State of Utah

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Department of Administrative Services
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Division of Facilities Construction and Management
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Addendum No. 1

Date:	July 11, 2014
To:	Contractors
From:	Rick James – Project Manager, DFCM
Reference:	Pierre Lassonde Living Learning Center University of Utah DFCM Project No. 13285750
Subject:	**Addendum No. 1**

Pages	Addendum Cover Sheet	1	page
	General Items	292	pages
	Total	293	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.

1.1 SCHEDULE CHANGES: There are no Project Schedule Changes.

1.2 GENERAL ITEMS:

1.2.1 Question/Answer – 1 page
1.2.2 Basis of Design – 218 pages
1.2.3 SD Drawing – 73

Addendum No 1

Lassonde Cx Selection

Project 13285750

July 11, 2014

Question 1: Would you please clarify if the list of systems in both solicitations ["…control, mechanical, electrical, and (list other systems such as sound, acoustic, fire alarm, elevators that may need commissioning services)] should be suggested by the proposer or if proposers should assume all systems require commissioning?
Answer 1: See the "Commissioning Services Preamble, Objectives & Responsibilities" in the DFCM web site under Standard Construction Documents" It is our intent to hire the commissioning agent to provide services as suggested in the document here with one exception. The exterior envelope consultant has been hired separately from this project. We have a separate Envelope Cx on both the Lassonde and Crocker Science Center projects. DFCM reserves to negotiate removal or addition of commissioning services as the project may require.

Questions 2: Will SD documents be made available electronically to potential bidders before or shortly after the Mandatory Pre-bid meeting?
Answer 2: See attached Schematic Design drawings and specs for the Lassonde Center.

Question 3: Does DFCM intend to award both Cx jobs to the <u>same</u> firm?
Answer 3: No. DFCM intends to make the selection on both the Lassonde and Crocker Science Center separately. DFCM and the University also reserve the right to select the same firm for both projects if there is a strong benefit to the projects.

in association with CANNONDESIGN

SCHEMATIC DESIGN SUBMITTAL FOR THE

UNIVERSITY OF UTAH
LASSONDE STUDIOS

May 23, 2014

DFCM Project No:
13285750

University of Utah Project No:
21388

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01.
CONCEPT DESCRIPTION

01.1 Vision and Goals
01.2 Site Planning
01.3 Program Space Planning
01.4 Architectural Design

O1.1 VISION AND GOALS

The Lassonde Studios will provide working space for the The Lassonde Entrepreneur Institute to carry out its mission of creating opportunities for students to learn about and engage in all phases of the entrepreneurship and innovation process. The building will promote cross disciplinary collaboration between business / entrepreneur students and students from a wide spectrum of arts and sciences programs on campus. By combining ample workshop / bench space with study / meeting areas and 400 student residences, the building will serve as a natural crossroads for students from a wide variety of programs to meet and engage in entrepreneurial activity.

With its unique mixture of programmatic elements, the building will be the first of its kind. At the ground level the project will present itself as a welcoming and public student life building, open to all students on campus – a quality that is most closely related to the Marriot Library or Student Union. On the four floors above, the building will provide a safe and comfortable living environment while preserving the raw artist loft character of the making space below. The upper levels will be open to students of all ages providing a variety of unit types appropriate for freshmen and upperclassmen alike. The residential floors are planned in such a way that if the desirability of one unit type over another changes, the residential suites can be easily converted to the most appropriate and successful unit style.

Vision for the Center
The Lassonde Studios will build and organize its community to leverage existing and new assets, providing a transformative student life experience and launching a legacy of entrepreneurs.

- Create a collaborative and vibrant environment for the students, faculty, and staff of the University of Utah to engage in entrepreneurial and creative activity.
- Provide a safe, secure and comfortable living space for 400 University students that promotes collaboration, mentorship, and creativity.

The new Complex will support:
- Workshop / studio activities related to building conceptual prototypes and mockups.
- Team collaboration and presentation
- Sleeping and living accommodations for 400 students.
- A small food venue and dining space

1.2 SITE PLANNING

- Master plan fit
- Contextual design; good neighbor to the Tanner Irish Humanities building.
- Preserve views from HPER and Humanities of the surrounding mountains
- Preserve green space and open area for the surrounding intramural playfields.
- Fit with campus context
- Negotiate changes in level across the site, reduce stairs and preserve and maintain accessibility.
- Accommodate future bike routes, shuttle route, drop off, loading and parking for 160 cars
- Separation of kids, peds, cars, bikes
- Connect and extend outdoor space along HPER mall

1.3 PROGRAM SPACE PLANNING

Planning Goals
Through the schematic design phase the committee and design team have reconfirmed the following purposes and goals:

- Flexibility and adaptability to accommodate changes in the way people may live and work in the future.
- Create a visually open facility
- Provide adequate access and security
- Create a central create–ve making hub for all
- Organize to facilitate synergy
- Maximize gathering, lounge and open work spaces to support collaboration
- Eliminate barriers for persons with disabilities
- Supports mentorship between the class tiers
- Allows students to “watch one, do one, teach one”
- improved student experience

Organization
Ground Floor:
- Main entry with outdoor space directly off of HPER mall
- Secondary entries from the east and west
- Transparent, accessible, and porous ground level plan that serves as an interdisciplinary creative hub on campus.
- Split level plan - responds to grades and creates opportunities for informal gatherings and talks.

