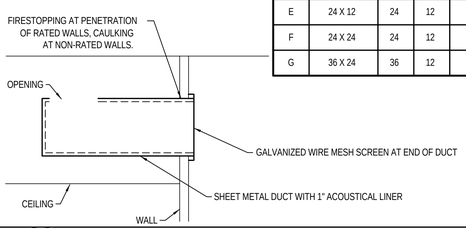
NO SCALE



3 RO/IHW TYPICAL VALVE AT LAB TAKE OFFS

NO SCALE

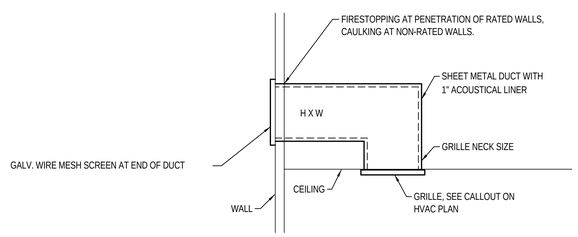
SIZE	OPENING (INXIN)	W (IN)	H (IN)	MAX. TRANSFER (CFM)	APPROX. ΔP (INWC)
A	12 X 6	12	6	230	0.02
B	12 X 12	12	6	380	0.02
C	24 X 6	24	6	400	0.02
D	24 X 12	24	6	680	0.02
E	24 X 12	24	12	920	0.02
F	24 X 24	24	12	1500	0.02
G	36 X 24	36	12	2500	0.02



4 TRANSFER AIR DUCT (PLENUM/WALL)

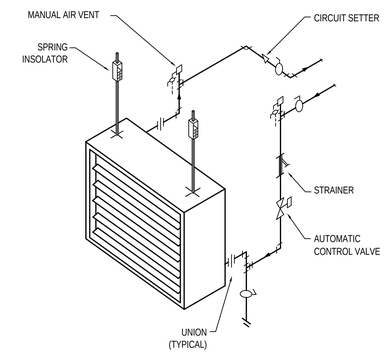
NO SCALE

SIZE	GRILLE NECK (INXIN)	W (IN)	H (IN)	MAX. TRANSFER (CFM)	APPROX. ΔP (INWC)
A	22 X 10	22	6	300	0.05
B	22 X 22	22	12	650	0.05



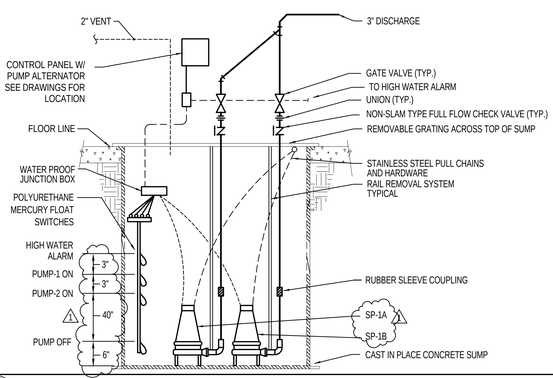
5 TRANSFER AIR DUCT (GRILLE/GRILLE)

NO SCALE



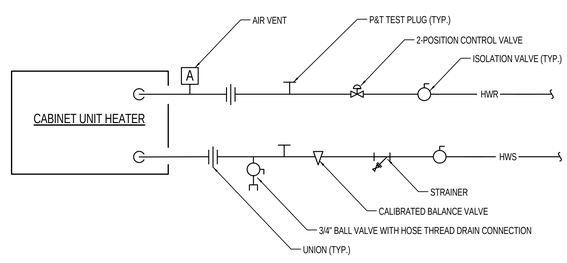
6 UNIT HEATER PIPING DETAIL

NO SCALE



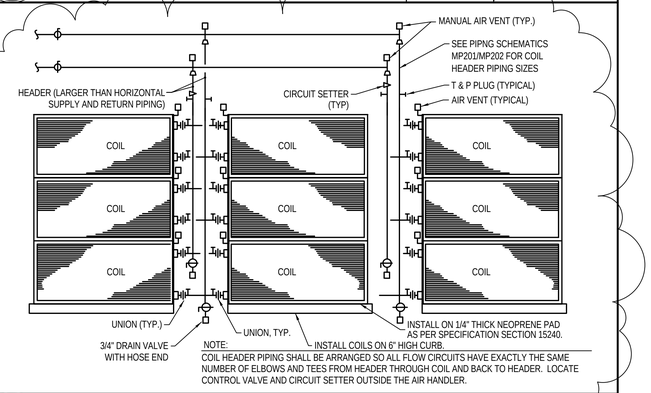
7 DUPLEX SUMP PUMP DETAIL

NO SCALE



8 CABINET UNIT HEATER PIPING SCHEMATIC

NO SCALE



NOTE:
COIL HEADER PIPING SHALL BE ARRANGED SO ALL FLOW CIRCUITS HAVE EXACTLY THE SAME NUMBER OF ELBOWS AND TEES FROM HEADER THROUGH COIL AND BACK TO HEADER. LOCATE CONTROL VALVE AND CIRCUIT SETTER OUTSIDE THE AIR HANDLER.

9 COIL BANK CONNECTION DETAIL

NO SCALE

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

MECHANICAL DETAILS

CONSTRUCTION DOCUMENTS

MH505

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

CONTROL DAMPER SCHEDULE (CD)

PLAN CODE	SERVICE	TYPE	AIR FLOW VOLUME (CFM)	DIMENSIONS WIDTH (IN)	DIMENSIONS HEIGHT (IN)	MAX FACE VELOCITY (FPM)	METHOD OF CONTROL	BLADE ORIENTATION	MANUFACTURER & MODEL NO
CD-OA-1	AH-1 OUTSIDE AIR	MOTORIZED/ MODULATING	23,625	48	48	1,475	DDC/AIRFLOW SETPOINT	PARALLEL UP	RUSKIN CD60
CD-OA-2	AH-1 OUTSIDE AIR	MOTORIZED/ MODULATING	23,625	48	48	1,475	DDC/AIRFLOW SETPOINT	PARALLEL UP	RUSKIN CD60
CD-OA-3	AH-1 OUTSIDE AIR	MOTORIZED/ MODULATING	23,625	48	48	1,475	DDC/AIRFLOW SETPOINT	PARALLEL UP	RUSKIN CD60
CD-OA-4	AH-1 OUTSIDE AIR	MOTORIZED/ MODULATING	23,625	48	48	1,475	DDC/AIRFLOW SETPOINT	PARALLEL UP	RUSKIN CD60
CD-OA-5	AH-1 OUTSIDE AIR	MOTORIZED/ MODULATING	23,625	48	48	1,475	DDC/AIRFLOW SETPOINT	PARALLEL UP	RUSKIN CD60
CD-OA-6	AH-1 OUTSIDE AIR	MOTORIZED/ MODULATING	23,625	48	48	1,475	DDC/AIRFLOW SETPOINT	PARALLEL UP	RUSKIN CD60
CD-OA-7	AH-1 OUTSIDE AIR	MOTORIZED/ MODULATING	23,625	48	48	1,475	DDC/AIRFLOW SETPOINT	PARALLEL UP	RUSKIN CD60
CD-OA-8	AH-1 OUTSIDE AIR	MOTORIZED/ MODULATING	23,625	48	48	1,475	DDC/AIRFLOW SETPOINT	PARALLEL UP	RUSKIN CD60
CD-OA-9	AH-1 OUTSIDE AIR	MOTORIZED/ MODULATING	34,340	52	48	1,485	DDC/AIRFLOW SETPOINT	PARALLEL UP	RUSKIN CD60
CD-OA-10	AH-1 OUTSIDE AIR	MOTORIZED/ MODULATING	34,340	52	48	1,485	DDC/AIRFLOW SETPOINT	PARALLEL UP	RUSKIN CD60
CD-OA-11	AH-1 OUTSIDE AIR	MOTORIZED/ MODULATING	34,340	52	48	1,485	DDC/AIRFLOW SETPOINT	PARALLEL UP	RUSKIN CD60
CD-RA-1	AH-1 RETURN AIR	MOTORIZED/ MODULATING	18,900	36	52	1,450	DDC/AIRFLOW SETPOINT	PARALLEL DOWN	RUSKIN CD60
CD-RA-2	AH-1 RETURN AIR	MOTORIZED/ MODULATING	18,900	36	52	1,450	DDC/AIRFLOW SETPOINT	PARALLEL DOWN	RUSKIN CD60
CD-EX-1	LAB EXHAUST SYSTEM	MOTORIZED/ MODULATING	34,340	52	64	1,485	DDC/AIRFLOW SETPOINT	OPPOSED BLADE	RUSKIN CD60
CD-EX-2	LAB EXHAUST SYSTEM	MOTORIZED/ MODULATING	34,340	52	64	1,485	DDC/AIRFLOW SETPOINT	OPPOSED BLADE	RUSKIN CD60
CD-EX-3	LAB EXHAUST SYSTEM	MOTORIZED/ MODULATING	34,340	52	64	1,485	DDC/AIRFLOW SETPOINT	OPPOSED BLADE	RUSKIN CD60
CD-EX-4	LAB EXHAUST SYSTEM	MOTORIZED/ MODULATING	34,340	52	64	1,485	DDC/AIRFLOW SETPOINT	OPPOSED BLADE	RUSKIN CD60
CD-EX-5	LAB EXHAUST SYSTEM	MOTORIZED/ MODULATING	34,340	52	64	1,485	DDC/AIRFLOW SETPOINT	OPPOSED BLADE	RUSKIN CD60
CD-EX-6	LAB EXHAUST SYSTEM	MOTORIZED/ MODULATING	34,340	52	64	1,485	DDC/AIRFLOW SETPOINT	OPPOSED BLADE	RUSKIN CD60
CD-RF-1	BULDING RELIEF SYSTEM	MOTORIZED/ MODULATING	25,000	72	72	700	DDC/AIRFLOW SETPOINT	OPPOSED BLADE	RUSKIN CD60
CD-RF-2	BUILDING RELIEF SYSTEM	MOTORIZED/ MODULATING	25,000	72	72	700	DDC/AIRFLOW SETPOINT	OPPOSED BLADE	RUSKIN CD60
CD-EX-7 THROUGH CD-EX-12	LAB EXHAUST SYSTEM	MOTORIZED/ 2-POSITION	17,670	54	72	655	DDC	OPPOSED BLADE	RUSKIN CD60

(1) PROVIDE EMERGENCY POWER TO DAMPER ACTUATOR. (2) PROVIDE END SWITCHES ON DAMPER.

EXPANSION TANK SCHEDULE (ET)

PLAN CODE	SYSTEM SERVED	WATER TEMP (°F)	% GLYCOL	TANK VOL (GAL)	ACCEPTANCE VOL (GAL)	PRE-CHARGE (PSI)	MAX DIMENSIONS DIA (IN)	MAX DIMENSIONS HEIGHT (IN)	MAX DIMENSIONS OPERATING WT (LBS)	MANUFACTURER & MODEL NO	REMARKS
ET-1	AH-1 CHILLED COILS	48	25	44.5	22.6	10	24	28	520	AMTROL AX-80V	1" NPT SYSTEM CONNECTION
ET-2	AH-1 HEATING COILS	110	40	44.5	22.6	10	24	28	520	AMTROL AX-80V	1" NPT SYSTEM CONNECTION
ET-3	LAB VENTILATION HEAT RECOVERY	95	40	44.5	22.6	10	24	28	520	AMTROL AX-80V	1" NPT SYSTEM CONNECTION
ET-4	LAB PROCESS COOLING LOOP	48	NONE	22	11	10	17	30	300	AMTROL AX-40V	1" NPT SYSTEM CONNECTION
ET-5	CENTRAL HEATING WATER	115	NONE	112	61	10	24	82	1310	TACO CAX-425	1" NPT SYSTEM CONNECTION
ET-6	CENTRAL CHILLED WATER	48	NONE	22	11	10	17	30	300	AMTROL AX-40V	1" NPT SYSTEM CONNECTION

AIR SEPARATOR (AS)

PLAN CODE	SYSTEM SERVED	CONNECTION SIZE	MAX GPM	PD (FT)	MAXIMUM DIMENSIONS DIA	MAXIMUM DIMENSIONS HEIGHT	MAXIMUM DIMENSIONS FLANGE TO FLANGE (IN)	DRY WT (LBS)	MAX OPER WT (LBS)	MANUFACTURER & MODEL NO
AS-1	AH-1 CHILLED COILS	10"	815	.5	20	46.9	37.5	490	890	SPIROVENT SENIOR
AS-2	AH-1 PREHEAT COILS	8"	550	.5	16	39.4	33.6	271	471	SPIROVENT SENIOR
AS-3	LAB HEAT RECOVERY COILS	6"	286	.5	12.8	30.3	27.7	145	245	SPIROVENT SENIOR
AS-4	LAB PROCESS COOLING	2 1/2"	66	.5	6.3	18.5	15.8	31	45	SPIROVENT SENIOR
AS-5	CENTRAL HEATING WATER	10"	815	.5	20	46.9	37.5	490	890	SPIROVENT SENIOR
AS-6	CENTRAL CHILLED WATER	10"	815	.5	20	46.9	37.5	490	890	SPIROVENT SENIOR

FIELD ERECTED INDOOR AIR HANDLER SCHEDULE (AH)

PLAN CODE	AREAS SERVED	TOTAL SUPPLY CFM	TOTAL RELIEF CFM	FILTER BANK	SUPPLY FANS	PREHEAT COILS	INDIRECT EVAPORATIVE COOLING COILS	CHILLED WATER COOLING COILS	DIRECT EVAP COOLER	RELIEF FANS	MAX OUTSIDE DIMENSIONS (FT-IN) LENGTH	MAX OUTSIDE DIMENSIONS (FT-IN) WIDTH	MAX OUTSIDE DIMENSIONS (FT-IN) HEIGHT	MAX WEIGHT (LBS)	REMARKS
AH-1	LEVEL 0 LEVEL 1 LEVEL 2	176,000	50,000	FB-1 FB-2	SF-1 SF-2 SF-3	PHC-1 THROUGH PHC-12	ICC-1 THROUGH ICC-12	CC-1 THROUGH CC-12	ECM-1 THROUGH ECM-4	RF-1 RF-2	92'-0"	34'-0"	17'-0"	100,000	FIELD ERECTED INDOOR AIR HANDLER

FILTER BANK (FB)

PLAN CODE	ASHRAE 52 EFFICIENCY	FILTER SIZE (IN) HEIGHT	FILTER SIZE (IN) WIDTH	FILTER SIZE (IN) THICK	NUMBER OF FILTERS	RACK CONFIGURATION	MAX INITIAL PD (IN WC)	MAX FACE VELOCITY (FPM)	MANUFACTURER & MODEL NO
FB-1	MERV 13 (80-85%)	24	24	2	160	ANGLE	0.14	300	FLANDERS PRE PLEAT M13

SUPPLY AIR FAN SCHEDULE (SF)

PLAN CODE	SYSTEM SERVED	TYPE	CFM @ ELEV	TSP @ ELEV (INWC)	FAN RPM	MOTOR (1) HP	MOTOR (1) BHP	MOTOR (1) EFF %	MOTOR (1) RPM	MOTOR (1) VOLTAGE/ PHASE	OCTAVE BAND / HZ	1 / 63	2 / 125	3 / 250	4 / 500	5 / 1K	6 / 2K	7 / 4K	8 / 8K	AIR VOLUME CONTROL	METHOD OF CONTROL	FAN DIAMETER (IN)	OPERATING WEIGHT (LBS)	MANUFACTURER & MODEL NO	REMARKS
SF-1 SF-2 SF-3	AH-1	DIRECT DRIVE AIR FOIL PLENUM	63,000	7.0	878	150	89.4	95.8	1,200	460/3	INLET	109	111	102	97	94	90	85	81	ATC/VFD	ATC SYSTEM/ DUCT STATIC	60	20,000 (2)	COOK 600PLC	PROVIDE WITH INLET SAFETY SCREEN, INERTIA BASE
											OUTLET	114	114	108	103	98	93	89	85						

(1) 150 HP MOTOR REQUIRED FOR SECOND OPERATING POINT (94,500 CFM, 7.0" TSP, 138 BHP, 1,022 RPM). PROVIDE MOTOR WITH NEMA MG1, PART 31 RATING.
(2) INCLUDES WEIGHT OF INERTIA BASE.

PREHEAT COIL SCHEDULE (PHC)

PLAN CODE	SYSTEM SERVED	CFM (ALT)	CAPACITY (MBH)	AIR SIDE EAT (°F)	AIR SIDE LAT (°F)	AIR SIDE MAX FACE VELOCITY (FPM)	AIR SIDE MAX PD (IN WC)	WATER SIDE EWT / LWT (°F)	WATER SIDE GPM	WATER SIDE MAX PD (FT HD)	WATER SIDE PPG %	ROWS	MAX FINS PER INCH	PASSES	FINNED AREA SIZE (IN) FIN WIDTH	FINNED AREA SIZE (IN) FIN HEIGHT	FINNED AREA SIZE (IN) DEPTH	MANUFACTURER & MODEL NO	REMARKS
PHC-1 THROUGH PHC-12	AH-1	8,584	304	25	60.5	264	0.05	98/83.1	44.2	8.6	40	2	8	4	108"	43.5"	5"	TEMTROL 5WC-4-43.5x108x2-8AL	MAX 1.5" CHANNEL AROUND FINNED AREA ON ALL SIDES

INDIRECT EVAPORATIVE COOLING COIL SCHEDULE (ICC)

PLAN CODE	SYSTEM SERVED	CFM (ALT) (1)	CAPACITY (MBH) SENS MBH	CAPACITY (MBH) TOTAL MBH	AIR SIDE EAT (°F) db/wb	AIR SIDE LAT (°F) db/wb	AIR SIDE MAX FACE VELOCITY (FPM)	AIR SIDE MAX PD (IN WC)	WATER SIDE EWT/ LWT (°F)	WATER SIDE GPM	WATER SIDE MAX PD (FT HD)	WATER SIDE PPG %	ROWS	FINS PER INCH	PASSES	FINNED AREA SIZE (IN) FIN WIDTH	FINNED AREA SIZE (IN) FIN HEIGHT	FINNED AREA SIZE (IN) DEPTH	MANUFACTURER & MODEL NO	REMARKS
ICC-1 THROUGH ICC-12	AH-1	15,920	403.9	403.9	98/63.3	68.6/53.4	488	0.52	66/72.5	125	12	NONE	8	8	6	108"	43.5"	13"	TEMTROL 5WC-6-43.5x108x8-8AL	MAX 1.5" CHANNEL AROUND FINNED AREA ON ALL SIDES

(1) AIRFLOW AT DESIGN DRYBULB CONDITIONS ENTERING COIL, RESULTS IN 162,000 CFM LEAVING THE AIR HANDLER

CHILLED WATER COOLING COIL SCHEDULE (CC)

PLAN CODE	SYSTEM SERVED	CFM (ALT) (1)	CAPACITY MBH SENS MBH	CAPACITY MBH TOTAL MBH	AIR SIDE EAT (°F) db/wb	AIR SIDE LAT (°F) db/wb	AIR SIDE MAX FACE VELOCITY (FPM)	AIR SIDE MAX PD (IN WC)	WATER SIDE EWT / LWT (°F)	WATER SIDE GPM	WATER SIDE MAX PD (FT HD)	WATER SIDE PPG %	ROWS	FINS PER INCH	PASSES	FINNED AREA SIZE FIN WIDTH	FINNED AREA SIZE FIN HEIGHT	FINNED AREA SIZE DEPTH	MANUFACTURER & MODEL NO	REMARKS
CC-1 THROUGH CC-12	AH-1	15,420	229.1	312.8	71.6/ 62.5	55.0/ 54.9	473	0.65	49/61	54	59	25	8	8	18	108"	43.5"	13"	TEMTROL 5WC-18-43.5x108x8-8AL	MAX 1.5" CHANNEL AROUND FINNED AREA ON ALL SIDES

(1) AIRFLOW AT DESIGN WETBULB CONDITIONS ENTERING COIL, RESULTS IN 162,000 CFM OF SUPPLY AIR LEAVING THE AIR HANDLER

EVAPORATIVE COOLING MEDIA SCHEDULE (ECM)

PLAN CODE	SYSTEM SERVED	AIR WASHER CFM (ALT)	AIR WASHER MAX AIR VELOCITY (FPM)	AIR WASHER MAX AIR PD (INWC)	AIR WASHER MEDIA THICKNESS (IN)	AIR WASHER COOLING EFFECTIVENESS	AIR WASHER PUMP GPM	AIR WASHER HP	AIR WASHER VOLTAGE/ PHASE	INDIVIDUAL MEDIA SIZE (IN) MIN WIDTH	INDIVIDUAL MEDIA SIZE (IN) MIN DEPTH	INDIVIDUAL MEDIA SIZE (IN) HEIGHT	OVERALL UNIT SIZE (IN) MIN WIDTH	OVERALL UNIT SIZE (IN) MAX DEPTH	OVERALL UNIT SIZE (IN) MAX HEIGHT	REMARKS
ECM-1 THROUGH ECM-4	AH-1	45,050	540	0.28	12	90%	27 PER PUMP	1/3	120/1	174	12	69	360	60	188 (INCLUDES SUMP)	MUNTERS GLASDEK MEDIA WITH TUF-EDG, TWO PUMPS PER UNIT

RELIEF FAN SCHEDULE (RF)

PLAN CODE	SYSTEM SERVED	TYPE	CFM @ ELEV	TSP @ ELEV (INWC)	FAN RPM	MOTOR HP	MOTOR BHP	MOTOR EFF %	MOTOR RPM	MOTOR VOLTAGE/ PHASE	OCTAVE BAND / HZ	1 / 63	2 / 125	3 / 250	4 / 500	5 / 1K	6 / 2K	7 / 4K	8 / 8K	AIR VOLUME CONTROL	METHOD OF CONTROL	FAN DIAMETER (IN)	OPERATING WEIGHT (LBS)	MANUFACTURER & MODEL NO	REMARKS
RF-1 RF-2	AH-1	DIRECT DRIVE EXTRUDED PROPELLER	25,000	1.0	675	10	7.6	91.7	900	460/3	OUTLET	99	99	94	91	89	86	81	80	ATC/VFD	ATC SYSTEM/ DUCT STATIC	60	1,250	COOK 60EW620B	PROVIDE WITH INLET AND FAN SAFETY SCREENS

LOUVER SCHEDULE (L)

PLAN CODE	CFM	MAX. VELOCITY FPM	MIN. FREE AREA SQ FT	MAX DIMENSIONS (W x H) (IN)	MANUFACTURER & MODEL NO
L-1	189,000	820	231	324 X 168 (1)	RUSKIN ELF6375DX
L-2	50,000	872	57	162 X 84 (1)	RUSKIN ELF6375DX
L-3	3,375	850	4	36 X 36 (1)	RUSKIN ELF6375DX
L-4	1,100	800	1.63	30 X 18 (1)	RUSKIN ELF6375DX
L-5	1,100	800	1.63	30 X 18 (1)	RUSKIN ELF6375DX

(1) PROVIDE REQUIRED HARDWARE FOR A CONTINUOUS, SEAMLESS, EXTERIOR APPEARANCE

COOLING TOWER SCHEDULE FOR CT-1

PLAN CODE CT-1	SYSTEM SERVED	FLOW RATE (GPM) (1)	FLOW RATE PER CELL (GPM)	TOTAL HEAT REJECTED (MBH)(1)	EWT (°F)	LWT (°F)	OSA WB (°F)	NO OF CELLS	ELECTRICAL - PER CELL MOTOR HP	ELECTRICAL - PER CELL CONTROL	ELECTRICAL - PER CELL SUMP HEATERS (KW)	ELECTRICAL - PER CELL VOLTAGE/ PHASE	MAXIMUM DIMENSIONS (1) LENGTH (IN)	MAXIMUM DIMENSIONS (1) WIDTH (IN)	MAXIMUM DIMENSIONS (1) HEIGHT (IN)	MAXIMUM OPERATING WEIGHT (LBS) (1)	MANUFACTURER & MODEL NO
CELL-1 CELL-2 CELL-3	AH-1	1,500	500	4,875	72.5	66	63	3	25	VFD	2 @ 5KW	460/3	509	102	175	37,000	EVAPCO AT-39-742

(1) DATA COMBINED FOR ALL 3 CELLS

JOB SITE ELEVATION = 4,700 FT
JOB SITE PRESSURE = 12.37 PSI
SELECT ALL EQUIPMENT FOR OPERATION AT JOB SITE ELEVATION

ALL MOTORS TO BE NEMA PREMIUM EFFICIENCY

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY: JMN
CHECKED BY: RLH
DFCM PROJECT NO.: 09020790
GSBS PROJECT NO.: 2009.053.02
ISSUED DATE: 05.07.2010

MECHANICAL SCHEDULES

MH601

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

RE-HEAT COIL SCHEDULE (RH)

PLAN CODE	VAV BOX SERVED	CFM @ ELEV.	MBH	FV (FPM)	AIR SIDE EAT/LAT (°F)	AIR SIDE MAX AIR PD (IN WC)	WATER SIDE EWT/LWT (°F)	WATER SIDE GPM	WATER SIDE MAX PD (F0.)	COIL FACE MAX DIMENSIONS (H" x W")	ROWS/ FINS PER IN	MANUFACTURER & MODEL NO.
RH-1	6I	360	11.6	247	54/88	0.1	100/85	1.6	2.4	10.5 x 20	3/10	TEMTROL 5WC-20-10.5X20X3-10AL
RH-2	6E	500	16.7	343	54/88	0.18	100/85	2.3	6.0	10.5 x 20	4/9	TEMTROL 5WC-28-10.5X20X4-9AL
RH-3	8I	450	14.8	246	54/88	0.1	100/85	2.0	4.4	12 x 22	3/10	TEMTROL 5WC-24-12X22X3-10AL
RH-4	8E	800	29.5	416	54/88	0.28	100/85	4.0	3.3	12 x 26	4/10	TEMTROL 5WC16-12X26X4-10AL
RH-5	10I	700	22.5	216	54/88	0.07	100/85	3.1	0.8	18 x 26	3/10	TEMTROL 5WC-12-18X26X3-10AL
RH-6	10E	1400	46.9	431	54/88	0.3	100/85	6.4	11.1	18 x 26	4/10	TEMTROL 5WC-24-18X26X4-10AL
RH-7	12I	900	29.3	258	54/88	0.1	100/85	4.0	3.8	18 x 28	3/10	TEMTROL 5WC-18-18X28X3-10AL
RH-8	12E	1600	52.7	427	54/88	0.3	100/85	7.1	5.0	18 x 30	4/10	TEMTROL 5WC-16-18X30X4-10AL
RH-9	14I	1250	40.5	257	54/88	0.1	100/85	5.5	2.9	19.5 x 36	3/10	TEMTROL 5WC-12-19.5X36X3-10AL
RH-10	14E	2500	83.3	429	54/88	0.3	100/85	11.2	7.4	21 x 40	4/10	TEMTROL 5WC-14-21X40X4-10AL
RH-11	8LSV	530	17.8	398	54/88	0.3	100/85	2.4	6.7	12 x 16	4/10	TEMTROL 5WC-32-12X16X4-10AL
RH-12	10LSV	750	24.4	400	54/88	0.3	100/85	3.3	2.3	13.5 x 20	4/10	TEMTROL 5WC-18-13.5X20X4-10AL
RH-13	12LSV	1100	36.2	437	54/88	0.3	100/85	4.9	5.8	16.5 x 22	4/10	TEMTROL 5WC-22-16.5X22X4-10AL
RH-14	14LSV	1900	61.6	439	54/88	0.3	100/85	8.3	3.5	19.5 x 32	4/10	TEMTROL 5WC-12-19.5X32X4-10AL
RH-15	16LSV	2700	88.6	393	54/88	0.3	100/85	12.0	9.5	22.5 x 44	4/9	TEMTROL 5WC-14-22.5X44X4-9AL

1

LABORATORY VENTURI SUPPLY VALVE (SV)

PLAN CODE — VALVE NO.
MAX CFM — MIN CFM

PLAN CODE	INLET SIZE (IN)	MIN/MAX INLET SP (IN WC)	MAXIMUM AIRFLOW CFM	MAX SP DROP @ MAX AIRFLOW (IN WC)	MIN. CONTROL AIRFLOW CFM	USE WITH REHEAT COIL (*)	MAX dBA RADIATED @ 1.5" WC	MANUFACTURER/ MODEL	COMMENTS
8LSV	8"	0.6/3.0	530	0.6	40	RH-11	39	PHOENIX ACCEL II MAV	-
10LSV	10"	0.6/3.0	750	0.6	50	RH-12	45	PHOENIX ACCEL II MAV	-
12LSV	12"	0.6/3.0	1,100	0.6	90	RH-13	47	PHOENIX ACCEL II MAV	-
14LSV	24" x 12"	0.6/3.0	1,900	0.6	200	RH-14	50	PHOENIX ACCEL II EXV	TWO 12" VALVES IN FACTORY ASSEMBLY
16LSV	30" x 15"	0.6/3.0	2,700	0.6	450	RH-15	45	PHOENIX ACCEL II MAV	THREE 12" VALVES IN FACTORY ASSEMBLY

1

(*) REHEAT COILS PROVIDED BY DIVISION 232113 CONTRACTOR

LABORATORY VENTURI EXHAUST VALVE (EV)

PLAN CODE — VALVE NO.
MAX CFM — MIN CFM

PLAN CODE	INLET SIZE (IN)	MIN/MAX INLET SP (IN WC)	MAXIMUM AIRFLOW CFM	MAX SP DROP @ MAX AIRFLOW (IN WC)	MIN. CONTROL AIRFLOW CFM	MAX dBA RADIATED @ 1.5" WC	MANUFACTURER/ MODEL	COMMENTS
8EV	8"	0.6/3.0	530	0.6	40	39	PHOENIX ACCEL II EXV	-
10EV	10"	0.6/3.0	750	0.6	50	45	PHOENIX ACCEL II EXV	-
12EV	12"	0.6/3.0	1,100	0.6	90	47	PHOENIX ACCEL II EXV	-
14EV	24" x 12"	0.6/3.0	1,900	0.6	200	50	PHOENIX ACCEL II EXV	TWO 12" VALVES IN FACTORY ASSEMBLY
16EV	30" x 15"	0.6/3.0	2,700	0.6	450	45	PHOENIX ACCEL II EXV	THREE 12" VALVES IN FACTORY ASSEMBLY

1

IN-LINE SOLIDS SEPARATOR (ISS)

PLAN CODE	SYSTEM	FLOW (GPM)	PUMP HEAD (PSI)	INLET/ OUTLET	PUMPS AMPS	PUMPS VOLTAGE/ PHASE	PUMPS HP	OPERATING WEIGHT (LBS)	MANUFACTURER & MODEL NO	REMARKS
ISS-1	AH-1 COND WATER	78	23	2"/ 1 1/2"	4.3	460/3	1	300	GRISSWOLD CSS-150	PURGE FUNCTION (1) (2)

(1) CONTROL OF PURGE FUNCTION TO BE BY INTERLOCK BETWEEN ISS CONTROLLER (BY DIVISION 15548) AND MOTORIZED BALL VALVE (BY 15548 CONTRACTOR). VALVE WILL BE INSTALLED AT PURGE OUTLET OF ISS AND WIRED TO THE DDC CONTROL SYSTEM BY THE DIVISION 15955 CONTRACTOR.

(2) INCLUDE FULLY OPERATIONAL CONTROL PANEL MOUNTED ON ISS SKID. PANEL SHALL INCLUDE MOTOR STARTER, H-O-A SWITCH, DISCONNECTS, AND DRY CONTACT FOR USE BY DDC SYSTEM TO INDICATE ERROR STATUS.

OUTSIDE AIR INJECTION FAN (OAF)

PLAN CODE	SYSTEM SERVED	TYPE	CFM @ ELEV	TSP @ ELEV (IN WC)	FAN RPM	MOTOR HP	MOTOR BHP	MOTOR EFF %	MOTOR RPM	MOTOR VOLTAGE/ PHASE	OCTAVE BAND HZ	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K	AIR VOLUME CONTROL	METHOD OF CONTROL	FAN DIAMETER (IN)	OPERATING WEIGHT (LBS)	MANUFACTURER & MODEL NO	REMARKS
OAF-1	OUTSIDE AIR	DIRECT DRIVE AIR FOIL PLENUM	103,000	2.0	841	75	70	95	900	460/3	INLET	96	113	102	99	99	97	92	88	ATC/VFD	ATC SYSTEM/ DUCT STATIC	60	20,000 (1)	COOK 600PLC	PROVIDE WITH INLET SAFETY SCREEN, INERTIA BASE
											OUTLET	103	115	108	105	104	102	98	93						

(1) INCLUDES WEIGHT OF INERTIA BASE.

FILTER BANK (FB)

PLAN CODE	ASHRAE 52 EFFICIENCY	FILTER SIZE (IN) HEIGHT	FILTER SIZE (IN) WIDTH	FILTER SIZE (IN) THICK	NO OF FILTERS	RACK CONFIGURATION	MAX INITIAL PD (IN WC)	MAX FACE VELOCITY (FPM)	MANUFACTURER & MODEL NO
FB-2	MERV 13 (80-85%)	24	24	2	72	FLAT	0.18	360	FLANDERS PRE PLEAT M13
FB-3	MERV 13 (80-85%)	24	24	2	56	FLAT	0.24	460	FLANDERS PRE PLEAT M13

ENERGY RECOVERY COIL SCHEDULE (ERC)

PLAN CODE	SYSTEM SERVED	CFM (ALT)	TOTAL MBH	AIR SIDE EAT (°F)	AIR SIDE LAT (°F)	AIR SIDE MAX FACE VELOCITY (FPM)	AIR SIDE MAX PD (IN WC)	WATER SIDE EWT / LWT (°F)	WATER SIDE GPM	WATER SIDE MAX PD (FT HD)	WATER SIDE PPG %	ROWS	MAX FINS PER INCH	PASSES	FINNED AREA SIZE (IN) FIN WIDTH	FINNED AREA SIZE (IN) FIN HEIGHT	FINNED AREA SIZE (IN) DEPTH	MANUFACTURER & MODEL NO	REMARKS
ERCO-1 THROUGH ERCO-8	OUTSIDE AIR/ LAB EXHAUST	12,875	2,616	6	30.5	374	0.4	59.4/30.0	24	18	40	8	10	18	114	43.5	13	TEMTROL 5WC-18-43.5x114x8-10AL	MAX 1.5" CHANNEL AROUND FINNED AREA ON ALL SIDES
ERCE-1 THROUGH ERCE-8	OUTSIDE AIR/ LAB EXHAUST	12,875	2,612	72	48	355	0.47	30.0/59.4	24	18.5	40	8	11	18	120	43.5	13	TEMTROL 5WC-18-43.5x120x8-11AL	MAX 1.5" CHANNEL AROUND FINNED AREA ON ALL SIDES

LAB EXHAUST FAN (LEF)

PLAN CODE	SYSTEM SERVED	TYPE	CFM @ ELEV	TSP @ ELEV (IN WC)	FAN RPM	MOTOR (1) HP	MOTOR (1) BHP	MOTOR (1) EFF %	MOTOR (1) RPM	MOTOR (1) VOLTAGE/ PHASE	OCTAVE BAND HZ	1 63	2 125	3 250	4 500	5 1K	6 2K	7 4K	8 8K	AIR VOLUME CONTROL	METHOD OF CONTROL	FAN DIAMETER (IN)	OPERATING WEIGHT (LBS)	MANUFACTURER & MODEL NO	REMARKS
LEF-1 LEF-2 LEF-3	LAB EXHAUST	BELT DRIVE MIXED FLOW	34,340	4.5	828	60	35	95.0	1,200	460/3	INLET	94	95	92	90	85	81	78	74	ATC/VFD	ATC SYSTEM/ DUCT STATIC	49	5,500	COOK 490QMX-HP	PROVIDE WITH INLET AND OUTLET FLEXIBLE CONNECTIONS
											OUTLET	99	98	95	93	89	84	84	84						

(1) 50 HP MOTOR REQUIRED FOR SECOND OPERATING POINT (103,000 CFM, 4.5" TSP, 50 BHP, 932 RPM). PROVIDE MOTOR WITH NEMA MG1, PART 31 RATING.
PROVIDE FANS LEF-1 AND LEF-2 WITH BACK-UP POWER.

VAV

PLAN CODE — BOX NO.
MAX COOLING CFM — MIN COOLING CFM

PLAN CODE	INLET SIZE (IN)	DESIGN INLET SP (IN WC)	MAX COOLING AIR FLOW (CFM)	MAX HEATING AIR FLOW (CFM)	MAX NC	MIN CONTROL (CFM)	MAX SP DROP (IN WC COOLING)	USE WITH REHEAT COIL
6I	6	1.0	500	360	34	80	0.22	RH-1
6E	6	1.0	500	500	34	80	0.22	RH-2
8I	8	1.0	900	450	33	150	0.05	RH-3
8E	8	1.0	800	800	33	150	0.05	RH-4
10I	10	1.0	1400	700	34	230	0.05	RH-5
10E	10	1.0	1400	1400	34	230	0.05	RH-6
12I	12	1.0	1600	900	34	325	0.05	RH-7
12E	12	1.0	1600	1600	34	325	0.05	RH-8
14I	14	1.0	2500	1250	35	450	0.07	RH-9
14E	14	1.0	2500	2500	35	450	0.07	RH-10

PUMP SCHEDULE (P)

PLAN CODE	TYPE	SYSTEM SERVED	FLOW (GPM)	PRESSURE (FT)	MAX BHP	FLUID	MOTOR TYPE	MOTOR SIZE (HP)	MOTOR SPEED (RPM)	MOTOR VOLTAGE & PHASE	MOTOR VFD	PUMP & MOTOR WT (LBS)	MANUFACTURER & MODEL	REMARKS
P-1	IN-LINE	CONDENSER WATER	1,500	58	29	WATER	PREMIUM	40	1,800	460/3	NO	1,000	B&G SERIES 80 8x8x9-1/2	INSTALL AS CLOSE TO FLOOR AS POSSIBLE
P-2	IN-LINE	CONDENSER WATER	1,500	58	29	WATER	PREMIUM	40	1,800	460/3	NO	1,000	B&G SERIES 80 8x8x9-1/2	INSTALL AS CLOSE TO FLOOR AS POSSIBLE
P-3	BASE MOUNTED	BUILDING CHILLED SYSTEM	650	70	14	WATER	PREMIUM	20	1,800	460/3	YES	2,400 (W/INERTIA BASE)	B&G SERIES 1510 4BC	PROVIDE WITH INERTIA BASE
P-4	BASE MOUNTED	AH-1 CHILLED COILS	648	100	22	25% PPG	PREMIUM	25	1,800	460/3	NO	2,800 (W/INERTIA BASE)	B&G SERIES 1510 4E	PROVIDE WITH INERTIA BASE
P-5	BASE MOUNTED	BUILDING HEATING SYSTEM	830	80	22.7	WATER	PREMIUM	25	3,600	460/3	YES	2,300 (W/INERTIA BASE)	B&G SERIES 1510 4AC	PROVIDE WITH INERTIA BASE
P-6	BASE MOUNTED	BUILDING HEATING SYSTEM	830	80	22.7	WATER	PREMIUM	25	3,600	460/3	YES	2,300 (W/INERTIA BASE)	B&G SERIES 1510 4AC	PROVIDE WITH INERTIA BASE
P-7	BASE MOUNTED	AH-1 PREHEAT COILS	530	40	6.9	40% PPG	PREMIUM	7.5	1,800	460/3	NO	1,900 (W/INERTIA BASE)	B&G SERIES 1510 4BC	PROVIDE WITH INERTIA BASE
P-8	BASE MOUNTED	AH-1 PREHEAT COILS	530	40	6.9	40% PPG	PREMIUM	7.5	1,800	460/3	NO	1,900 (W/INERTIA BASE)	B&G SERIES 1510 4BC	PROVIDE WITH INERTIA BASE
P-9	BASE MOUNTED	LAB EXHAUST HEAT RECOVERY	240	70	5.8	40% PPG	PREMIUM	7.5	1,800	460/3	NO	1,700 (W/INERTIA BASE)	B&G SERIES 1510 2-1/2 BB	PROVIDE WITH INERTIA BASE
P-10	BASE MOUNTED	LAB EXHAUST HEAT RECOVERY	240	70	5.8	40% PPG	PREMIUM	7.5	1,800	460/3	NO	1,700 (W/INERTIA BASE)	B&G SERIES 1510 2-1/2 BB	PROVIDE WITH INERTIA BASE
P-11	IN-LINE	CHILLED HX-4	40	60	1.3	WATER	PREMIUM	1.5	3,600	460/3	YES	100	B&G SERIES 90 1-1/4 AA	SUSPEND FROM OVERHEAD STRUCTURE
P-12	IN-LINE	PROCESS COOLING	40	75	1.5	WATER	PREMIUM	2	3,600	460/3	YES	100	B&G SERIES 90 1-1/4 AA	SUSPEND FROM OVERHEAD STRUCTURE

EXHAUST FAN SCHEDULE (EF)

PLAN CODE	AREA SERVED	TYPE	CFM @ ELEV.	ESP (@ ELEV.)	FAN RPM	MOTOR B.H.P.	MOTOR H.P.	MOTOR EFFICIENCY %	MOTOR VOLTAGE & PHASE	SONES	DAMPER (GRAVITY OR MOTOR)	METHOD OF CONTROL	OPENING SIZE	MAX. OPERATING WT. (LBS.)	MANUFACTURER / MODEL	REMARKS
EF-1	AREA A TOILETS	INLINE CENTRIFUGAL	3375	1.5	2038	1.75	2.0	PREMIUM	460/3	31	MOTORIZED	ATC	20 X 20	150	COOK 150 SQN-B	-
EF-2	AREA B TOILETS	UPBLAST CENTRIFUGAL	1425	1.2	1634	.52	.75	PREMIUM	460/3	16	MOTORIZED	ATC	25 X 25	100	COOK ACRU-XP 180RX6B	-
EF-3	TRASH/RECYCLE 032A	CEILING FAN	150	0.5	1300	FRAC	FRAC	PREMIUM	220/1	4.7	GRAVITY	CONTINUOUS	6" DIA.	16	COOK CC-164	-
EF-4	TUNNEL -	INLINE CENTRIFUGAL	1100	.4	1102	.13	1/6	PREMIUM	115/1	8.9	MOTORIZED	CONTINUOUS	20 X 20	155	COOK 135 SQND	-
LEF-4	RADIOISOTOPE LAB 156	RADIAL CENTRIFUGAL	1000	6.3	3508	1.89	3	PREMIUM	460/3	38	NONE	CONTINUOUS	7" DIA.	125A (W/INERTIA BASE)	COOK 70-MHA-SD	PROVIDE W/STANDBY POWER, DRAIN, PHENOLIC COATED INTERNAL SURFACES, AND CERMAMIC BEARINGS.

1

ALL MOTORS TO BE NEMA PREMIUM EFFICIENCY

JOB SITE ELEVATION = 4,700 FT
JOB SITE PRESSURE = 12.37 PSI
SELECT ALL EQUIPMENT FOR OPERATION AT JOB SITE ELEVATION

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY: Author
CHECKED BY: Checker
DFCM PROJECT NO.: 09020790
GSBS PROJECT NO.: 2009.053.02
ISSUED DATE: 05.07.2010

MECHANICAL SCHEDULES

CONSTRUCTION DOCUMENTS

MH602

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

HEAT EXCHANGER SCHEDULE (HX)

PLAN CODE	SYSTEM SERVED	HOT WATER SIDE				COLD WATER SIDE					FOULING RESISTANCE	MAX DIMENSIONS LxWxH (IN)	MAX WEIGHT (LBS)	TYPE	MANUFACTURER & MODEL NO
		GPM	EWT/LWT (°F)	MAX PD (FT)	% GLYCOL	CAP (MBH)	EWT/LWT (°F)	GPM	MAX PD (FT)	% GLYCOL					
HX-1	AH-1 COOLING COILS	650	60.7/49	11.1	25	3,660	48/59.7	630	10.3	NONE	NONE	104x26x110	7,000	PLATE AND FRAME	ITT P110-390-TLA
HX-2	AH-1 PREHEAT COILS	480	100/85	19.4	NONE	3,600	82/97	530	23.1	40	0.0005	58x26x110	5,400	PLATE AND FRAME	ITT P110-155-TMTL59
HX-3	LAB PROCESS COOLING LOOP	40	64/52	4.0	NONE	240	48/60	40	4.0	NONE	0.0005	30x14x48	500	PLATE AND FRAME	ITT P20A-54-TLA

UNIT HEATER SCHEDULE (UH) HORIZONTAL BLOW

PLAN CODE	CFM @ ELEV.	HEATING CAP. (MBH) (LOW SPD)	GPM	WPD (FT)	EWT/LWT (°F)	EAT (°F)	MOTOR		MOUNTING	MANUFACTURER & MODEL NO.	REMARKS
							HP	VOLTAGE & PHASE			
UH-1	1,900	20.4	3	0.1	100/85	60	1/3	115/1	②	TRANE UHSA-120-W2	HORIZONTAL BLOW
UH-2	380	4.2	0.6	0.1	100/85	60	160 W	115/1	②	TRANE UHSA-024-W2	HORIZONTAL BLOW
UH-3	380	4.2	0.6	0.1	100/85	60	160 W	115/1	②	TRANE UHSA-024-W2	HORIZONTAL BLOW
UH-4	380	4.2	0.6	0.1	100/85	60	160 W	115/1	②	TRANE UHSA-024-W2	HORIZONTAL BLOW
UH-5	2,900	34.7	4.8	0.1	100/85	60	1/3	115/1	②	TRANE UHSA-204-W2	HORIZONTAL BLOW
UH-6	380	4.2	0.6	0.1	100/85	60	160 W	115/1	②	TRANE UHSA-024-W2	HORIZONTAL BLOW
UH-7	1,900	20.4	3	0.1	100/85	60	1/3	115/1	②	TRANE UHSA-120-W2	HORIZONTAL BLOW
UH-8	380	4.2	0.6	0.1	100/85	60	160 W	115/1	②	TRANE UHSA-024-W2	HORIZONTAL BLOW
UH-9	380	4.2	0.6	0.1	100/85	60	160 W	115/1	②	TRANE UHSA-024-W2	HORIZONTAL BLOW
UH-10	380	4.2	0.6	0.1	100/85	60	160 W	115/1	②	TRANE UHSA-024-W2	HORIZONTAL BLOW
UH-11	380	4.2	0.6	0.1	100/85	60	160 W	115/1	②	TRANE UHSA-024-W2	HORIZONTAL BLOW
UH-12	1,900	20.4	3	0.1	100/85	60	1/3	115/1	②	TRANE UHSA-120-W2	HORIZONTAL BLOW
UH-13	1,900	20.4	3	0.1	100/85	60	1/3	115/1	②	TRANE UHSA-120-W2	HORIZONTAL BLOW

②HANG FROM CEILING OR ROOF STRUCTURE.

ELECTRIC UNIT HEATER SCHEDULE (EUH)

PLAN CODE	ELECTRICAL				CFM (ALT.)	MOUNTING	EAT (°F)	MANUFACTURER & MODEL NO.	REMARKS
	TOTAL KW	NO. OF STEPS	VOLTAGE & PHASE	FAN H.P.					
EUH-1	2.6	1	277/1	1/30	360	OVERHEAD BRACKET	60	CHROMALOX HVH-02-71-00	HORIZONTAL DISCHARGE
EUH-2	2.6	1	277/1	1/30	360	OVERHEAD BRACKET	60	CHROMALOX HVH-02-71-00	HORIZONTAL DISCHARGE

CABINET UNIT HEATER SCHEDULE (CUH)

PLAN CODE	CFM @ ELEV.	MIN. HEATING CAP. (MBH) (LOW SPD)	GPM	MAX. WPD (FT)	EWT/LWT (°F)	EAT (°F)	MOTOR		MOUNTING	CONFIGURATION	MAX. DIMENSIONS FACE/CABINET W X H X D (IN)	MANUFACTURER & MODEL NO	REMARKS
							HP	VOLTAGE & PHASE					
CUH-1	600	8.1	1.2	0.4	100/85	70	1/20	120/1	RECESSED	INVERTED FLOW	63 X 30/ 43 X 27 X 10	TRANE MODEL "N" SIZE 06	CABINET RECESSED INTO WALL, FLUSH FACE, INVERTED FLOW
CUH-2	600	8.1	1.2	0.4	100/85	70	1/20	120/1	FLOOR MOUNTED, FLUSH TO WALL	INVERTED FLOW	48 X 32 X 11	TRANE MODEL "M" SIZE 06	FLOOR MOUNTED, BACK FLUSH TO WALL, WITH 4" BASE

1 1

BAG-IN/BAG-OUT FILTER HOUSING (FH)

PLAN CODE	ASHRAE 52 EFFICIENCY	FILTER SIZE (IN)			NO OF FILTERS	MAX INITIAL PD (INWC)	MAX INITIAL PD (INWC)	MAX FACE VELOCITY (FPM)	MANUFACTURER & MODEL NO	REMARKS
		HEIGHT	WIDTH	THICK						
FH-1	PRE-FILTER MERV 8 (30%)	24	24	2	1	0.22	0.22	250	FLANDERS HOUSING: CSC BF SERIES PREFILTER AND ADSORBER: BF1-1H1W-20G15-304-D3 HEPA: BF1-1H1W-GGF-304-D3	VERTICAL INSTALLATION WITH AIR ENTERING AT BOTTOM, LEAVING AT TOP. INCLUDE 12" DIAMETER BUBBLE-TIGHT DAMPERS DBTM-FB-304-12 AT INLET AND OUTLET.
	CARBON ADSORBER	24	24	16-3/4	1	0.32	0.32			
	FINAL FILTER MERV 14 (95%)	24	24	12	1	0.32	0.32			

TRANSFER FAN SCHEDULE (TF)

PLAN CODE	AREA SERVED	TYPE	CFM @ ELEV	ESP (INWC)	FAN RPM	MOTOR			MAX dBA	DAMPER (GRAVITY OR MOTOR)	METHOD OF CONTROL	MAX OPERATING WT (LBS)	MANUFACTURER & MODEL NO	REMARKS
						HP	EFFICIENCY %	VOLTAGE/ PHASE						
TF-1	ELECTRICAL ROOM 035	CENTRIFUGAL UPBLAST	2,700	0.5	942	0.75	PREMIUM	120/1	61	GRAVITY	THERMOSTAT	190	COOK ACRU-D 180R10D	PROVIDE WITH FACTORY WIRED SPEED CONTROLLER

ROOF TOP UNIT SCHEDULE (RTU) ①

PLAN CODE	AREA SERVED	NOMINAL TONS	SEER	SUPPLY FAN				COOLING					ELECTRICAL			MAXIMUM WEIGHT (LBS)	MAXIMUM SIZE			MANUFACTURER & MODEL NO	REMARKS
				QUANTITY	TYPE	CFM @ ELEVATION	ESP (IN WC)	TOTAL MBH	SENS MBH	EAT (DB/WB)	OA (DB °F)	LAT	VOLTAGE/ PHASE	MCA AMPS	MOCP		L (IN)	W (IN)	H (IN)		
RTU-1	ELEVATOR EQUIPMENT ROOM	2.5	14	1	DIRECT	900	0.6	26.5	23.7	80/62	95	51	460/3	9.5	15	440	49	47	34	YORK AFFINITY D1NQ030N03646	PROVIDE WITH 12" INSULATED CURB ①②③④

①PROVIDE EMERGENCY POWER TO RTU-1.
②AIR SIDE ECONOMIZER WITH BAROMETRIC RELIEF.
③UNIT MUST MEET REQUIREMENTS FOR LEED 3.0 ENERGY AND ATMOSPHERE CREDIT #4 FOR ENHANCED REFRIGERANT MANAGEMENT (REFRIGERANT CHARGE NOT TO EXCEED 1.6 LB/TON).
④ROOM TEMPERATURE SENSOR AND COMMAND TO RUN FORM 230900 CONTROL SYSTEM.

DX COOLING-ONLY FAN COIL UNIT (DXFC)

NOT USED

AIR COOLED CONDENSING UNIT SCHEDULE (ACCU)

NOT USED

1

VARIABLE FREQUENCY DRIVE SCHEDULE (VFD)

PLAN CODE	SERVICE	DRIVE TYPE	BYPASS	MAX AMBIENT TEMPERATURE (°F)	CONTROL OF VFD			CONTROL SYS INTERFACE	REMARKS
					METHOD	MAXIMUM RESPONSE TIME	CONTROLLER INPUT		
VFD-1	SUPPLY FAN SF-1	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	DUCT STATIC	LON	PASSWORD PROTECTED KEYPAD, LOCKING DISCONNECT
VFD-2	SUPPLY FAN SF-2	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	DUCT STATIC	LON	PASSWORD PROTECTED KEYPAD, LOCKING DISCONNECT
VFD-3	SUPPLY FAN SF-3	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	DUCT STATIC	LON	PASSWORD PROTECTED KEYPAD, LOCKING DISCONNECT
VFD-4	RELIEF FAN RF-1	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	DIFFERENTIAL PRESSURE	LON	PASSWORD PROTECTED KEYPAD, LOCKING DISCONNECT
VFD-5	RELIEF FAN RF-2	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	DIFFERENTIAL PRESSURE	LON	PASSWORD PROTECTED KEYPAD, LOCKING DISCONNECT
VFD-6	CT-1 CELL 1	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	AH-1 LAT	LON	PASSWORD PROTECTED KEYPAD, LOCKING DISCONNECT
VFD-7	CT-1 CELL-2	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	AH-1 LAT	LON	PASSWORD PROTECTED KEYPAD, LOCKING DISCONNECT
VFD-8	CT-1 CELL-3	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	AH-1 LAT	LON	KEYPAD, LOCKING DISCONNECT
VFD-9	PUMP P-3	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	DIFFERENTIAL PRESSURE	LON	KEYPAD, LOCKING DISCONNECT
VFD-10	PUMP P-5	PULSE WIDTH MODULATION	NONE	105	MANUAL	<150 MILLISECONDS	DIFFERENTIAL PRESSURE	LON	KEYPAD, LOCKING DISCONNECT
VFD-11	PUMP P-6	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	DIFFERENTIAL PRESSURE	LON	KEYPAD, LOCKING DISCONNECT
VFD-12	PUMP P-11	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	DIFFERENTIAL PRESSURE	LON	KEYPAD, LOCKING DISCONNECT
VFD-13	PUMP P-12	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	DIFFERENTIAL PRESSURE	LON	KEYPAD, LOCKING DISCONNECT
VFD-14	FAN OAF-1	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	AIRFLOW MEASURING STATION	LON	KEYPAD, LOCKING DISCONNECT
VFD-15	LAB EXHAUST LEF-1	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	DUCT STATIC	LON	KEYPAD, LOCKING DISCONNECT
VFD-16	LAB EXHAUST LEF-2	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	DUCT STATIC	LON	KEYPAD, LOCKING DISCONNECT
VFD-17	LAB EXHAUST LEF-3	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	DUCT STATIC	LON	KEYPAD, LOCKING DISCONNECT
VFD-18	LAB EXHAUST LEF-4	PULSE WIDTH MODULATION	NONE	105	ATC	<150 MILLISECONDS	DUCT STATIC	LON	KEYPAD, LOCKING DISCONNECT

1

JOB SITE ELEVATION = 4,700 FT
JOB SITE PRESSURE = 12.37 PSI
SELECT ALL EQUIPMENT FOR OPERATION AT JOB SITE ELEVATION

ALL MOTORS TO BE NEMA PREMIUM EFFICIENCY

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY: -
CHECKED BY: RLH
DFCM PROJECT NO.: 09020790
GSBS PROJECT NO.: 2009.053.02
ISSUED DATE: 05.07.2010

MECHANICAL SCHEDULES

CONSTRUCTION DOCUMENTS

MH603

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

ELECTRIC HUMIDIFIER SCHEDULE (EH)

PLAN CODE	AREA SERVED	LBS/HR STEAM	ELECTRICAL		MAX. DIMENSIONS					MANUFACTURER & MODEL NO.	REMARKS
			INPUT (KW)	VOLTS/PH.	LENGTH (IN.)	WIDTH (IN.)	HEIGHT (IN.)	CW	DRAIN		
EH-1	ROOM 068B	20	6.8	460/3	13	17	34	1/2"	2"	NORTEC NHTC-20	W/UNIT MOUNTED BLOWER PACK
EH-2	ROOM 068C	20	6.8	460/3	13	17	34	1/2"	2"	NORTEC NHTC-20	W/UNIT MOUNTED BLOWER PACK
EH-3	ROOM 068D	20	6.8	460/3	13	17	34	1/2"	2"	NORTEC NHTC-20	W/UNIT MOUNTED BLOWER PACK
EH-4	ROOM 068E	20	6.8	460/3	13	17	34	1/2"	2"	NORTEC NHTC-20	W/UNIT MOUNTED BLOWER PACK
EH-5	ROOM 173A	50	17	460/3	16	23	40	1/2"	2"	NORTEC NHTC-50	W/UNIT MOUNTED BLOWER PACK
EH-6	ROOM 148B	20	6.8	460/3	13	17	34	1/2"	2"	NORTEC NHTC-20	W/UNIT MOUNTED BLOWER PACK
EH-7	ROOM 148C	20	6.8	460/3	13	17	34	1/2"	2"	NORTEC NHTC-20	W/UNIT MOUNTED BLOWER PACK
EH-8	ROOM 277	50	17	460/3	16	23	40	1/2"	2"	NORTEC NHTC-50	W/UNIT MOUNTED BLOWER PACK

1

AIR DEVICE SCHEDULE

PLAN CODE — GRILLE — CFM

PLAN CODE	TYPE & DUTY	FACE SIZE	NECK SIZE	CEILING TYPE (2)	MAX. CFM	MAX. T.P. (IN. W.C.)	N.C. LEVEL MAX	MIN. THROW (FT) (T50)	MANUFACTURER & MODEL NO.	REMARKS
1	LINEAR-SUPPLY	24"L	12"□	MATCH CEILING	380	0.111	16	28	TITUS FL-30	2 @ 3" SLOT
2	LINEAR-SUPPLY	48"L	12"□	MATCH CEILING	630	0.076	19 (3)	36	TITUS FL-30	2 @ 3" SLOT
3	LINEAR-SUPPLY	48"L	10"□	MATCH CEILING	200	0.031	10	200	TITUS FL-30	1 @ 3" SLOT
4	LINEAR-SUPPLY	24"L	10"□	MATCH CEILING	320	0.11	35	15	TEMP0 L.D.	4 @ 1" SLOT
9	PERFORATED RETURN	24" X 24"	22" X 22"	MATCH CEILING	1200	0.05	17	-	TITUS PAR	-
10	PERFORATED RETURN	24" X 12"	22"X 10"	MATCH CEILING	600	0.06	10	-	TITUS PAR	-
12	PERFORATED EXHAUST GRILLE	24" X 12	22" x 10"	MATCH CEILING	600	0.06	-	-	TITUS PAR	-
14	PERFORATED EXHAUST GRILLE	10" X 10"	8" X 8"	MATCH CEILING	225	0.12	12	-	TITUS 8F	-
15	PERFORATED EXHAUST GRILLE	12" X 12"	10" X 10"	MATCH CEILING	360	0.12	14	-	TITUS 8F	-
16	PERFORATED EXHAUST GRILLE	14" X 14"	12" X 12"	MATCH CEILING	550	0.12	16	-	TITUS 8F	-
18	PERFORATED EXHAUST GRILLE	20" X 20"	18"X 18"	MATCH CEILING	1250	0.12	17	-	TITUS 8F	-
19	PERFORATED EXHAUST GRILLE	24" X 24"	22" X 22"	MATCH CEILING	1900	0.12	21	-	TITUS 8F	-
21	RADIAL BLADE DIFFUSER	12"□	8"□	SURFACE	210	0.14	29	8 (1)	AIR DIFFUSION PRODUCTS, INC. DNR	-
22	RADIAL BLADE DIFFUSER	15"□	10"□	SURFACE	330	0.14	29	10 (1)	AIR DIFFUSION PRODUCTS, INC. DNR	-
23	RADIAL BLADE DIFFUSER	18"□	12"□	SURFACE	470	0.14	30	12 (1)	AIR DIFFUSION PRODUCTS, INC. DNR	-
24	RADIAL BLADE DIFFUSER	21"□	14"□	SURFACE	640	0.14	30	14 (1)	AIR DIFFUSION PRODUCTS, INC. DNR	-
26	RADIAL BLADE DIFFUSER	24" X 24"	8"□	GRID	210	0.14	29	8 (1)	AIR DIFFUSION PRODUCTS, INC. DNR	-
27	RADIAL BLADE DIFFUSER	24" X 24"	10"□	GRID	330	0.14	29	10 (1)	AIR DIFFUSION PRODUCTS, INC. DNR	-
28	RADIAL BLADE DIFFUSER	24" X 24"	12"□	GRID	470	0.14	30	12 (1)	AIR DIFFUSION PRODUCTS, INC. DNR	-
29	RADIAL BLADE DIFFUSER	24" X 24"	14"□	GRID	640	0.14	30	14 (1)	AIR DIFFUSION PRODUCTS, INC. DNR	-
30	BALL DIFFUSER	10"□	8"□	-	209	0.18	24	25	AIR CONCEPTS APLD-RR	-
31	BALL DIFFUSER	12"□	10"□	-	331	0.18	28	32	AIR CONCEPTS APLD-RR	-
32	BALL DIFFUSER	14"□	12"□	-	471	0.17	30	42	AIR CONCEPTS APLD-RR	-
33	RADIAL AIR DIFFUSER	24" X 24"	8"□	MATCH CEILING	300	0.080	29	6	TITUS TRITEC	2-WAY
34	RADIAL AIR DIFFUSER	24" X 24"	10"□	MATCH CEILING	475	0.093	31	7	TITUS TRITEC	2-WAY
35	RADIAL AIR DIFFUSER	24" X 48"	10"□	MATCH CEILING	500	0.097	26	9	TITUS TRICTEC	2-WAY
36	RADIAL AIR DIFFUSER	24" X 48"	12"□	MATCH CEILING	650	0.092	24	7	TITIUS TRITEC	2-WAY
37	RADIAL AIR DIFFUSER	24" X 24"	8"□	MATCH CEILING	325	0.094	29	4	TITUS TRITEC	1-WAY
38	RADIAL AIR DIFFUSER	24" X 24"	10"□	MATCH CEILING	450	0.081	28	7	TITUS TRITEC	1-WAY
39	RADIAL AIR DIFFUSER	24" X 48"	10"□	MATCH CEILING	500	0.092	24	3	TITUS TRITEC	1-WAY
40	RADIAL AIR DIFFUSER	24" X 48"	12"□	MATCH CEILING	750	0.114	31	5	TITUS TRITEC	1-WAY
41	NOT USED									
42	SIDEWALL RETURN GRILLE	-	18" X 16"	DUCT MOUNTED	900	0.046	19	-	TITUS 350L	(1) -
43	SIDEWALL RETURN GRILLE	-	42" X 24"	DUCT MOUNTED	2700	0.029	20	-	TITUS 350L	-
44	SIDEWALL SUPPLY GRILLE	-	30" X 12"	DUCT MOUNTED	1375	0.022	26	-	TITUS 300FL	-
45	SIDEWALL SUPPLY GRILLE	-	12" X 12"	DUCT MOUNTED	525	0.022	22	-	TITUS 300FL	-
50	LINEAR SLOT	9" X 42"	12"Ø	NO CEILING	-	-	-	-	TEMPO	4 @ 1" SLOT 40" LONG

1 RECOMMENDED MIN. DISTANCE BETWEEN DIFFUSERS IN A CEILING.
2 VERIFY FRAME TYPE OF ALL AIR DEVICES WITH ARCHITECTURAL REFLECTED CEILING PLAN BEFORE ORDERING.
3 PROVIDE ACOUSTICALLY LINED PLENUM.

JOB SITE ELEVATION = 4,700 FT
JOB SITE PRESSURE = 12.37 PSI
SELECT ALL EQUIPMENT FOR OPERATION AT JOB SITE ELEVATION

ALL MOTORS TO BE NEMA PREMIUM EFFICIENCY

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7915
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

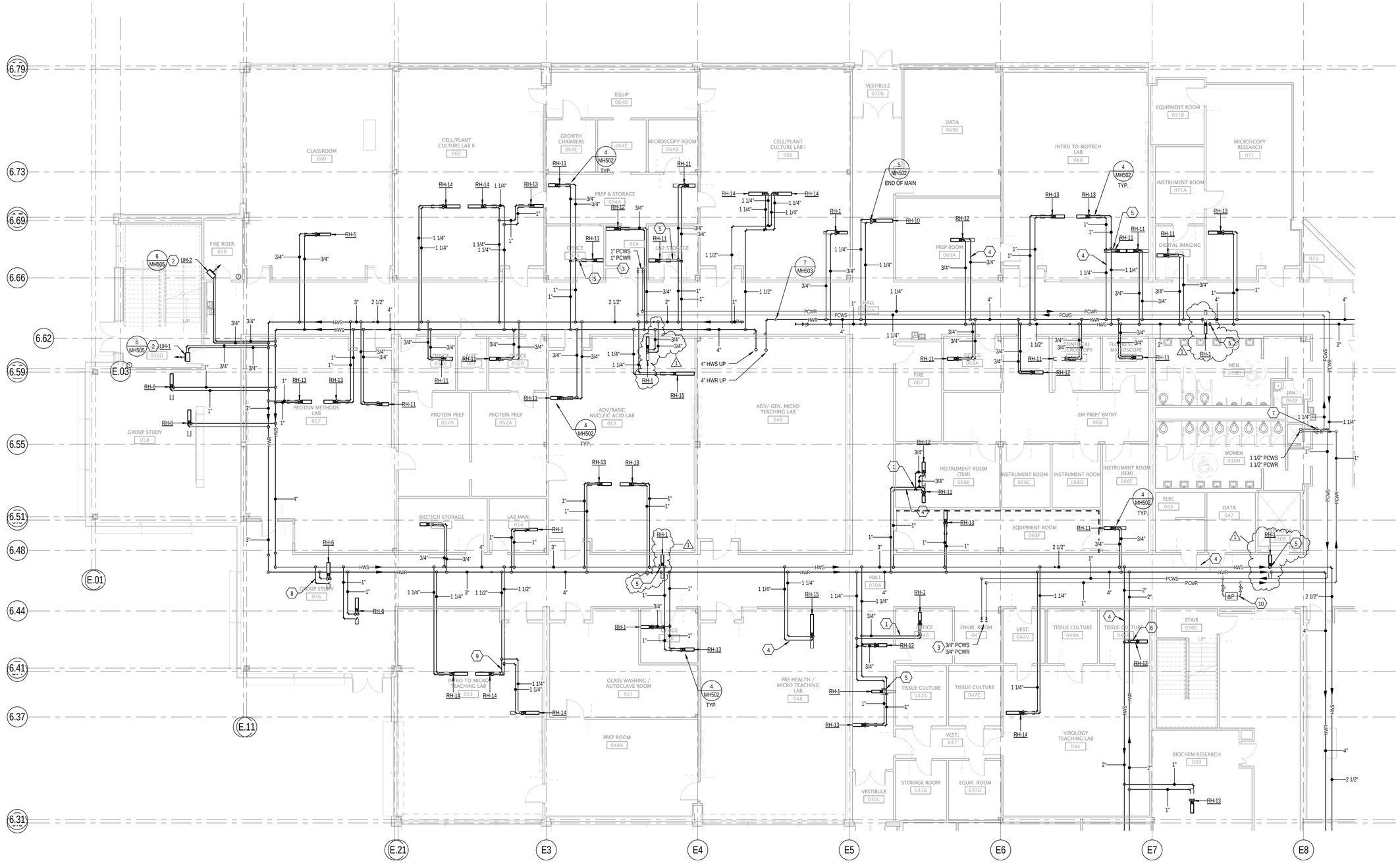
Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

MECHANICAL SCHEDULES

CONSTRUCTION DOCUMENTS

MH604



1 LEVEL 0 MECHANICAL PIPING FLOOR PLAN - AREA A

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

GENERAL NOTES

A. SEE DEVICE SCHEDULES FOR WATER FLOW RATES TO ALL COILS.
B. SEE SHEET MH001 FOR ADDITIONAL GENERAL NOTES.

KEYED NOTES

1 ROUTE HOT WATER SUPPLY AND RETURN PIPE UP HIGH, ABOVE CONTROLS MAINTENANCE/CLEARANCE SPACE FOR VAV BOX OR LAB SUPPLY AIR VALVE.
2 INSTALL UNIT HEATER TIGHT TO UNDERSIDE OF OVERHEAD STURCTURE.
3 DROP PROCESS PIPING TO JUST ABOVE CEILING SPACE FOR EASY ACCESS. CAP AND VALVE STUB OUTS FOR CONTINUATION AS SHOWN ON LABORATORY DRAWINGS. STUB OUTS SHOULD BE LOCATED ABOVE THE DOOR TO THE LAB IN WHICH THEY SERVE. UNLESS SHOWN OTHERWISE. DO NOT ROUTE PIPING OVER ELECTRICAL PANELS. COORDINATE LAB UTILITY LOCATIONS WITH LAB DRAWINGS. COORDINATE LOCATIONS WITH ALL OTHER DISCIPLINES.
4 MAINTENANCE CLEARANCE AREA. CONTROLS FOR VAV BOX OR AIRFLOW CONTROL VALVE TO BE INSTALLED ON THIS SIDE OF BOX. COORDINATE WITH ALL TRADES TO ENSURE ALL CONDUIT, PIPIING, AND DUCTWORK ARTE INSTALLED OUTSIDE THIS AREA OR ABOVE AIRFLOW CONTROL VALVE.
5 PROVIDE 3/4" HEATING WATER SUPPLY AND RETURN TO COIL.
6 PROVIDE 3/4" HEATING WATER PIPING CONNECTION TO COILS.
7 ISOLATION VALVES AND CIRCUIT SETTER.
8 PROVIDE 1" HEATING WATER SUPPLY AND RETURN TO COIL.
9 PROVIDE 1 1/4" HEATING WATER SUPPLY AND RETURN TO COIL.
10 INSTALL PROCESS WATER DIFFERENTIAL PRESSURE SENSOR AT THIS LOCATION.

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

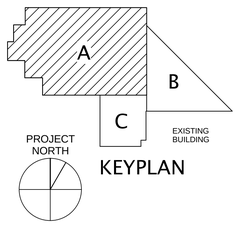
LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

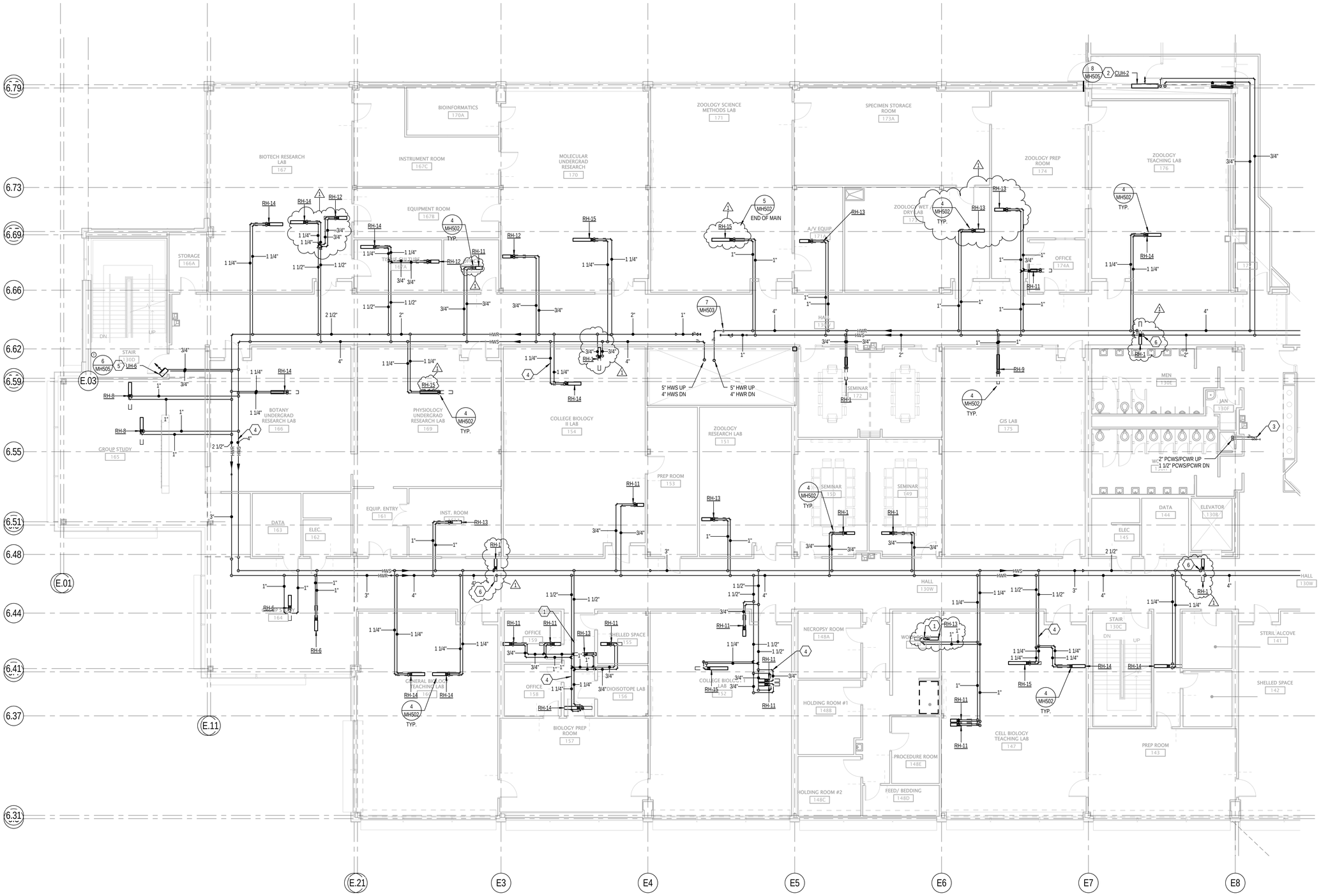
Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 0 MECHANICAL PIPING FLOOR PLAN - AREA A

CONSTRUCTION DOCUMENTS

MP101A



1 LEVEL 1 MECHANICAL PIPING FLOOR PLAN - AREA A

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

GENERAL NOTES

A. SEE DEVICE SCHEDULES FOR WATER FLOW RATES TO ALL COILS.
B. SEE SHEET MH001 FOR ADDITIONAL GENERAL NOTES.

KEYED NOTES

1. ROUTE HOT WATER SUPPLY AND RETURN PIPE UP HIGH, ABOVE CONTROLS MAINTENANCE/CLEARANCE SPACE FOR VAV BOX OR LAB SUPPLY AIR VALVE.
2. INSTALL CABINET UNIT HEATER RECESSED INTO WALL WITH BOTTOM OF HEATER FACE 8" AFF. COORDINATE CAVITY IN GYP BOARD WALL WITH GENERAL CONTACTOR.
3. VALVE AND CAP 1 1/2" PROCESS COOLING WATER STUB OUTS FOR FUTURE CONNECTION.
4. MAINTENANCE CLEARANCE AREA. CONTROLS FOR VAV BOX OR AIRFLOW CONTROL VALVE TO BE INSTALLED ON THIS SIDE OF BOX. COORDINATE WITH ALL TRADES TO ENSURE ALL CONDUIT, PIPIING, AND DUCTWORK ARTE INSTALLED OUTSIDE THIS AREA OR ABOVE AIRFLOW CONTROL VALVE.
5. INSTALL UNIT HEATER TIGHT TO UNDERSIDE OF OVERHEAD STURCTURE.
6. PROVIDE 3/4" HEATING WATER SUPPLY AND RETURN TO COIL.

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

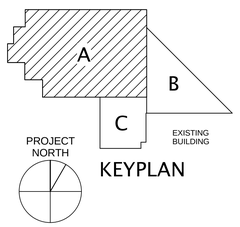
LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

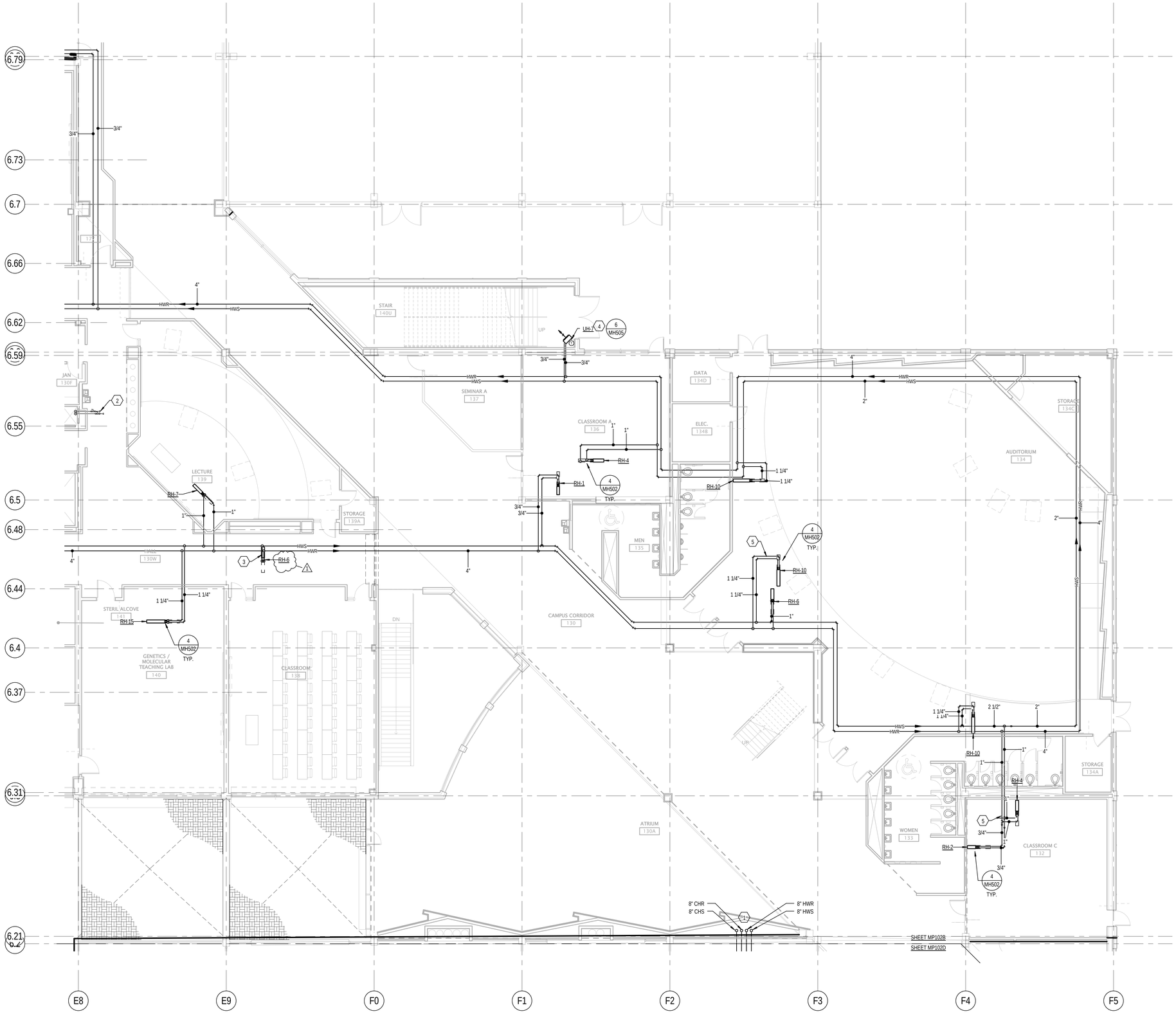
Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 1 MECHANICAL PIPING FLOOR PLAN - AREA A

CONSTRUCTION DOCUMENTS

MP102A



KEYED NOTES

1. PIPES TO RISE AGAINST EXISTING WALL OF OLD POPE SCIENCE BUILDING, AND WILL BE CONCEALED BEHIND NEW WALL TO THE NORTH.
2. VALVE AND CAP 1 1/2" PROCESS COOLING WATER STUB OUTS FOR FUTURE CONNECTION.
3. PROVIDE 3/4" HEATING WATER SUPPLY AND RETURN TO COIL.
4. INSTALL UNIT HEATER TIGHT TO UNDERSIDE OF OVERHEAD STURCTURE.
5. MAINTENANCE CLEARANCE AREA. CONTROLS FOR VAV BOX OR AIRFLOW CONTROL VALVE TO BE INSTALLED ON THIS SIDE OF BOX. COORDINATE WITH ALL TRADES TO ENSURE ALL CONDUIT, PIPIING, AND DUCTWORK ARTE INSTALLED OUTSIDE THIS AREA OR ABOVE AIRFLOW CONTROL VALVE.

GENERAL NOTES

A. SEE DEVICE SCHEDULES FOR WATER FLOW RATES TO ALL COILS.
B. SEE SHEET MH001 FOR ADDITIONAL GENERAL NOTES.

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.

1 LEVEL 1 MECHANICAL PIPING FLOOR PLAN - AREA B

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

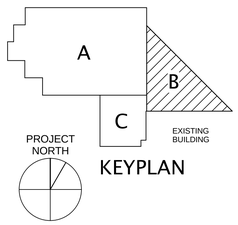
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

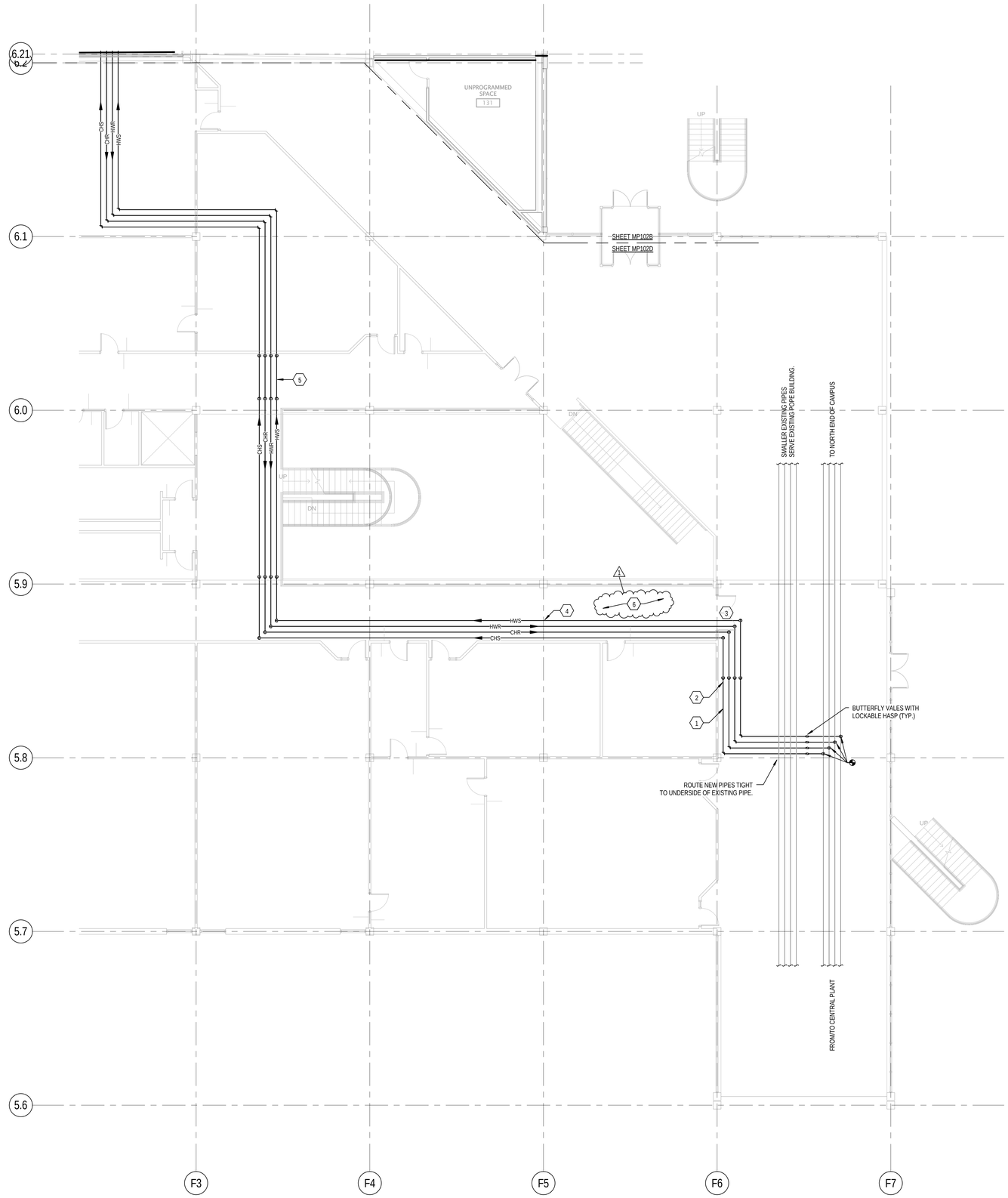
LEVEL 1 MECHANICAL PIPING FLOOR PLAN - AREA B

CONSTRUCTION DOCUMENTS

MP102B

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com



1 LEVEL 1 MECHANICAL PIPING FLOOR PLAN - AREA D

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

KEYED NOTES

1. ROUTE PIPES BENEATH DUCTWORK. DO NOT ROUTE BENEATH THE EXISTING FAN COIL UNIT.
2. OFFSET PIPING UP ABOVE EXISTING BUS DUCT.
3. ROUTE PIPE BELOW EXISTING CABLE TRAY AND ABOVE CLERESTORY AT DOORWAY INTO EXISTING POPE SCIENCE BUILDING. RISE UP ABOVE DUCTWORK ONCE PIPES ARE INSIDE THE EXISTING BUILDING.
4. OFFSET PIPES DOWN SO TOP OF INSULATED PIPE IS 1" BELOW CONCRETE BEAM. CONTINUE ROUTING PIPE TO THE WEST AT THIS LOCATION.
5. OFFSET PIPES AT 45° ANGLE BETWEEN EXISTING DUCT AND CABLE TRAY. PENETRATE WALL WITH PIPES AT ELEVATION BETWEEN TOP OF WALL-MOUNTED LIGHTS AND BOTTOM OF CABLE TRAY. CUT WOOD TRIM ON LIGHT FIXTURE AS NECESSARY - SEE NEARBY DUCT PENETRATIONS THAT REQUIRED LIGHT FIXTURE TO BE CUT.
6. EXISTING ROUND BRANCH SUPPLY WITH DIFFUSERS SERVING EXISTING HALLWAY TO BE ROTATED UP OUT OF THE WAY OF NEW PIPING. ORIENT DIFFUSERS DOWN AND TO THE SOUTH. PAINT DUCT JOINTS TO MATCH COLOR OF EXISTING DUCTWORK.

GENERAL NOTES

A. SEE DEVICE SCHEDULES FOR WATER FLOW RATES TO ALL COILS.
B. SEE SHEET MH001 FOR ADDITIONAL GENERAL NOTES.

LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	JN
CHECKED BY:	RLH
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 1 MECHANICAL PIPING FLOOR PLAN - AREA D

CONSTRUCTION DOCUMENTS

MP102D

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

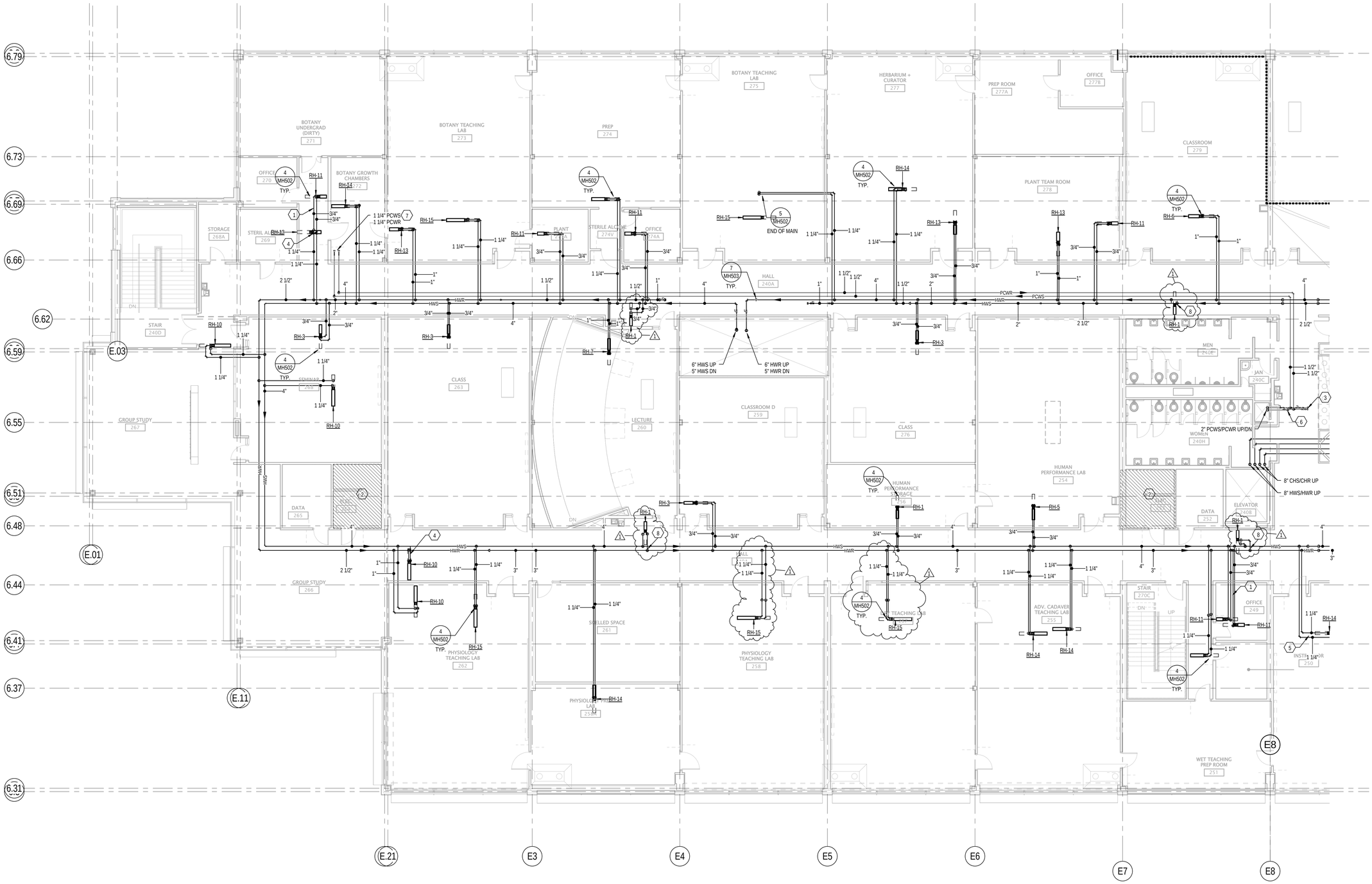
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7915
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

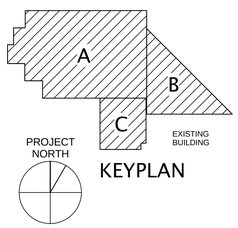
REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416



REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.