Programmatic elements include:
- A shop with tools for wood and metal working
- Food and snack venue
- Conference / break-out rooms
- Desks, work benches and pin-up space

Residential Floors:
The residential program is comprised of four levels of secure campus housing above with easy access to ground floor resources and extended facilities for entrepreneurial endeavors.

Four residential clusters per floor - two clusters organized as traditional single and double rooms, one suite of modular units, and one cluster of loft style apartments. Each cluster will include common living and lounge space. Loft and modular suites will include space for workshop/ studio space for creative activity.

Each level of housing to include shared common areas that serve as an extension of the making space below.

Laundry / study room on each level.

A floor kitchen is available to be shared between the two traditional clusters. Kitchens are also present in the modular and loft style units.

1.4 ARCHITECTURAL DESIGN

The Lassonde Studios is located near the heart of the University of Utah's main Campus just east of the academic core. Appropriate to its central location, the building will present itself as a student life and academic resource building open and inviting to all students and faculty of the University of Utah as well as an exciting place to engage and be inspired by leaders in the surrounding Salt Lake City entrepreneurial community. The scale, quality and finishes of the project will promote this reading and encourage passers-by to stop by and have a look around. Plaza space at the entry will serve as a place for the activity within to spill-out when weather permits further encouraging campus-wide participation. The ground floor will maintain a high level of transparency and visibility with full height glazing off of the south façade along HPER mall. Keeping with the industrial character of the ground level garage space, areas of cast-in-place architectural finish concrete will balance glazing to provide a comfortable and energy efficient environment within.

Above the ground level the mass of the building is organized onto linear elements that ebb and flow in a rhythm that parallel the pathways of the HPER mall and recall the ridges and canyons of the Wasatch Mountain range that forms the ever present campus backdrop.

On the upper levels, the building is clad in a copper panel rain screen perforated by openings at a regular interval to provide ample light to the residential units within. The copper will be chemically treated to accelerate patination creating a soft warm finish that is compatible with the color of red clay color of the buildings immediately surrounding the Lassonde Studios and ubiquitous on the University campus. Slightly varying levels of patina will recall the natural striation of the surrounding landscape.

02.
PROGRAM AREA SUMMARY

02.1 Assignable Space Program Tabulation
02.2 Space Plan Distribution

LASSONDE MAKE-LIVE CENTER									
	Original Program Areas					Revised SD Program Areas			
PROGRAM - DETAIL	**Quantity**	**Unit**	**Proposed NSF**	**Subtotal NSF**	**GSF**	**Quantity**	**Proposed NSF**	**Subtotal NSF**	**Comments**
Garage Community Space									
Community Space									
Entry and Lobby Area	1	800	800			1	2,382		
Pitch /Multi Media Room	2	240	480			2	1,012		
Director Hotel Offices	2	150	300		need acoust and visual privac	2	315		
Mail Room	1	300	300				77		
Storage	1	150	150				475		
Breakout Rooms	4	80	320				????		
				2,350	3,133			4,261	
Food Venue									
C-Store Coffee Shop	1	1,500	1,500				1,772		
				1,500	2,083			1,772	
Maker Space									
Garage Space	*1*	*14,900*	*14,900*				16,296		
First Aid Station	0	45	-		incl above				
Garage Storage	2	-	-		incl above				
				14,900	16,556			16,296	
Support									
ATM	1	-	-		in lobby		_		
Vending	1	-	-		in lobby		_		
Bike Storage	1	800	800			1	625		
				800	1,000				
Subtotal - Community Space			**19,550**		**22,772**		**22,329**		
Community Director Apartments									
Director Apts									
2 BR Apartment, full Kitchen, living, dini	1	950	950			1	1112		
1 BR Apartment, full Kitchen, living, dini	1	850	850			1	1202		
				1,800	2,647			2314	
Subtotal - Community Director Apt. Space			**1,800**		**2,647**		**2314**		
Student Residential Space									
Residential Space - Private									
240 First Years in Semi Suites (64 singles	240	180	43,200		8 pods: 4@28, 4@32		26,157		Single and double beds were calculated
80 Upper Classman in Modular	80	200	16,000		4 pods of 20		20,604		modular suite
80 Upper Classman in Modular/Lofts	80	220	17,600		4 pods of 20		20,120		lofts
12 RA Studios	12	150	1,800		distributed	8	2,014		
72% net to gross factor	412			*78,600*	109,167			68,895	
Residential Space - Shared									
Shared Kitchens	8	150	1,200		per pod for Semi-suites	8	1,937		
Maker Space/Flr lounge	4	900	3,600		1 per floor	4	9,828		
Skype Booth	5	-	-		1 per floor				
Laundry Room	4	180	720			4	2281		
				5,520	6,900			14,046	
Subtotal - Student Residential Space			**84,120**		**116,067**		**82,941**		
Support Space									
Public Support Space									
Public Bathrooms	2	240	480			2	601		
Public Bathrooms (Unisex)	2	56	112			1	60		
Trash Deposit Rooms	5	80	400		1/ floor	4	295		
				992	**1,378**			956	
Building Support Space									
Custodial Closets/JC	5	80	400		1/ floor	10	1107		Custodial closets, w/d, breakroom office
Building Storage	1	400	400			7	887		
Loading/Receiving	1	120	120				141		
				920	**1,150**			2135	
Mechanical Rooms/Trash									
Trash Collection Room	1	240	240			1	374		
Cell Phone Ant	1	100	100						
Mechnical Rooms	5	80	400		1/ floor				
TEL/DATA Closets	5	45	225		1/ floor	5	599		
Electrical Room	10	80	800		2/ floor	5	949		
Main Mechnical/Electrical Room	1	500	500				2476		
				2,265	**3,146**			4398	add another 875 for generator and transformer yard
Subtotal - Support Space			**4,177**		**5,674**		**7489**		
Building Totals									
BUILDING TOTAL NSF			**109,647**	**TOTAL GSF**	**147,160**		**115,073**	**161, 807**	
GSF per Bed			**359**		410 beds		**398.00**	406 Beds	
Outdoor Amenitites/ Program Space									
Garage work/gathering area			5,000		1/3 of garage space				
Fire Pit			200						
Seating - Café adjacent	30	15	450						
Bike Racks	100	5	500		1/4 res pop.				
Service/loading yard	1	400	400						
				6,550	**6,550**				
Total Outdoor Hardscape				**TOTAL GSF**	**6,550**				