KEYPLAN

1 LEVEL 2 MECHANICAL PIPING FLOOR PLAN - AREA A

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

6' 0' 4' 8' 12' 16'

GENERAL NOTES

A. SEE DEVICE SCHEDULES FOR WATER FLOW RATES TO ALL COILS.
B. SEE SHEET MH001 FOR ADDITIONAL GENERAL NOTES.

KEYED NOTES

1. ROUTE HOT WATER SUPPLY AND RETURN PIPE UP HIGH, ABOVE CONTROLS MAINTENANCE/CLEARANCE SPACE FOR VAV BOX OR LAB SUPPLY AIR VALVE.
2. DO NOT ROUTE ANY PIPING OVER ELECTRICAL EQUIPMENT/ROOM. TYPICAL.
3. VALVE AND CAP 1 1/2" PROCESS COOLING WATER STUB OUTS FOR FUTURE CONNECTION.
4. PROVIDE 1" HEATING WATER SUPPLY AND RETURN TO COIL.
5. MAINTENANCE CLEARANCE AREA. CONTROLS FOR VAV BOX OR AIRFLOW CONTROL VALVE TO BE INSTALLED ON THIS SIDE OF BOX. COORDINATE WITH ALL TRADES TO ENSURE ALL CONDUIT, PIPIING, AND DUCTWORK ARTE INSTALLED OUTSIDE THIS AREA OR ABOVE AIRFLOW CONTROL VALVE.
6. ISOLATION VALVES AND CIRCUIT SETTER.
7. DROP PROCESS PIPING TO JUST ABOVE CEILING SPACE FOR EASY ACCESS. CAP AND VALVE STUB OUTS FOR CONTINUATION AS SHOWN ON LABORATORY DRAWINGS. STUB OUTS SHOULD BE LOCATED ABOVE THE DOOR TO THE LAB IN WHICH THEY SERVE. UNLESS SHOWN OTHERWISE. DO NOT ROUTE PIPING OVER ELECTRICAL PANELS. COORDINATE LAB UTILITY LOCATIONS WITH LAB DRAWINGS. COORDINATE LOCATIONS WITH ALL OTHER DISCIPLINES.
8. PROVIDE 3/4" HEATING WATER SUPPLY AND RETURN TO COIL.

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

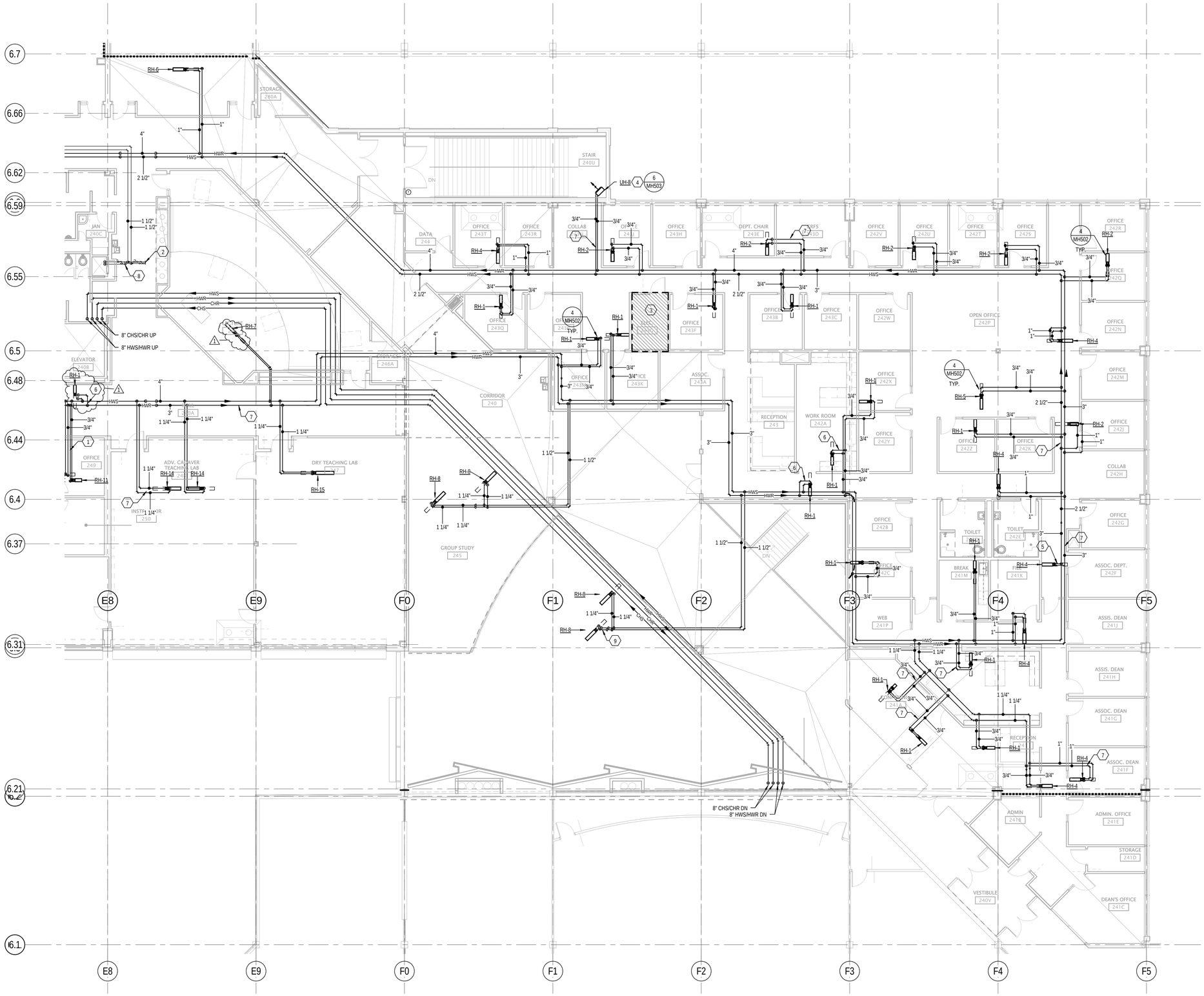
DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 2 MECHANICAL PIPING FLOOR PLAN - AREA A

CONSTRUCTION DOCUMENTS

MP103A

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.



LEVEL 2 MECHANICAL PIPING FLOOR PLAN - AREA B

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

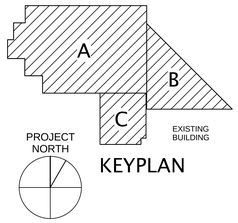
KEYED NOTES

1. ROUTE HOT WATER SUPPLY AND RETURN PIPE UP HIGH, ABOVE CONTROLS MAINTENANCE/CLEARANCE SPACE FOR VAV BOX OR LAB SUPPLY AIR VALVE.
2. VALVE AND CAP 1 1/2" PROCESS COOLING WATER STUB OUTS FOR FUTURE CONNECTION.
3. DO NOT ROUTE ANY PIPING OVER ELECTRICAL EQUIPMENT/ROOM. TYPICAL.
4. INSTALL UNIT HEATER TIGHT TO UNDERSIDE OF OVERHEAD STURCTURE.
5. PROVIDE 1" HEATING WATER SUPPLY AND RETURN TO COIL.
6. PROVIDE 3/4" HEATING WATER SUPPLY AND RETURN TO COIL.
7. MAINTENANCE CLEARANCE AREA. CONTROLS FOR VAV BOX OR AIRFLOW CONTROL VALVE TO BE INSTALLED ON THIS SIDE OF BOX. COORDINATE WITH ALL TRADES TO ENSURE ALL CONDUIT, PIPIING, AND DUCTWORK ARTE INSTALLED OUTSIDE THIS AREA OR ABOVE AIRFLOW CONTROL VALVE.
8. ISOLATION VALVES AND CIRCUIT SETTER.
9. PROVIDE 1 1/4" HEATING WATER SUPPLY AND RETURN TO COIL.

GENERAL NOTES

A. SEE DEVICE SCHEDULES FOR WATER FLOW RATES TO ALL COILS.
B. SEE SHEET MH001 FOR ADDITIONAL GENERAL NOTES.

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.



KEYPLAN

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 2 MECHANICAL PIPING FLOOR PLAN - AREA B

CONSTRUCTION DOCUMENTS

MP103B

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

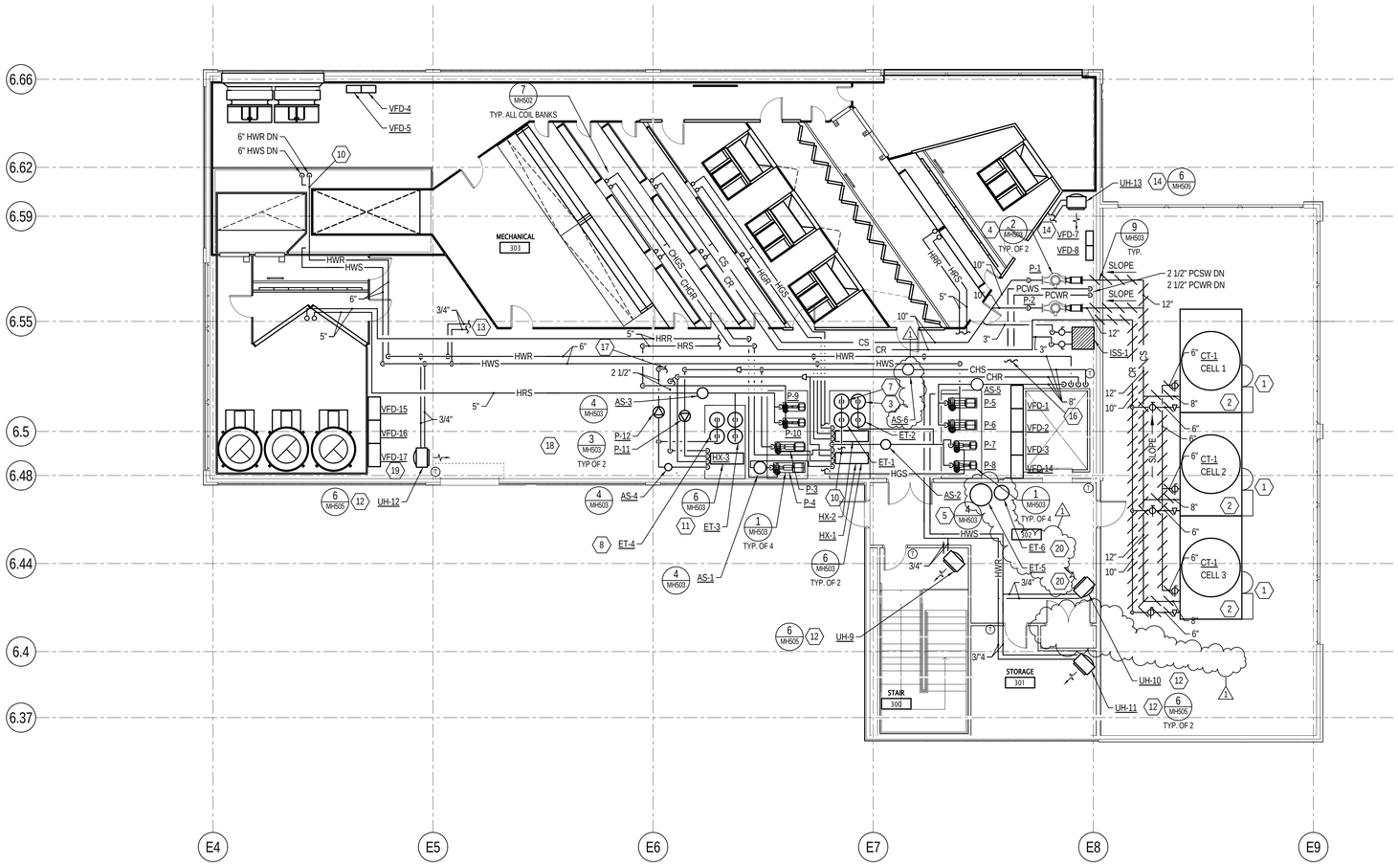
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7915
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416



1 PENTHOUSE MECHANICAL PIPING PLAN

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

KEYED NOTES

1. LADDER, SAFETY CAGE, AND PLATFORM ON SIDE OF TOWER DO NOT EXTEND ABOVE TOP OF TOWER.
2. COORDINATE WITH STEEL DETAILER SO SUPPORT STEEL BENEATH TOWER RESULTS IN INSTALLED HEIGHT OF TOWER SUCH THAT TOP OF TOWER IS FLUSH WITH TOP OF SCREEN WALL.
3. GLYCOL MAKE-UP SYSTEM, 40% PPG. SEE DETAIL 8/MH502.
4. PROVIDE A 2" SYSTEM DRAIN FROM THE 12" PIPE AT THE INLET TO PUMPS P-1 AND P-2 TO THE NEAREST FLOOR SINK. INCLUDE A 2" BALL VALVE IN EACH 2" DRAIN LINE.
5. INSTALL AS-2 HIGH OVERHEAD AND HX-2 ON PENTHOUSE FLOOR.
6. 1" LINE TO ET-2.
7. GLYCOL MAKE-UP SYSTEM, 25% PPG. SEE DETAIL 8/MH502.
8. MAKE-UP TANK FOR PROCESS COOLING SYSTEM LOCATED NEXT TO ET-4. SAME AS GLYCOL MAKE-UP SYSTEM, BUT CONTAINS CLOSED-LOOP HVAC SOLUTION AND CHEMICALS/INHIBITORS, BUT NO GLYCOL. THIS SYSTEM ALLOWS FOR MANUAL MAKE-UP OF HVAC SOLUTION WHEN SYSTEM FLUID IS LOST FROM SYSTEM AT THE PROCESS EQUIPMENT. SIMILAR TO DETAIL 8/MH502.
9. INSTALL P-12 PER DETAIL 3/MH503.
10. TO SUCTION PIPE OF P-4, JUST DOWNSTREAM OF AS-1.
11. GLYCOL MAKE-UP SYSTEM NEXT TO ET-3, 40% PPG. SEE DETAIL 8/MH502.
12. INSTALL UNIT HEATER TIGHT TO UNDERSIDE OF OVERHEAD STRUCTURE.
13. 3/4" HWS AND HWR LINES TO UNIT HEATER AT EAST END OF PENTHOUSE.
14. CONTINUATION OF 3/4" HWS AND HWR LINES IDENTIFIED IN KEYED NOTE 13.
15. NOT USED.
16. 2 1/2" PROCESS COOLING LINES TO HX-3.
17. CONTINUATION OF 2 1/2" PROCESS COOLING LINES IDENTIFIED IN KEYED NOTE 16.
18. LEAVE AREA CLEAR FOR MOTOR CONTROL CENTER. COORDINATE WITH DIVISION 26.
19. SPACE FOR CONTROL SYSTEM PANELS.
20. 1" PIPE FROM EXPANSION TANK TO JUST UPSTREAM OF PUMP ON SYSTEM SERVED, AS PER PIPING SCHEMATICS. PIPE NOT SHOWN FOR CLARITY ON THIS FLOOR PLAN. INCLUDE 3/4" FILL PORT.

GENERAL NOTES

A. CONTINUOUSLY SLOPE ALL CONDENSER WATER SUPPLY PIPING BETWEEN TOWERS AND PUMPS P-1/P-2 IN THE DIRECTION OF FLOW.

B. HEAT TRACE, INSULATE, AND JACKET ALL OUTDOOR CONDENSER WATER LINES.

C. SEE PIPE SIZES AND ADDITIONAL PIPING REQUIREMENTS ON PIPING SCHEMATICS MP201 AND MP202.

D. PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCES AROUND ALL HEAT EXCHANGERS SO UNITS CAN BE EASILY MAINTAINED.

E. LOCATE VFDS FOR PUMPS AT NORTH END OF HOUSEKEEPING PADS ON UNISTRUT STANDS OR ON HOUSEKEEPING PADS IF UNITS ARE VERY LARGE. DO NOT ROUTE PIPING ABOVE VFDS.

F. PROVIDE 1/4 SCALE COORDINATION DRAWING SHOWING ALL SHEET METAL, HVAC AND PLUMBING PIPING, FIRE SPRINKLER PIPING AND ALL ELCETRICAL IN PENTHOUSE. DO NOT ROUTE PIPING ABOVE ELECTRICAL PANELS OR VFD'S.

G. SEE DEVICE SCHEDULES FOR WATER FLOW RATES TO ALL COILS.

H. SEE ADDITIONAL GENERAL NOTES ON SHEET MH001.

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

PENTHOUSE MEHCANICAL PIPING PLAN

CONSTRUCTION DOCUMENTS

MP104

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

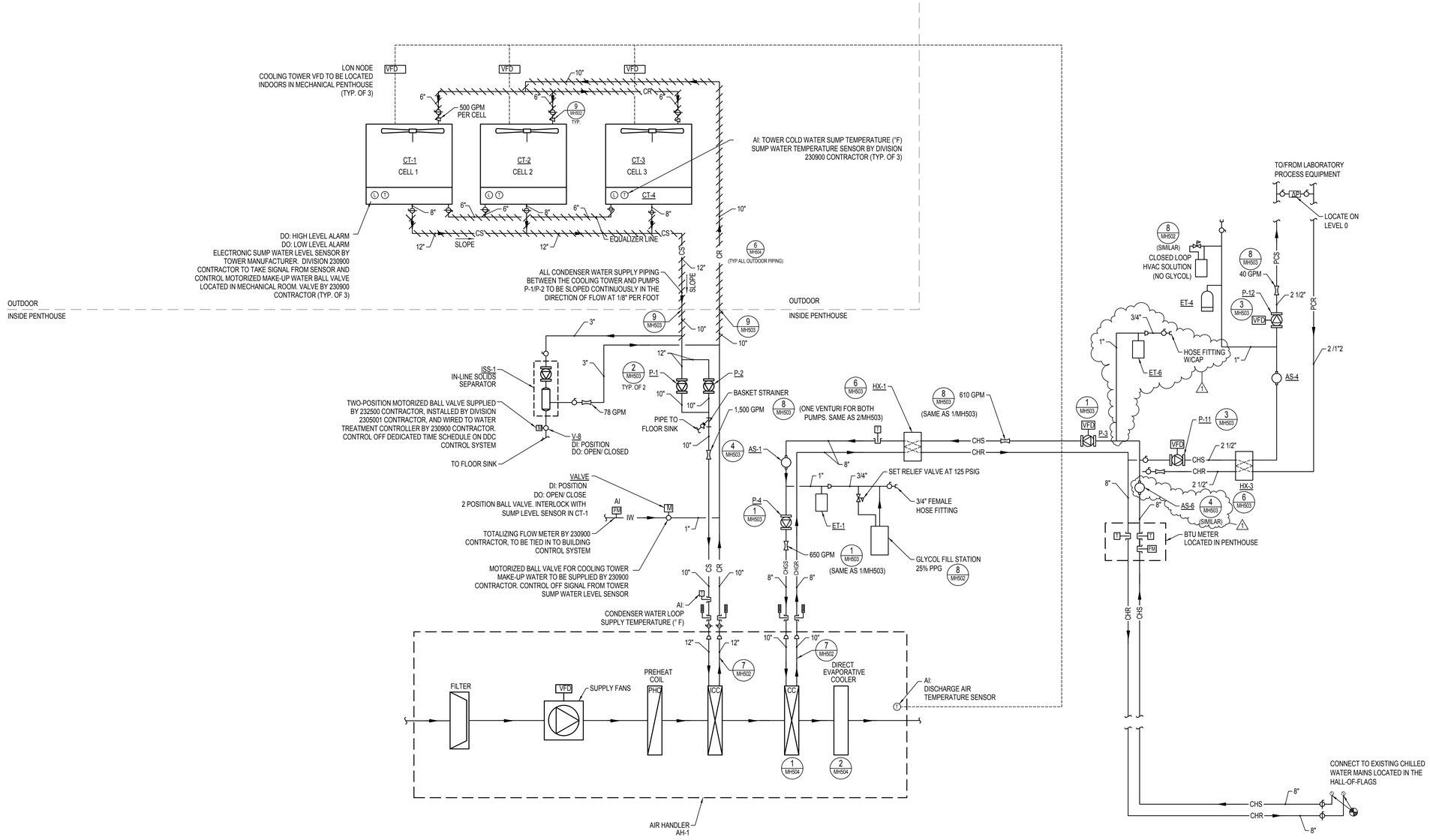
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7915
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416



1 CHILLED/CONDENSER WATER SCHEMATIC
SCALE: NONE

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

CHILLED/CONDENSER WATER SCHEMATIC

CONSTRUCTION DOCUMENTS

MP201

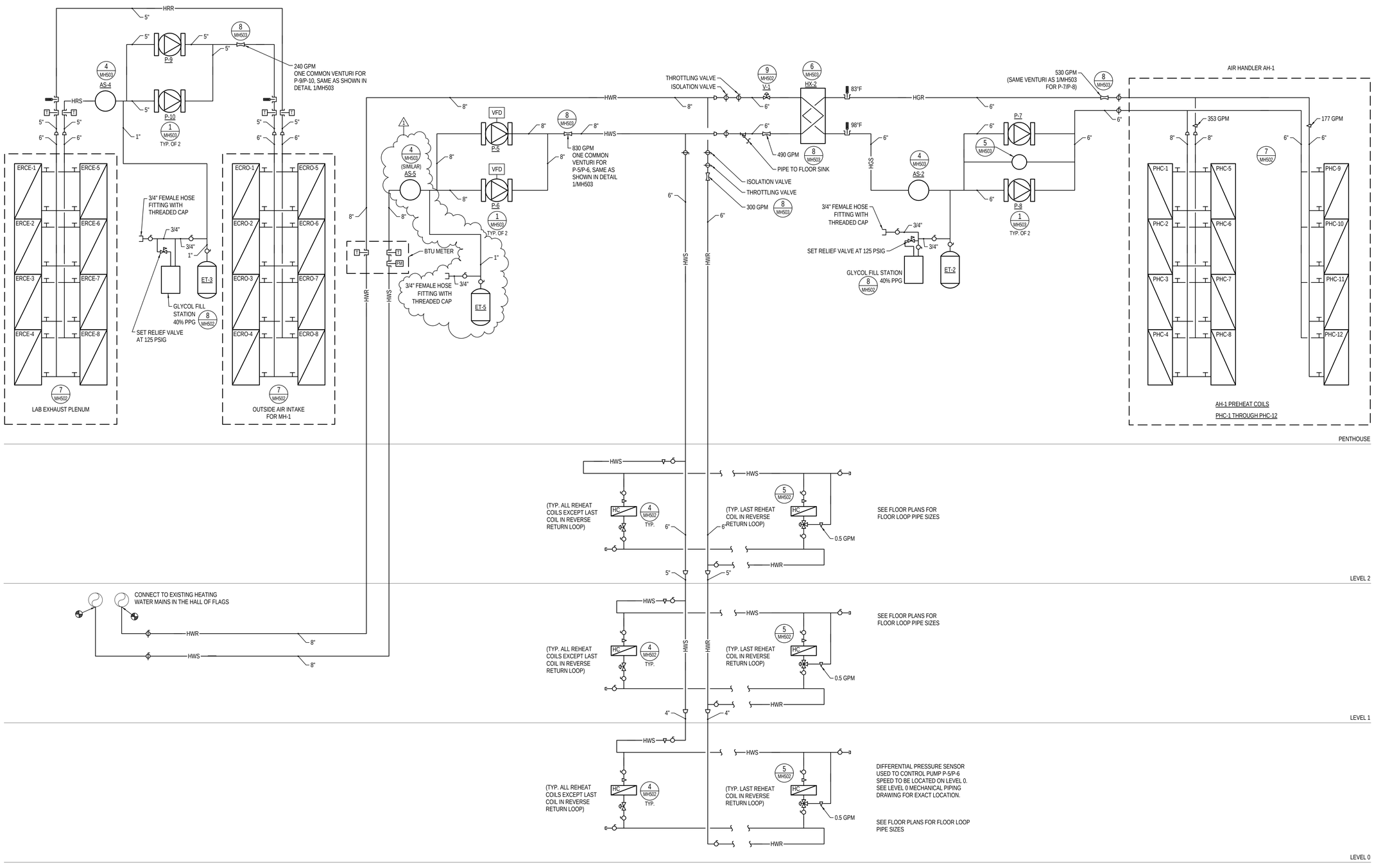
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7915
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416



1 HEATING WATER PIPING SCHEMATIC
SCALE: NONE

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	-
CHECKED BY:	RLH
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

HEATING WATER PIPING SCHEMATIC

CONSTRUCTION DOCUMENTS

MP202

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

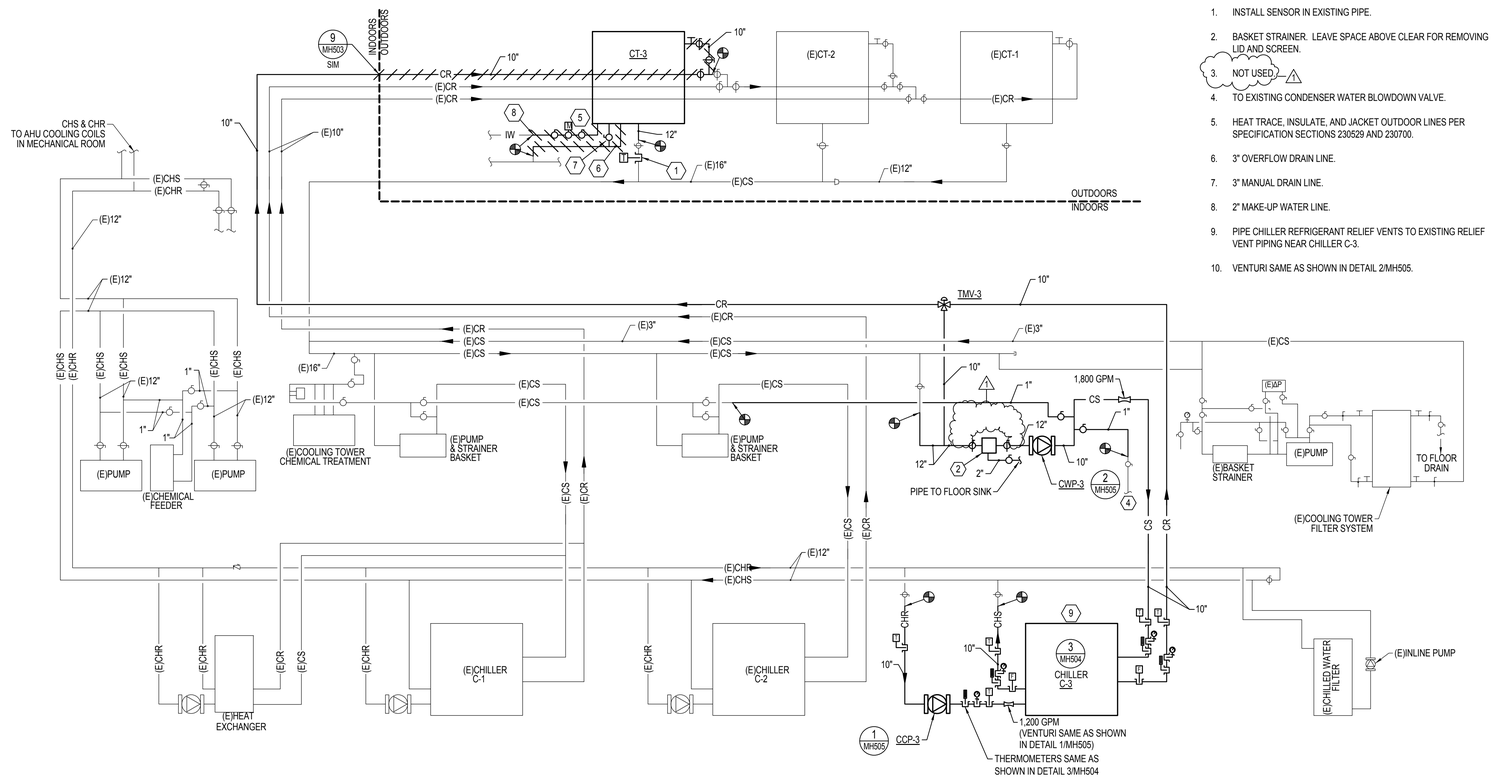
REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

KEYED NOTES

1. INSTALL SENSOR IN EXISTING PIPE.
2. BASKET STRAINER. LEAVE SPACE ABOVE CLEAR FOR REMOVING LID AND SCREEN.
3. NOT USED.
4. TO EXISTING CONDENSER WATER BLOWDOWN VALVE.
5. HEAT TRACE, INSULATE, AND JACKET OUTDOOR LINES PER SPECIFICATION SECTIONS 230529 AND 230700.
6. 3" OVERFLOW DRAIN LINE.
7. 3" MANUAL DRAIN LINE.
8. 2" MAKE-UP WATER LINE.
9. PIPE CHILLER REFRIGERANT RELIEF VENTS TO EXISTING RELIEF VENT PIPING NEAR CHILLER C-3.
10. VENTURI SAME AS SHOWN IN DETAIL 2/MH505.



1 UPPER PLANT PIPING SCHEMATIC

SCALE: NONE

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	JMN
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

UPPER PLANT PIPING SCHEMATIC

CONSTRUCTION DOCUMENTS

MP251

WATER-COOLED CHILLER SCHEDULE (C)

PLAN CODE	LOCATION	CAPACITY (TONS)	COMPRESSOR TYPE (NO.)	MAX. NPLV	MAX. KW/TON	EVAPORATOR (WATER)					CONDENSER (WATER)					ELECTRICAL		MAX. DIMENSIONS			MAX. OPERATING WT. (LBS)	VIBRATION ISOLATION	MANUFACTURER & MODEL NO.	REMARKS
						EWT (°F)	LWT (°F)	GPM	MAX P.D. (FT.)	FOULING FACTOR	EWT (°F)	LWT (°F)	GPM	MAX P.D. (FT.)	FOULING FACTOR	MCA	VOLTAGE & PHASE	LENGTH	WIDTH	HEIGHT				
C-3	UPPER PLANT	600	CENTRIFUGAL	0.473	0.533	57	45	1,200	12.2	0.0005	80	90	1,800	15.4	0.001	591	460/3	168	83	110	30,000	RESTRAINED SPRING	YORK YKGQEXP8-CRGS	COOLING-ONLY CHILLER, R-134A REFRIGERANT

HEAT RECOVERY CHILLER SCHEDULE (C)

PLAN CODE	LOCATION	CAPACITY (TONS)	COMPRESSOR TYPE (NO.)	MAX. NPLV	MAX. KW/TON	EVAPORATOR (WATER) (1)					CONDENSER (WATER) (1)					ELECTRICAL			MAX. DIMENSIONS			MAX. OPERATING WT. (LBS)	VIBRATION ISOLATION	MANUFACTURER & MODEL NO.	REMARKS
						EWT (°F) COOL/ HEAT	LWT (°F) COOL/ HEAT	GPM COOL/ HEAT	MAX P.D. (FT.)	FOULING FACTOR	EWT (°F) COOL/ HEAT	LWT (°F) COOL/ HEAT	GPM COOL/ HEAT	MAX P.D. (FT.)	FOULING FACTOR	MAX RLA	MAX MCA	VOLTAGE & PHASE	LENGTH	WIDTH	HEIGHT				
CH-5	LOWER PLANT	600	CENTRIFUGAL	0.390	0.453	60/ 73	43/ 60	850/ 1107	13 (HEAT)	0.0001	80/ 95	90/ 110	1640/ 1112	22.1 (COOLING)	0.0005	400	509	480/3	204	103	115	32,000	RESTRAINED SPRING	TRANE CVHF0570	HEAT RECOVERY CHILLER, R-123 REFRIGERANT

(1) CONDENSER AND EVAPORATOR VALUES ARE GIVEN FOR THE CHILLER OPERATING IN BOTH FULL HEATING MODE AND FULL COOLING MODE.

COOLING TOWER SCHEDULE (CT)

PLAN CODE	LOCATION	FLOW RATE (GPM)	MIN. FLOW RATE (GPM)	TOTAL HEAT REJECTED (MBH)	EWT (°F)	LWT (°F)	OSA wb (°F)	NO. OF CELLS	ELECTRICAL					MAXIMUM DIMENSIONS			MAX. OPERATING WEIGHT (LBS)	MANUFACTURER	REMARKS
									MAX BHP	MOTOR HP	CONTROL	SUMP HEATERS (KW)	VOLTAGE/ PHASE	LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)			
CT-3	UPPER PLANT	1,800	1,800	9,000	90	80	70	1	37	40	VFD	12 (1)	480/3	204	204	312	-	TOWER ENGINEERING	CERAMIC TOWER, MATCH DIMENSIONS OF ONE EXISTING TOWER CELL CT-1/CT-2

(1) PROVIDE SUMP HEATERS WITH BACK-UP POWER.

CONTROL VALVE SCHEDULE

PLAN CODE	LOCATION	SYSTEM SERVED	VALVE TYPE	FLOW GPM	PRESSURE DROP (PSI)	SIZE (IN.)	ACTUATOR (1)	REMARKS
TMV-3	UPPER PLANT	C-3 CONDENSER	MODULATING 3-WAY BUTTERFLY	1,800	< 1	10	ELECTRIC	LINE-SIZED
V-35	LOWER PLANT	CH-5 EVAPORATOR	2-POSITION 2-WAY BUTTERFLY	1,100	< 1	8	ELECTRIC	LINE-SIZED
V-36	LOWER PLANT	CH-5 CONDENSER	2-POSITION 2-WAY BUTTERFLY	1,600	< 1	10	ELECTRIC	LINE-SIZED
V-37	LOWER PLANT	CH-5 HEATING PIPING	MODULATING 3-WAY BUTTERFLY	1,100	< 1	8	ELECTRIC	LINE-SIZED
V-38	LOWER PLANT	CH-5 CHILLED PIPING	MODULATING 3-WAY BUTTERFLY	1,600	< 1	10	ELECTRIC	LINE-SIZED

(1) ACTUATORS ALL 120 VOLT

PUMP SCHEDULE

PLAN CODE	TYPE	LOCATION	SYSTEM SERVED	FLOW (GPM)	PRESSURE (FT)	MAX. BHP	FLUID	MOTOR					MAX PUMP & MOTOR WT. (LBS)	MANUFACTURER & SERIES	REMARKS
								EFFICIENCY	SIZE (HP)	SPEED (RPM)	VOLTAGE & PHASE	VFD			
CCP-3	BASE MOUNTED	UPPER PLANT	CHILLER C-3	1,200	35	12.4	WATER	PREMIUM	15	1150	480/3	NO	1,020	B&G 1510 6E	-
CWP-3	BASE MOUNTED	UPPER PLANT	CHILLER C-3	1,800	55	30.4	WATER	PREMIUM	40	1770	480/3	NO	1,200	B&G 1510 6BC	-
BP-1	IN-LINE	LOWER PLANT	BOILER B-1	240	26	2.3	WATER	PREMIUM	3	1770	480/3	NO	280	B&G SERIES 80 4x4x7	SUSPEND FROM OVERHEAD STRUCTURE
BP-2	IN-LINE	LOWER PLANT	BOILER B-2	240	26	2.3	WATER	PREMIUM	3	1770	480/3	NO	280	B&G SERIES 80 4x4x7	SUSPEND FROM OVERHEAD STRUCTURE
BP-3	IN-LINE	LOWER PLANT	BOILER B-3	240	26	2.3	WATER	PREMIUM	3	1770	480/3	NO	280	B&G SERIES 80 4x4x7	SUSPEND FROM OVERHEAD STRUCTURE
BP-4	IN-LINE	LOWER PLANT	BOILER B-4	240	26	2.3	WATER	PREMIUM	3	1770	480/3	NO	280	B&G SERIES 80 4x4x7	SUSPEND FROM OVERHEAD STRUCTURE

FORCED DRAFT CONDENSING BOILER SCHEDULE (B)

PLAN CODE	MBH CAPACITY			ASME PRESS. RATING (PSI)	OPERATING PRESSURE	MIN. EFFICIENCY % (*)	FLUE CATEGORY	FLUE SIZE	GPM	PRESS. DROP (FT.HD.)	MAX. SIZE				ELECTRICAL		MIN. GAS PRESSURE (IN. W.C.)	MAKE & MODEL	REMARKS
	OUTPUT @ 4400 FT.	OUTPUT @ SEA LEVEL	INPUT @ SEA LEVEL								LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	OPERATING WT.(LBS)	FLA	VOLTAGE & PHASE			
B-1	3,560	3,560	4,000	150	80	90	IV	14"	450	9	126	41	88	9,000	9.3	460/3	11	FULTON VANTAGE 4000	CONDENSING BOILER, 89% EFFICIENT BASED ON FULL-FIRING RATE AND 100 RETURN WATER TEMPERATURE
B-2	3,560	3,560	4,000	150	80	90	IV	14"	450	9	126	41	88	9,000	9.3	460/3	11	FULTON VANTAGE 4000	CONDENSING BOILER, 89% EFFICIENT BASED ON FULL-FIRING RATE AND 100 RETURN WATER TEMPERATURE
B-3	3,560	3,560	4,000	150	80	90	IV	14"	450	9	126	41	88	9,000	9.3	460/3	11	FULTON VANTAGE 4000	CONDENSING BOILER, 89% EFFICIENT BASED ON FULL-FIRING RATE AND 100 RETURN WATER TEMPERATURE
B-4	3,560	3,560	4,000	150	80	90	IV	14"	450	9	126	41	88	9,000	9.3	460/3	11	FULTON VANTAGE 4000	CONDENSING BOILER, 89% EFFICIENT BASED ON FULL-FIRING RATE AND 100 RETURN WATER TEMPERATURE

VARIABLE FREQUENCY DRIVE SCHEDULE (VFD)

PLAN CODE	SERVICE	DRIVE TYPE	BYPASS	ALTITUDE (FT)	MAX AMBIENT TEMPERATURE (°F)	CONTROL OF VFD			CONTROL SYS INTERFACE	REMARKS
						METHOD	MAXIMUM RESPONSE TIME	CONTROLLER INPUT		
DRIVE-3	COOLING TOWER CT-3	PULSE WIDTH MODULATION	NONE	4,400	105	ATC	<150 MILLISECONDS	DUCT STATIC	LON	PASSWORD PROTECTED KEYPAD, LOCKING DISCONNECT

NATURAL GAS PRESSURE REGULATOR

PLAN CODE	SERVES	INLET PRESSURE (PSIG)	OUTLET PRESSURE (IN. W.C.)	PROJECT LOAD (MBH)	REMARKS
REG-1	BOILER B-1	5	11	4,000,000	VENT RELIEF TO ATMOSPHERE
REG-2	BOILER B-2	5	11	4,000,000	VENT RELIEF TO ATMOSPHERE
REG-3	BOILER B-3	5	11	4,000,000	VENT RELIEF TO ATMOSPHERE
REG-4	BOILER B-4	5	11	4,000,000	VENT RELIEF TO ATMOSPHERE

JOB SITE ELEVATION = 4,500 FT
JOB SITE PRESSURE = 12.32 PSI
SELECT ALL EQUIPMENT FOR OPERATION AT JOB SITE ELEVATION

ALL MOTORS TO BE PREMIUM EFFICIENCY

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7915
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

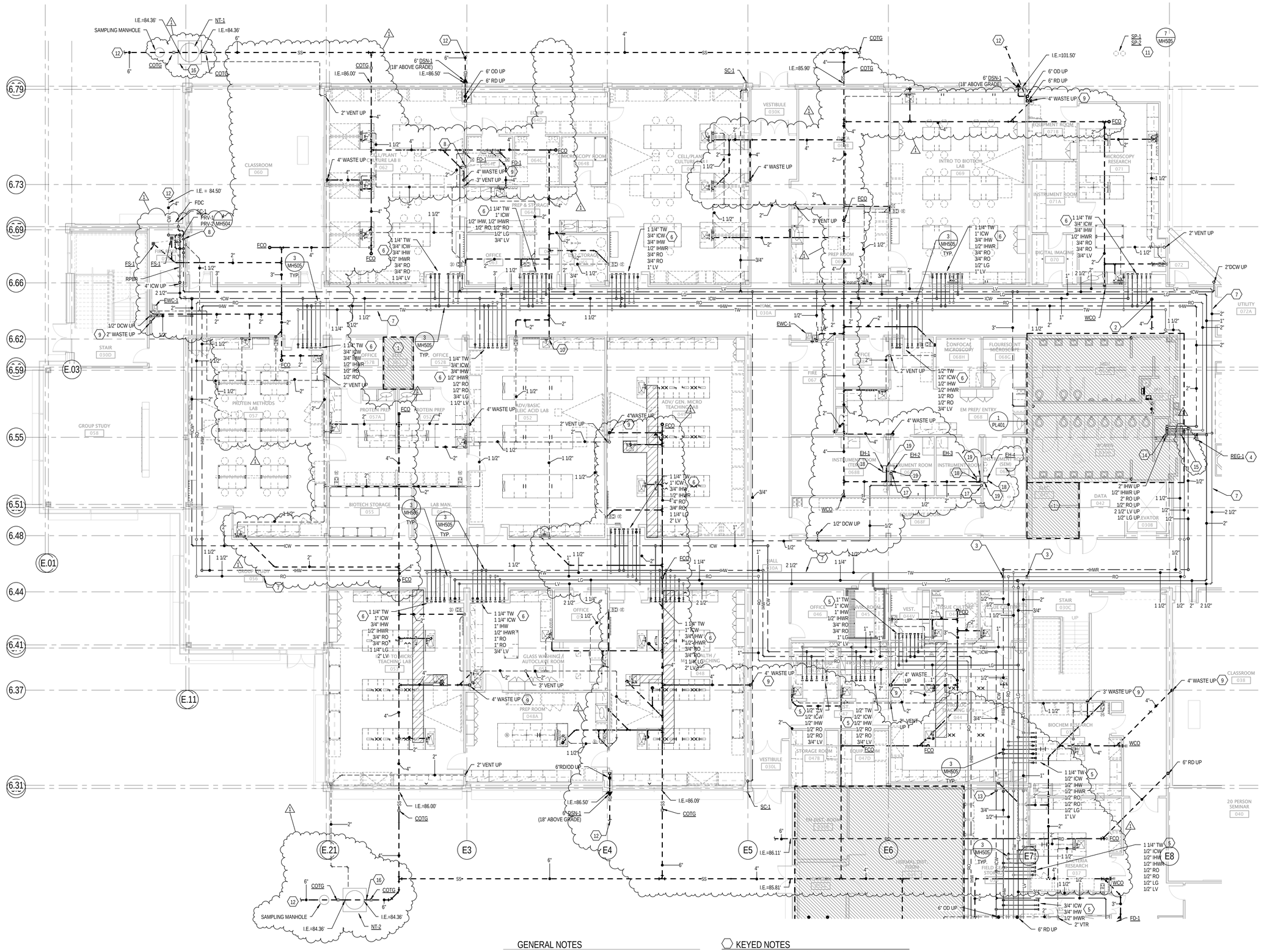
Division of Facilities Construction and Management

DRAWN BY: Author
CHECKED BY: Checker
DFCM PROJECT NO.: 09020790
GSBS PROJECT NO.: 2009.053.02
ISSUED DATE: 05.07.2010

MECHANICAL PLANT SCHEDULES

CONSTRUCTION DOCUMENTS

MP651



LEVEL 0 PLUMBING FLOOR PLAN - AREA A

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

GENERAL NOTES

A. COORDINATE WASTE AND VENT ROUGH IN LOCATIONS WITH LAB PLUMBING DRAWINGS.
B. COORDINATE PIPING WITH ELECTRICAL PLANS. DO NOT ROUTE ANY PIPING OVER ELECTRICAL PANELS.
C. SEE SHEET MH001 FOR ADDITIONAL GENERAL NOTES.
D. RO WATER PIPING FROM MAINS IN HALLWAY INTO INDIVIDUAL ROOMS TO INCLUDE A BYPASS VALVE PER DETAIL 5, SHEET MH505.
E. INSTALL ALL FLOOR MOUNTED EQUIPMENT UPON 4" TALL HOUSEKEEPING PAD.
F. COORDINATE ALL PLUMBING WITH ALL OTHER DISCIPLINES.

KEYED NOTES

1. DO NOT ROUTE ANY PIPING/PLUMBING OVER ELECTRICAL EQUIPMENT/ROOM. TYPICAL.
2. DROP WASTE PIPE DOWN IN TUNNEL FOR UTILITY CONNECTION. COORDINATE CONNECTION LOCATION WITH SITE UTILITY CONTRACTOR. SEE CIVIL DRAWINGS.
3. PROVIDE CIRCUIT SETTER IN ACCESSIBLE LOCATION. BALANCE TO 0.5 GPM. SEE DETAIL 7/MH503.
4. PROVIDE NATURAL GAS PRESSURE REGULATOR. VENT TO ATMOSPHERE AS NECESSARY.
5. DROP LAB UTILITIES TO JUST ABOVE CEILING SPACE FOR EASY ACCESS. CAP AND VALVE STUB OUTS FOR CONTINUATION AS SHOWN ON LABORATORY DRAWINGS. COORDINATE LOCATIONS WITH ALL OTHER DISCIPLINES. DO NOT ROUTE PIPING OVER ELECTRICAL PANELS.
6. DROP LAB UTILITIES TO JUST ABOVE CEILING SPACE FOR EASY ACCESS. CAP AND VALVE STUB OUTS FOR CONTINUATION AS SHOWN ON LABORATORY DRAWINGS. STUB OUTS SHOULD BE LOCATED ABOVE THE DOOR TO THE LAB IN WHICH THEY SERVE. UNLESS SHOWN OTHERWISE. DO NOT ROUTE PIPING OVER ELECTRICAL PANELS. COORDINATE LAB UTILITY LOCATIONS WITH LAB DRAWINGS. COORDINATE LOCATIONS WITH ALL OTHER DISCIPLINES. TYPICAL ALL LAB SPACES.
7. PIPING IN CORRIDOR SHALL BE STACKED ON ONE SIDE OF SUPPLY AIR DUCT. SEE SECTION 5/MH302 FOR COORDINATION WITH ALL OTHER DISCIPLINES. PIPING SHOWN SIDE BY SIDE ON THIS SHEET FOR CLARIFICATION.
8. PROVIDE ELECTRONIC TRAP PRIMER. ROUTE TO FLOOR DRAIN/FLOOR SINK.
9. PROVIDE CLEANOUT AT THE BASE OF ALL WASTE STACKS. TYPICAL.
10. PROVIDE CLEANOUT BELOW SINK.
11. SUMP PUMPS IN TUNNEL. LOCATE CONTROL PANEL ON WALL OF TUNNEL. CONNECT 3" DISCHARGE LINE TO 10" WASTE PIPE IN TUNNEL. COORDINATE WITH SITE UTILITY CONTRACTOR.
12. SEE SITE UTILITY DRAWINGS FOR CONTINUATION.
13. OFFSET PIPE BELOW BEAM. FIELD COORDINATE.
14. PROVIDE 2 1/2" DRIP LEG AT BASE OF LAB VACUUM RISER. EXTEND TO THE NORTH OUT OF SHAFT INTO JANITORS CLOSET AND TRANSITION TO VERTICAL. INSTALL ONE ISOLATION BALL VALVE IN VERTICAL PIPE, THEN A SECOND BALL VALVE BELOW. TRANSITION TO 3/4" HOSE FITTING AFTER LAST 2 1/2" BALL VALVE SLOPE ALL PIPE TOWARDS HOSE FITTING.
15. PROVIDE ISOLATION VALVES FOR ALL UTLITIES EXITING THE SHAFT.
16. COORDINATE LOCATION OF NEUTRALIZATION TANK WITH ALL UTILITIES IN THIS AREA. SEE CIVIL DRAWINGS.
17. ROUTE 1/2" WATER LINE FROM ELECTRONIC TRAP PRIMER TO P-TRAP AT AIR GAP SERVING HUMIDIFIER.
18. TOP OF HUMIDIFIER AT 8'-3" AFF.
19. HUMIDIFIER DRAIN DISCHARGED TO AIRGAP FITTING IN 2" WASTE LINE W/ P-TRAP.

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

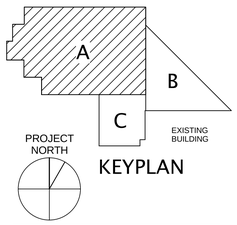
LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

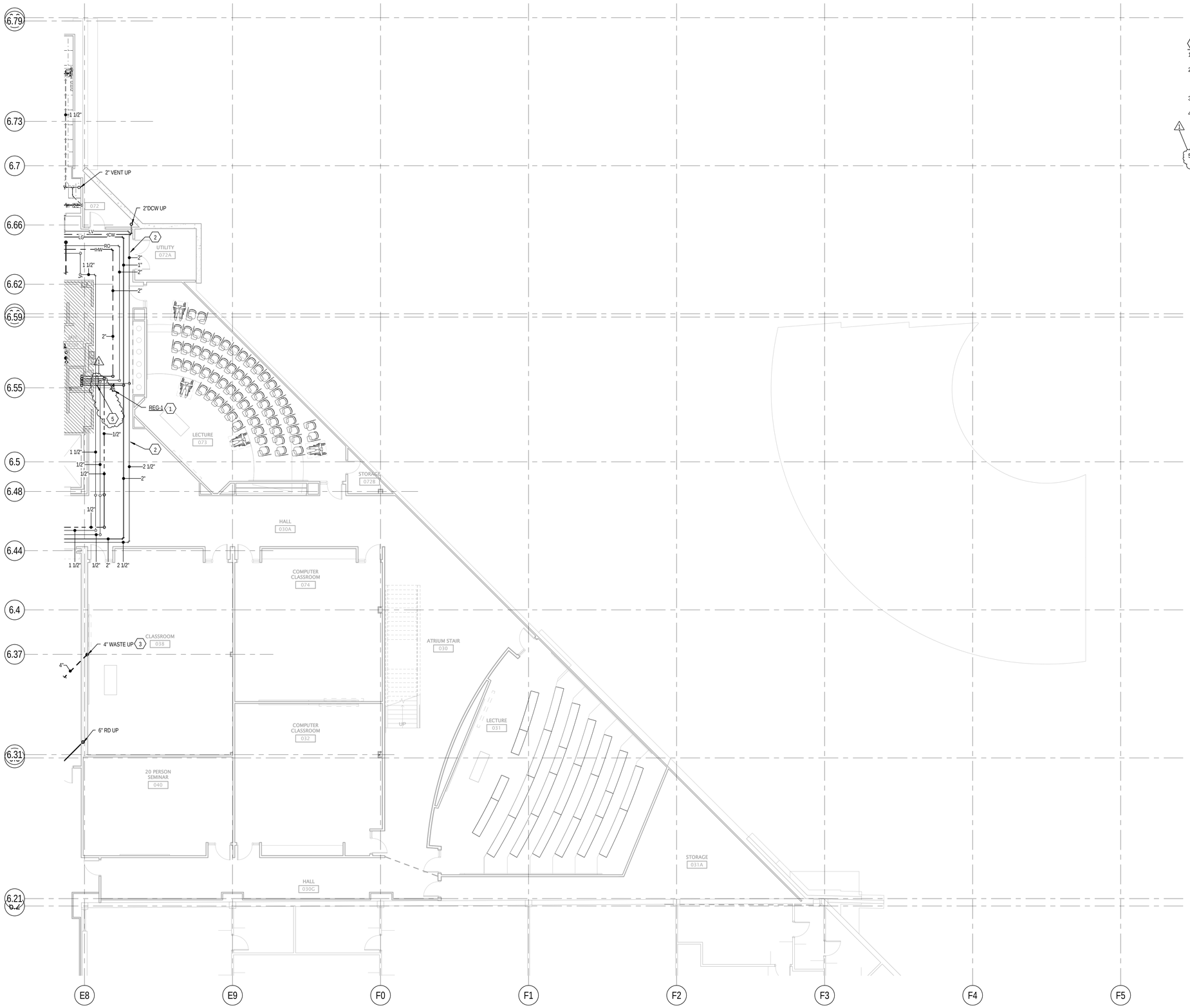
Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 0 PLUMBING FLOOR PLAN - AREA A

CONSTRUCTION DOCUMENTS

PL101A



KEYED NOTES

1. PROVIDE NATURAL GAS PRESSURE REGULATOR. VENT TO ATMOSPHERE AS NECESSARY.
2. PIPING IN CORRIDOR SHALL BE STACKED ON ONE SIDE OF SUPPLY AIR DUCT. SEE SECTION 5/MH302 FOR COORDINATION WITH ALL OTHER DISCIPLINES. PIPING SHOWN SIDE BY SIDE ON THIS SHEET FOR CLARIFICATION.
3. PROVIDE CLEANOUT AT THE BASE OF ALL WASTE STACKS. TYPICAL.
4. PROVIDE 2 1/2" DRIP LEG AT BASE OF LAB VACUUM RISER. EXTEND TO THE NORTH OUT OF SHAFT INTO JANITORS CLOSET AND TRANSITION TO VERTICAL. INSTALL ONE ISOLATION BALL VALVE IN VERTICAL PIPE. THEN A SECOND BALL VALVE BELOW. TRANSITION TO 3/4" HOSE FITTING AFTER LAST 2 1/2" BALL VALVE. SLOPE ALL PIPE TOWARDS HOSE FITTING.
5. PROVIDE ISOLATION VALVES FOR ALL UTILITIES EXITING THE SHAFT.

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.

1 LEVEL 0 PLUMBING FLOOR PLAN - AREA B

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

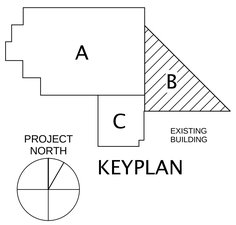
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 0 PLUMBING FLOOR PLAN - AREA B

CONSTRUCTION DOCUMENTS

PL101B

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

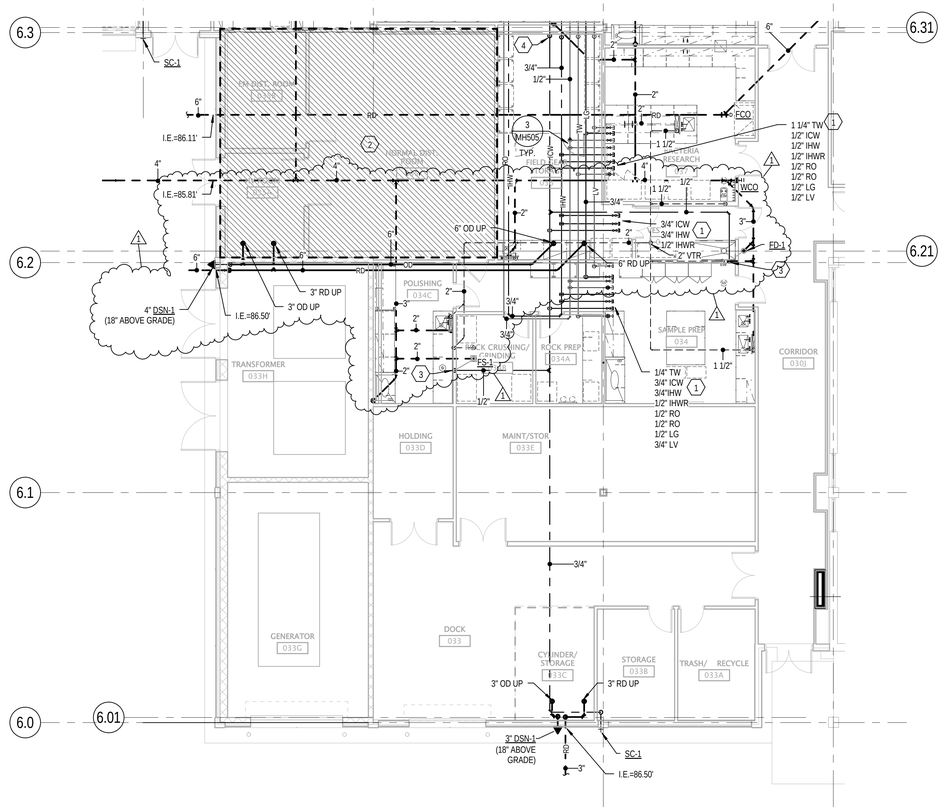
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7915
www.gsbsarchitects.com

KEYED NOTES

1. DROP LAB UTILITIES TO JUST ABOVE CEILING SPACE FOR EASY ACCESS. CAP AND VALVE STUB OUTS FOR CONTINUATION AS SHOWN ON LABORATORY DRAWINGS. COORDINATE LOCATIONS WITH ALL OTHER DISCIPLINES. DO NOT ROUTE PIPING OVER ELECTRICAL PANELS.
2. DO NOT ROUTE ANY PIPING/PLUMBING OVER ELECTRICAL EQUIPMENT/ROOM. TYPICAL.
3. PROVIDE ELECTRONIC TRAP PRIMER. ROUTE TO FLOOR DRAIN/FLOOR SINK.
4. OFFSET PIPE BELOW BEAM. FIELD COORDINATE.

GENERAL NOTES

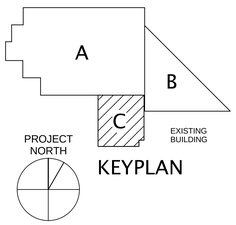
A. COORDINATE WASTE AND VENT ROUGH IN LOCATIONS WITH LAB PLUMBING DRAWINGS.
B. COORDINATE PIPING WITH ELECTRICAL PLANS. DO NOT ROUTE ANY PIPING OVER ELECTRICAL PANELS.
C. SEE SHEET MH001 FOR ADDITIONAL GENERAL NOTES.
D. RO WATER PIPING FROM MAINS IN HALLWAY INTO INDIVIDUAL ROOMS TO INCLUDE A BYPASS VALVE PER DETAIL 5, SHEET MH505.
E. INSTALL ALL FLOOR MOUNTED EQUIPMENT UPON 3" TALL HOUSEKEEPING PAD.
F. COORDINATE ALL PLUMBING WITH ALL OTHER DISCIPLINES.



1 LEVEL 0 PLUMBING FLOOR PLAN - AREA C

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

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.



KEYPLAN

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Licensed Professional Engineer NO. 5954406 Roger Lee. Hamlet JR. State of Utah

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 0 PLUMBING FLOOR PLAN - AREA C

CONSTRUCTION DOCUMENTS

PL101C

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

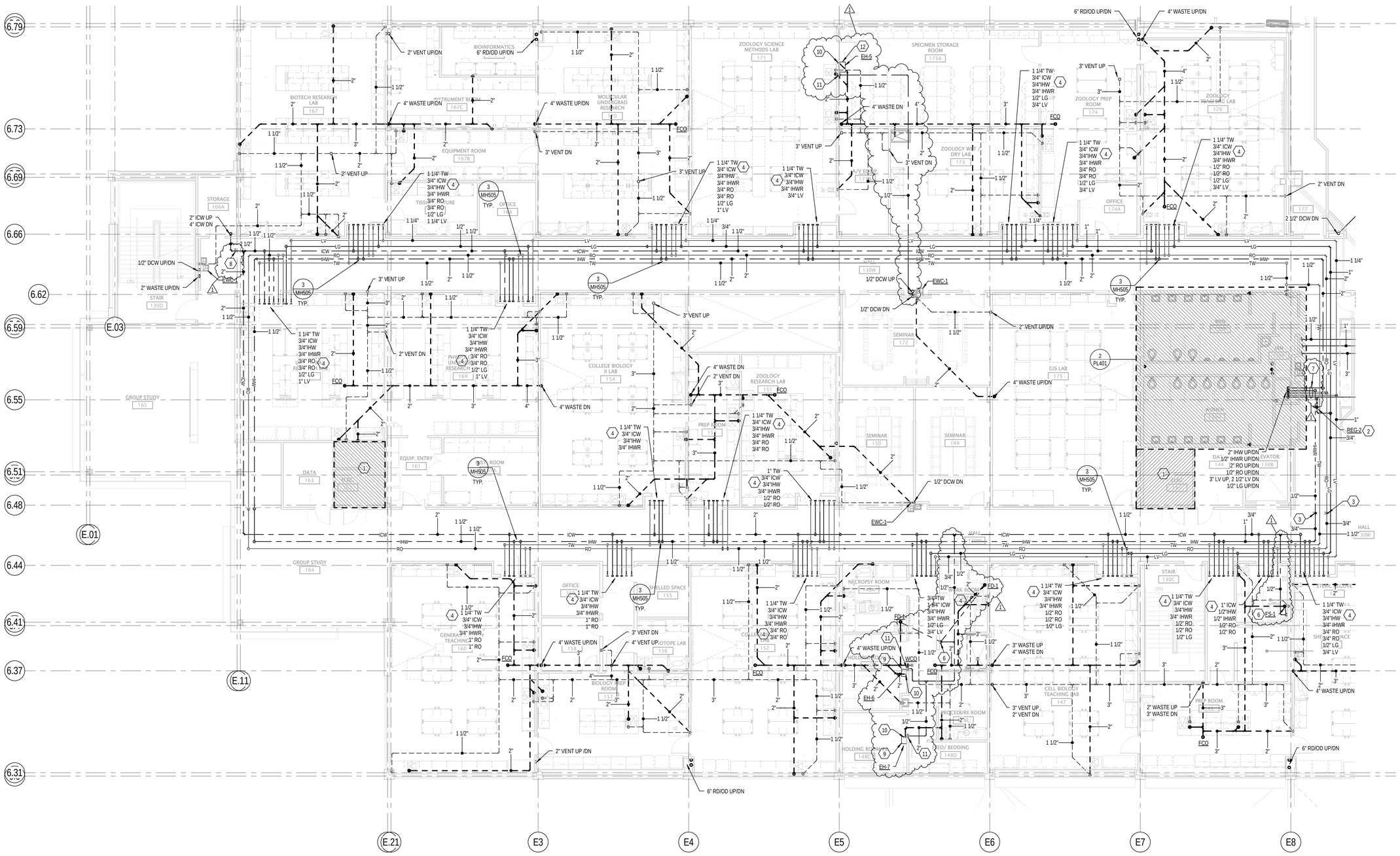
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416



LEVEL 1 PLUMBING FLOOR PLAN - AREA A

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

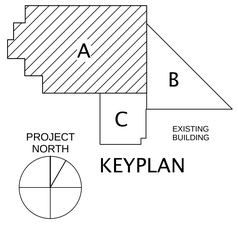
GENERAL NOTES

A. COORDINATE WASTE AND VENT ROUGH IN LOCATIONS WITH LAB PLUMBING DRAWINGS.
B. COORDINATE PIPING WITH ELECTRICAL PLANS. DO NOT ROUTE ANY PIPING OVER ELECTRICAL PANELS.
C. SEE SHEET MH001 FOR ADDITIONAL GENERAL NOTES.
D. RO WATER PIPING FROM MAINS IN HALLWAY INTO INDIVIDUAL ROOMS TO INCLUDE A BYPASS VALVE PER DETAIL 5, SHEET MH505.
E. INSTALL ALL FLOOR MOUNTED EQUIPMENT UPON 4" TALL HOUSEKEEPING PAD.
F. COORDINATE ALL PLUMBING WITH ALL OTHER DISCIPLINES.

KEYED NOTES

1. DO NOT ROUTE ANY PIPING/PLUMBING OVER ELECTRICAL EQUIPMENT/ROOM. TYPICAL.
2. PROVIDE NATURAL GAS PRESSURE REGULATOR. VENT TO ATMOSPHERE AS NECESSARY.
3. PROVIDE CIRCUIT SETTER IN ACCESSIBLE LOCATION. BALANCE TO 0.5 GPM. SEE DETAIL 7/MH503.
4. DROP LAB UTILITIES TO JUST ABOVE CEILING SPACE FOR EASY ACCESS. CAP AND VALVE STUB OUTS FOR CONTINUATION AS SHOWN ON LABORATORY DRAWINGS. STUB OUTS SHOULD BE LOCATED ABOVE THE DOOR TO THE LAB IN WHICH THEY SERVE, UNLESS SHOWN OTHERWISE. DO NOT ROUTE PIPING OVER ELECTRICAL PANELS. COORDINATE LAB UTILITY LOCATIONS WITH LAB DRAWINGS. COORDINATE LOCATIONS WITH ALL OTHER DISCIPLINES. TYPICAL ALL LAB SPACES.
5. CONNECT TO EXISTING CONDENSATE DRAIN FROM FAN COIL UNITS.
6. PROVIDE ELECTRONIC TRAP PRIMER. ROUTE TO FLOOR DRAIN/FLOOR SINK.
7. PROVIDE ISOLATION VALVES FOR ALL UTLITIES EXITING THE SHAFT.
8. PROVIDE ISOLATION VALVES. TYPICAL.
9. TOP OF HUMIDIFIER AT 8'-3" AFF.
10. HUMIDIFIER DRAIN DISCHARGED TO AIRGAP FITTING IN 2" WASTE LINE VIA P-TRAP.
11. ROUTE 1/2" WATER LINE FROM ELECTRONIC TRAP PRIMER TO P-TRAP AT AIR GAP SERVING HUMIDIFIER.
12. TOP OF HUMIDIFIER AT 5'-6" AFF.

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

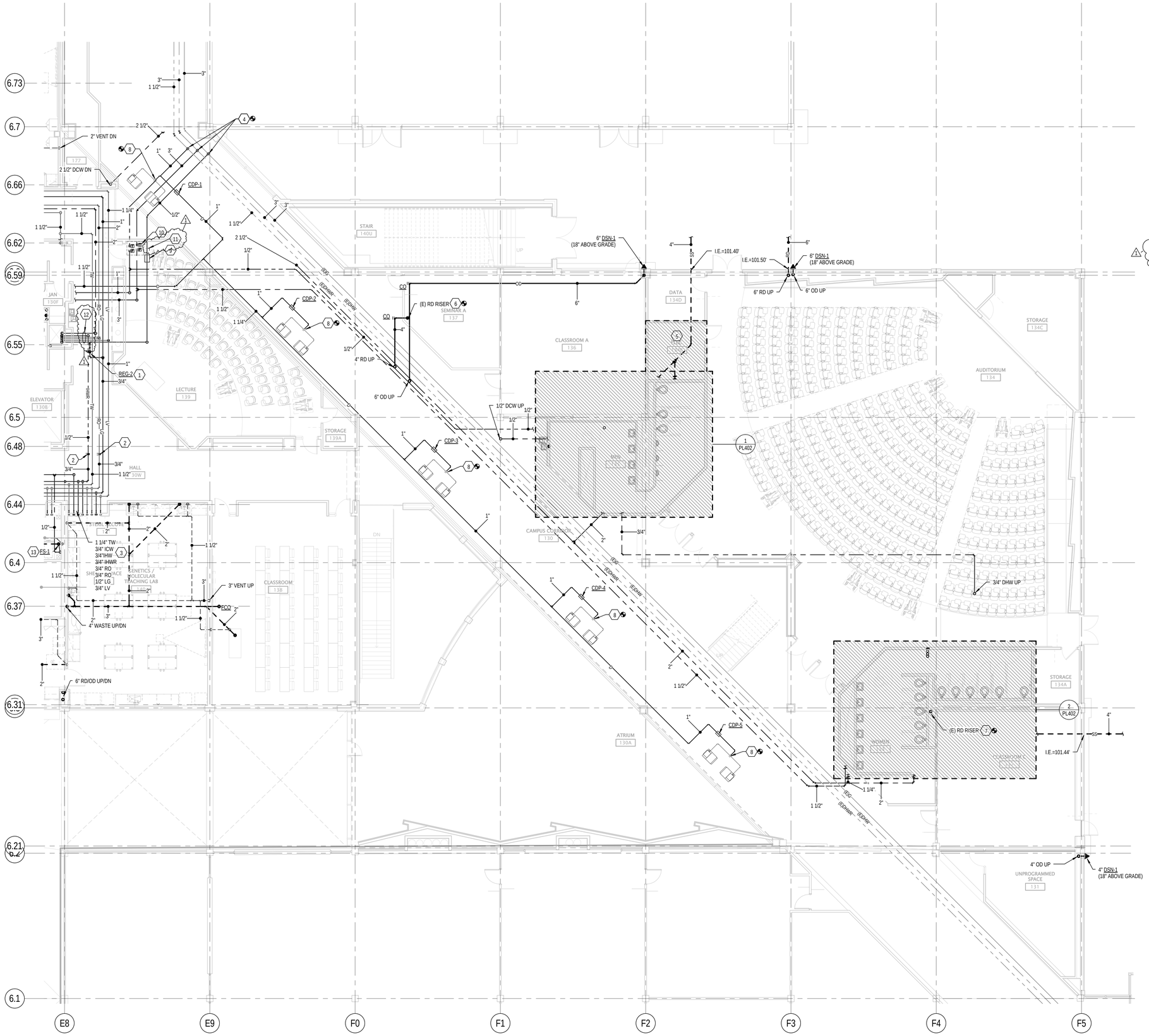
LEVEL 1 PLUMBING FLOOR PLAN - AREA A

CONSTRUCTION DOCUMENTS

PL102A

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com



KEYED NOTES

1. PROVIDE NATURAL GAS PRESSURE REGULATOR. VENT TO ATMOSPHERE AS NECESSARY.
2. PROVIDE CIRCUIT SETTER IN ACCESSIBLE LOCATION. BALANCE TO 0.5 GPM. SEE DETAIL 7/MH503.
3. DROP LAB UTILITIES TO JUST ABOVE CEILING SPACE FOR EASY ACCESS. CAP AND VALVE STUB OUTS FOR CONTINUATION AS SHOWN ON LABORATORY DRAWINGS. STUB OUTS SHOULD BE LOCATED ABOVE THE DOOR TO THE LAB IN WHICH THEY SERVE. UNLESS SHOWN OTHERWISE. DO NOT ROUTE PIPING OVER ELECTRICAL PANELS. COORDINATE LAB UTILITY LOCATIONS WITH LAB DRAWINGS. COORDINATE LOCATIONS WITH ALL OTHER DISCIPLINES. TYPICAL ALL LAB SPACES.
4. CONNECT TO EXISTING UTILITIES IN CONCOURSE. FIELD VERIFY LOCATION.
5. DO NOT ROUTE ANY PIPING/PLUMBING OVER ELECTRICAL EQUIPMENT/ROOM. TYPICAL.
6. CONNECT TO EXISTING ROOF DRAIN RISER.
7. CONNECT NEW ROOF DRAIN FROM ABOVE TO EXISTING RISER.
8. CONNECT TO EXISTING CONDENSATE DRAIN FROM FAN COIL UNITS.
9. INSTALL TENANT GAS METER IN GAS LINE. INTERLOCK WITH 230900 CONTROL SYSTEM.
10. INSTALL FLOW METERS AND TEMPERATURE SENSORS IN DOMESTIC HOT WATER AND HOT WATER CIRCULATING LINES. INTERLOCK WITH 230900 CONTROL SYSTEM.
11. PROVIDE EARTHQUAKE VALVE IN NATURAL GAS LINE SERVING NEW BUILDING.
12. PROVIDE ISOLATION VALVES FOR ALL UTILITIES EXITING THE SHAFT.
13. PROVIDE ELECTRONIC TRAP PRIMER. ROUTE TO FLOOR DRAIN/FLOOR SINK.

GENERAL NOTES

A. COORDINATE WASTE AND VENT ROUGH IN LOCATIONS WITH LAB PLUMBING DRAWINGS.
B. COORDINATE PIPING WITH ELECTRICAL PLANS. DO NOT ROUTE ANY PIPING OVER ELECTRICAL PANELS.
C. SEE SHEET MH001 FOR ADDITIONAL GENERAL NOTES.
D. RO WATER PIPING FROM MAINS IN HALLWAY INTO INDIVIDUAL ROOMS TO INCLUDE A BYPASS VALVE PER DETAIL 5, SHEET MH505.
E. INSTALL ALL FLOOR MOUNTED EQUIPMENT UPON 3" TALL HOUSEKEEPING PAD.
F. COORDINATE ALL PLUMBING WITH ALL OTHER DISCIPLINES.

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.

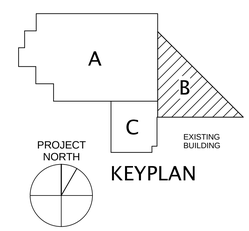
1 LEVEL 1 PLUMBING FLOOR PLAN - AREA B
SCALE: 1/8" = 1'-0"

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

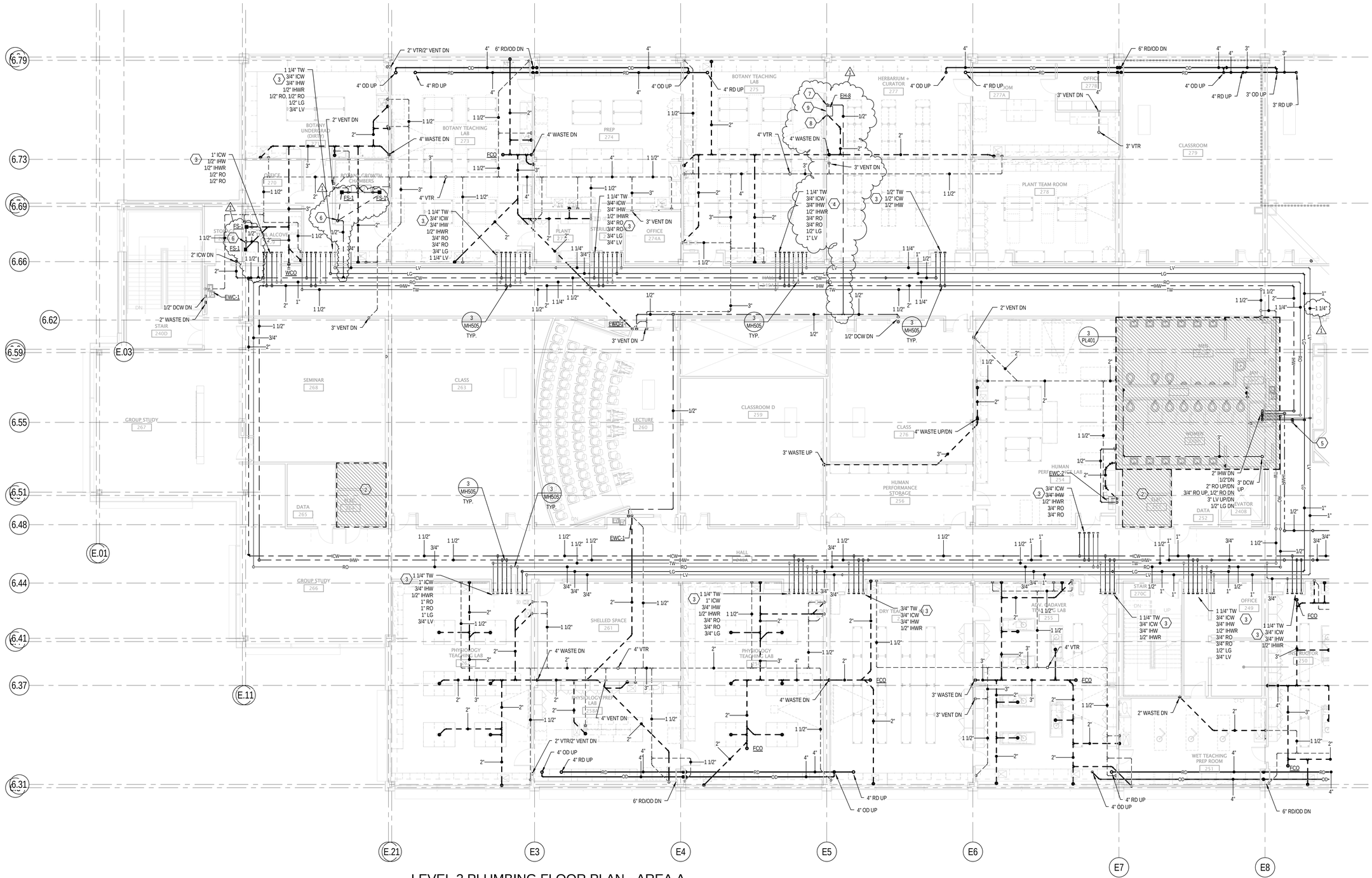
DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 1 PLUMBING FLOOR PLAN - AREA B

CONSTRUCTION DOCUMENTS

PL102B

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.



LEVEL 2 PLUMBING FLOOR PLAN - AREA A

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

GENERAL NOTES

A. COORDINATE WASTE AND VENT ROUGH IN LOCATIONS WITH LAB PLUMBING DRAWINGS.
B. COORDINATE PIPING WITH ELECTRICAL PLANS. DO NOT ROUTE ANY PIPING OVER ELECTRICAL PANELS.
C. SEE SHEET MH001 FOR ADDITIONAL GENERAL NOTES.
D. RO WATER PIPING FROM MAINS IN HALLWAY INTO INDIVIDUAL ROOMS TO INCLUDE A BYPASS VALVE PER DETAIL 5, SHEET MH505.
E. INSTALL ALL FLOOR MOUNTED EQUIPMENT UPON 3" TALL HOUSEKEEPING PAD.
F. COORDINATE ALL PLUMBING WITH ALL OTHER DISCIPLINES.

KEYED NOTES

1. DROP WASTE PIPE DOWN IN TUNNEL FOR UTILITY CONNECTION. COORDINATE CONNECTION LOCATION WITH SITE UTILITY CONTRACTOR. SEE CIVIL DRAWINGS.
2. DO NOT ROUTE ANY PIPING/PLUMBING OVER ELECTRICAL EQUIPMENT/ROOM. TYPICAL.
3. DROP LAB UTILITIES TO JUST ABOVE CEILING SPACE FOR EASY ACCESS. CAP AND VALVE STUB OUTS FOR CONTINUATION AS SHOWN ON LABORATORY DRAWINGS. STUB OUTS SHOULD BE LOCATED ABOVE THE DOOR TO THE LAB IN WHICH THEY SERVE. UNLESS SHOWN OTHERWISE. DO NOT ROUTE PIPING OVER ELECTRICAL PANELS. COORDINATE LAB UTILITY LOCATIONS WITH LAB DRAWINGS. COORDINATE LOCATIONS WITH ALL OTHER DISCIPLINES. TYPICAL ALL LAB SPACES.
4. DROP LAB UTILITIES TO JUST ABOVE CEILING SPACE FOR EASY ACCESS. CAP AND VALVE STUB OUTS FOR CONTINUATION AS SHOWN ON LABORATORY DRAWINGS. COORDINATE LOCATIONS WITH ALL OTHER DISCIPLINES. DO NOT ROUTE PIPING OVER ELECTRICAL PANELS.
5. PROVIDE NATURAL GAS PRESSURE REGULATOR. VENT TO ATMOSPHERE AS NECESSARY.
6. PROVIDE ELECTRONIC TRAP PRIMER. ROUTE TO FLOOR DRAIN/FLOOR SINK.
7. ROUTE 1/2" WATER LINE FROM ELECTRONIC TRAP PRIMER TO P-TRAP AT AIR GAP SERVING HUMIDIFIER.
8. HUMIDIFIER DRAIN DISCHARGED TO AIRGAP FITTING IN 2" WASTE LINE W/ P-TRAP.
9. TOP OF HUMIDIFIER AT 5'-6" AFF.

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

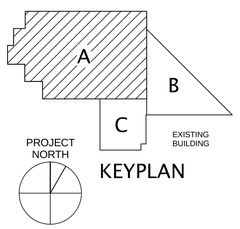
LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

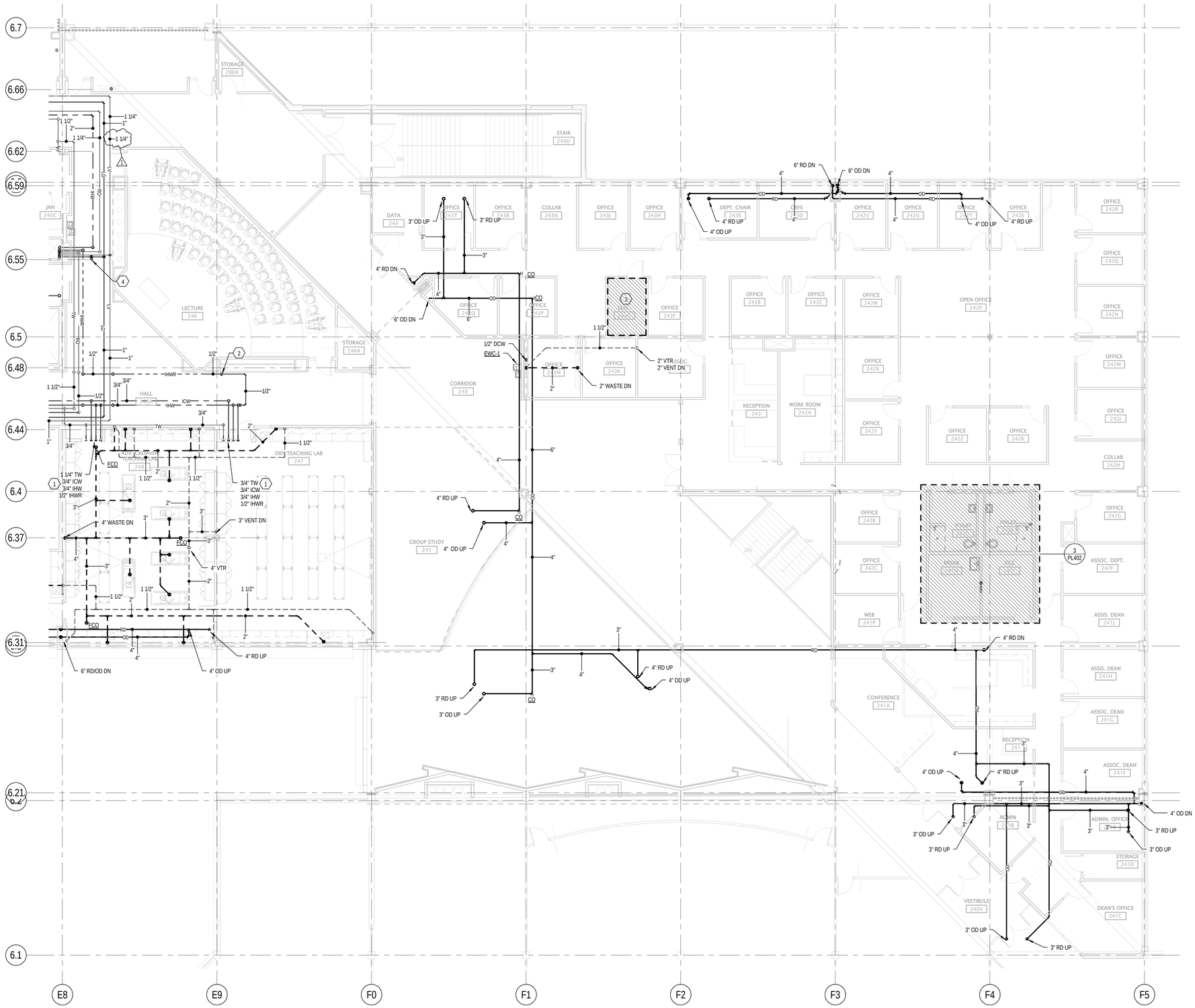
Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 2 PLUMBING FLOOR PLAN - AREA A

CONSTRUCTION DOCUMENTS

PL103A



1 LEVEL 2 PLUMBING FLOOR PLAN - AREA B

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

KEYED NOTES

1. DROP LAB UTILITIES TO JUST ABOVE CEILING SPACE FOR EASY ACCESS. CAP AND VALVE STUB OUTS FOR CONTINUATION AS SHOWN ON LABORATORY DRAWINGS. STUB OUTS SHOULD BE LOCATED ABOVE THE DOOR TO THE LAB IN WHICH THEY SERVE. UNLESS SHOWN OTHERWISE. DO NOT ROUTE PIPING OVER ELECTRICAL PANELS. COORDINATE LAB UTILITY LOCATIONS WITH LAB DRAWINGS. COORDINATE LOCATIONS WITH ALL OTHER DISCIPLINES. TYPICAL ALL LAB SPACES.
2. PROVIDE CIRCUIT SETTER IN ACCESSIBLE LOCATION. BALANCE TO 0.5 GPM. SEE DETAIL 7/MH503.
3. DO NOT ROUTE ANY PIPING/PLUMBING OVER ELECTRICAL EQUIPMENT/ROOM. TYPICAL.
4. PROVIDE NATURAL GAS PRESSURE REGULATOR. VENT TO ATMOSPHERE AS NECESSARY.

GENERAL NOTES

A. COORDINATE WASTE AND VENT ROUGH IN LOCATIONS WITH LAB PLUMBING DRAWINGS.
B. COORDINATE PIPING WITH ELECTRICAL PLANS. DO NOT ROUTE ANY PIPING OVER ELECTRICAL PANELS.
C. SEE SHEET MH001 FOR ADDITIONAL GENERAL NOTES.
D. RO WATER PIPING FROM MAINS IN HALLWAY INTO INDIVIDUAL ROOMS TO INCLUDE A BYPASS VALVE PER DETAIL 5, SHEET MH505.
E. INSTALL ALL FLOOR MOUNTED EQUIPMENT UPON 4" TALL HOUSEKEEPING PAD.
F. COORDINATE ALL PLUMBING WITH ALL OTHER DISCIPLINES. 1

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.

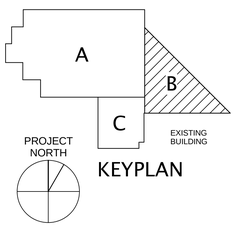
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

LEVEL 2 PLUMBING FLOOR PLAN - AREA B

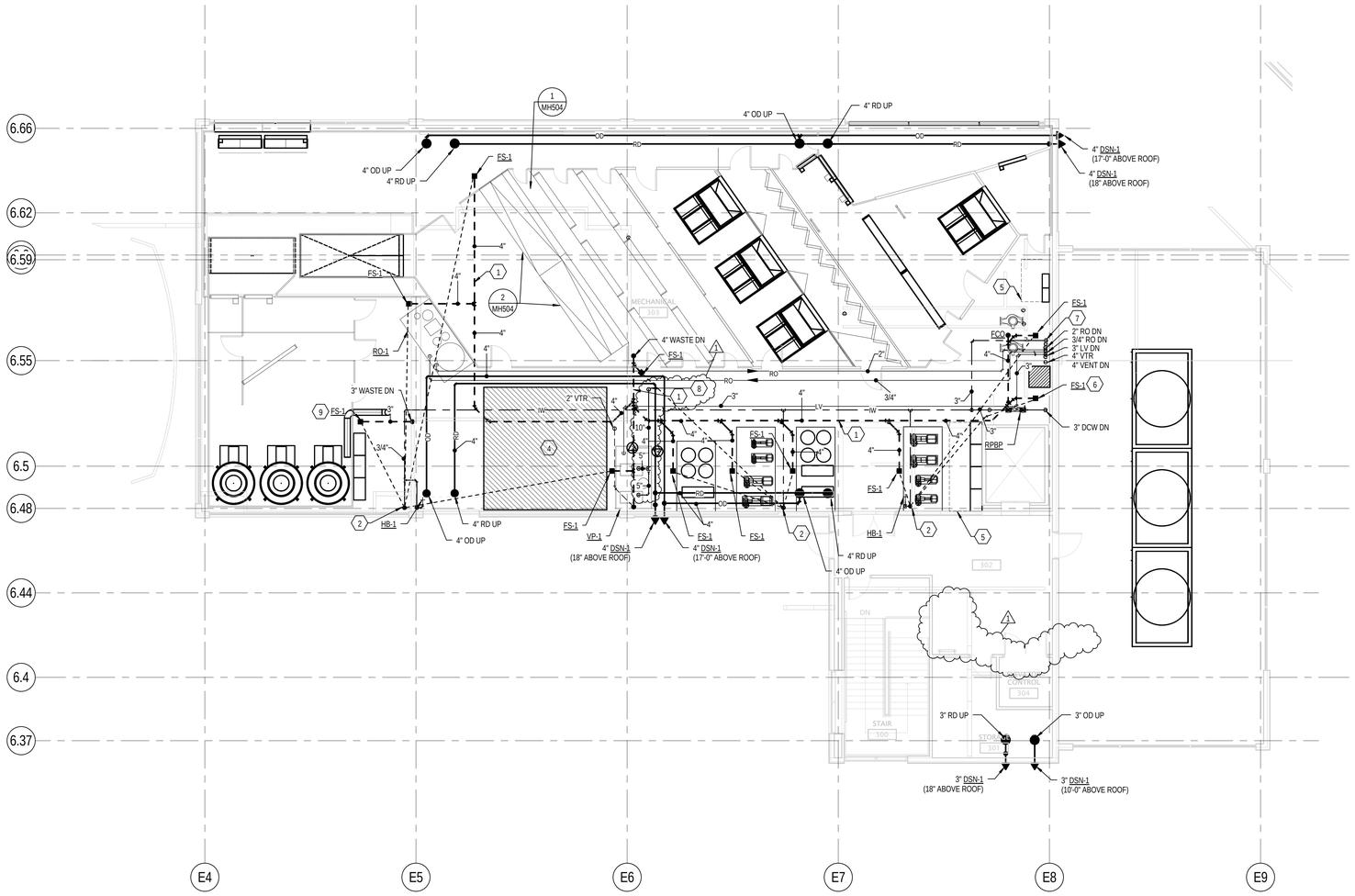
CONSTRUCTION DOCUMENTS

PL103B

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

KEYED NOTES

1. COMBINATION WASTE AND VENT.
2. PROVIDE ELECTRONIC TRAP PRIMER. ROUTE TO FLOOR DRAIN/FLOOR SINK.
3. NOT USED.
4. DO NOT ROUTE ANY PIPING/PLUMBING OVER ELECTRICAL EQUIPMENT/ROOM. TYPICAL.
5. DO NOT ROUTE ANY PIPING OVER VFD'S OR CLEARANCE AREA.
6. PROVIDE 2" DRAIN LINE FROM ISS-1 TO FLOOR SINK. INSTALL MOTORIZED BALL VALVE IN LINE. VALVE FURNISHED BY WATER TREATMENT CONTRACTOR.
7. 3" INDUSTRIAL WATER. ROUTE 2" LINE TO INLET OF CONDENSER WATER PUMPS TO PROVIDE MAKE-UP FOR COOLING TOWERS. ROUTE 1" LINE TO EACH EVAPORATIVE MEDIA IN AIR HANDLER. COORDINATE TIE-IN LOCATIONS WITH MECHANICAL PIPING AND HVAC PLANS.
8. 10" VACUUM VENT DISHCARGE UP THROUGH ROOF. PROVIDE GOOSENECK WITH GALVANIZED BIRD SCREEN. PIPING FROM PUMPS TO ROOF PENETRATION SHALL BE SCHEDULE 40 BLACK STEEL PIPE. PIPING AND GOOSENECK ON ROOF SHALL BE GALVANIZED PIPE.
9. PIPE 1" DRAIN LINE FROM EACH FAN LEF-1, LEF-2, AND LEF-3, AND 3/4" DRAIN LINE FROM LEF-4 TO FLOOR SINK.



1 ENLARGED PENTHOUSE PLUMBING PLAN/ROOF PLAN

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

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

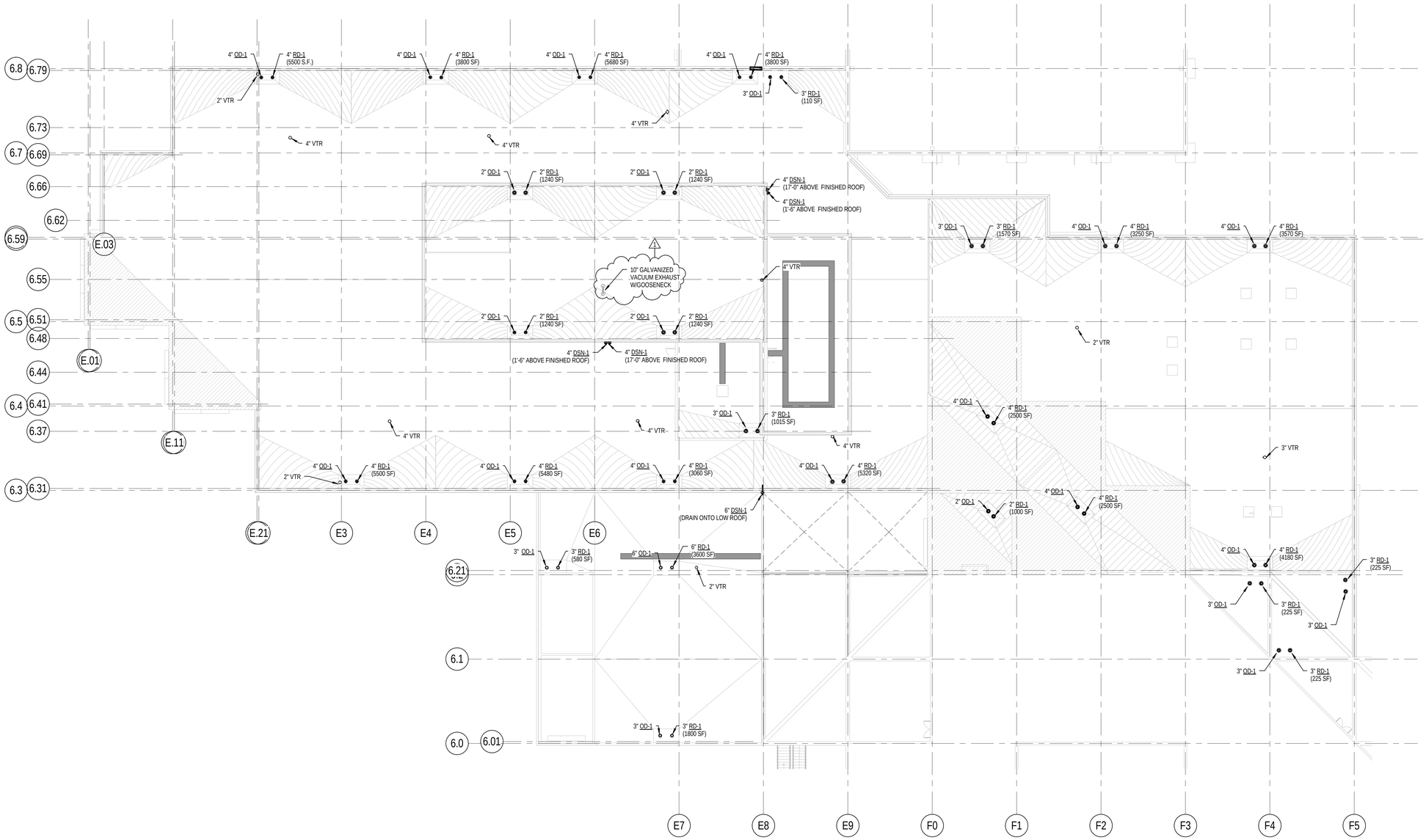
DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

PENTHOUSE PLUMBING PLAN

CONSTRUCTION DOCUMENTS

PL104

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.



1 PLUMBING ROOF PLAN

SCALE: 1/16" = 1'-0"

12' 0' 8' 16' 24' 32'

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
STATE OF UTAH

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

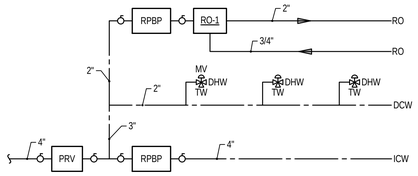
Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

PLUMBING ROOF PLAN

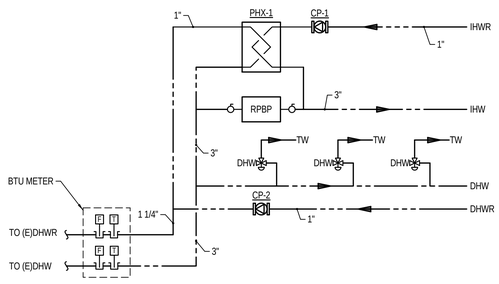
CONSTRUCTION DOCUMENTS

PL105



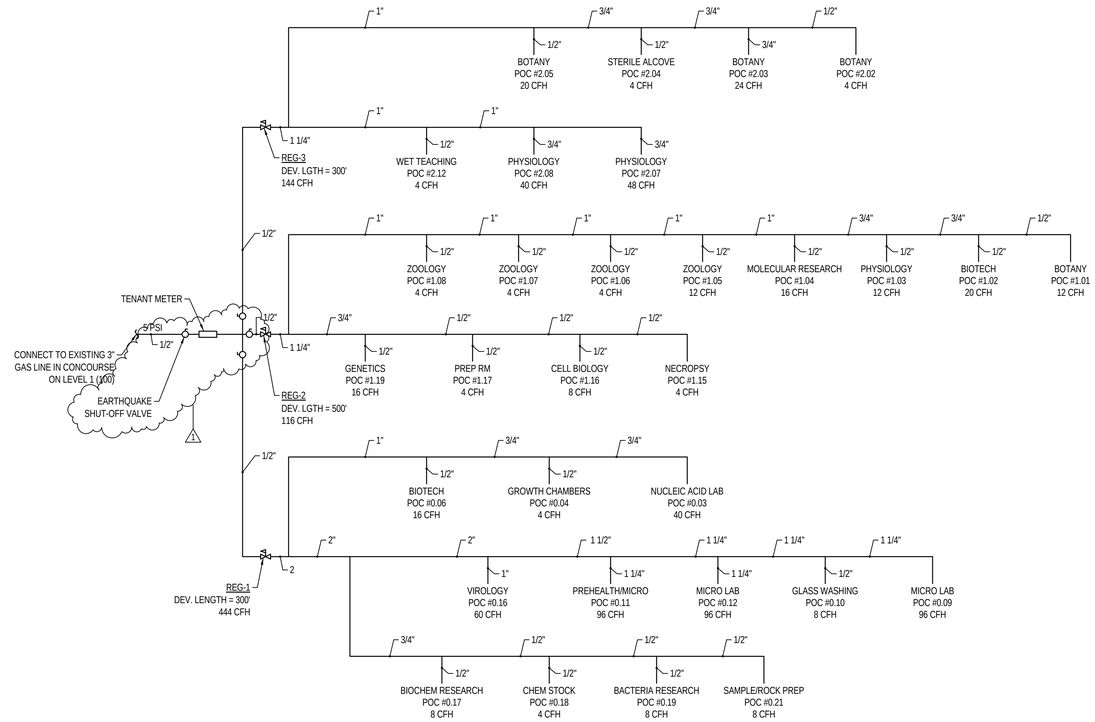
1 INDUSTRIAL/DOMESTIC COLD WATER SCHEMATIC

SCALE: NONE



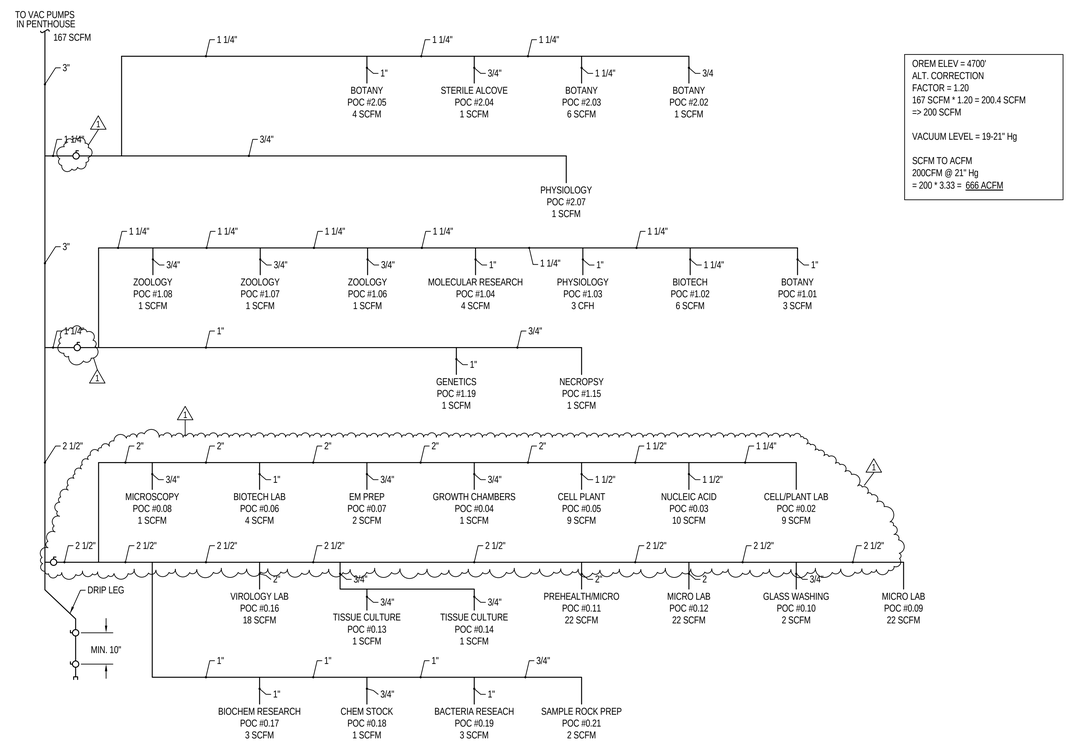
2 INDUSTRIAL/DOMESTIC HOT WATER SCHEMATIC

SCALE: NONE



3 LABORATORY GAS SCHEMATIC

SCALE: NONE



OREM ELEV = 4700'
ALT. CORRECTION
FACTOR = 1.20
167 SCFM * 1.20 = 200.4 SCFM
=> 200 SCFM

VACUUM LEVEL = 19-21" Hg

SCFM TO ACFM
200CFM @ 21" Hg
= 200 * 3.33 = 666 ACFM

4 LABORATORY VACUUM SYSTEM SCHEMATIC

SCALE: NONE

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7915
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

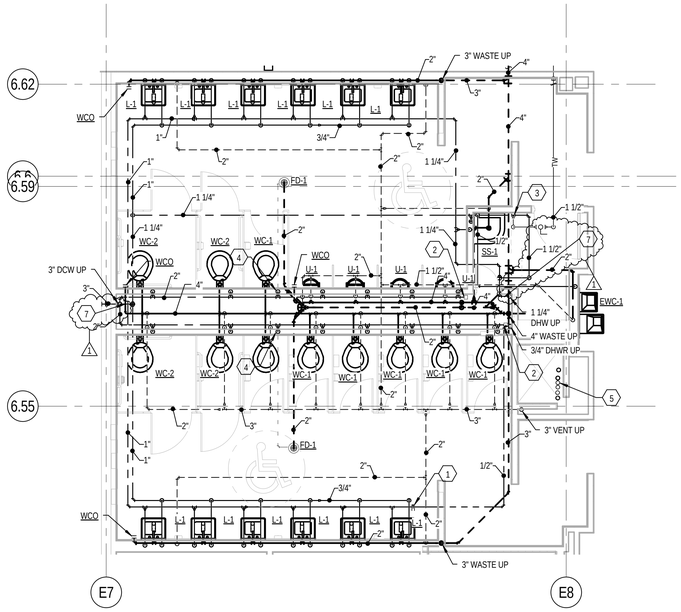
Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

PLUMBING SCHEMATICS

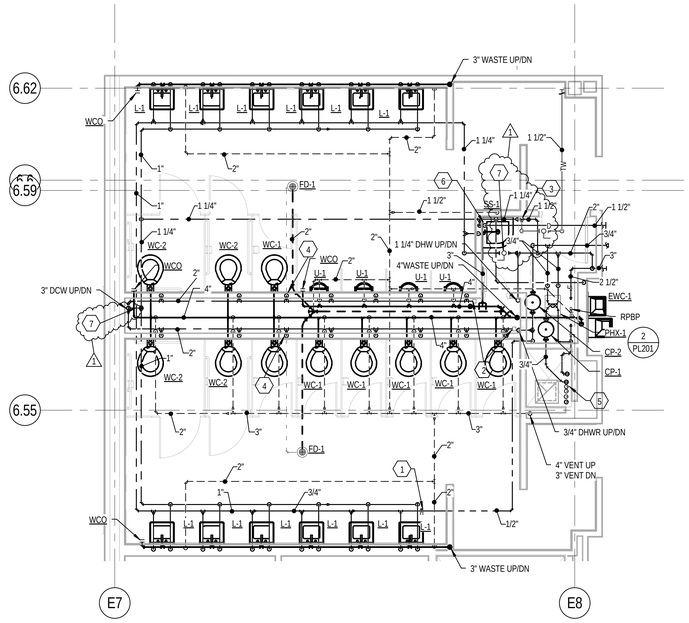
CONSTRUCTION DOCUMENTS

PL201



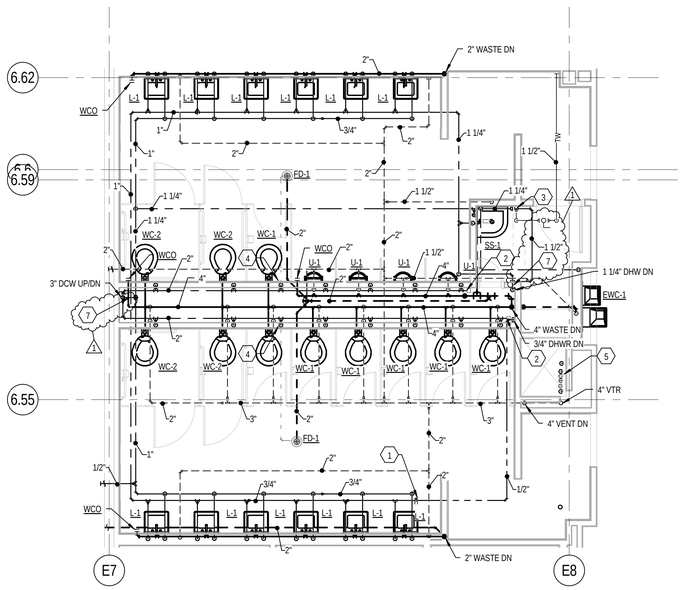
ENLARGED LEVEL 0 RESTROOM PLUMBING PLAN - AREA A

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



ENLARGED LEVEL 1 RESTROOM PLUMBING PLAN - AREA A

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



ENLARGED LEVEL 2 RESTROOM PLUMBING PLAN - AREA A

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

KEYED NOTES

1. PROVIDE CIRCUIT SETTER IN ACCESSIBLE LOCATION. BALANCE TO 0.5 GPM. SEE DETAIL 7/MH503.
2. PROVIDE WATER HAMMER ARRESTOR IN ACCESSIBLE AREA IN PLUMBING CHASE.
3. PROVIDE MIXING VALVE FOR TEMPERED LAB WATER. SET AT 105 DEG. F.
4. PROVIDE TRAP PRIMER AT FLUSH VALVE. ROUTE TO FLOOR DRAIN/FLOOR SINK.
5. PLUMBING RISERS IN SHAFT. SEE 1/8" SCALE PLANS FOR SIZES.
6. DROP 1 1/2" CONDENSATE DRAIN TO SERVICE SINK. PROVIDE AIR GAP AS REQUIRED.
7. PROVIDE SHUT-OFF VALVES TO ISOLATE RESTROOM GROUP.

GENERAL NOTES

A. COORDINATE WASTE AND VENT ROUGH IN LOCATIONS WITH LAB PLUMBING DRAWINGS.
B. COORDINATE PIPING WITH ELECTRICAL PLANS. DO NOT ROUTE ANY PIPING OVER ELECTRICAL PANELS.
C. SEE SHEET MH001 FOR ADDITIONAL GENERAL NOTES.
D. RO WATER PIPING FROM MAINS IN HALLWAY INTO INDIVIDUAL ROOMS TO INCLUDE A BYPASS VALVE PER DETAIL 5, SHEET MH505.
E. INSTALL ALL FLOOR MOUNTED EQUIPMENT UPON 4" TALL HOUSEKEEPING PAD.
F. COORDINATE ALL PLUMBING WITH ALL OTHER DISCIPLINES.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

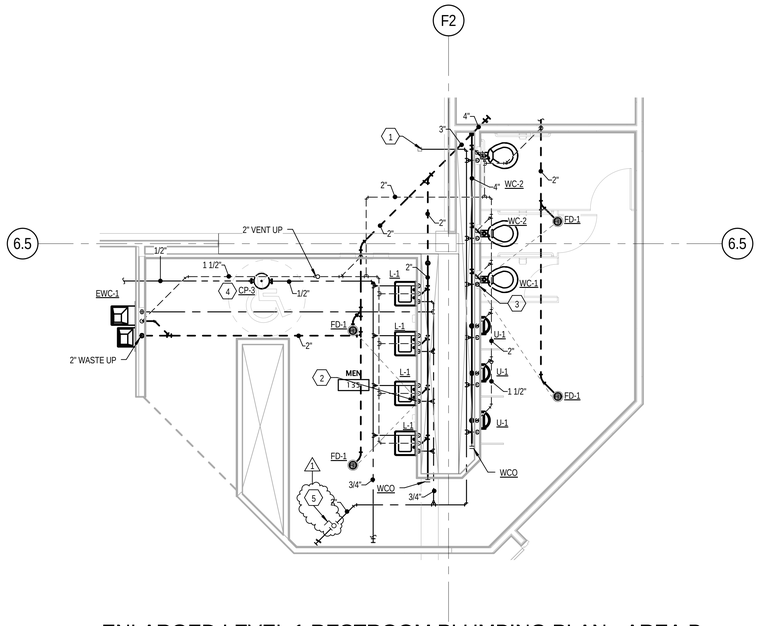
DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

ENLARGED PLUMBING PLANS

CONSTRUCTION DOCUMENTS

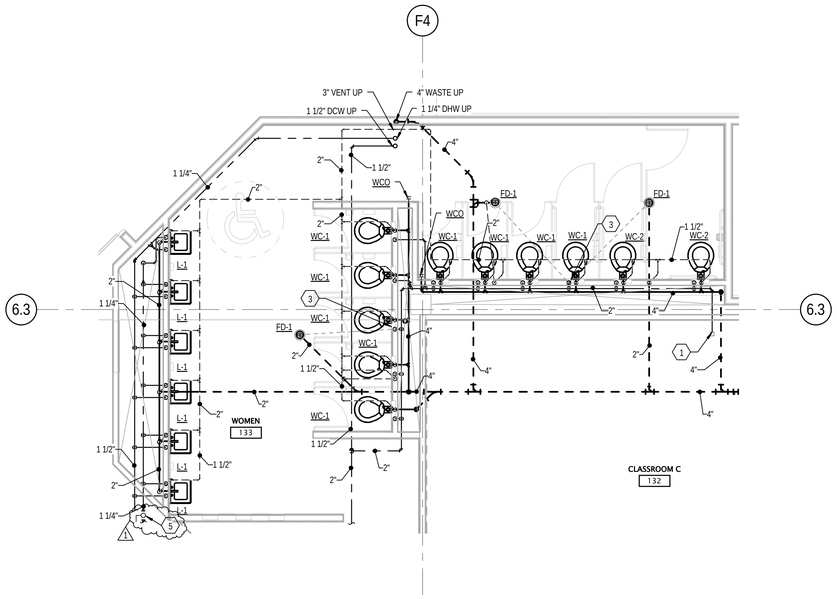
PL401

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.



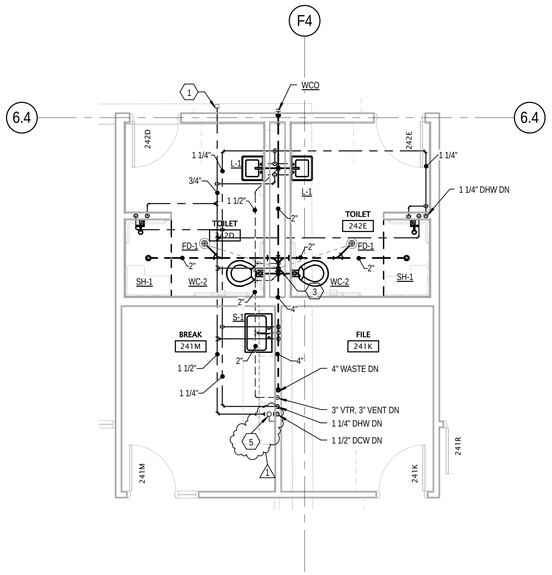
ENLARGED LEVEL 1 RESTROOM PLUMBING PLAN - AREA B

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



ENLARGED LEVEL 1 RESTROOM PLUMBING PLAN- AREA B

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



ENLARGED LEVEL 2 RESTROOM PLUMBING PLAN - AREA B

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

KEYED NOTES

1. PROVIDE WATER HAMMER ARRESTOR ABOVE ACCESSIBLE CEILING.
2. PROVIDE ELECTRONIC TRAP PRIMER BELOW LAVATORY. ROUTE TO FLOOR DRAIN/FLOOR SINK.
3. PROVIDE TRAP PRIMER AT FLUSH VALVE. ROUTE TO FLOOR DRAIN/FLOOR SINK.
4. LOCATE CIRCULATION PUMP ABOVE CEILING. PROVIDE ACCESS DOOR.
5. PROVIDE SHUT-OFF VALVES TO ISOLATE RESTROOM GROUP.

GENERAL NOTES

A. COORDINATE WASTE AND VENT ROUGH IN LOCATIONS WITH LAB PLUMBING DRAWINGS.
B. COORDINATE PIPING WITH ELECTRICAL PLANS. DO NOT ROUTE ANY PIPING OVER ELECTRICAL PANELS.
C. SEE SHEET MH001 FOR ADDITIONAL GENERAL NOTES.
D. RO WATER PIPING FROM MAINS IN HALLWAY INTO INDIVIDUAL ROOMS TO INCLUDE A BYPASS VALVE PER DETAIL 5, SHEET MH505.
E. INSTALL ALL FLOOR MOUNTED EQUIPMENT UPON 4" TALL HOUSEKEEPING PAD.
F. COORDINATE ALL PLUMBING WITH ALL OTHER DISCIPLINES.

REFER TO SPECIFICATION SECTION 012300 ALTERNATES AND ARCHITECTURAL/LAB FURNISHINGS/ELECTRICAL/ LAB PLUMBING/ELECTRICAL/LAB ELECTRICAL DRAWINGS FOR COMPLETE DEFINITION OF 5 ALTERNATES.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER NO. 5954406 Roger Lee. Hamlet JR. State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	Author
CHECKED BY:	Checker
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.053.02
ISSUED DATE:	05.07.2010

ENLARGED PLUMBING PLANS

CONSTRUCTION DOCUMENTS

PL402

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

VACUUM SYSTEM SCHEDULE (VP)

PLAN CODE	TYPE (1)	DUTY (1)	SYSTEM FLOW (ACFM AT RECEIVER VACUUM PRESSURE)	NOMINAL PUMPING SPEED (ACFM/PUMP)	VACUUM IN RECEIVER ("Hg@ 4,700FT)	TANK (GAL)	SINGLE-POINT ELECTRICAL			DIMENSIONS (IN)			WEIGHT (LBS)	SYSTEM MANUFACTURER & MODEL NO.	PUMP MANUFACTURER & MODEL NO.
							FLA	MOCP	VOLTAGE & PHASE	L	W	H			
VP-1	DUPLEX	LAB VACUUM	600	300	23 (2)	200	52.5	60	460/3	101	78	89	3550	BUSH THED-2-LAB-400	BUSH RC 0400

(1) DUPLEX PUMP SYSTEM WITH VERTICAL RECEIVER MOUNTED ON A SKID. COMPLETE VACUUM SYSTEM INCLUDING CONTROLS. PUMPS IN HORIZONTAL ARRANGEMENT. THAT ALLOW FOR FUTURE EXPANSION TO TRIPLEX OR QUADRUPLEX SYSTEM.

(2) 23"Hg VACUUM AT 4,700 FT ELEVATION (25.177"Hg ATMOSPHERIC PRESSURE) RESULTS IN 2.177"Hg PRESSURE ABSOLUTE.

REVERSE OSMOSIS SYSTEM (RO)

PLAN CODE	NOMINAL CAPCITY (GPD)	APPROXIMATE RECOVERY (%)	MOTOR			DIMENSIONS (IN)			WEIGHT (LBS)	MANUFACTURER & MODEL NO	DESCRIPTION
			SIZE (HP)	FLA	VOLTAGE & PHASE	L	W	H			
RO-1	5,800	60	1	10.4	208/1	132	60	75	-	CULLIGAN AP-3	UNIT SHALL CONSIST OF WATER SOFTENER, BRINE TANK, RO UNIT WITH 2 D.I. TANKS, REPRESSURE PUMP, FINAL FILTER AND A 500 GALLON STORAGE TANK.

SUMP PUMP SCHEDULE (SP)

PLAN CODE	PUMP				MOTOR		REMARKS
	FLOW (GPM)	HEAD (FT)	CONFIGURATION	MAKE/MODEL	VOLTAGE/ PHASE	SIZE (HP)	
SP-1A SP-1B	50	18.5	DUPLEX SUBMERSIBLE GRAY WATER SUMP PUMP	WEIL 1413	460/3 1750 RPM	3/4	FURNISH WITH #8136 PER-WIRED DUPLEX CONTROL PANEL. NEMA 4X WITH REMOTE MONITOR MODEL 8302. FURNISH WITH MODEL #8230 TETHERED FLOAT SWITCHES. FURNISH WITH MODEL 8251 NEMA-6P JUNCTION BOX.

NATURAL GAS PRESSURE REGULATOR SCHEDULE

PLAN CODE	AREA SERVED	INLET PRESURE (PSIG)	OUTLET PRESURE (OZ/SQ IN)	LOAD (BTU/H)	GAS DELIVERY (CFH)	REMARKS
REG-1	LEVEL 0	5	4	395,160	444	SPRING LOADED, VENT LIMITING
REG-2	LEVEL 1	5	4	103,240	116	SPRING LOADED, VENT LIMITING
REG-3	LEVEL 0	5	4	128,160	144	SPRING LOADED, VENT LIMITING

PLUMBING HEAT EXCHANGER SCHEDULE (PHX)

PLAN CODE	SYSTEM SERVED	HOT WATER SIDE			COLD WATER SIDE			TYPE	MANUFACTURER & MODEL NO.
		GPM	EWT LWT °F	P.D. (FT.)	EWT LWT °F	GPM	P.D. (FT.)		
PHX-1	LABORATORY INDUSTRIAL HOT WATER	1.5	110/95	1	93/108	1.5	1	DOUBLE WALL BRAZED PLATE	BELL & GOSSETT BPDW415-101

CIRCULATOR PUMP SCHEDULE (CP)

PLAN CODE	TYPE	DUTY	FLOW (GPM)	PRESSURE (FT)	FLUID	MOTOR				PUMP & MOTOR WT. (LBS)	MANUFACTURER & MODEL NO.	REMARKS
						LOAD (BHP)	SIZE (HP)	EFF. (%)	VOLTAGE & PHASE			
CP-1	INLINE	LABORATORY INDUSTRIAL HOT WATER	1.5	10	WATER	FRAC.	FRAC.	PREM.	115/1	20	GRUNDFOS UP15-18B5	-
CP-2	INLINE	DOMESTIC HOT WATER	1.5	10	WATER	FRAC.	FRAC.	PREM.	115/1	20	GRUNDFOS UP15-18B5	-
CP-3	INLINE	DOMESTIC HOT WATER	1.5	10	WATER	FRAC.	FRAC.	PREM.	115/1	20	GRUNDFOS UP15-18B5	-

ACID NEUTRALIZATION TANK SCHEDULE (NT)

PLAN CODE	AREA SERVED	TYPE	NEUTRALIZATION TANK CAPACITIES (GAL) DIMENSIONS		MANUFACTURER & MODEL NO	DESCRIPTION
			CARRIER TANK	CONTAINMENT TANK		
NT-1	NORTH LAB WASTE	DOUBLE WALL TANK	180 / 36"DIA X 42"H	360 / 48"DIA X 48"H	ORION STYLE 5	DOUBLE WALL MOLDED TANK, VIRGIN POLYETHYLENE/POLYPROPYLENE RESIN, FIBERGLASS WRAP (FRP) FOR DIRECT BURIAL. PROVIDE STANDARD DOMED COVER FOR BOTH CARRIER AND CONTAINMENT TANKS WITH 12" GAMMA PLUS EASY THREADED ACCESS BOLTED TOP, REINFORCING ANCHOR FLANGES (RAF), EXTENSIONS AS REQUIRED, 60"X60" WHEEL LOADING TRAP DOOR JD4H20. PROVIDE LEAK DETECTION MONTITOR. PROVIDE 6" CONCRETE PAD.
NT-2	SOUTH LAB WASTE	DOUBLE WALL TANK	180 / 36"DIA X 42"H	360 / 48"DIA X 48"H	ORION STYLE 5	DOUBLE WALL MOLDED TANK, VIRGIN POLYETHYLENE/POLYPROPYLENE RESIN, FIBERGLASS WRAP (FRP) FOR DIRECT BURIAL. PROVIDE STANDARD DOMED COVER FOR BOTH CARRIER AND CONTAINMENT TANKS WITH 12" GAMMA PLUS EASY THREADED ACCESS BOLTED TOP, REINFORCING ANCHOR FLANGES (RAF), EXTENSIONS AS REQUIRED, 60"X60" WHEEL LOADING TRAP DOOR JD4H20. PROVIDE LEAK DETECTION MONTITOR. PROVIDE 6" CONCRETE PAD.

CONDENSATE PUMP SCHEDULE (CDP)

PLAN CODE	UNIT SERVED	TYPE	FLOW (GPM)	PRESSURE (FT)	FLUID	TANK CAPACITY (GAL)	ELECTRICAL		PUMP & MOTOR WT (LBS)	MANUFACTURER & MODEL NO
							SIZE (A)	VOLTAGE/ PHASE		
CDP-1 THRU CDP-5	EXISTING FAN COIL	CONDENSATE REMOVAL	0.4	15	WATER	0.5	1.5	115/1	5.2	LITTLE GIANT CURP-20ULS

PLUMBING FIXTURE SCHEDULE

PLAN CODE	DESCRIPTION	CONNECTION SIZE						REMARKS
		DCW	DHW	TEMPERED	WASTE	VENT	STORM	
WC-1	WATER CLOSET- WALL MOUNTED	1"	-	-	4"	2"	-	KOHLER MODEL K-4330 "KINGSTON" WALL MOUNTED WATER CLOSET. WATER CLOSET SHALL BE PROVIDED WITH A SIPHON JET OPERATING SYSTEM AND AN ELONGATED BOWL. PROVIDE WITH KOHLER MODEL K-4670-SA LUSTRA ELONGATED OPEN FRONT ANTI-MICROBIAL SOLID PLASTIC TOILET SEAT WITH SELF-SUSTAINING CHECK HINGE. WATER CLOSET AND TOILET SEAT TO BE COLOR WHITE. PROVIDE WATER CLOSET WITH WALL CARRIER (VERTICAL OR HORIZONTAL) AND SLOAN ECOS MODEL 8111-1.6/1.1 ELECTRONIC DUAL FLUSH FLUSHOMETER VALVE, WITH BUMPER ON ANGLE STOP. OR EQUAL.
WC-2	WATER CLOSET- WALL MOUNTED (ADA COMPLIANT)	1"	-	-	4"	2"	-	KOHLER MODEL K-4330 "KINGSTON" WALL MOUNTED WATER CLOSET. WATER CLOSET SHALL BE PROVIDED WITH A SIPHON JET OPERATING SYSTEM AND AN ELONGATED BOWL. PROVIDE WITH KOHLER MODEL K-4670-SA LUSTRA ELONGATED OPEN FRONT ANTI-MICROBIAL SOLID PLASTIC TOILET SEAT WITH SELF-SUSTAINING CHECK HINGE. WATER CLOSET AND TOILET SEAT TO BE COLOR WHITE. PROVIDE WATER CLOSET WITH WALL CARRIER (VERTICAL OR HORIZONTAL) AND SLOAN ECOS MODEL 8111-1.6/1.1 ELECTRONIC DUAL FLUSH FLUSHOMETER VALVE, WITH BUMPER ON ANGLE STOP AND TRAP PRIMER. WATER CLOSET TO BE INSTALLED AT ADA APPROVED FLOOR TO RIM HEIGHT. OR EQUAL.
U-1	URINAL - WALL MOUNTED (ADA COMPLIANT)	3/4"	-	-	2"	1 1/2"	-	KOHLER MODEL K-4904-ET "BARDON" 1/8TH GPF WALL MOUNTED URINAL. URINAL SHALL BE OF VITREOUS CHINA CONSTRUCTION, COLOR WHITE, AND SHALL BE PROVIDED WITH A BLOWOUT OPERATING SYSTEM. URINAL SHALL BE PROVIDED WITH SLOAN ECOS MODEL 8186 ELECTRONIC FLUSH VALVE (0.13 GPF) WITH ADJUSTABLE SENSOR EYES , ANTI-BACKSPLASH WALL, 14" ELONGATED RIM, WALL HANGERS, REMOVABLE BEEHIVE STRAINER, AND THREE COMPLETE SETS OF SPARE BATTERIES. ADDITIONALLY, PROVIDE CARRIER WALL SUPPORT SYSTEM. URINAL SHALL BE INSTALLED AT ADA COMPLIANT FLOOR TO RIM HEIGHT. ENTIRE INSTALLATION SHALL BE ADA COMPLIANT. OR EQUAL.
L-1	LAVATORY - SELF RIMMING (ADA COMPLIANT)	-	-	1/2"	1 1/2"	1 1/2"	-	KOHLER MODEL K-1728 "CHESAPEAKE" WALL MOUNTED THREE HOLE DRILLING LAVATORY WITH OVERFLOW. LAVATORY SHALL BE OF VITREOUS CHINA CONSTRUCTION, AND COLOR WHITE. LAVATORY IS TO BE PROVIDED WITH MOEN MODEL 8433 WITH PIVOT ACTION SINGLE LEVER HANDLE, ADJUSTABLE TEMPERATURE LIMIT STOP, 0.5 GPM AERATOR. WILKINS MODEL 1070 THERMOSTIC MIXING VALVE. BRASSCRAFT MODEL KTSR19-C 1/4 TURN BALL STOP WITH LOOSE KEY AND BRAIDED STAINLESS STEEL SUPPLY HOSES. KOHLER MODEL K-8998 1 1/4" CAST BRASS P-TRAP, AND K-7715 LAVATORY DRAIN WITH 1 1/4" DIAMETER TAILPIECE. ADDITIONALLY PROVIDE ADA COMPLIANT SUPPLY AND DRAIN INSULATION KIT TO ENSURE THAT ENTIRE INSTALLATION SHALL BE ADA COMPLIANT. OR EQUAL.
S-1	SINK-SINGLE COMPARTMENT (ADA COMPLIANT)	1/2"	1/2"	-	1 1/2"	1 1/2"	-	MOEN MODEL 22131 21"x16"x5.5" DEEP SINGLE BOWL 20 GUAGE STAINLESS STEEL SINK, FULLY ADA COMPLIANT. SINK SHALL BE PROVIDED WITH THREE HOLE FAUCET DRILLING ON FOUR INCH CENTERS. SINK BOWL TO BE FULLY SOUND DEADENED. PROVIDE WITH MOEN MODEL 14750 DRAIN/STRAINER. BRASSCRAFT MODEL KTSR19-C 1/4-TURN LOOSE KEY STOP WITH BRAIDED STAINLESS STEEL SUPPLY HOSES FOR HOT AND COLD WATER CONNECTIONS AND KOHLER MODEL K-9000 1-1/2" CAST BRASS P-TRAP. PROVIDE WITH MOEN MODEL 8289 TWO-HANDLE KITCHEN FAUCET WITH GOOSENECK SWING SPOUT AND 5" ADA COMPLIANT BRASS WRIST BLADE STYLE HANDLES, 2.0 GPM AERATOR MAXIMUM. PROVIDE FAUCET FOR THREE HOLE DRILLING ON FOUR INCH CENTERS. OR EQUAL
SS-1	SERVICE SINK - FLOOR MOUNTED	3/4"	3/4"	-	3"	1 1/2"	-	KOHLER MODEL K-6710 "WHITBY" 28"x28" FLOOR MOUNTED SERVICE SINK FOR CORNER INSTALLATIONS. SERVICE SINK SHALL BE OF CAST IRON CONSTRUCTION WITH WHITE ENAMELED FINISH. SINK SHALL BE PROVIDED WITH COATED WIRE RIM GUARD MODEL K-8940 AND 3" I.P.S. STRAINER MODEL K-9146. SERVICE SINK SHALL ALSO BE PROVIDED WITH CHICAGO FAUCETS MODEL 540-LD-897S-WXF WITH 8" CENTERS, VACUUM BREAKER SPOUT, 369, HANDLES, POLISHED CHROME PLATE EXTERIOR FINISH, WALL FLANGE, AND PAIL HOOK WITH WALL SUPPORT. OR EQUAL.
EWC-1	BI-LEVEL, SURFACE MOUNT ELECTRIC WATER COOLER	1/2"	-	-	2"	1 1/2"	-	ACORN AQUA MODEL A112100F, GRANITE POWDER COATED CABINET FINISH.
EWC-2	SINGLE-LEVEL, SURFACE MOUNT ELECTRIC WATER COOLER	1/2"	-	-	2"	1 1/2"	-	ACORN AQUA MODEL A111100F, GRANITE POWDER COATED CABINET FINISH.
FD-1	FLOOR DRAIN	-	-	-	2"	1 1/2"	-	J.R. SMITH MANUFACTURING COMPANY FIG. 2005Y-CP DUCO CAST IRON FLOOR DRAIN. DRAIN TO BE PROVIDED WITH ROUND CHROME PLATED NICKEL BRONZE STRAINER HEAD, TRAP PRIMER CONNECTION. SEE PLANS FOR OUTLET SIZE. STRAINER HEAD MUST BE HEEL PROOF. OR EQUAL.
FD-2	FLOOR DRAIN (MECHANICAL ROOM USE)	-	-	-	4"	2"	-	JAY R. SMITH MANUFACTURING COMPANY FIG. 2120Y-B-P050-M-XP DUCO CAST IRON FLOOR DRAIN. DRAIN TO BE PROVIDED WITH 4" OUTLET, DUCTILE IRON GRATE, TRAP PRIMER CONNECTION, AND CLOSURE PLUG. OR EQUAL.
FS-1	FLOOR SINK (MECHANICAL ROOM USE)	-	-	-	4"	2"	-	JAY R. SMITH MANUFACTURING COMPANY FIG. 3150-Y-ASB SQUARE FLOOR SINK. FLOOR SINK SHALL BE OF CAST IRON CONSTRUCTION WITH ENAMEL INTERIOR FINISH, MINIMUM INTERIOR DIMENSIONS OF 12"x12"x8"D. PROVIDE WITH TRAP PRIMER CONNECTION AND HEAVY DUTY NICKEL BRONZE HALF GRATE. OR EQUAL.
RD-1	ROOF DRAIN - PRIMARY	-	-	-	-	-	SEE PLANS	JAY R. SMITH MANUFACTURING COMPANY FIG. 1015Y-E-R-C-CID-U LARGE GENERAL PURPOSE ROOF DRAIN WITH ADJUSTABLE EXTENSION. ROOF DRAIN SHALL BE PROVIDED WITH DUCO CAST IRON BODY WITH ADJUSTABE EXTENSION SLEEVE, REVERSIBLE COLLAR, COMBINED FLASHING CLAMP AND GRAVEL STOP, CAST IRON DOME - FACTORY PAINTED BLACK, SUMP RECEIVER, UNDERDECK CLAMP AND VANDAL PROOF SECURITY SCREWS, OR EQUAL.
OD-1	ROOF DRAIN - SECONDARY	-	-	-	-	-	SEE PLANS	JAY R. SMITH MANUFACTURING COMPANY FIG. 1080Y-R-C-CID-U LARGE GENERAL PURPOSE ROOF DRAIN W/ADJUSTABLE EXTENSION. PROVIDE W/DUCO CAST IRON BODY FLASHING CLAMP W/GRAVEL STOP, 2" CAST IRON WATER DAM, CAST IRON DOME, UNDERDECK CLAMP, SUMP RECEIVER, VANDAL PROOF SECURITY SCREWS, OR EQUAL. DAM AND DOME FACTORY PAINTED BLACK.
DSN-1	DOWNSPOUT NOZZLE - SECONDARY	-	-	-	-	-	SEE PLANS	JAY R. SMITH MANUFACTURING COMPANY FIG. 1770-BS BRONZE DOWNSPOUT NOZZLE WITH BIRD SCREEN. OR EQUAL. ROUGH BRASS FINISH
HB-1	HOSE BIBB - WALL MOUNTED (INDOOR FINISHED AREA USE)	3/4"	-	-	-	-	-	WOODFORD MANUFACTURING CO. MODEL 26 WALL MOUNTED BACKFLOW PROTECTED WALL FAUCET. HOSE BIBB TO BE PROVIDED WITH LOOSE KEY SHUTOFF, 3/4" INLET AND 3/4" MALE HOSE THREAD OUTLET. EXTERIOR FINISH TO BE POLISHED CHROME. OR EQUAL.
HB-2	HOSE BIBB - WALL MOUNTED (INDOOR UNFINISHED AREA USE)	3/4"	-	-	-	-	-	WOODFORD MANUFACTURING CO. MODEL 26 WALL MOUNTED BACKFLOW PROTECTED WALL FAUCET. HOSE BIBB TO BE PROVIDED WITH LOOSE KEY SHUTOFF, 3/4" INLET AND 3/4" MALE HOSE THREAD OUTLET. EXTERIOR FINISH TO BE BRASS. OR EQUAL.
SC-1	SILLCOCK (OUTDOOR FREEZEPROOF USE)	3/4"	-	-	-	-	-	WOODFORD MANUFACTURING CO. MODEL B65-BR (OR EQUAL) WALL MOUNTED, CONCEALED BOX TYPE, ANTI-SIPHON AUTOMATIC DRAINING FREEZELESS WALL HYDRANT. WALL HYDRANT SHALL BE PROVIDED WITH LOOSE KEE SHUTOFF, 3/4" INLET AND 3/4" MALE HOSE THREAD OUTLET. EXTERIOR FINISH SHALL BE ROUGH BRASS.
SH-1	SHOWER SYSTEM WITH HANDSPRAY	1/2"	1/2"	-	2"	1 1/2"	-	KOHLER "RITE-TEMP" MODEL K-304 PRESSURE BALANCING VALVE, KOHLER "MASTERSHOWER" MODEL K-T9492 VALVE TRIM WITH LEVER HANDLE, KOHLER "MASTERSHOWER" HANDSHOWER MODEL K-8501, KOHLER "MASTERSHOWER" MODEL K-8516 SLIDEBAR WITH HOSE. WILKINS MODEL 1070 THERMOSTIC MIXING VALVE. ENTIRE INSTALLATION SHALL BE ADA COMPLIANT. OR EQUAL.

JOB SITE ELEVATION = 4,700 FT
JOB SITE PRESSURE = 12.37 PSI
SELECT ALL EQUIPMENT FOR OPERATION AT JOB SITE ELEVATION

ALL MOTORS TO BE PREMIUM EFFICIENCY

Copyright (C) 2010 by Colvin Engineering Associates, Inc. Salt Lake City, Utah. All rights reserved. Unauthorized copying and/or use is illegal and subject to prosecution.

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER
NO. 5954406
Roger Lee. Hamlet JR.
State of Utah

REVISIONS:

1	May 26, 2010	Addenda 5 - Revision 1

Colvin Engineering Associates, Inc.
244 West 300 North Suite 200
Salt Lake City, Utah 84103
Phone: (801) 322-2400 / Fax: (801) 322-2416

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY: Author
CHECKED BY: Checker
DFCM PROJECT NO.: 09020790
GSBS PROJECT NO.: 2009.053.02
ISSUED DATE: 05.07.2010

PLUMBING SCHEDULES

CONSTRUCTION DOCUMENTS

PL601

UTAH VALLEY UNIVERSITY NEW SCIENCE BUILDING

ELECTRICAL

Addendum #5

May 26, 2010

Contents of Electrical Addendum:	Written Addendum	19 pages
	Panel Schedule "0LA2"	1 page
	Dimmer Schedule "DMD"	1 page
	UVU Master Cable Specifications	15 pages
	Revision Drawings	4 pages (8½ x 11)
	Revision Drawings	5 full-size sheets

I. GENERAL ITEMS

1. The UVU's Master Cable Specifications are included in this addendum as referenced in the Electrical/Technology drawings and specifications and are hereby made part of the contract documents.
2. Prior to installation verify exact mounting of screen and lectern.

II. SPECIFICATIONS

Section 261350, Medium-Voltage Switchgear, Pad or Vault Mounted:

1. Paragraph 2.3.E.2: Delete this paragraph and replace with the following:

   3 . The unit is to be insulated with Envirotemp 200 less-flammable fluid for operation to minus 30 degrees C dielectric, contained in a sealed tank design, so operation is unimpaired by flood conditions or contaminated environments (except control). The unit shall utilize vacuum interrupters for all current switching and fault current interruption such that the dielectric media is not consumed or contaminated by normal operations of the interrupters. The unit shall be designed for installation on a concrete or fiberglass pad at ground level.

   (Note: Sold dielectric is still allowed. SF-6 option is replaced with the liquid-filled option per new paragraph above).

Section 263213, Engine Generators:

1. Paragraph 2.6: Delete paragraph "A" referencing molded-case, thermal magnetic circuit breakers. Generator circuit breakers shall be molded-case, electronic trip type (indicated in paragraph B.).

2. Paragraph 2.8.B: Delete paragraph "1" referencing fixed louvers. Generator enclosure shall use automatic dampers to maintain temperature within the enclosure per NFPA 110 requirements for site conditions.

3. Paragraph 2.10: Delete paragraph "A" referencing elastomeric isolator pads. Generator isolation devices shall be seismic restrained spring isolators (indicated in paragraph B.).

Section 271300, Communications Backbone Cabling,:

1. All cabling install shall comply with the UVU Master Able Specifications.
2. All data cable shall be Augmented 6A.
3. All back bone cable shall be minimum riser rated and plenum where required.
4. Under Part 1/1.7 - all installers must be Siemons CI certified. This includes Cache Valley, Niels Fugal, and Americom. No other voice-data installers will be accepted unless they are certified Siemons CI installers.
5. Under Part 1/1.13 the warranty shall be a 10 year Siemons CI warranty.
6. Part 2/2.1/C reference Division 26 cable tray spec.
7. Part 2/2.3/A/1 approved UTP cable are by General Cable and Mohawk.
8. Part 2/2.4/2 approved UTP hardware is Siemons
9. Part 2/2.6/A/ approved optical fiber hardware is Siemons.

Section 271500, Communications Horizontal Cabling,:

1. All cabling install shall comply with the UVU Master Able Specifications.
2. All data cable shall be Augmented 6A.
3. Under Part 1/1.7 - all installers must be Siemons CI certified. This includes Cache Valley, Niels Fugal, and Americom. No other voice-data installers will be accepted unless they are certified Siemons CI installers.
4. Under Part 1/1.13 the warranty shall be a 10 year Siemons CI warranty.
5. Part 2/2.1/C reference Division 26 cable tray spec.
6. Part 2/2.3/A/1 approved UTP cable are by General Cable and Mohawk.
7. Part 2/2.4/2 approved UTP hardware is Siemons
8. Part 2/2.6/A/ approved optical fiber hardware is Siemons.

III. DRAWINGS

Sheet EP-101A:

1. Provide electrical connections to unit heater UH-1 in Stair 030D (refer to mechanical plans for exact location). Provide thermal switch at unit and circuit to 0LB1-45.
2. Provide electrical connections to unit heater UH-2 in Fire Riser 059 (refer to mechanical plans for exact location). Provide thermal switch at unit and circuit to 0ELC-4 (standby power).

3. Provide electrical connections trap primer in Fire Riser 059 (refer to plumbing plans for exact location). Circuit with nearest outlet in room.
4. Provide electrical connections trap primer in Growth Chambers 064E (refer to plumbing plans for exact location). Circuit with nearest outlet in room.
5. Provide electrical connections to acid neutralization tanks outdoors in two locations, at northwest and southwest corners (refer to plumbing plans and addenda for exact locations). Circuit each to 0LB1-47 and 49 respectively. Provide weather-proof toggle switch at each for means of local disconnect.
6. Provide electrical connections to electrical humidifier EH-1 in room 068B (refer to mechanical plans and addenda for exact location). Circuit to 0HA-14, 20A/3P CB, with 3 #12, 1 #12 GR, 0.75" CND. Provide 30A/3P non-fuse disconnect at unit.
7. Provide electrical connections to electrical humidifier EH-2 in room 068C (refer to mechanical plans and addenda for exact location). Circuit to 0HA-20, 20A/3P CB, with 3 #12, 1 #12 GR, 0.75" CND. Provide 30A/3P non-fuse disconnect at unit.
8. Provide electrical connections to electrical humidifier EH-3 in room 068D (refer to mechanical plans and addenda for exact location). Circuit to 0HA-26, 20A/3P CB, with 3 #12, 1 #12 GR, 0.75" CND. Provide 30A/3P non-fuse disconnect at unit.
9. Provide electrical connections to electrical humidifier EH-4 in room 068E (refer to mechanical plans and addenda for exact location). Circuit to 0HA-32, 20A/3P CB, with 3 #12, 1 #12 GR, 0.75" CND. Provide 30A/3P non-fuse disconnect at unit.
10. Delete panel "OLA5" in Equipment Room 068F. (Panel OLA5 is in EM PREP/Entry 068 as shown).
11. Add Panel "OLA2" in Electrical Room 043, along east wall in location where "Future" panels are indicated. Panel is 1-section with provisions for future section 2.

Sheet EP-101B:

1. Provide electrical connections to unit heater UH-1 in Stair 030D (refer to mechanical plans for exact location). Provide thermal switch at unit and circuit to 0LB1-45.
2. Lecture 031: Add power and data to selected seats. Refer to attached revision drawing.
3. Lecture 073: Add power and data to selected seats. Refer to attached revision drawing.

Sheet EP-101C:

1. Provide electrical connections to unit heater UH-3 in Trash 033A (refer to mechanical plans for exact location). Provide thermal switch at unit and circuit to 0LC1-8.
2. Provide electrical connections to unit heater UH-4 in Storage 033B (refer to mechanical plans for exact location). Provide thermal switch at unit and circuit to 0LC1-8.
3. Provide electrical connections to unit heater UH-5 in Dock 033 (refer to mechanical plans for exact location). Provide thermal switch at unit and circuit to 0LC1-6.
4. Provide electrical connections to unit heater EUH-1 in EM Dist Room 035B (refer to mechanical plans for exact location). Provide thermal switch at unit and circuit to OHC-5.
5. Provide electrical connections to unit heater EUH-2 in HV Room 035A (refer to mechanical plans for exact location). Provide thermal switch at unit and circuit to OHC-7.
6. Provide electrical connections to cabinet unit heater CUH-1 in Corridor 030J (refer to mechanical plans for exact location). Provide thermal switch at unit and circuit to 0LC1-10.

7. Provide electrical connections trap primer in Vestibule 036A (refer to plumbing plans for exact location). Circuit with nearest outlet in room.
8. Provide electrical connections trap primer in Rock Crushing 034B (refer to plumbing plans for exact location). Circuit with nearest outlet in room.
9. Provide electrical connections to exhaust fan EF-3 in Trash 033a (refer to mechanical plans for exact location). Provide 30A/2P fusible combo disconnect/starter at unit and circuit to 0LC1-12 (provide 20A/2P CB in panel).

Sheet EP-102A:

1. Provide electrical connections to unit heater UH-6 in Stair 130D (refer to mechanical plans for exact location). Provide thermal switch at unit and circuit to 1LB1-16.
2. Provide electrical connections to cabinet unit heater CUH-2 in Exit Corridor 177 near exterior door (refer to mechanical plans for exact location). Provide thermal switch at unit and circuit to 1LA1-44.
3. Provide electrical connections trap primer in Work Room 148F (refer to plumbing plans for exact location). Circuit with nearest outlet in room.
4. Provide electrical connections trap primer in Steril Alcove 141 (refer to plumbing plans for exact location). Circuit with nearest outlet in room.
5. Provide electrical connections to electrical humidifier EH-5 in room 173A (refer to mechanical plans and addenda for exact location). Circuit to 1HA-14, 30A/3P CB, with 3 #10, 1 #10 GR, 0.75" CND. Provide 30A/3P non-fuse disconnect at unit.
6. Provide electrical connections to electrical humidifier EH-6 in room 148B (refer to mechanical plans and addenda for exact location). Circuit to 1HA-20, 20A/3P CB, with 3 #12, 1 #12 GR, 0.75" CND. Provide 30A/3P non-fuse disconnect at unit.
7. Provide electrical connections to electrical humidifier EH-7 in room 148C (refer to mechanical plans and addenda for exact location). Circuit to 1HA-26, 20A/3P CB, with 3 #12, 1 #12 GR, 0.75" CND. Provide 30A/3P non-fuse disconnect at unit.
8. Provide two additional outlets in Exit Corridor 177: one centered on north wall of east-west portion of corridor, and the other centered on east wall of north-south portion of corridor. Circuit both with the one outlet already shown in this corridor.

Sheet EP-102B:

1. Provide electrical connections to unit heater UH-7 in Stair 140U (refer to mechanical plans for exact location). Provide thermal switch at unit and circuit to 1LD1-34.
2. Provide electrical connections trap primer in Mens Restroom 135 (refer to plumbing plans for exact location). Circuit with circ pump CP-3 in room.
3. Atrium Stair-2: In lieu of two electric roll-down doors, there are 7 each smoke doors. Refer to architectural plans for exact locations. Provide electrical connections with all power and control wiring per manufacturers shop drawings. Circuit the northeast doors to 1ELA-6 and the southeast doors to 1ELA-8. Use minimum 3 #8, 1 #10 GR in 1" CND. This doors also require fire alarm connections to activate upon alarm.
4. Atrium Stair-2 030-2: The west wall (along gridline F0) of this area has power outlets for video monitors (reference Sheet Keynote #10). The quantity of power outlets shall be increased to 9 total, with 3 outlets per circuit: 3 each on 1LA1-57, 59, 61 (in lieu of 1LA1-40, 42). Coordinate exact location and mounting of these outlets with architectural elevations and AV installer.

5. Lecture 139: Add power and data to selected seats. Refer to attached revision drawing.

Sheet EP-103A:

1. Provide electrical connections trap primer in Steril Alcove 269 (refer to plumbing plans for exact location). Circuit with nearest outlet in room.
2. Provide electrical connections trap primer in Botany Growth 272 (refer to plumbing plans for exact location). Circuit with nearest outlet in room.
3. Provide electrical connections to electrical humidifier EH-8 in room 277 (refer to mechanical plans and addenda for exact location). Circuit to 2HA-14, 30A/3P CB, with 3 #10, 1 #10 GR, 0.75" CND. Provide 30A/3P non-fuse disconnect at unit.
4. Provide GFI drinking fountain outlet in Human Performance Lab 254, east wall at south end (see architectural and Lab plans for exact location). Circuit to 2LA1-28.
5. Lecture 260 (shown as 332 on this sheet): Add power and data to selected seats. Refer to attached revision drawing.

Sheet EP-103B:

1. Provide electrical connections to unit heater UH-8 in Stair 240U (refer to mechanical plans for exact location). Provide thermal switch at unit and circuit to 2LD1-69.
2. Lecture 246: Add power and data to selected seats. Refer to attached revision drawing.

Sheet EP-104:

1. Provide electrical connections exhaust fan EF-2 on roof of Admin wing (refer to mechanical plans for exact location). Provide combo fusible disconnect/starter at unit and circuit to 2HD-15 with 3 #12, 1 #12 GR in 0.75" CND. Provide 15A/3P CB at panel.
2. Provide electrical connections transfer fan TF-1 on roof of main electrical room (refer to mechanical plans for exact location). Provide combo thermal switch and starter at unit and circuit to 0QLC1-15 with 2# 10, 1 #10 GR in 0.75" CND. Provide 30A/1P CB at panel.

Sheet EP-104A:

1. Numerous mechanical changes cause revisions to this sheet. Changes are summarized below. Refer to mechanical drawings, schedules and addenda for exact locations, layouts and other information relevant to the electrical installation:
    a. VFD numbering scheme has changed to match VFD schedule on Sheet MH603. The VFD ID numbers and the homeruns from motors to VFD's are changed to match the mechanical information.
    b. Equipment item VP-1 relocates to south wall near gridline E9.
    c. Pump P-13 with associated connection is deleted.
    d. Pump P-11 is homerun through a VFD in lieu of directly to MCC.
    e. Trap primer connections on west wall near gridlines E5 and E7, circuited with nearest outlet.
    f. Electrical connections to LEF-4 near gridlines E5 and 6.5: connection requirements as indicated on equipment schedule and one-line diagram. VFD-18 for this motor is located along backside of PMCCA.

g. Delete connections to CP-1, CP-2 and CP-3 in the Penthouse. These pumps are indicated in other locations already on the power plans.
h. Equipment ID "RU-1" should be "RO-1".
i. Electrical connections to UH-12 near gridline E5 and 6.55. Provide thermal switch and circuit to PQL1-19
j. Electrical connections to UH-13 near gridline E8 and 6.59. Provide thermal switch and circuit to PQL1-11.
k. Electrical connections to UH-9 in Stairwell. Provide thermal switch and circuit to PQL1-17.
l. Electrical connections to UH-10 near gridline E8 and 6.44. Provide thermal switch and circuit to PQL1-13.
m. Electrical connections to UH-11 in Elevator Machine room. Provide thermal switch and circuit to PQL1-15.
n. There are 3 cooling tower cells in lieu of 4 per mechanical plans. Homeruns for each of the 3 towers have a conduit and conductor schedule "14" in lieu of "10". One-line and equipment schedule for the cooling towers are correct.
o. Equipment items DXFC-1 and ACCU-1 (serving elevator machine room) are deleted and replaced with RTU-1 located outdoors, adjacent and east of elevator machine room. Provide 30A/3P fusible disconnect at RTU-1 and circuit to PQMCCA with 3 #12, 1 #12 GR, 0.75" CND.

Sheet EP-151:

1. Cooling Tower Heater CT-3H: Change homerun to existing panel EDPHB in lieu of MCCB. Provide disconnect and 30A/3P contactor/controller at unit for on/off control from thermostat. Provide 30A/3P, 65 kAIC CB in panel for the new circuit.

Sheet EP-602:

1. Delete the text "By UP&L" adjacent to pad-mounted transformer #1. This transformer is provided by the electrical installer!

Sheet EP-603:

1. Add panel "0LA2" fed from "0LDPA" with 225/3 CB and $\#30_{2N}$ feeder. Panel is 1-section 42-circuit filled with 20/1 CB's, with subfeedlugs and provisions for section 2. The panel schedule is included as an attachment to this addendum.

Sheet EP-604:

1. Equipment item LEF-4 is 3HP in lieu of 2HP and has a VFD in lieu of a 30A/3P disconnect at the unit.
2. Delete equipment items DXFC-1 and ACCU-1 from the one-line (fed from PQMCCA).
3. Add equipment item RTU-1, fed from 15A/3P CB in PQMCCA with 3 #12, 1 #12 GR, 0.75" CND. Include 30A/3P fusible disconnect at unit with FRS-15A fuses.

Sheet EP-605:

1. Equipment Schedule has the following changes:
    a. CUH-1 and CUH-2: HP is 1/20.
    b. EF-2: Change OCDP to 15A/3P CB located in panel, with starter located adjacent to the equipment.
    c. EF-3: Voltage is 208V/1-phase. OCPD is 20A/2P located in panel; provide 30A/2P fusible disconnect and size 0 starter at the equipment.
    d. ISS-1: Amps is 4.3; change fuse in disconnect to 7.5A.
    e. EF-3: Motor is 3HP, 4.8A. OCPD is 15A/3P CB; unit is to be provided with a VFD adjacent to the equipment that will also act as the disconnecting device.
2. Delete equipment items DXFC-1 and ACCU-1 from the equipment schedule.
3. Add equipment items EH-1 through EH-8 to the equipment schedule as follows:

    Item EH-1 (also typical of EH-2, 3, 4, 6, 7)
    Load Data: 6.8 kW, 480V/3ph
    Wiring: 3 #12, 1 #12 GR, 0.75" CND
    OCPD: 20A/3P CB in panel
    Disconnect: 30A/3P NF adj. to equip.
    Starter: furnished with equipment.

    Item EH-5 (also typical of EH-8)
    Load Data: 17 kW, 480V/3ph
    Wiring: 3 #10, 1 #10 GR, 0.75" CND
    OCPD: 30A/3P CB in panel
    Disconnect: 30A/3P NF adj. to equip.
    Starter: furnished with equipment
4. Add equipment RTU-1 to the equipment schedule as follows:

    Item RTU-1
    Load Data: 9.5MCA, 480V/3ph
    Wiring: 3 #12, 1 #12 GR, 0.75" CND
    OCPD: 15A/3P CB in MCC
    Disconnect: 30A/3P, FRS-15 fuses, adj. to equip.
    Starter: furnished with equipment.

<u>Sheets EP-606 through EP-610:</u>

1. Panel schedules are revised based on circuit additions/changes made within the addenda. Added circuits use spare 20A/1P circuit breakers indicated in the panel schedules, except for the following:
    a. OLC1-12: 20A/2P CB for EF-3.
    b. OQLC1-5: 30A/1P CB for TF-1.
    c. OHA-14, 20, 26, 32: 20A/3P for EH units.
    d. 1HA-14: 30A/3P for EH unit.
    e. 1HA-20, 26: 20A/3P for EH units.
    f. 2HA-14: 30A/3P for EH unit.
    g. 2HD-15: 15A/3P CB for EF-2

2. Add panel schedule for panel "0LA2" (attached).
3. The following panelboards are fusible main (unless MLO is indicated) and branch devices: 0ELC, 1ELA, 1ELD, 0EHC, 1EHA, 1EHD

Sheet EP-651:

1. Remove CT-3H from MCC-B. This equipment shall be fed from existing panel EDPHB as indicated above.

Sheet EP-671:

1. Equipment Schedule has the following changes:
    a. CT-3H: Load is 12 kW, 480V. Provide 4 #8, 1 #10 GR in 1" CND; equipment is fed with 30A/3P CB from existing panel. Provide 30A/3P contactor at equipment with 30A/3P disconnect. Coordinate controls with the mechanical installers.

Sheet EL-101A

1. Protein Prep 052A - Change UC fixture in NE corner to fixture type (UC-8).
2. Biochem Research 039 - Add additional (UC-9) fixture to underside of cabinet in SE corner of room. Refer to sheet LF-101D for cabinet locations

Sheet EL-102A

1. Biotech Research Lab 167 - Shift two (UC-9) type fixtures to the north and one (UC-8) type fixture south of them under the cabinets on the west wall. Circuit to 1LB1-6. Refer to sheet LF-111A for cabinet locations.
2. Zoology Wet/Dry Lab 173 - Add five (UC-9) type fixtures under the cabinets on the south wall. Provide three-way switches on walls at both ends. Circuit to 1LA1-18. Refer to sheet LF-111B for cabinet locations. Add keynote #3 to fixtures.
3. Zoology Wet/Dry Lab 173 - Add four (UC-9) type fixtures under the cabinets on the east wall. Provide three-way switches on walls at both ends. Circuit to 1LA1-18. Refer to sheet LF-111B for cabinet locations. Add keynote #3 to fixtures.
4. Zoology Prep Room 174 - Add two (UC-8) type fixtures under the cabinets on the west wall. Provide single-pole switch on wall. Circuit to 1LA1-18. Refer to sheet LF-111B for cabinet locations. Add keynote #3 to fixtures.
5. Zoology Prep Room 174 - Add one (UC-8) and one (UC-9) type fixtures under the cabinets on the south wall. Provide single-pole switch on wall. Circuit to 1LA1-18. Refer to sheet LF-111B for cabinet locations. Add keynote #3 to fixtures.
6. Zoology Prep Room 174 - Add one (UC-8) and one (UC-9) type fixtures under the cabinets on the east wall. Provide single-pole switch on wall. Circuit to 1LA1-18. Refer to sheet LF-111B for cabinet locations. Add keynote #3 to fixtures.
7. Zoology Teaching Lab 176 - Add three (UC-9) type fixtures under the cabinets on the east wall. Provide three-way switches on walls at both ends. Circuit to 1LA1-18. Refer to sheet LF-111B for cabinet locations. Add keynote #3 to fixtures.

8. Zoology Teaching Lab 176 - Add one (UC-8) type fixture under the cabinets on the south wall. Provide single-pole switch on wall. Circuit to 1LA1-18. Refer to sheet LF-111B for cabinet locations. Add keynote #3 to fixtures.
9. College Biology II Lab 154 - Change fixture type in SW corner of the room to (UC-8).
10. General Biology Teaching Lab 160 - Add three (UC-9) and one (UC-8) type fixtures under the cabinets on the north wall. Provide three-way switches on walls at both ends. Circuit to 1LB1-4. Refer to sheet LF-111C for cabinet locations. Add keynote #3 to fixtures.
11. General Biology Teaching Lab 160 - Add two (UC-9) and two (UC-8) type fixtures under the cabinets on the east wall. Provide three-way switches on walls at both ends. Circuit to 1LB1-4. Refer to sheet LF-111C for cabinet locations. Add keynote #3 to fixtures.
12. College Biology Lab 152 - Add four (UC-9) type fixtures under the cabinets on the north wall. Provide three-way switches on walls at both ends. Circuit to 1LB1-4. Refer to sheet LF-111C for cabinet locations. Add keynote #3 to fixtures.
13. College Biology Lab 152 - Add two (UC-9) type fixtures under the cabinets on the north side of the east wall. Provide single-pole switch on wall. Circuit to 1LB1-4. Refer to sheet LF-111C for cabinet locations. Add keynote #3 to fixtures.
14. College Biology Lab 152 - Add two (UC-8) type fixtures under the cabinets on the south side of the east wall. Provide single-pole switch on wall. Circuit to 1LB1-4. Refer to sheet LF-111C for cabinet locations. Add keynote #3 to fixtures.
15. Cell Biology Teaching Lab 147 - Add four (UC-9) type fixtures under the cabinets on the north wall. Provide three-way switches on walls at both ends. Circuit to 1LA1-18. Refer to sheet LF-111D for cabinet locations. Add keynote #3 to fixtures.
16. Cell Biology Teaching Lab 147 - Add two (UC-9) type fixtures under the cabinets on the north side of the east wall. Provide single-pole switch on wall. Circuit to 1LA1-18. Refer to sheet LF-111D for cabinet locations. Add keynote #3 to fixtures.
17. Cell Biology Teaching Lab 147 - Add two (UC-8) type fixtures under the cabinets on the south side of the east wall. Provide single-pole switch on wall. Circuit to 1LA1-18. Refer to sheet LF-111C for cabinet locations. Add keynote #3 to fixtures.

Sheet EL-102B

1. Genetics/Molecular Teaching Lab 140 - Add three (UC-9) type fixtures under the cabinets on the north wall. Provide three-way switches on walls at both ends. Circuit to 1LA1-18. Refer to sheet LF-111D for cabinet locations. Add keynote #3 to fixtures.
2. Genetics/Molecular Teaching Lab 140 - Add two (UC-9) type fixtures under the cabinets on the north side of the west wall. Provide single-pole switch on wall. Circuit to 1LA1-18. Refer to sheet LF-111D for cabinet locations. Add keynote #3 to fixtures.
3. Genetics/Molecular Teaching Lab 140 - Add one (UC-9) and one (UC-8) type fixtures under the cabinets on the south side of the west wall. Provide single-pole switch on wall. Circuit to 1LA1-18. Refer to sheet LF-111C for cabinet locations. Add keynote #3 to fixtures.
4. This sheet re-issued again to indicate modifications in lighting due to ceiling changes in main concourse and Lecture Hall.

Sheet EL-103A

1. Add keynote #2 to sheet which reads: "MOUNT UNDERCABINET LIGHTS TO UNDERSIDE OF UPPER CABINETS THAT ARE NOT-ADJUSTABLE. COORDINATE WITH MILLWORK AND/OR LAB FURNITURE INSTALLER."
2. Botany Undergrad (Dirty) 271 - Add one (UC-8) and one (UC-9) type fixture under the cabinets on the south wall. Provide single-pole switch on wall. Circuit to 2LB1-34. Refer to sheet LF-121A for cabinet locations. Add keynote #2 to fixtures.
3. Botany Undergrad (Dirty) 271 - Add one (UC-8) type fixture under the cabinets on the east wall. Provide single-pole switch on wall. Circuit to 2LB1-34. Refer to sheet LF-121A for cabinet locations. Add keynote #2 to fixtures.
4. Botany Teaching Lab 273 - Add three (UC-9) type fixtures under the cabinets on the south wall. Provide three-way switches on walls at both ends. Circuit to 2LB1-34. Refer to sheet LF-121A for cabinet locations. Add keynote #2 to fixtures.
5. Botany Teaching Lab 273 - Add one (UC-9) and one (UC-8) type fixtures under the cabinets on the east wall. Provide single-pole switch on wall. Circuit to 2LB1-34. Refer to sheet LF-121A for cabinet locations. Add keynote #2 to fixtures.
6. Prep 274 - Add two (UC-9) type fixtures under the cabinets on the west wall. Provide single-pole switch on wall. Circuit to 2LB1-34. Refer to sheet LF-121A for cabinet locations. Add keynote #2 to fixtures.
7. Prep 274 - Add one (UC-9) type fixture under the cabinet on the east wall. Provide single-pole switch on wall. Circuit to 2LB1-34. Refer to sheet LF-121A for cabinet locations. Add keynote #2 to fixtures.
8. Botany Teaching Lab 275 - Add two (UC-9) type fixtures under the cabinets on the west wall. Provide single-pole switch on wall. Circuit to 2LB1-34. Refer to sheet LF-121B for cabinet locations. Add keynote #2 to fixtures.
9. Botany Teaching Lab 275 - Add four (UC-9) and two (UC-8) type fixtures under the cabinets on the south wall. Provide three-way switches on walls at both ends. Circuit to 2LB1-34. Refer to sheet LF-121B for cabinet locations. Add keynote #2 to fixtures.
10. Herbarium + Curator 277 - Add six (UC-9) type fixtures under the cabinets on the south wall. Provide three-way switches on walls at both ends. Circuit to 2LA1-30. Refer to sheet LF-121B for cabinet locations. Add keynote #2 to fixtures.
11. Herbarium + Curator 277 - Add seven (UC-9) and two (UC-8) type fixtures under the cabinets on the east wall. Provide three-way switches on walls at both ends. Circuit to 2LA1-30. Refer to sheet LF-121B for cabinet locations. Add keynote #2 to fixtures.
12. Prep Room 277A - Add seven (UC-9) and one (UC-8) type fixtures under the cabinets on the south wall. Provide three-way switches on walls at both ends. Circuit to 2LA1-30. Refer to sheet LF-121B for cabinet locations. Add keynote #2 to fixtures.
13. Plant Team Room 278 - Add six (UC-9) type fixtures under the cabinets on the north wall. Provide three-way switches on walls at both ends. Circuit to 2LA1-30. Refer to sheet LF-121B for cabinet locations. Add keynote #2 to fixtures.
14. Human Performance Lab 254 - Add nine (UC-9) type fixtures under the cabinets on the west wall. Provide three-way switches on walls at both ends. Circuit to 2LA1-30. Refer to sheet LF-121B for cabinet locations. Add keynote #2 to fixtures.
15. Physiology Teaching Lab 262 - Add three (UC-9) type fixtures under the cabinets on the west wall and add four (UC-9) type fixtures under the cabinets on the north wall. Provide three-way switches on walls at both ends. Circuit to 2LB1-34. Refer to sheet LF-121C for cabinet locations. Add keynote #2 to fixtures.

16. Physiology Teaching Lab 258 - Add eleven (UC-9) type fixtures under the cabinets on the west wall and add four (UC-9) type fixtures under the cabinets on the north wall. Provide three-way switches on walls at both ends. Circuit to 2LB1-34. Refer to sheet LF-121C for cabinet locations. Add keynote #2 to fixtures.
17. Dry Teaching Lab 257 - Add five (UC-9) type fixtures under the cabinets on the north wall. Provide three-way switches on walls at both ends. Circuit to 2LA1-32. Refer to sheet LF-121C for cabinet locations. Add keynote #2 to fixtures.
18. Adv. Cadaver Teaching Lab 255 - Add four (UC-9) type fixtures under the cabinets on the north wall. Provide three-way switches on walls at both ends. Circuit to 2LA1-32. Refer to sheet LF-121D for cabinet locations. Add keynote #2 to fixtures.
19. Wet Teaching Prep Room 251 - Add six (UC-9) type fixtures under the cabinets on the south wall. Provide three-way switches on walls at both ends. Circuit to 2LA1-32. Refer to sheet LF-121D for cabinet locations. Add keynote #2 to fixtures.
20. Wet Teaching Prep Room 251 - Add one (UC-9) type fixture under the cabinet on the west wall. Provide single-pole switch on wall. Circuit to 2LA1-32. Refer to sheet LF-121D for cabinet locations. Add keynote #2 to fixtures.
21. Wet Teaching Prep Room 251 - Add two (UC-9) type fixtures under the cabinets on the east wall. Provide single-pole switch on wall. Circuit to 2LA1-32. Refer to sheet LF-121D for cabinet locations. Add keynote #2 to fixtures.

Sheet EL103B

1. Adv. Cadaver Teaching Lab 248 - Add three (UC-9) and one (UC-8) type fixtures under the cabinets on the north wall. Provide three-way switches on walls at both ends. Circuit to 2LA1-32. Refer to sheet LF-121D for cabinet locations. Add keynote #2 to fixtures.
2. Dry Teaching Lab 247 - Add four (UC-9) and one (UC-8) type fixtures under the cabinets on the north wall. Provide three-way switches on walls at both ends. Circuit to 2LA1-32. Refer to sheet LF-121D for cabinet locations. Add keynote #2 to fixtures

Sheet EL-501:

1. Add Dimmer Schedule for Dimming Panel "DMD" (attached).

Sheet EL-601:

2. Lighting Fixture Schedule Modifications are as follows:
    a. Fixture Type DD-5: This fixture was added in the previous addendum as is specified below:
    Type DD-5: 120V/250W tungsten halogen ellipsoidal downlight, 60 deg beam, 5" aperture, clear cone;
    Manufacturers:

RAMBUSCH	RD-60-250-Q-CC
KURT	
VERSEN	C7392
PRESCOLITE	N/A
OMEGA	OM6-500T4QTZ-WD-CS
LIGHTOLIER	7082-782 CL

LITHONIA	N/A
KIRLIN	RR30611

b. Fixture Type DF-47 and DF-48: Use the requirements and manufacturers for DF-48 for both of these fixtures (delete the requirements for DF-47, and the ID# for DF-48 becomes "DF-47 and DF-48").
c. Fixture Type OJ-2: Delete this fixture. It is no longer in the project.
d. OX-5, 5.4, 5.8: Change the description of the fixture to require 8 watts/foot in lieu of 3 watts/foot. Manufacturers shall adjust catalog numbers accordingly.
e. Fixture Type ZX-1: Increase contractor allowance to $2,250. The style and manufacturer are still to be determined.
f. Alternate Manufacturers: Subject to compliance with project requirements, the following manufacturers are allowed on the project:

Fixture Type	Manufacturer
AS-2	Ametrix SN-SI-X-1-CF-042-UNV-W-X-L45
AS-3	Ametrix SN-LI-X-2-CF-042-UNV-W-X-L45
AS-4D	Ametrix SN-LI-X-2-CF-055-UNV-W-X-L45
OX-5, 5.4, 5.8	Electric L100W-08-SA-XX-W3-45-SM
TX-1	Erco 33760.023 WE-EF 618-2726
UC-8	Airey-Thompson 12-1-14T5-0-3-SW
UC-9	Airey-Thompson 12-1-21T5-0-3-SW

Sheet ET-101A:

1. Alter conduit and cable tray to below Data room 163 as indicated on the attached sketch.
2. Relocate the cable tray above 052 to above the corridor to the east.
3. For all offices change all of the open triangles to a voice-data outlet.
4. Change keyed note #3 to read 4 each 4" conduits.
5. Verify exact location of all lecterns prior to installation.

Sheet ET-101B:

1. In 073 change the data outlet at the front of the room to a voice-data outlet.
2. In 038 change the data outlet at the front of the room to a voice-data outlet.
3. In 040 provide a data outlet on the north, east, and west walls. Provide a voice-data outlet on the south wall.
4. In 074 and 032 change the data outlet near the lectern to a voice-data outlet.
5. In 370 change the data outlet at the front of the room to a voice-data outlet.

6. Verify exact location of all lecterns prior to installation.

Sheet ET-102A:

1. Alter conduit and cable tray to Data room 163 as indicated on the attached sketch.
2. The cable tray above 154 shall not have sleeves at the wall. Cable tray shall be continuous.
3. For all offices change all of the open triangles to a voice-data outlet.
4. Change keyed note #1 to read 4 each 4" conduits.
5. Verify exact location of all lecterns prior to installation.

Sheet ET-102B:

1. Verify exact location of all lecterns prior to installation.
2. The conduit between the cable tray between gridlines 6.66 and 6.59 shall be changed to cable tray.
3. The conduit between the cable tray between gridlines 6.5 and 6.44 shall be changed to cable tray.
4. The conduit from the corridor to Data 134D is to be changed to cable tray.
5. Provide 4 each 4" conduits from the corridor cable tray to Data 244 above.
6. In 139 and 138 change the data outlet at the front of the room closest to the lectern to a voice-data outlet.
7. In space adjacent to Elec 134B that is not labeled there are 2 existing data locations one on the east wall and the other on the west wall. Remove all existing cabling and make the west outlet a new data outlet and the east outlet a new voice-data outlet.
8. In 132 there are 2 existing data locations one on the east wall and the other on the west wall. Remove all existing cabling and make the west outlet a new data outlet and the east outlet a new voice-data outlet.
9. In 134 provide data outlets as indicated on the EP sheets.
10. Provide an outlet in 134C with 6 each drops to the AV cabinet.
11. There is an array of 9 flat panel monitors shown on the atrium wall. Provide 1 each data outlet to each box. See attached EJ sketch.

Sheet ET-103A:

1. Alter conduit and cable tray to below Data room 163 as indicated on the attached sketch.
2. Relocate the cable tray above 052 to above the corridor to the east.
3. For all offices change all of the open triangles to a voice-data outlet.
4. Change keyed note #1 to read 4 each 4" conduits.
5. Verify exact location of all lecterns prior to installation.
6. At all locations with a lectern the front of the room near the lectern shall have a voice-data jack. If a data jack is already shown change it to voice-data.
7. In 268 provide a data outlet to each floor box and make the 2 western boxes voice-data.

Sheet ET-103B:

1. The rooms south of grid line 6.3 were not shown on the drawings. Add rooms and provide data as indicated on the power plans.

2. Add TV jacks to the following rooms: 243E, 243D, 243A, 242F, 241J, 241H, 241G, 241F, and 241C.
3. For a open triangles shown change to a voice-data outlet.
4. At all locations with a lectern the front of the room near the lectern shall have a voice-data jack. If a data jack is already shown change it to voice-data.
5. Change the conduit shown between cable tray at gridline 6.62 and corridor 240F to cable tray.

Sheet ET-601:

1. There are no future outlets. All open triangles are to be voice-data outlets.

Sheet EJ-102B:

1. The equipment rack in 134C is equipment rack #1.

Sheet EJ601:

1. Update detail 5 per the attached sketch. Exact location on wall is to be verified with architectural details. Verify rough-in prior to installation.
2. On detail 4 change the 1" conduits to the left to 2".
3. On detail 3 change all 1.25" conduits to 2".
4. On the projection screen schedule rooms 259, 273, 275, 276, 279 and 280 are to match 258.
5. On the project screen schedule 134 is to be a rear project screen Model Da-lite Series 200 Lace and Grommet Frame with Ultra Wide Angle Rear project screen material. Screen shall be 10' by 16' wide.
6. The projections screens specified can be supplied by a Stewart Film screen equivalent product.

Sheet EJ-602:

1. On detail 2 provide 4 each conduits from the lectern to 'M'.
2. On detail 1 from FB10, 11 provide 4 each 2" conduits from the 4/6 gang side.
3. On detail 3 change the conduit to 'F' to 2", the conduit to FB10 on the 2 gang side to 1.25" and on the 4 gang side add 2 each 2" conduits.

Sheets FA-101A through FA-601:

1. Add flow and tamper switch connections in the following locations (coordinate exact locations and quantities with fire sprinkler shop drawings and installer):
    a. Stair 030D, Levels 0, 1 and 2.
    b. Stair 030C, levels 0, 1, 2 and Penthouse
2. Atrium Stair-2 (Sheet FA-102B): In lieu of two electric roll-down doors, there are 7 each smoke doors. Refer to architectural plans for exact locations. Provide fire alarm connections such that doors activate (close) upon alarm and reset (open) when alarm is cleared.
3. Clarification on circuits and zoning: Fire alarm circuits with associated conduit and wiring shall be as follows:

a. Provide separate conduit loops for speaker/strobe devices (separate from conduit loops for initiating devices).
b. Provide no fewer than one initiating circuit per level: Levels 0, 1, 2 and Penthouse.
c. Provide no fewer than one speaker circuit (zone) per level: Levels 0, 1, 2 and Penthouse.
d. Quantity of strobe circuits shall be based on the power supply serving the circuits, with 25% spare capacity in each power supply. Do not circuit strobes on different floors together.

Sheet TT-001:

1. There is no outside plant fiber or riser cable. All riser cable is to be plenum rated.
2. All multi-mode fiber is to be 62.5 micron.
3. The voice jacks are to be black.
4. The open frame 19" equipment rack is to be a Siemons RS-07-S and VPC-6.
5. The Seimon 10GMX-02 part number is to be a Z6A-02.
6. The punch down blocks shall be 110 not 66.

Sheet TT-501:

1. All faceplates shall be double gang when indicated on equipment list.

Sheet TT-601:

1. Provide a data drop to all projectors shown on ET sheets.
2. Provide TV jacks as added on ET sheets.
3. Change the 300 cat 3 riser cable to 600 pair.
4. For all floor boxes at conference room tables provide 4 each data drops and a voice drop.
5. Provide a 'F' type cable and 200 pair cat 3 riser cable from the new server to the 3 existing comm rooms in the existing science building. There is one on each floor. Provide sufficient cable to reach the farthest location on each floor. Verify exact termination with UVU personnel. Provide fiber patch panel and 110 blocks in existing rooms and new server room.

Sheets LE-101A through LE-121D (all Lab Electrical Plan Sheets):

1. Power to AV lecterns and overhead document camera is required in each lab room where projectors and/or lecterns are indicated. In each room, provide ceiling power outlet above lectern, circuited with projector power outlet. Provide two quad outlets at lectern, each on dedicated circuit, circuited to the panel location where other outlets in same room are circuited. Exact circuit numbers to be provided later. Rooms where this occurs are as follows:

   Level 0:
   Rooms 044, 048, 049, 052, 053, 057, 062, 066, 069

   Level 1:
   Rooms 140, 147, 152, 154, 160, 171, 175, 176

   Level 2:

Rooms 247, 248, 254, 255, 257, 258, 262, 273, 275, 278

Sheet LE-001:

1. Refer to EJ and ET sheets for coordination of voice-data and audio-visual systems rough-in.
2. The open symbols shown on the LE sheets do not match the symbols on the ET and EJ sheets. Descriptions provided for the devices shall take precedent over the symbol shown.
    a. The open triangle shall be equivalent to a data jack shown on the ET sheets.
    b. The half shaded triangle shall be the same as the ET sheets.
    c. All floor boxes shall receive 2 each data drops unless indicated otherwise.
3. All voice-data and audio-visual systems shall comply with UVU Master Cabling Spec.
4. In all instances voice-data outlets shall be within 6" of a duplex power outlet.
5. Where voice-data outlets are added verify all locations with UVU personnel prior to installation.
6. All conduit for data and voice-data outlets shall be minimum 1.25". Where conduit enters surface raceway provide minimum 2 each 1.25" conduit.

Sheet LE-101A:

1. In Room 062 and 066 provide a data outlet to each of the tables and provide a voice-data outlet on the north and south walls next to an accessible power outlet.
2. Provide a voice-data outlet on the northwest and southeast wall above the countertop.
3. Provide a voice-data outlet in 065.
4. In 057 provide a voice-data outlet at the front of the room and added an additional outlet at the back to the south of the one shown.
5. In 057A provide a voice-data outlet on the west wall above the counter, a data outlet in the center island and on the south wall.
6. In 52A provide a voice-data outlet on the east wall above the counter, a data outlet in the center island and on the south wall.
7. In 055 provide a voice-data outlet on the north and south walls.
8. In 054 provide a voice-data outlet on the north and south walls.
9. In 052 provide a data outlet to each of the lab tables and a voice-data outlet to each of the walls.
10. In 049 provide a data outlet to each of the lab tables and a voice-data outlet to west east and south walls.

Sheet LE-101B:

1. In 069 provide a data outlet to each of the lab tables and a voice-data outlet to each of the walls.
2. In 071A provide a data outlet on the west wall. change the phone outlet on the west wall to a voice-data outlet.
3. In 070 change the outlet to voice-data.
4. In 071 provide a data outlet to each of the island lab benches and 2 each data outlets on the east wall. Change the phone outlet on the south wall to voice-data.
5. In 068B add a data outlet on the west and south wall.
6. In 068 change the data outlet on the south wall to a voice-data.
7. In 068H change the data outlets to voice-data.
8. In 068G change the data outlet to voice-data.

9. In 068E change the data outlet to voice-data

Sheet LE-101C:

1. In 033 provide a data outlet at each lab table, and provide a voice-data outlet on the front wall.
2. In 051 provide a data outlet on the west and north wall and in the northeast wall.
3. In 048A provide a data outlet in the center island.
4. In 050 add a voice-data outlet on the east and south walls.
5. In 048 provide a data outlet to each of the lab tables and a voice-data outlet to the front wall.

Sheet LE-101D:

1. In 047A add a data outlet on the east wall.
2. In 045B and 047D add a data outlet on the south wall.
3. In 047C provide a data outlet on the west wall.
4. In 044A provide a data outlet on the east wall.
5. In 044B provide a data outlet on the east wall.
6. In 044 provide a data outlet on the west wall, 2 each on the south wall, one to each lab table and a voice-data outlet on the south wall.
7. In 039 provide a data outlet on the north, west, and south walls.
8. In 037 provide a data outlet on the north and west walls.
9. In 034 provide a data outlet on the west wall and a voice-data outlet on the south wall.

Sheet LE-111A:

1. In 167 provide a data outlet to each of the lab tables and on the south and east walls. Provide a second data outlet on the west wall.
2. In 167C provide a second data outlet on the north wall on the east side.
3. In 167B add a data outlet on the north and south walls.
4. In 170 provide a data outlet to each lab table and to the north, south, and east walls.
5. In 171 provide a data outlet to each lab table and to the north and east walls. Provide a voice-data outlet on the west wall.
6. In 166 provide a data outlet on the north and south walls.
7. In 169 provide a data outlet on the east and west walls and a voice data outlet on the north and south walls.
8. In 154 provide a voice-data outlet on the north, south, and east walls.
9. In 153 provide a data outlet on the east and west walls.
10. In 151 provide a data outlet on the west wall and a voice-data outlet on the east wall.

Sheet LE-111B:

1. In 173A provide data outlet s on the east, west and south walls.
2. In 171 provide a data outlet on the west wall.

3. In 173 provide data outlets on the north, south, and east walls and in the center lab table. Provide a voice-data outlet on the west wall. In 174 provide a data outlet on the north and west walls. Provide a voice-data outlet on the east wall.
4. In 176 provide a voice-data outlet on the north, east, and west walls. Provide a data outlet to each of the lab tables.

Sheet LE-111C:

1. In 160 provide a data outlet on the north, south and east walls and a voice-data outlet on the west wall.
2. In 157 provide a data outlet on the west wall and the north east wall and in the lab table. provide a voice-data outlet on the south wall.
3. In 152 provide a data outlet on the north wall and a voice-data outlet on the south wall.

Sheet LE-111D:

1. In 147 provide data outlets on the north, south, and east walls. Provide a voice-data outlet on the west wall.
2. In 143 provide a data outlet at the lab table and a voice-data outlet on the south wall.
3. In 140 provide a voice data outlet on the north, south, east, and west walls.
4. Provide a voice-data outlet on east and south walls of the shelled space.

Sheet LE-121A:

1. In 273 make the data outlet on the east, west and south walls voice-data.
2. In 274 provide a data outlet on the west wall and the south wall on the east side and in the lab table. Make one of the data outlets on the north wall a voice-data outlet.

Sheet LE-121B:

1. In 275 provide a data outlet on the west wall.
2. In 277A provide a voice-data outlet on the west wall.
3. In 277B change the data outlets to voice-data.
4. In 278 provide a data outlet on the west wall.
5. In 254 provide a floor data outlet next to each of the power outlets shown on the floor.

Sheet LE-121C:

1. In 262 provide a data outlet to each of the center lab tables and provide a voice-data outlet on the east wall.
2. In 258A provide a data outlet in the center lab table.
3. In 258 provide a data outlet to each of the center lab tables.
4. In 257 provide a floor data outlet next to each of the power outlets at the tables and a voice-data outlet at the east and west walls.

Sheet LE-121D:

1. In 251 provide a voice-data outlet on the south wall.
2. In 247 provide a floor data outlet next to each of the power outlets at the tables and a voice-data outlet at the east and west walls.

IV. QUESTION AND ANSWERS

The following questions were presented by various bidders. Answers are provided below (if a questions from any bidder is not listed below, then the question should have been answered in this addendum, above, or in previous addenda):

Question: UVU currently is licensed for 256 access control doors within OnGuard, and is using approx. 205 of these available licenses. The Lenel system will require a server software upgrade to "PROI" in addition to the extra reader licenses required to facilitate all access doors on the new science building. Will this be required to be included in the base bid?
Answer: Providing all additional licensing for the number of card readers being added to the campus system as part of this project are addressed in the specifications. If the existing system is not expandable for the inclusion of the required reader licenses to cover the new readers, the system shall be upgraded to meet system requirements. Whatever licensing and/or software upgrades that are required for the additional number of readers to function as a complete system with the existing campus access control system shall be provided as part of this project. A complete and functioning system is specified.

Question: Section 282300 – Video Surveillance – Section does not indicate if and how cameras will be recorded.
Answer: The specified system components are an addition of IP (network) cameras to an existing campus Video network. Recording for these new cameras, as well as all existing cameras elsewhere on the campus are recorded on the network in some existing storage array, most likely on the security office video servers. There is no requirement for any additional recording components to be provided in this scope of work.

END OF ADDENDUM

Attached:

Panel Schedule "0LA2"	1 page
Dimmer Schedule "DMD"	1 page
UVU Master Cable Specifications	15 pages
Revision Drawings	4 pages (8½ x 11)
Revision Drawings	5 full-size sheets

PANEL "0LA2"

VOLTS/PHASE/WIRE:	PANEL SIZE & TYPE:	MAIN SIZE & TYPE:	LOCATION:	CABINET:	NOTES:
120/208 V, 3 PH 4 WIRE	22" W x 6" D, BOLT-ON	225 AMPERE MAIN LUGS			

ACCESSORIES: PANEL DIRECTORY, IDENTIFICATION, GR BAR, INS GR BAR, THRU-FEED LUGS, 200% NEUTRAL, SURGE PROTECTIVE DEVICE

CKT	OCP		LOAD (kVA)			DESCRIPTION	LCL	PHASE LOAD			LCL	DESCRIPTION	LOAD (kVA)			OCP		CKT
NO	AMP	POLE	LTG	CO	PWR		kVA	A	B	C	kVA		LTG	CO	PWR	AMP	POLE	NO
1	20	1		1.2		LECTURE 073 SEAT CO'S	1.2	1.2			0.0	SPARE				20	1	2
3	20	1		1.2		LECTURE 073 SEAT CO'S	1.2		1.2		0.0	SPARE				20	1	4
5	20	1		1.2		LECTURE 073 SEAT CO'S	1.2			1.2	0.0	SPARE				20	1	6
7	20	1		1.2		LECTURE 073 SEAT CO'S	1.2	1.2			0.0	SPARE				20	1	8
9	20	1		1.2		LECTURE 031 SEAT CO'S	1.2		1.2		0.0	SPARE				20	1	10
11	20	1		1.2		LECTURE 031 SEAT CO'S	1.2			1.2	0.0	SPARE				20	1	12
13	20	1		1.2		LECTURE 031 SEAT CO'S	1.2	1.2			0.0	SPARE				20	1	14
15	20	1		1.2		LECTURE 031 SEAT CO'S	1.2		1.2		0.0	SPARE				20	1	16
17	20	1				SPARE	0.0			0.0	0.0	SPARE				20	1	18
19	20	1				SPARE	0.0	0.0			0.0	SPARE				20	1	20
21	20	1				SPARE	0.0		0.0		0.0	SPARE				20	1	22
23	20	1				SPARE	0.0			0.0	0.0	SPARE				20	1	24
25	20	1				SPARE	0.0	0.0			0.0	SPARE				20	1	26
27	20	1				SPARE	0.0		0.0		0.0	SPARE				20	1	28
29	20	1				SPARE	0.0			0.0	0.0	SPARE				20	1	30
31	20	1				SPARE	0.0	0.0			0.0	SPARE				20	1	32
33	20	1				SPARE	0.0		0.0		0.0	SPARE				20	1	34
35	20	1				SPARE	0.0			0.0	0.0	SPARE				20	1	36
37	20	1				SPARE	0.0	0.0			0.0	SPARE				20	1	38
39	20	1				SPARE	0.0		0.0		0.0	SPARE				20	1	40
41	20	1				SPARE	0.0			0.0	0.0	SPARE				20	1	42
43	20	1				SPARE	0.0	0.0			0.0	SPARE				20	1	44
45	20	1				SPARE	0.0		0.0		0.0	SPARE				20	1	46
47	20	1				SPARE	0.0			0.0	0.0	SPARE				20	1	48
49	20	1				SPARE	0.0	0.0			0.0	SPARE				20	1	50
51	20	1				SPARE	0.0		0.0		0.0	SPARE				20	1	52
53	20	1				SPARE	0.0			0.0	0.0	SPARE				20	1	54
55	20	1				SPARE	0.0	0.0			0.0	SPARE				20	1	56
57	20	1				SPARE	0.0		0.0		0.0	SPARE				20	1	58
59	20	1				SPARE	0.0			0.0	0.0	SPARE				20	1	60
61	20	1				SPARE	0.0	0.0			0.0	SPARE				20	1	62
63	20	1				SPARE	0.0		0.0		0.0	SPARE				20	1	64
65	20	1				SPARE	0.0			0.0	0.0	SPARE				20	1	66
67	20	1				SPARE	0.0	0.0			0.0	SPARE				20	1	68
69	20	1				SPARE	0.0		0.0		0.0	SPARE				20	1	70
71	20	1				SPARE	0.0			0.0	0.0	SPARE				20	1	72
73	20	1				SPARE	0.0	0.0			0.0	SPARE				20	1	74
75	20	1				SPARE	0.0		0.0		0.0	SPARE				20	1	76
77	20	1				SPARE	0.0			0.0	0.0	SPARE				20	1	78
79	20	1				SPARE	0.0	0.0			0.0	SPARE				20	1	80
81	20	1				SPARE	0.0		0.0		0.0	SPARE				20	1	82
83	20	1				SPARE	0.0			0.0	0.0	SPARE				20	1	84
TOTALS:						CONNECTED kVA PER PHASE		**4**	**4**	**2**					CONNECTED TOTAL kVA			**10**
						CONNECTED AMPS PER PHASE		**30**	**30**	**20**					CONNECTED AVERAGE AMPS PER PHASE			**27**

NEC DIVERSIFIED LOAD CALCULATIONS

LIGHTING 0kVA @125% =	**0** kVA	ALL OTHER LOADS @100% =	**0** kVA	DIVERSIFIED TOTAL kVA =	**10**
RECEPTACLES 10kVA @100% =	**10** kVA	25% OF LARGEST MOTOR =	**0** kVA	AVERAGE AMPS PER PHASE =	**27**
REMAINDER 0kVA @ 50% =	**0** kVA				

DIMMING SCHEDULE

UVU POPE SCIENCE BUILDING

Panel ID: DMD	Location: 134 C	Page 1	Main CB: None	JOB # 20090473	5/25/2010
Mount: WALL	Feeder: 3P4W 4 #6 THHN		120/208 VOLTS		

Accessories: Locking Door, Circuit Directory, Panel ID Tag, Ground Bar, Control Decoder, Individual Neutrals, digital controller, network interface

Slot No.	Type	Amps	Control Pole	Control Ch#	Load Lighting	Load Outlets	ID	Location	Total Watts	Panel Loading A	Panel Loading B	Panel Loading C	Total Watts	Location	ID	Load Outlets	Load Lighting	Control Ch#	Control Pole	Amps	Type	Slot No.
1	Dimmer	20	1	A 7	750	0	DMD 1	DB1	15000	30000			15000	DB1	DMD 2	0	750	A 8	1	20	Dimmer	2
3	Dimmer	20	1	A 9	750	0	DMD 3	DB1	15000		30000		15000	DB1	DMD 4	0	750	A 10	1	20	Dimmer	4
5	Dimmer	20	1	A 11	750	0	DMD 5	DB2	15000			30000	15000	DB2	DMD 6	0	750	A 12	1	20	Dimmer	6
7	Dimmer	20	1	A 13	750	0	DMD 7	DB2	15000	30000			15000	DB2	DMD 8	0	750	A 14	1	20	Dimmer	8
9	Dimmer	20	1		750	0	DMD 9	SPARE	15000		30000		15000	SPARE	DMD 10	0	750		1	20	Dimmer	10
11	Dimmer	20	1		750	0	DMD 11	SPARE	15000			30000	15000	SPARE	DMD 12	0	750		1	20	Dimmer	12
				100%						Total A	Total B	Total C						Lighting Diversity			125%	
									Watts	60,000	60,000	60,000										
	STARTING ADDRESS - DMX 12								Amps	500	500	500										

Utah Valley University
IT Infrastructure and Cabling Specifications
for all new construction and remodeled spaces

Cable TV, Media, Voice and Data (10Gig Solution)

Revised 07/8/09

The purpose of this document is to define UVU IT Infrastructure and Cabling specifications and standards.

All new construction and/or remodels on UVU campus will, at least, include the infrastructure necessary for the installation of technology weather the technology itself will be purchased as part of the building project or at a future date.

Bonding All bonding must comply with current TIA/EIA 607 standards.

Testing and Documentation All voice/data and fiber cables must be tested and certified to run at minimum speeds as set buy cable manufacture. Each cable must be documented and recorded in a database and supplied to UVU in a digital format. CAD drawings documenting the voice/data/fiber systems will also need to be supplied to UVU. **All work must meet 569 Pathways Standards.**

Certification and Warranty All voice/data/fiber work must have both installers guarantee as well as a manufacturer's warrantee. Each fiber will be tested at both 850nM and 1300nM multimode, or 1310nM and 1550nM singlemode. All work will be in compliance with UVU standards and stay in compliance of EIA/TIA standards. All state and local codes must also be followed. Any changes from these standards must have written permission from UVU IT. All contractors will keep UVU updated throughout the project.

Contractors, Sub-contractors and Installers All contractors, sub-contractors and installers must be approved by UVU IT. All voice/data contractors, sub-contractors and installers must be Siemon CI's.

Abandoned Cable All abandoned cable that isn't terminated at both ends must be removed by contractor before any cable can be placed. Abandoned cable can also be determined by UVU IT.

Communications Wire Drop and Termination Specification Horizontal voice drop cable must be a blue cat5e wire, terminated on (2) USOC RJ-14c jacks. Blue and orange pairs must be terminated on jack 1. Green and brown pairs terminated on jack 2. Jacks must be mounted in the upper left of the double gang face plate on the work station end and terminated in the IDF/MDF on standard 110 style termination block. Horizontal data drop cables must be white 10G 6A terminated on angled RJ45 10G 6A jacks and mounted in the lower left double gang face plate on the work station end and terminated in the IDF/MDF/Switch enclosure with flat RJ45 10G 6A jacks on a 48 port 10G 6A patch panel.

Any unused face plate hole on the workstation end will be filled with a blank cover. All wire used at UVU will be plenum rated and terminated to 568B wiring standards. All wiring will be in a conduit or cable tray. (1) 10G 6A white patch cable will be supplied for every terminated horizontal data connection from the patch panel in the IDF/MDF (50% 3', 25% 5', and 25% 7'). The channel link must comply with the TIA/EIA standards for Cat 6A.

Conduit No Communications or Media conduit will be smaller than 1". All work must meet the 572 TIA/EIA standards.

Communications Conduit All data/voice communication conduit runs will consist of 1" conduits that go from the termination box in the wall up into the ceiling and then stubs into the nearest cable tray. These conduit runs will have a maximum of (3) 90 degree bends. All termination boxes will be double gang with a double mud ring unless otherwise specked by UVU. All conduit ends will have insulating bushings to protect cables from abrasion.

Podium Communications Conduit All podium data/voice communication conduit runs will consist of (2) 1" and (1) 2" conduit that go from the in-floor termination box through the floor then up the wall into the ceiling and then stubs into the nearest cable tray. These conduit runs will have a maximum of (3) 90 degree bends. All conduit ends will have insulating bushings to protect cables from abrasion.

Media Conduit All media conduit runs must consist of mix of 1" and 2" conduits. These conduit runs will have a maximum of (3) 90 degree bends. All termination boxes will be double gang with a double mud ring unless otherwise specked by UVU. All conduit ends will have insulating bushings to protect cables from abrasion.

Standard Communications Drop A standard drop is (1) voice cable and (2) data cables. (See UVU Communications Wire Drop and Termination Specification)

Raised Floor Communications Drop A raised floor drop is (2-12) data cables to MUTOA points/termination boxes. MUTOA point/termination box jacks under the floor must be equally distributed around the room with a maximum patch cord to computer length of 25' (maximum of (12) data connections to any one location). All jacks including wall and podium data drops in a lab will terminate in the uplink patch panel located in the switch enclosure. A complete end to end/channel link solution will be provided which means patch cords on both ends. (See UVU Communications Wire Drop and Termination Specification)

Movable/Modular Furniture Communications Drop Furniture will be connected to the hardwired jack via a patch cord with a coupler located in the furniture. No pertinent wiring will be allowed in furniture.

Wireless Access/IP camera drop A wireless access/IP camera drop is (2) data cables, located above the drop ceiling or above 120" from floor. Purple patch cords will be provided for every terminated wireless access/IP camera connection from the Max patch panel in the MDF/IDF (50% 3', 25% 5', and 25% 7'). (See UVU Communications Wire Drop and Termination Specification)

Podium Communications Drop A podium drop is (6) data, (1) voice and (1) cable TV. This communications drop will also include (2) 20 amp duplex power outlets on separate circuits. This will be terminated in (1) in-floor box. This Podium Data/Power in-floor Box will be located within 4" of the Podium Media in-floor box. This in-floor box needs to be adequately sized to accommodate all connections without compromising the integrity of the cables. The floor box must be level with the floor and have the capability of placing a podium over it. (See UVU Communications Wire Drop and Termination Specification)

Front Wall Communications Drop A front wall drop is (4) data cables, installed on the front wall near the center, above the drop ceiling or above 120" from floor. (See UVU Communications Wire Drop and Termination Specification)

Fiber Multimode and singlemode fiber will be rated to the appropriate TIA/EIA standard to provide 10G. Each fiber cable will be terminated, documented and labeled at each end in its own RIC/LIU. All fiber terminations must be SC connectors. All fiber must be in conduit or plenum innerduct. All singlemode terminations will be fusion spliced pigtails. Multimode and singlemode duplex SC-LC fiber patch cords will be provided for a minimum of 25% of the installed fiber in the building (60% 1 Meter and 40% 3 Meter).

Fiber Uplinks Fiber uplinks will be at least (24) strands of singlemode and at least (24) strands of multimode fiber to all IDF rooms from the MDF room, and (12) strands of singlemode and at least (12) strands of multimode fiber to all server room racks/enclosures from the MDF room. There must also be at least (12) strands of multimode fiber to each wall mount swing out switch enclosure.

Backbone Fiber Connection Backbone fiber that connects a buildings main data room (MDF) to another campus buildings main data room (MDF) will be at least (144) strands of singlemode fiber. All fiber cables will be terminated in separate RIC/LIU's.

Wiring for Security Devices Proximity lock wiring (See UVU Locksmith for Specs). Security camera (See wireless access/IP camera drop).

Data/network Equipment Connectivity for each jack must be provided. All data equipment must be compatible with current UVU systems and standards. See UVU IT for current spec.

Raised floor area Tiles must use stringer cross beam construction for support. Tiles need to be 2'x2' in size and non-concrete filled. Tiles will be held in place by friction and not individually attached using screws. Floor must have a minimum depth of 12" to allow for infrastructure placement without restricting air flow. Cable tray must be provided under raised floor area for cable management. Raised floor and cable tray must be properly grounded.

Computer Lab Raised floors All computer labs will have raised floor and follow all the specifications and standards that are outlined in the "Raised Floor Area" of this document. In a building where there are multiple computer labs those labs should be grouped together with

a common raised floor. There should be enough conduits from under floor to switch enclosure to allow for required cable plus 50% room for growth. Computer labs can have carpet on top of raised floor tiles. Conditioned power must be supplied under computer lab raised floors to adequately support computer lab workstations.

Switch enclosures Computer lab switch enclosures will be located either in a common Data/Telecomm Rooms (IDF/MDF) type room that is shared by multiple labs or in a Wall Mount Swing Out Switch Enclosure.

Server Room will have raised floor and follow all the specifications and standards that are outlined in the "Raised Floor Area" of this document. Tiles in the Server Room must have an anti-static finished tile surface (without carpet). Conditioned power that is protected with UPS and connected to a generator back up system must be supplied under server room raised floors to adequately support computer equipment that is installed in the server room (contact UVU IT Services to coordinate). All power distribution equipment such as transformers, UPS equipment, breaker panels, and PDU equipment will not be housed in the server room. Optimally the server room will be located adjacent to the buildings MDF. There must be a clear and easily accessible cable tray path that connects the server room with the MDF and there must be enough cable tray capacity between these two rooms to allow for 400% growth. The room will have a horizontal ladder/cable tray on all outside walls and extend just above the top of all the equipment racks/enclosures. Server rooms must have a 24/7 365 days a year HVAC system, controlled independently from the buildings HVAC system. The rooms HVAC system must be on the generator back up system. Temperature and humidity need to be monitored by both IT Services and Central Plant via TCP/IP. A secondary/backup heat displacement system that is manually controlled, reversible from outside supply to outside exhaust will be provided. Access will be proximity lock controlled as well as have video security monitoring. A ground bus connected to the main building ground will be provided. All walls must be covered with ¾" 8' high plywood, painted with a fire retardant paint.

Data/Telecomm Rooms (IDF/MDF) Data/Telecomm Rooms consist of IDF and MDF rooms. Optimally these rooms are located in the central core of a building. When construction consists of multiple floors these Data/Telecomm Rooms must be stacked on top of each other. These rooms work best if they are rectangle in shape with a door in one end. There must be a minimum of (2) 4" x 12" holes or (4) 4" conduit sleeves in floor/ceiling with vertical ladder/cable trays connecting the rooms. The room will have a horizontal ladder/cable tray on all outside walls with a tee extending just above the top of racks. In general all horizontal copper cabling (except for computer labs) will terminate in one of these rooms. All copper data connections to these rooms can be no longer then 280' (permanent link). Each rack and one or more outlets on each wall must have (1) dedicated 20 amp circuit conditioned through a UPS and connected to a generator back up system. Power transformers will not be housed in the IDF/MDF rooms. Rooms must have a 24/7 365 days a year HVAC system, controlled independently from the buildings HVAC system. The rooms HVAC system must be on the generator back up system. Temperature and humidity need to be monitored by both IT Services and Central Plant via TCP/IP. Access will be proximity lock controlled as well as have video security monitoring. A ground bus connected to the main

building ground will be provided. These rooms need to be directly accessible from the hallway. All IDF and MDF walls must be covered with ¾" 8' high plywood, painted with a fire retardant paint.

IDF Rooms All IDF rooms must be at least 140 square feet and centrally located on each floor and stacked vertically above each other and with the MDF room.

MDF Rooms The MDF room must be at least 500 square feet and centrally located on the floor and stacked vertically above or below the IDF rooms.

Wall Mount Swing Out Switch Enclosure Switch enclosures will be an enclosed standard 19" equipment rack with front and rear rack rails with a smoked glass front cover. Enclosure must lock and have a hinge in the front and rear for center swing out feature, with a door that will swing left or right. Enclosure must lock in front and rear and have wire management. Enclosure dimensions are 36" high with a center section no less than 18". Enclosures will be mounted in compliance with ADA standards, which is the bottom of the enclosure can be no lower then 80" from the floor. Each enclosure must have fiber uplink to MDF/IDF, (1) dedicated 20 amp circuit conditioned through a UPS and connected to a generator back up system, and a rack mount power strip. There should be enough conduit capacity from switch enclosure to the cable tray and to under the floor to allow for cabling, fiber and innerduct plus 50% room for growth.

Telco Racks MDF/IDF racks must be 7 foot full size steel racks, with cable and power management. Each rack must have a full height vertical cable management system attached. Just above the highest patch panel and just below the lowest patch panel there must be a 2RU horizontal wire management panel. In between each patch panel there needs to be a 2U horizontal wire management panel. Each rack must have (1) dedicated 20 amp circuit conditioned through a UPS and connected to a generator back up system. Each rack must have a rack mount power strip. All racks must be properly grounded to TIA/EIA standards. Copper cable, fiber optic cable and data electronics must be terminated and installed in separate racks. There must be enough rack capacity to handle all cable and equipment plus allow for 50% growth.

Equipment Racks/Enclosures Server room racks/enclosures must have an equipment mounting height of 42U for EIA-310-D 19" equipment. Cable and power management in the racks/enclosures must be provided. Each rack/enclosure must have (2) dedicated 20 amp circuits conditioned through a UPS and connected to a generator back up system. Each rack/enclosure must have (2) rack mount power strips. Each equipment rack/enclosure will have fiber uplinks to the MDF room. All racks/enclosures must be properly grounded to TIA/EIA standards.

Patch Panels 48 port 10G 6A Patch Panel

Phone feeder cable All feeder cable must be terminated in 110 style termination blocks. All feeder cable must be riser rated. All feeder cable must be fully tested for continuity. No defective pairs will be accepted.

Cable Tray Cable tray must follow all major corridors of the building; it must be ladder type and must be sized appropriately to provide adequate capacity for cable spec plus 50% growth, minimum size to be 4”x12”. The cable tray must penetrate all necessary walls in order to provide a continuous path. If it is not possible to continue the cable tray through the wall (4) 4” conduits must be provided in order to continue the path. Cable tray must extend into IDF/MDF rooms and will connect to ladder/cable tray on all outside walls with a tee extending to just above the top of racks of the IDF/MDF. Vertical ladder/cable trays will be used for any vertical rise of tray or when connecting rooms above or below tray. When a cable tray goes through a floor/ceiling there must be a minimum of (2) 4” x 12” rectangular holes or (4) 4” conduit sleeves in floor/ceiling with vertical ladder/cable trays connecting the rooms. A separate cable tray will be installed for all backbone hard sheath cable and inner duct. All cable trays will be properly grounded. There must be enough cable tray capacity to allow for 50% growth.

Cable TV Standard Drop

Digital Cable TV Option: IPTV specs to be determined. See owner.

Analog Cable TV Option: All Horizontal cable TV drops must be made with (1) white RG-6 plenum rated cable. All cable TV drops must be terminated with F-Conn Industries (part # FS6-R), Digicon (part # DS6.01-02), or equivalent RG6 F connector’s.

In offices, cable TV outlets will be terminated along with (1) of the standard communications voice/data drops. It will be located with the standard communications voice/data drop opposite the hallway entrance to the office. It will consist of (1) coax F-type angled module located on the bottom right of double gang face plate.

In non media enhanced instructional space/labs, cable TV outlets will be terminated in the front corner of the instructional space/lab normally opposite the hallway entrance, and 12” from the ceiling in the media front side J-box. It will consist of a coax coupler with (1) F-type adapter located on the bottom of face plate with a flat blank cover in the top of the face plate. There shall also be a power outlet within 12” of cable TV box to provide power for display.

In media enhanced instructional space/labs, cable TV outlet will be terminated in the podium communications drop it will consist of a coax F-type angled module located on the bottom right of double gang face plate.

All RG6 cable TV drops will home run back to the nearest tap location in the hallway cable tray or Data/Telecomm room. No daisy chains, splitters or combiners are to be used in the distribution lines. Cable TV drops will normally not be any longer then 100’ and may not exceed 150’ maximum. A minimum RF level of 0 to +4 dB will be maintained at the wall output connection. Cable TV drops normally will be grouped in the hallway cable tray in groups of (4-6) drops per tap location. Each cable TV drop must be labeled at each tap location.

Cable TV Distribution System
Digital Cable TV Option: IPTV specs to be determined. See owner.

Analog Cable TV Option: This system will be integrated into the existing campus wide C-Cor 750 MHz bi-directional Mid-Split broadband distribution system, using C-Cor Bridging Amplifier's (part # FNB99DS-L08G6C1), or equivalent, and ½" plenum rated Commscope trunk cable (part # Commscope 2312 White), or equivalent, installed with no splices and terminated with Gilbert ½ " Trunk connectors (part # 500-CH-DU-03) , or equivalent. Amplifiers may be placed in phone/data rooms or hung from the cable tray (As specified by UVU).
This cable TV broadband RF distribution system will distribute campus audio and video signals throughout the building including all instructional space labs and all offices. The system will use broadband bi-directional bridging amplifiers, a main trunk line to maintain an independent distribution system to amplifiers and a building distribution trunk line with directional couplers (taps). Power is provided thru the trunk cable from the CS Building head-end unless the signal is provided to the building via fiber then a power supply will be required in the building. The building distribution trunk line will have appropriately spaced multi-outlet "0" loss directional couplers (taps). Taps will be Regal RTM-XXBCP, or equivalent, with XX being the appropriate dB drop value of 32, 26, 23, 20, 14, and 11 (part # RTM-XXBCP). Taps will normally serve a maximum of six individual cable TV drops and have (2) ports available for future UVU use. Taps will be mounted on the hallway cable trays or in the phone/data rooms with an appropriately designed output gain, so that a minimum RF level of 0 to +4 dB will be maintained at the wall television connection. The cable TV distribution system will provide all cable, amplifiers, splitters, directional couplers (taps), terminators, outlets, and connectors. It will be designed and engineered to established Cable TV standards. The design will include schematics as to where all amps and taps should be located as well as the proper values for the taps. Documentation, including as-builds to where all amps and taps are located as well as the values for the taps will be supplied to UVU. The complete cable TV distribution system will be bid as a single lump sum unit price.

UVU Media Technology Definitions UVU media enhanced teaching environments consist of four types of instructional space: lecture halls, classrooms, labs and conference rooms. There are also three classifications or levels within the different types of instructional spaces: Premier, Standard and Basic. All new construction and/or remodels on UVU campus involving instructional space will include the infrastructure necessary for such technology as laid out in this document weather the equipment will be installed with the project or at a later date.

Media Testing and Documentation All media cabling must be tested and certified by the installer according to UVU specifications. Cable must be documented in a database and supplied to UVU in a digital format. CAD drawings documenting all media connections, settings and systems will need to be supplied to UVU upon substantial completion. All

system interfaces must match existing campus system. In the case that UVU Media Engineering opts to do the classroom integrations proper infrastructure and resources we be put into place to accommodate their needs following the standards outlined in this document.

Media Certification and Warranty If an AV integration company is used on a project they must have at least 5 years experience installing media equipment in the education environment and be accepted by UVU. All installations must be warranted by installer as specified in building program. All media integrators will follow UVU media standards and will stay in compliance with standards set fourth in the buildings program. Any deviance from these standards requires consent from UVU. Contractor and media integrator will keep UVU Media Engineering updated and informed throughout the building project.

Media Wire and Termination Specification All media cabling must be plenum rated (unless specified by UVU). Highest resolution signals will always be used. Each cable must be labeled on both ends first stating the destination and then the origination signal. All cable should be run in a cable management system following LVC standards, and will be organized in a professional manner approved by UVU. All cable will have enough length in order to allow for cable management without having any stress or strain to the cable or equipment connection. Cables will be terminated to length without excess cable length. All cabling should follow industry standards for length of run. VGA cables will be no longer than 45" without amplification. Cable used will be certified by UVU prior to use on any project. All cable clean-up will use Velcro straps instead of cable ties.

Media Integration All media integration must meet or exceed ADA, Americans with Disabilities Act, standards as well as UVU campus standards as outlined in this document. In person coordination is also recommended with the UVU media department as to assure continuity throughout all campus technology installs. Both cabling and equipment integration will be done as part of the building construction process, providing UVU a turn-key solution upon completion of the building. In the event that the media integration is not done as part of the building construction, UVU media and one sub-contractor will be allowed in the building 4 months prior to substantial completion, allowing them to complete the media work along with the final stages of the building construction process. UVU media will be compensated for labor and overtime costs through the building budget. All other UVU media projects and support priority needs will then be lowered.

Mounts Plywood or wood stud backing will be in place for all equipment mounted on walls including flat panels. Mounts will span at least 3 studs. Chief brand mounts will be used with all security features added. Currently UVU uses the non universal RPM series (projector and flat panel specific) when mounting displays.

Media Control System Crestron Control systems will be in place for easy control of all classifications of media systems. These systems will include touch panel/button interfaces, network control for all control systems, desktop executable files for IP control, and latest versions of Crestron Roomview. All programs will be compatible and interfaced with existing UVU systems. Two way Serial RS232 control must be used before any other control option.

Media Control System Programming Only level 3 Crestron Certified programmers can bid or do any programming at UVU. UVU will maintain rights to all Media and Crestron programs and source code. Before substantial completion programmer will deliver all final program files to the UVU liaison prior to UVU building sign off.

Media Equipment All media equipment must be compatible with current UVU systems and equipment standards. Campus standard equipment models must be used to accommodate easy support and issues such as bulb replacement etcetera…. All proposed models will be approved by UVU Media Engineering. A current list of brands and models being used can be requested from UVU media Engineering. UVU is always open to new ideas and suggestions, but reserves the right to stick with tried and true brands and models.

Media Conduit Layout ***(See Instructional Space Conduit Layout Plan)***

Main Media J-box 24"x24"x4" deep J-box will function as the main junction for all of the media A/V cabling in each room. (See Instructional Space/Lab Conduit Layout Plan) It is located on the front wall of the instructional space/lab above the ceiling grid. This box will have the following conduits connecting to it: 2" and two 1" conduits from the podium media in-floor box, 1" conduit to the cable tray, 1" conduits to J-box's on each side of the front wall (for display, speakers, CVS systems), 2" conduit that extends back above the ceiling (approx. 12') from the front of the room to the projector position (See Projector Placement), 1" conduit to ceiling mounted document camera location above podium, 1" conduit to IP camera location, and 1" conduit to motorized Screen for low voltage control. There will also be 4 data ports present within or within 12" of the main media J-box. These jacks will be used for: projector monitoring, IP cameras and IPTV. A 20 amp duplex power outlet will also be placed on the front wall within 12" of the main media J-box.

Podium Media (In-Floor Box) Minimum 6"x 6"x 4" deep in-floor box will have a 2" and 1" conduit for the media integrator and a 1" virgin conduit with pull string for future UVU use. These conduits will run from the in-floor box to the main media J-box. The in-floor box must be level with the floor and have the capability of placing a podium over it.

1" Conduit to hallway cable tray 1" conduit will run from the main media J-box to the hall cable tray. This conduit may be used for cable TV and other future room inputs and outputs.

1" Conduits to each side of the front wall 1" conduits will run from the main media J-box to double gang box's with a single gang mud ring's, which will be located on both sides of the front wall 24" from the side wall and 12" down from the ceiling. These boxes will be used for displays, flat panels, speakers, cable TV and RF receivers for CVS systems.

Projector Location 2" conduit will extend back (approx. 12ft) from the main media J-box above the ceiling from the front of the room to the projector position. The exact position will be determined by the display equipment selected. There will also be a 20 amp duplex outlet within 12" of the projector location (See projector manufacture and UVU specs for projector placement). The projector needs to be aliened with the motorized screen position.

Document Camera Conduit 1" conduit will run from the 24x24 main media J-box to a double gang J-box located above the ceiling grid over the podium. Exact placement will be coordinated with UVU Media Engineering

1" conduit to IP camera location 1" conduit will run from the 24x24 main media J-box to the back corner of the room opposite the entrance with a double gang J-box located above the ceiling grid 2' from the side wall.

Motorized Screen Conduit 1" conduit will run from the 24x24 main media J-box to the location of the screen. This will be used for low voltage control of screen. The screen will be offset to one side of the front wall, opposite the entrance with the projector and projector conduit placed accordingly. Power will also be present for screen.

Motorized Screen A motorized screen will be centered on the side of the room away from the entrance with one side of the screen near the center of the room. The motorized screen will be installed above the ceiling grid with accommodations made in the drop ceiling. The screen will be low voltage controlled from the room control system and from a front wall switch.

Lighting Ideally media enhanced areas have dimmable florescent and/or incandescent lighting that is RS 232 control via the room control system (Crestron Control). Typically the control system will have lighting presets and dimming controls in the front and back of the room. Lights should be arranged in stations or circuits as follows: The row of lighting in the front of the room should be one circuit. There should be incandescent directional lights pointed at the teacher podium on another circuit. All other rows of lights will have inboards and outboards on separate circuits to provide various lighting scenes. If UVU decides to go with non dimmable lighting for any reason, the lights will be arranged so that the front row is one circuit. All other rows of lights will have inboards and outboards on separate circuits so that we can simulate light dimming. All circuits need to be controlled via presets that are controllable through a central room control system via RS-232 or relay control. Lighting will be controlled from three locations the: media control system, front of the room and rear near the room entrance.

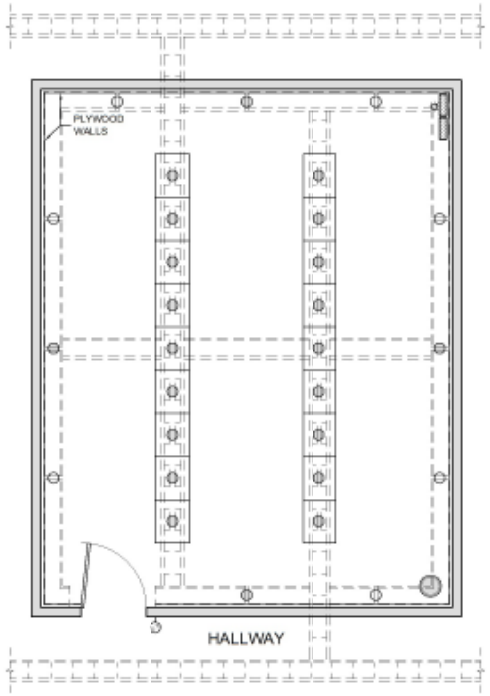
Podium Podiums will be supplied as part of the infrastructure. They will be built to UVU's current campus standard. All dimensions and an example drawing will be supplied by UVU. The podium will have two 19 1/8" wide rack mounting areas on both sides of the podium with a 4" race way between the two for routing cables. The side of the podium nearest the class (Back of Podium) will have locking doors for access to the back of all equipment and cable chase. The front side of the podium will have a locking door on the side nearest the wall with the side nearest the center having a magnetic electric strike that will open upon login for teacher equipment access. The podium will be placed over the podium in-floor box and the podium data drop. Two data ports, using patch cords, will be extended to the top of the podium along with a duplex power outlet and terminated into a surface mount enclosure. There will also be auxiliary inputs available in the enclosure.

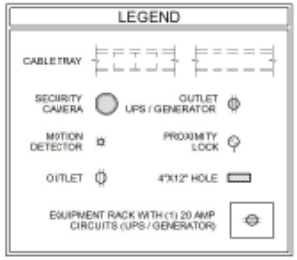
Video Surveillance Systems (VSS) Cameras will be specified for viewing of owner specified subject areas, and installed in appropriately rated enclosures. Cameras must be in place in all building entry/exit points as well as MDF/IDF's. Other select building thoroughfares, elevators, lobbies and other select sensitive interior areas will also be covered. IP camera signals will tie in the central campus NVR VSS system. Additional software licensing and NVR storage space will be addressed as part of the building budget.

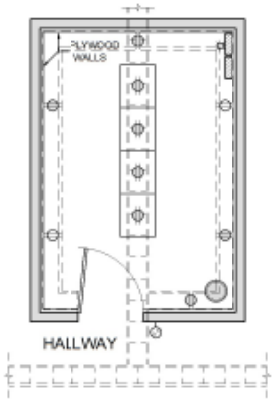
Digital Signage System (DSS) Flat panel displays will be installed throughout the building. Ideally each display will be back-set into the walls to accommodate for ADA standards. Where this is not possible other considerations will be made for ADA requirements. Displays will be strategically placed throughout the building following a similar pattern to the VSS system. Each display location will have power and data present along with 2 homerun CAT5 cables for central distribution running to a central IDF (all cables to one IDF). These CAT5 runs must meet campus data specifications and be yellow in color.

Proferred Voice and Data Wiring Companies Only the following listed companies can bid on the voice and data wiring at UVU:

1. Americom Technology (Phone 892-0519 Fax 892-0585)
2. Cache Valley Electric (Tim Hadden, Phone 908-4190 Fax 908-7041)
3. Niels Fugal & Sons (Matt Pierce, Phone 785- 3152 Fax 796-5081)







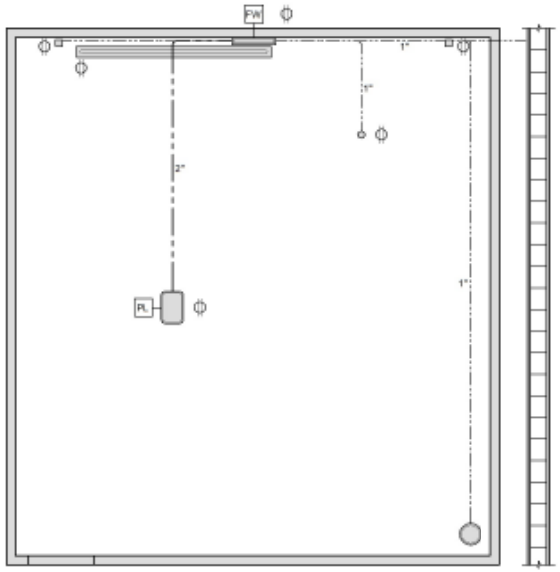
MAIN DISTRIBUTION FACILITY

500 SQ.FT.

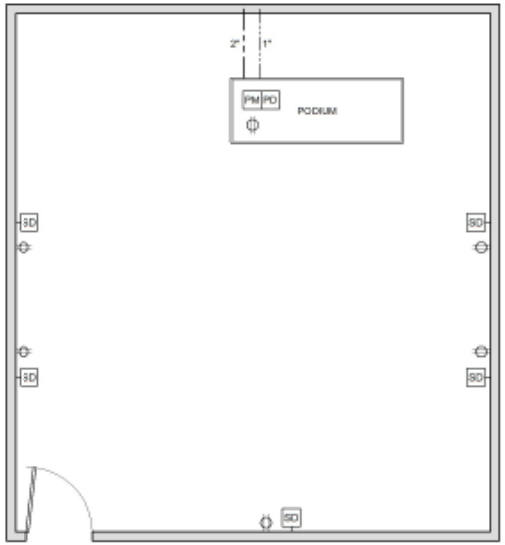
INTERMEDIATE DISTRIBUTION FACILITY

140 SQ.FT.

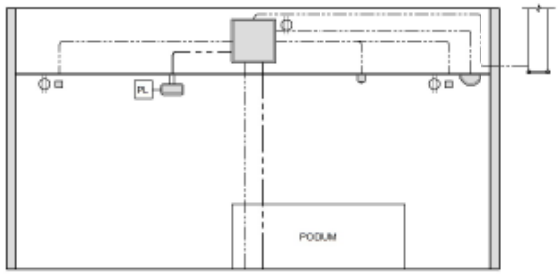
3-29-2006



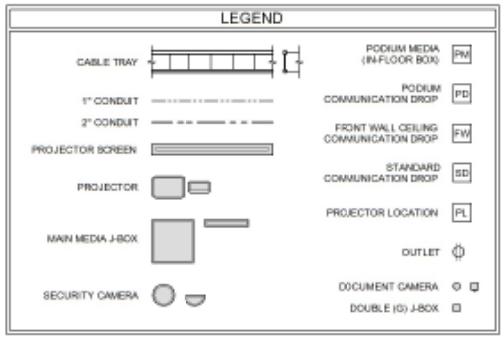
CEILING PLAN



FLOOR PLAN

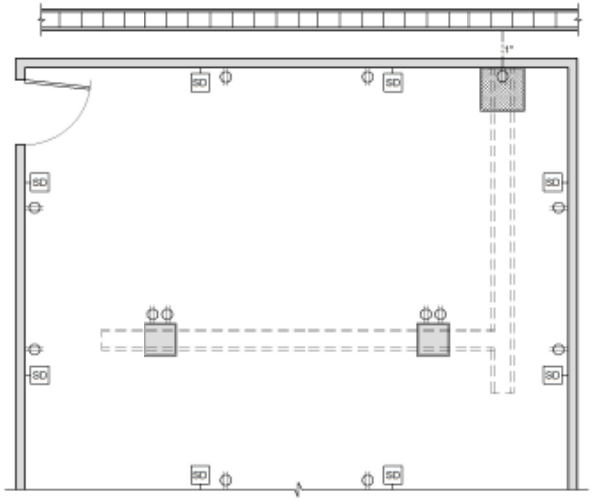


ELEVATION VIEW

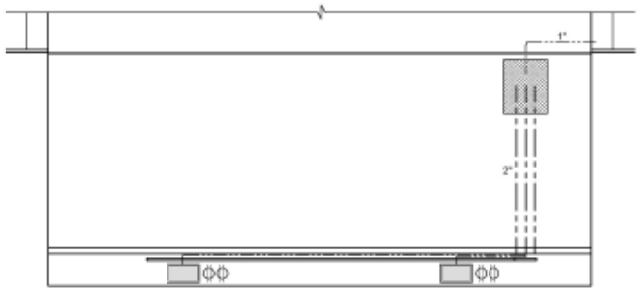


INSTRUCTIONAL SPACE - CONDUIT LAYOUT PLAN

3-29-2006

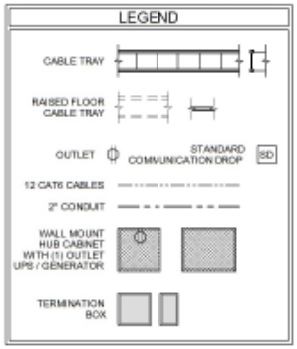


PLAN VIEW



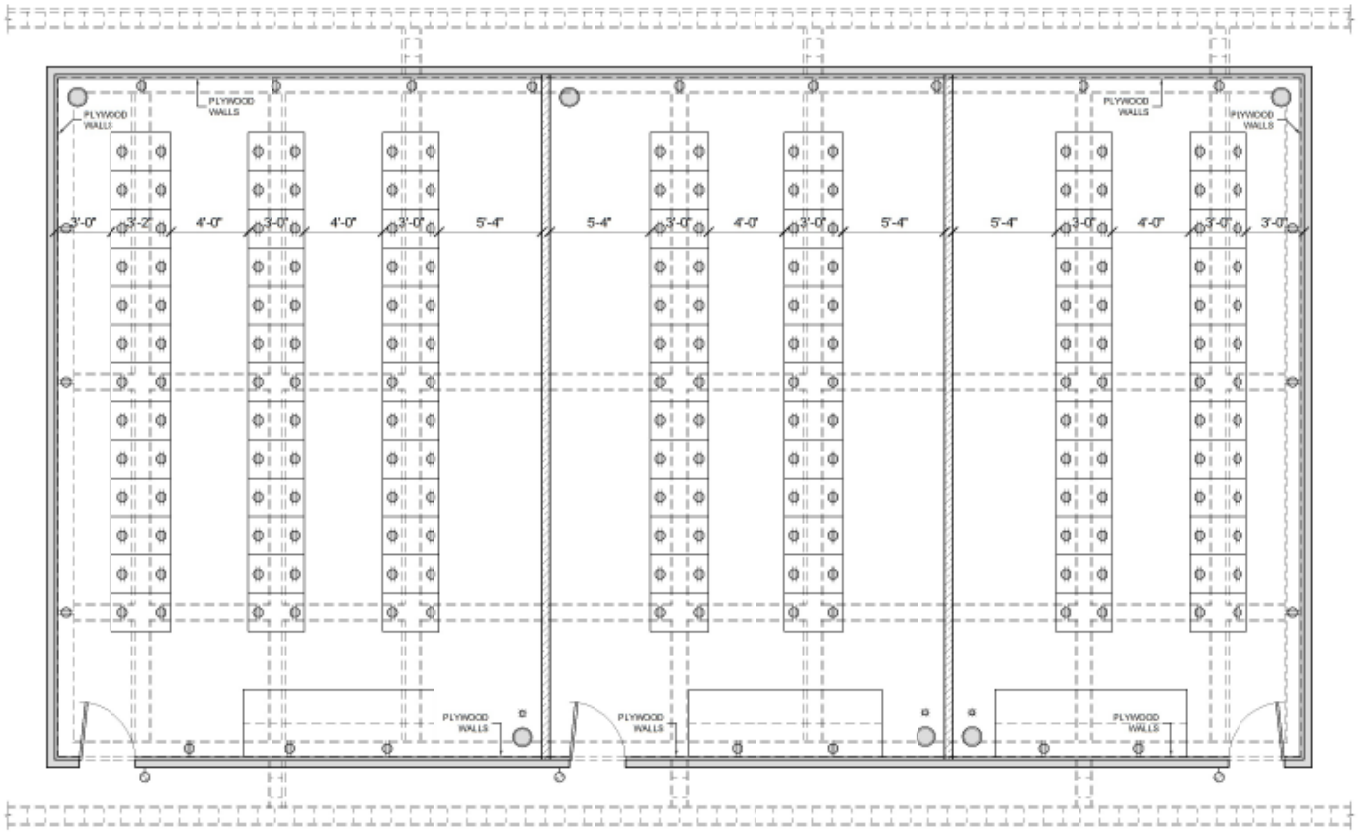
ELEVATION VIEW

COMPUTER LAB TO USE INSTRUCTIONAL SPACE - CONDUIT LAYOUT PLAN

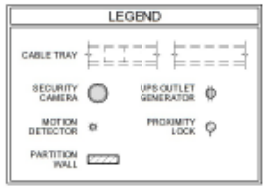


COMPUTER LAB

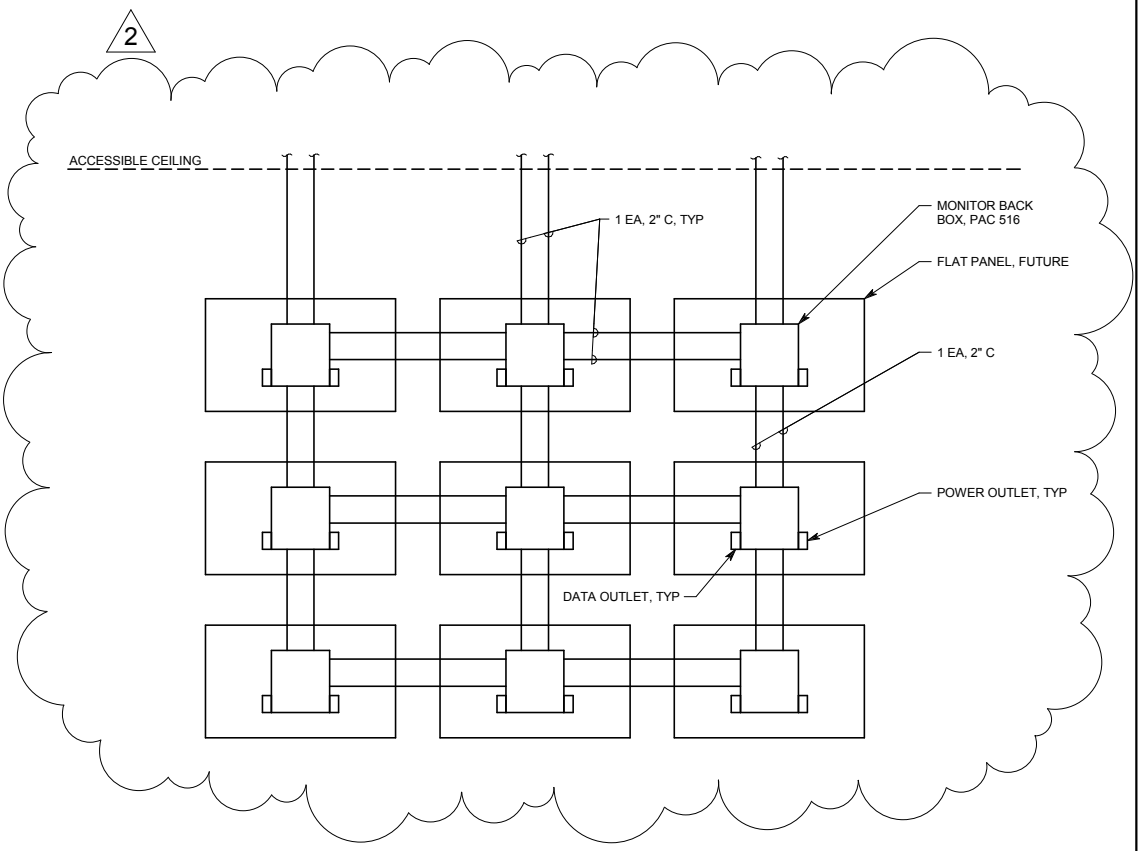
3-29-2006



SERVER ROOM - 2300 SQ. FT.



3-29-2006



5 MONITOR ARRAY DETAIL

NTS

F9

C:\Users\sjt\Documents\90473 Elec UVU Pope_sjt.rvt

5/26/2010 12:06:46 PM

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

EJ-601-RV02-4

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:

SHEET KEYNOTES

1 2 EACH, 4" CONDUITS.

2 1 EACH, 4" CONDUIT FROM DATA 042 TO CABLE TRAY.

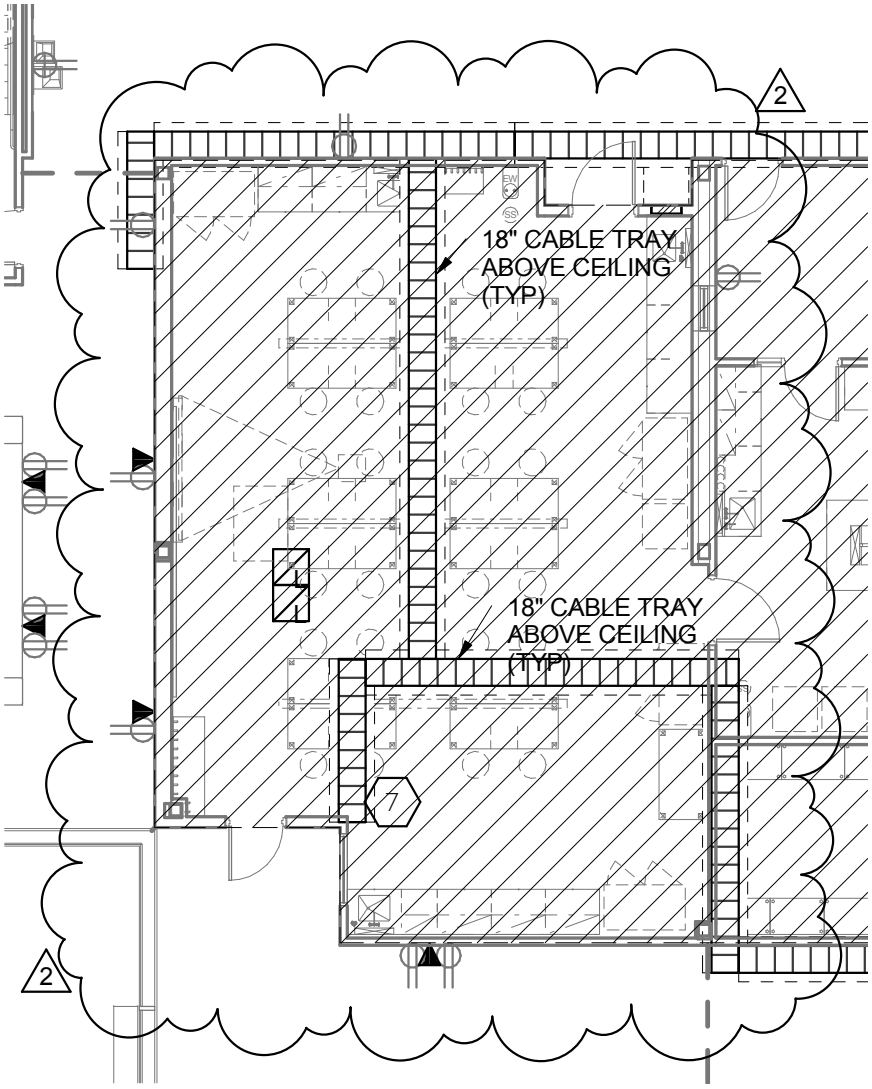
3 STUB TRAY INTO ROOM.

4 BID ALTERNATE AREA. REFER TO SPECIFICATION SECTION 01234 ALTERNATES AND ARCHITECTURAL/ LAB FURNISHINGS/ MECHANICAL/ PLUMBING/ ELECTRICAL/ AND LAB ELECTRICAL DRAWINGS FOR COMPLETE DESCRIPTION OF ALTERNATES. IN EACH ALTERNATE AREA, THE ELECTRICAL PANELBOARD AND FEEDER SHALL REMAIN AS WELL AS TELECOMMUNICATIONS CABLETRAYS AND MAIN CONDUITS, REGARDLESS OF WHETHER THE ALTERNATES ARE ACCEPTED OR NOT.

5 FUTURE SERVER RACKS FURNISHED AND INSTALLED BY OWNER.

6 MOUNT BEHIND FLAT PANEL. SEE DETAIL EJ601.

7 4 EACH, 4" CONDUITS FROM CABLE TRAY STUBBED INTO DATA 163 ABOVE.



C:\Users\sjt\Documents\90473 Elec UVU Pope_sjt.rvt

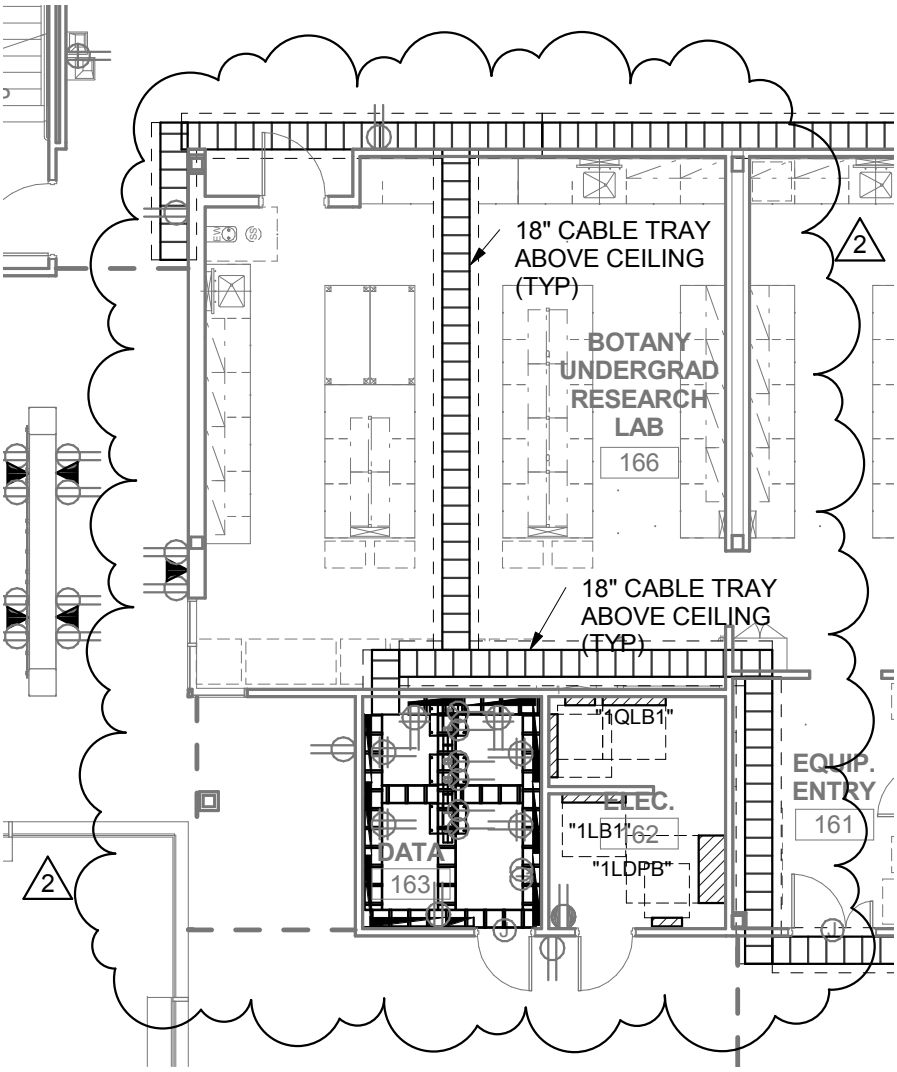
5/26/2010 12:06:48 PM

GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

ET-101A-RV02-1

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



C:\Users\sjt\Documents\90473 Elec UVU Pope_sjt.rvt

5/26/2010 12:06:50 PM

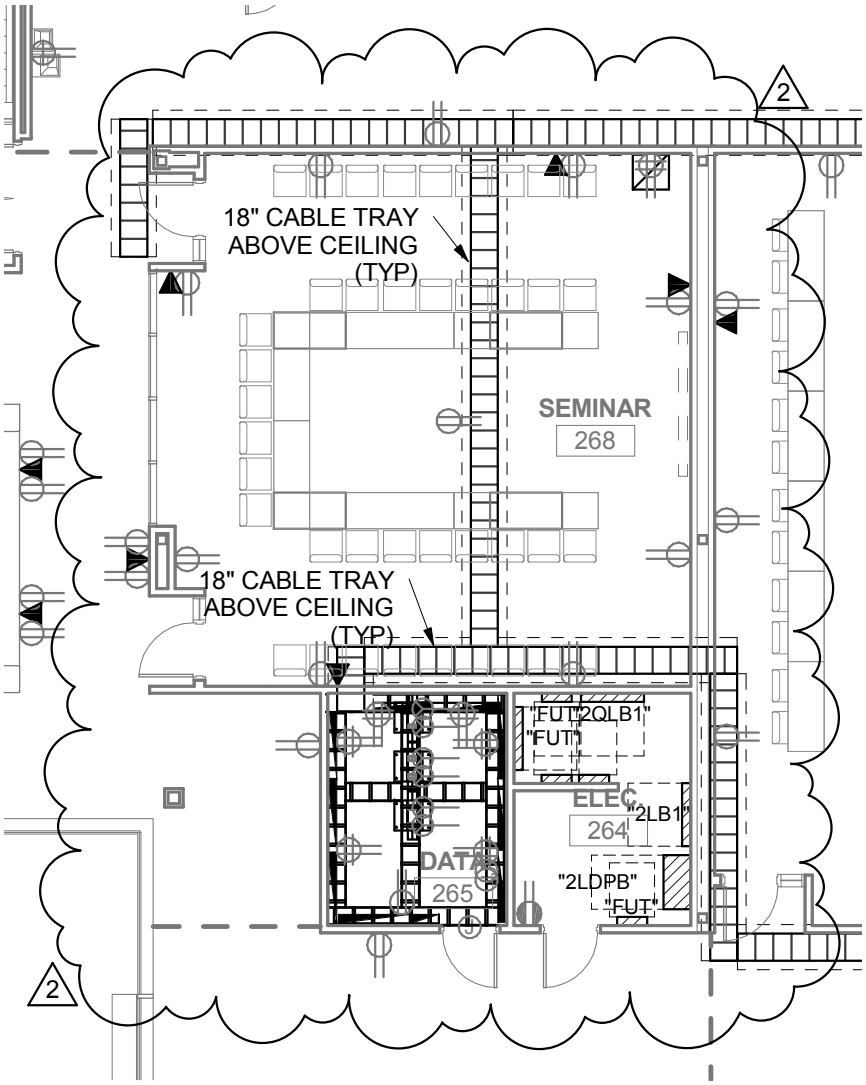
GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

ET-102A-RV02-2

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:



C:\Users\sjt\Documents\90473 Elec UVU Pope_sjt.rvt

5/26/2010 12:06:52 PM

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

ET-103A-RV02-3

GSBS PROJECT NO.: 2009.115.00

ISSUED DATE:

SHEET KEYNOTES

1. PROVIDE FLUSH CEILING OUTLET FOR A/V PROJECTOR. COORDINATE EXACT LOCATION WITH A/V INSTALLER. RIGIDLY SUPPORT OUTLET INDEPENDENT OF CEILING SYSTEM.
2. PROVIDE ELECTRICAL CONNECTIONS TO MOTORIZED SCREEN WITH ALL POWER AND CONTROL WIRING PER MANUFACTURER'S WRITTEN INSTRUCTIONS. MOUNT CONTROL SWITCH IN LOCATION APPROVED BY ARCHITECT. INTERFACE WITH A/V CONTROLS PWER A/V DRAWINGS.
3. JUNCTION BOX IN CEILING FOR BMS CONTROL TRANSFORMER. COORDINATE QUANTITIES AND LOCATIONS WITH BMS INSTALLER AND MAKE FINAL CONNECTIONS.
4. POWER FOR SECURITY DOOR.
5. PROVIDE OUTLET OR J-BOX FOR CEILING MOUNTED DOCUMENT CAMERA. COORDINATE WITH ARCHITECTURAL DETAILS AND A/V INSTALLER.
6. MOUNT QUADRAPLEX OUTLETS IN SMART LECTURN AND DUPLEX RECEPTACLE ON TOP OF LECTURN ACCORDING TO ARCHITECTURAL AND A/V DETAILS. VERIFY LOCATIONS WITH ARCHITECT AND FURNITURE INSTALLER PRIOR TO INSTALLATION.
7. STUB 1 25" CND TO DATA CLOSET FOR DATA CABLING IN THIS ROW OF SEATS. VERIFY EXACT STUB LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION.
8. PROVIDE ELECTRICAL CONNECTIONS TO POWERED SYSTEMS FURNITURE. BASIS OF DESIGN IS A 4-CIRCUIT/8-SIRE SYSTEM. VERIFY ELECTRICAL REQUIREMENTS AND EXACT STUB LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION.

1 LEVEL 0 POWER PLAN - AREA B

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

5/26/2010 2:10:33 PM C:\Users\dlm\Documents\09473 Elec UVU Pops_DLM.rvt

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER No. 181563 DAVID E. WESEMANN STATE OF UTAH

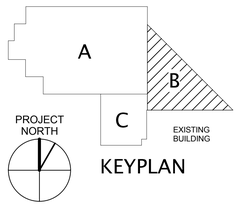
05-07-2010

REVISIONS:

2	2010-05-26	ADDENDUM #5

SPECTRUM ENGINEERS

324 S. State St., Suite 400
Salt Lake City, UT 84111
800-678-7077
801-328-5151
fax: 801-328-5155
www.spectrum-engineers.com



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

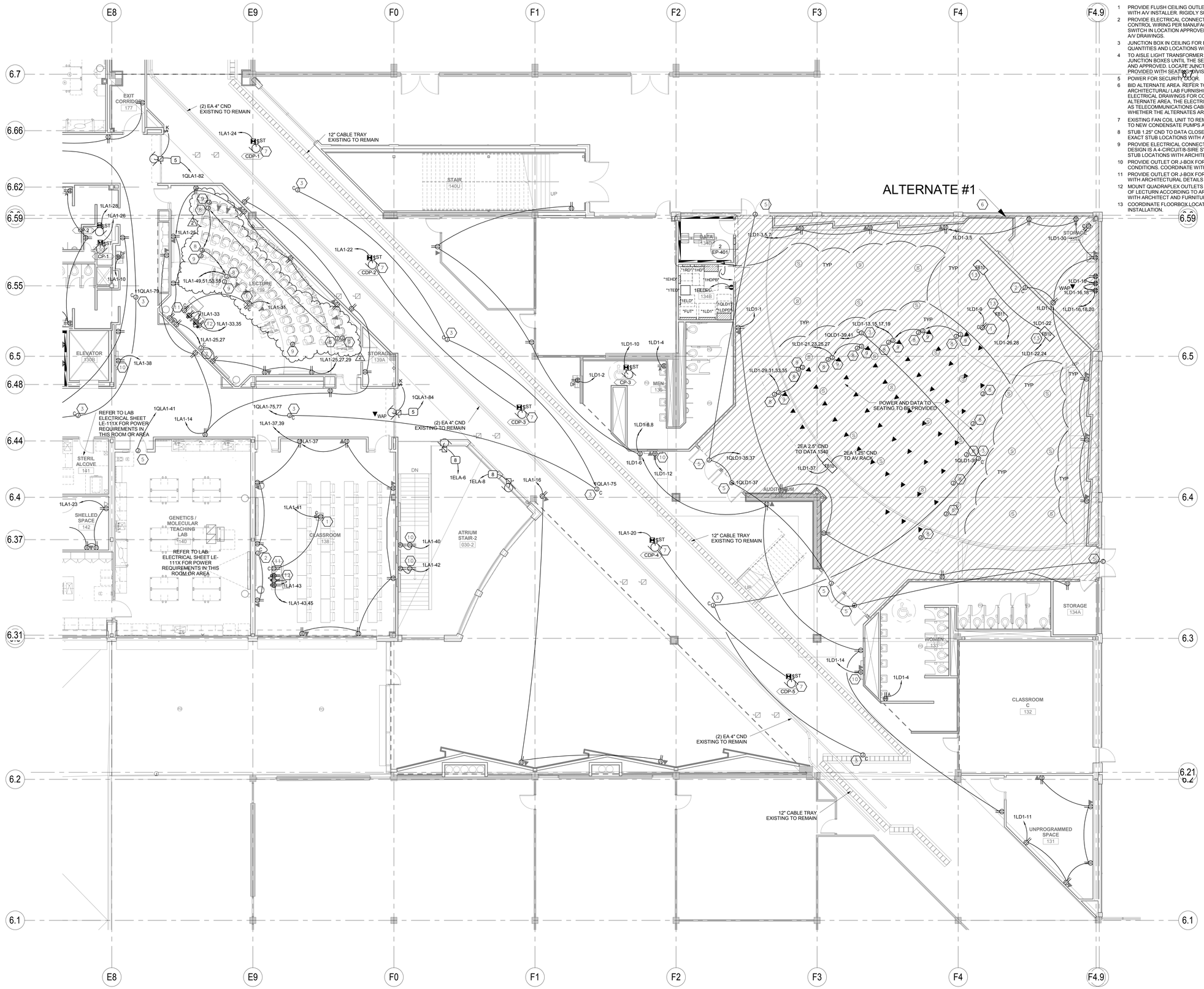
Division of Facilities Construction and Management

DRAWN BY:	DLM
CHECKED BY:	DEW
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 0 POWER PLAN - AREA B

CONSTRUCTION DOCUMENTS

EP-101B



1 LEVEL 1 POWER PLAN - AREA B

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

SHEET KEYNOTES

1. PROVIDE FLUSH CEILING OUTLET FOR A/V PROJECTOR. COORDINATE EXACT LOCATION WITH A/V INSTALLER. RIGIDLY SUPPORT OUTLET INDEPENDENT OF CEILING SYSTEM.
2. PROVIDED ELECTRICAL CONNECTIONS TO MOTORIZED SCREEN WITH ALL POWER AND CONTROL WIRING PER MANUFACTURER'S WRITTEN INSTRUCTIONS. MOUNT CONTROL SWITCH IN LOCATION APPROVED BY ARCHITECT. INTERFACE WITH A/V CONTROLS PWER A/V DRAWINGS.
3. JUNCTION BOX IN CEILING FOR BMS CONTROL TRANSFORMER. COORDINATE QUANTITIES AND LOCATIONS WITH BMS INSTALLER AND MAKE FINAL CONNECTIONS.
4. TO AISLE LIGHT TRANSFORMER IN ELECTRICAL ROOM. DO NOT LOCATE THESE JUNCTION BOXES UNTIL THE SEATING FEILD DIMENSIONS AND SUBMITTAL IS RECIEVED AND APPROVED. LOCATE JUNCTION BOX FLUSH IN FLOOR TO FEILD ISLE LIGHT PROVIDED WITH SEATING. DIVISION 26 TO DO ALL FIELD WIRING.
5. POWER FOR SECURITY DOOR.
6. BID ALTERNATE AREA. REFER TO SPECIFICATION SECTION 01234 ALTERNATES AND ARCHITECTURAL/ LAB FURNISHINGS/ MECHANICAL/ PLUMBING/ ELECTRICAL/ AND LAB ELECTRICAL DRAWINGS FOR COMPLETE DESCRIPTION OF ALTERNATES. IN EACH ALTERNATE AREA, THE ELECTRICAL PANELBOARD AND FEEDER SHALL REMAIN AS WELL AS TELECOMMUNICATIONS CABLETRAYS AND MAIN CONDUITS, REGARDLESS OF WHETHER THE ALTERNATES ARE ACCEPTED OR NOT.
7. EXISTING FAN COIL UNIT TO REMAIN WITH ASSOCIATED CIRCUITING. PROVIDE POWER TO NEW CONDENSATE PUMPS AS INDICATED.
8. STUB 1.25" CND TO DATA CLOSET FOR DATA CABLING IN THIS ROW OF SEATS. VERIFY EXACT STUB LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION.
9. PROVIDE ELECTRICAL CONNECTIONS TO POWERED SYSTEMS FURNITURE. BASIS OF DESIGN IS A 4-CIRCUIT8-SIRE SYSTEM. VERIFY ELECTRICAL REQUIREMENTS AND EXACT STUB LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION.
10. PROVIDE OUTLET OR J-BOX FOR A/V MONITOR DEPENDING ON ACTUAL FIELD CONDITIONS. COORDINATE WITH ARCHITECTURAL DETAILS AND A/V INSTALLER.
11. PROVIDE OUTLET OR J-BOX FOR CEILING MOUNTED DOCUMENT CAMERA. COORDINATE WITH ARCHITECTURAL DETAILS AND A/V INSTALLER.
12. MOUNT QUADRAPLEX OUTLETS IN SMART LECTURN AND DUPLEX RECEPTACLE ON TOP OF LECTURN ACCORDING TO ARCHITECTURAL AND A/V DETAILS. VERIFY LOCATIONS WITH ARCHITECT AND FURNITURE INSTALLER PRIOR TO INSTALLATION.
13. COORDINATE FLOORBOX LOCATIONS WITH ARCHITECT/OWNER PRIOR TO INSTALLATION.

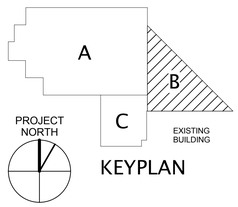
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER No. 181563 DAVID E. WESEMANN STATE OF UTAH
05-07-2010

REVISIONS:

2	2010-05-26	ADDENDUM #5

SPECTRUM ENGINEERS
324 S. State St., Suite 400
Salt Lake City, UT 84111
800-678-7077
801-328-5151
fax: 801-328-5155
www.spectrum-engineers.com



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	DLM
CHECKED BY:	DEW
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 1 POWER PLAN - AREA B

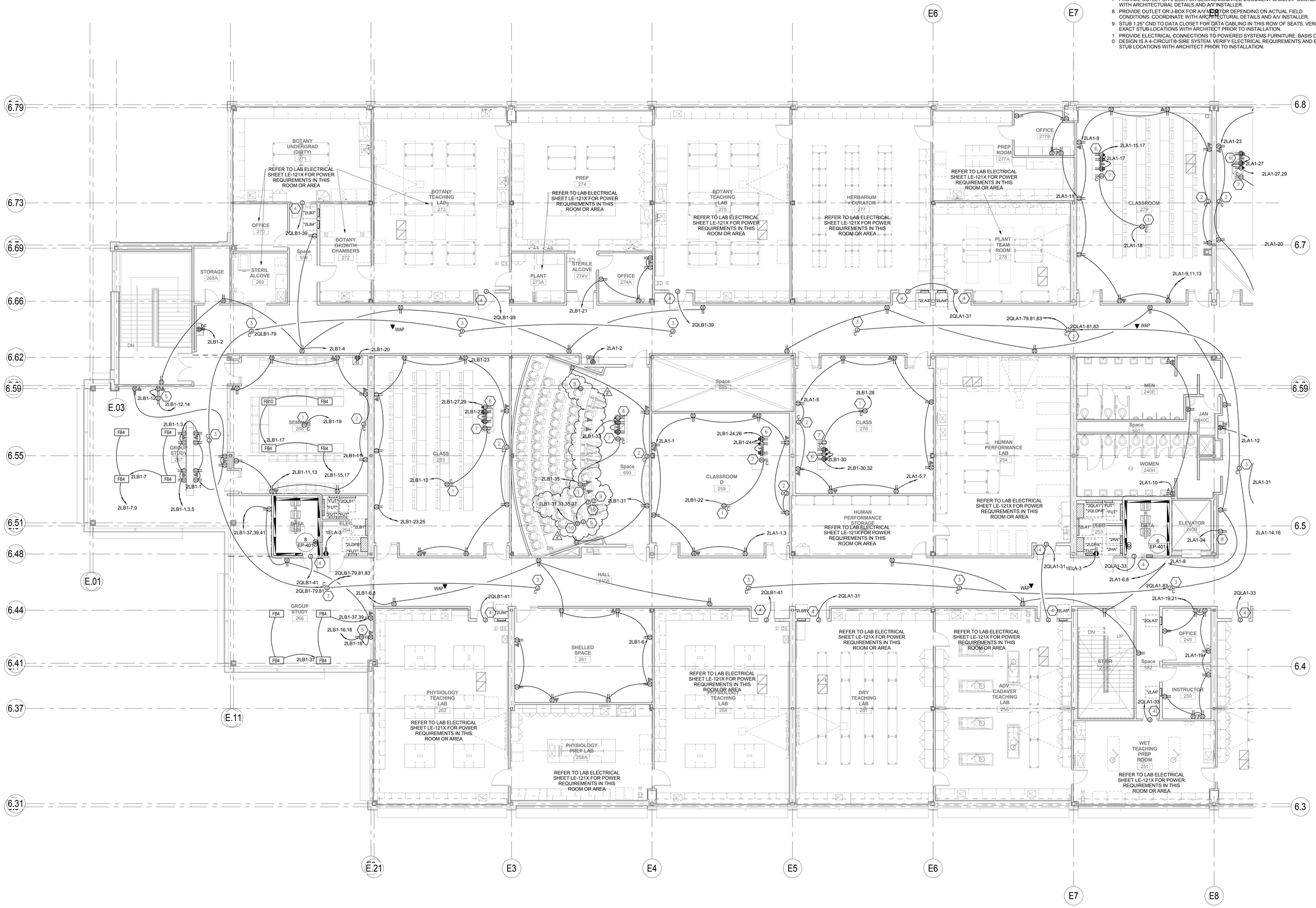
CONSTRUCTION DOCUMENTS

EP-102B

5/26/2010 2:10:49 PM C:\Users\dlm\Documents\09473 Elec UVU Pope_DLM.rvt

SHEET KEYNOTES

1 PROVIDE FLUSH CEILING OUTLET FOR A/V PROJECTOR. COORDINATE EXACT LOCATION WITH A/V INSTALLER. RIGIDLY SUPPORT OUTLET INDEPENDENT OF CEILING SYSTEM.
2 PROVIDE ELECTRICAL CONNECTIONS TO MOTORIZED SCREEN WITH ALL POWER AND CONTROL WIRING PER MANUFACTURER'S WRITTEN INSTRUCTIONS. MOUNT CONTROL SWITCH IN LOCATION APPROVED BY ARCHITECT. INTERFACE WITH A/V CONTROLS PWER A/V DRAWINGS.
3 JUNCTION BOX IN CEILING FOR BMS CONTROL TRANSFORMER. COORDINATE QUANTITIES AND LOCATIONS WITH BMS INSTALLER AND MAKE FINAL CONNECTIONS.
4 POWER FOR SECURITY DOOR.
5 MOUNT ONE OUTLET IN BACKBOX FOR A/V MONITOR AND ONE OUTLET IN CREDENZA FOR A/V EQUIPMENT. COORDINATE WITH ARCHITECTURAL AND A/V DETAILS.
6 MOUNT QUADRAPLEX OUTLETS IN SMART LECTURN AND DUPLEX RECEPTACLE ON TOP OF LECTURN ACCORDING TO ARCHITECTURAL AND A/V DETAILS. VERIFY LOCATIONS WITH ARCHITECT AND FURNITURE INSTALLER PRIOR TO INSTALLATION.
7 PROVIDE OUTLET OR J-BOX FOR CEILING MOUNTED DOCUMENT CAMERA. COORDINATE WITH ARCHITECTURAL DETAILS AND A/V INSTALLER.
8 PROVIDE OUTLET OR J-BOX FOR A/V MONITOR DEPENDING ON ACTUAL FIELD CONDITIONS. COORDINATE WITH ARCHITECTURAL DETAILS AND A/V INSTALLER.
9 STUB 1.25" CND TO DATA CLOSET FOR DATA CABLING IN THIS ROW OF SEATS. VERIFY EXACT STUB LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION.
1 0 PROVIDE ELECTRICAL CONNECTIONS TO POWERED SYSTEMS FURNITURE. BASIS OF DESIGN IS A 4-CIRCUIT/8-SIRE SYSTEM. VERIFY ELECTRICAL REQUIREMENTS AND EXACT STUB LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION.



1 LEVEL 2 POWER PLAN - AREA A
SCALE: 1/8" = 1'-0"

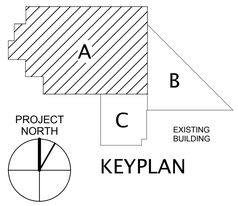
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER No. 181563 DAVID E. WESEMANN STATE OF UTAH
05-07-2010

REVISIONS:

2	2010-05-26	ADDENDUM #5

SPECTRUM ENGINEERS
324 S. State St., Suite 400
Salt Lake City, UT 84111
800-678-7077
801-328-5151
fax: 801-328-5155
www.spectrum-engineers.com



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

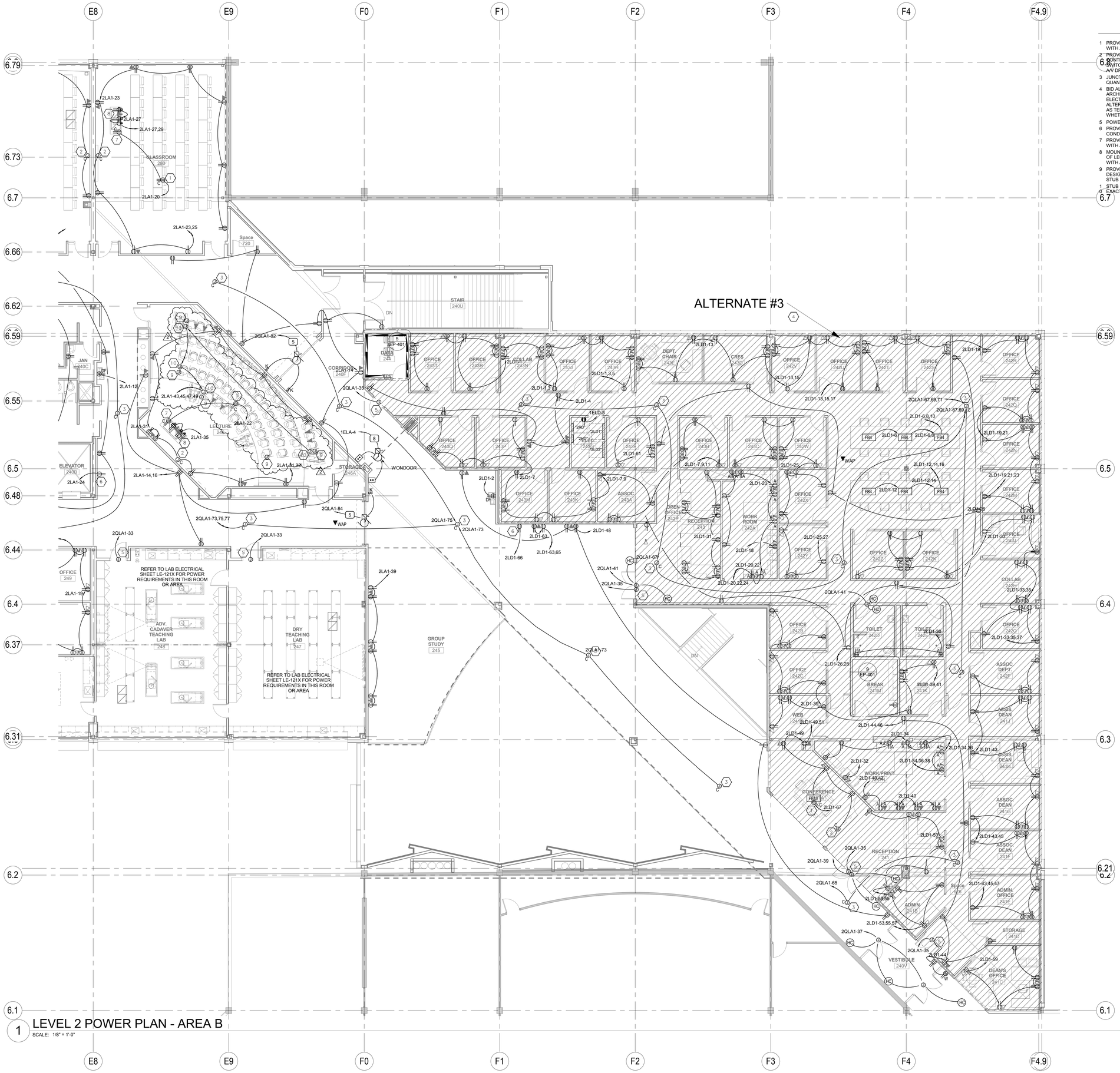
DRAWN BY:	DLM
CHECKED BY:	DEW
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 2 POWER PLAN - AREA A

CONSTRUCTION DOCUMENTS

EP-103A

5/26/2010 2:10:55 PM C:\Users\dlm\Documents\09473 Elec UVU Pope_DLM.rvt



1 LEVEL 2 POWER PLAN - AREA B

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

SHEET KEYNOTES

1 PROVIDE FLUSH CEILING OUTLET FOR A/V PROJECTOR. COORDINATE EXACT LOCATION WITH A/V INSTALLER. RIGIDLY SUPPORT OUTLET INDEPENDENT OF CEILING SYSTEM.
2 PROVIDE ELECTRICAL CONNECTIONS TO MOTORIZED SCREEN WITH ALL POWER AND CONTROL WIRING PER MANUFACTURER'S WRITTEN INSTRUCTIONS. MOUNT CONTROL SWITCH IN LOCATION APPROVED BY ARCHITECT. INTERFACE WITH A/V CONTROLS PWER A/V DRAWINGS.
3 JUNCTION BOX IN CEILING FOR BMS CONTROL TRANSFORMER. COORDINATE QUANTITIES AND LOCATIONS WITH BMS INSTALLER AND MAKE FINAL CONNECTIONS.
4 BID ALTERNATE AREA. REFER TO SPECIFICATION SECTION 01234 ALTERNATES AND ARCHITECTURAL/ LAB FURNISHINGS/ MECHANICAL/ PLUMBING/ ELECTRICAL/ AND LAB ELECTRICAL DRAWINGS FOR COMPLETE DESCRIPTION OF ALTERNATES. IN EACH ALTERNATE AREA, THE ELECTRICAL PANELBOARD AND FEEDER SHALL REMAIN AS WELL AS TELECOMMUNICATIONS CABLETRAYS AND MAIN CONDUITS, REGARDLESS OF WHETHER THE ALTERNATES ARE ACCEPTED OR NOT.
5 POWER FOR SECURITY DOOR.
6 PROVIDE OUTLET OR J-BOX FOR A/V MONITOR DEPENDING ON ACTUAL FIELD CONDITIONS. COORDINATE WITH ARCHITECTURAL DETAILS AND A/V INSTALLER.
7 PROVIDE OUTLET OR J-BOX FOR CEILING MOUNTED DOCUMENT CAMERA. COORDINATE WITH ARCHITECTURAL DETAILS AND A/V INSTALLER.
8 MOUNT QUADRAPLEX OUTLETS IN SMART LECTURN AND DUPLEX RECEPTACLE ON TOP OF LECTURN ACCORDING TO ARCHITECTURAL AND A/V DETAILS. VERIFY LOCATIONS WITH ARCHITECT AND FURNITURE INSTALLER PRIOR TO INSTALLATION.
9 PROVIDE ELECTRICAL CONNECTIONS TO POWERED SYSTEMS FURNITURE. BASIS OF DESIGN IS A 4-CIRCUIT/8-SIRE SYSTEM. VERIFY ELECTRICAL REQUIREMENTS AND EXACT STUB LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION.
1 STUB 1.25" CND TO DATA CLOSET FOR DATA CABLING IN THIS ROW OF SEATS. VERIFY
0 EXACT STUB LOCATIONS WITH ARCHITECT PRIOR TO INSTALLATION.

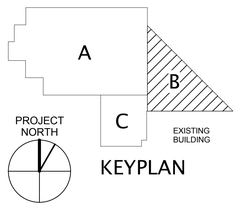
GSBS ARCHITECTS
375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101
P 801.521.8600
F 801.521.7913
www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER No. 181563 DAVID E. WESEMANN STATE OF UTAH
05-07-2010

REVISIONS:

2	2010-05-26	ADDENDUM #5

SPECTRUM ENGINEERS
324 S. State St., Suite 400
Salt Lake City, UT 84111
800-678-7077
801-328-5151
fax: 801-328-5155
www.spectrum-engineers.com



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	DLM
CHECKED BY:	DEW
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 2 POWER PLAN - AREA B

CONSTRUCTION DOCUMENTS

EP-103B

5/26/2010 2:11:13 PM C:\Users\dlm\Documents\90473 Elec UVU Pope_DLM.rvt

SHEET KEYNOTES

1 MOUNT FIXTURES IN ARCHITECTURAL COVE. REFER TO ARCHITECTURAL DETAILS AND FIELD VERIFY COVE DIMENSIONS.

2 TO AISLE LIGHT TRANSIFORMER IN ELECTRICAL ROOM. DO NOT LOCATE THESE JUNCTION BOXES UNTIL THE SEATING FEILD DIMENSIONS AND SUBMITTAL IS RECIEVED AND APPROVED. LOCATE JUNCTION BOX FLUSH IN FLOOR TO FEILD ISLE LIGHT PROVIDED WITH SEATING. DIVISION 26 TO DO ALL FIELD WIRING.

3 BID ALTERNATE AREA. REFER TO SPECIFICATION SECTION 01234 ALTERNATES AND ARCHITECTURAL/ LAB FURNISHINGS/ MECHANICAL/ PLUMBING/ ELECTRICAL/ AND LAB ELECTRICAL DRAWINGS FOR COMPLETE DESCRIPTION OF ALTERNATES. IN EACH ALTERNATE AREA, THE ELECTRICAL PANELBOARD AND FEEDER SHALL REMAIN AS WELL AS TELECOMMUNICATIONS CABLETRAYS AND MAIN CONDUITS, REGARDLESS OF WHETHER THE ALTERNATES ARE ACCEPTED OR NOT.

1 LEVEL 1 LIGHTING PLAN - AREA B

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

5/26/2010 2:10:20 PM C:\Users\dlm\Documents\09473 Elec UVU Pope_DLM.rvt

GSBS ARCHITECTS

375 WEST 200 SOUTH
SALT LAKE CITY, UT 84101

P 801.521.8600
F 801.521.7913

www.gsbsarchitects.com

LICENSED PROFESSIONAL ENGINEER No. 181563 DAVID E. WESEMANN STATE OF UTAH

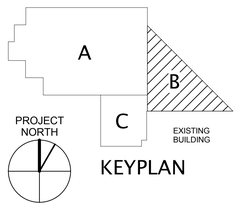
05-07-2010

REVISIONS:

1	2010-05-19	ADDENDUM #4
2	2010-05-26	ADDENDUM #5

SPECTRUM ENGINEERS

324 S. State St., Suite 400
Salt Lake City, UT 84111
800-678-7077
801-328-5151
fax: 801-328-5155
www.spectrum-engineers.com



KEYPLAN

Utah Valley University New Science Building

800 West University Parkway
Orem, Utah 84058

Division of Facilities Construction and Management

DRAWN BY:	DLM
CHECKED BY:	DEW
DFCM PROJECT NO.:	09020790
GSBS PROJECT NO.:	2009.115.00
ISSUED DATE:	05.07.2010

LEVEL 1 LIGHTING PLAN - AREA B

CONSTRUCTION DOCUMENTS

EL-102B