03.
CODE ANALYSIS

CODE ANALYSIS

APPLICABLE CODES

	Year		Year
International Building Code	2012	National Electrical Code	2011
International Mechanical Code	2012	ADA (ADAAG)	2010
International Plumbing Code	2012	ICC / ANSI A117.1	2009
International Fire Code	2012	NFPA	N/A
International Energy Conservation Code (IECC)	2012		

A. Occupancy and Group: R2 A3 _____ _____ _____
Change in Use: Yes _____ No X Mixed Occupancy: Yes X No _____
Special Use and Occupancy (e.g. High Rise, Covered Mall): N/A

B. Seismic Design Category: Exposure C Design Wind Speed: 90 mph

C. Type of Construction (circle one):

I	I	II	II	III	III	IV	V	V
A	B	A	B	A	B	HT	A	B

D. Fire Resistance Rating Requirements for the Exterior Walls based on the fire separation distance (in hours):
North: 1 (<30') South: O (>30') East: 1 (<30') West: O (>30')

E. Mixed Occupancies: X Non separated Uses: X

F. Sprinklers:
Required: X Provided: _____ Type of Sprinkler System: NFPA 13

G. Number of Stories: 5 - (11 allowed) Building Height: 70' - (160' allowed)

H. Actual Area per Floor (square feet): B – 5,113 S.F.; 1 – 31,278 S.F. ; 2 – 31,354 S.F.; 3 – 31,354 S.F.; 4 – 31,354 S.F.; 5 – 31,354 S.F.: **TOTAL 161,807 S.F.**

I. Tabular Area: (UL) Unlimited

J. Area Modifications:
a) $A_a = A_t + [A_t I_f /100] + [A_t I_s/100]$ $I_f = 100[(F/P)-0.25](W/30)$

b) Sum of the Ratio Calculations for Mixed Occupancies: **N/A – Unlimited Area Building**

c) Total Allowable Area for: **N/A - UL**

d) Unlimited Area Building: Yes _X___ No _____ Code Section: _Table 503

K. Fire Resistance Rating Requirements for Building Elements (hours).

Element	Hours	Assembly Listing
Exterior Bearing Walls	2	
Interior Bearing Walls	2	
Exterior Non-Bearing Walls	See Item D.	
Structural Frame	2	
Partitions - Permanent	0	
Fire Barriers	2	
Floors - Ceiling Floors	2	
Roofs - Ceiling Roofs	1	
Exterior Doors and Windows	0	
Shaft Enclosures	2	
Fire Walls	3	
Fire Partitions	1	
Smoke Partitions	1	

L. Design Occupant Load: **2,541 Total**
Basement Occupant Load (2)
+Level One Occupant Load (1,327)
+Level Two Occupant Load (303)
+Level Three Occupant Load (303)
+Level Four Occupant Load (303)
+Level Five Occupant Load (303)
=2,541 Occupant Load
Exit Width Required: **508"** Exit Width Provided: **544"**

M. Minimum Number of Required Plumbing Facilities:
a) Water Closets - Required (m) **28** (f) **32** Provided (m) **76** (f) **77**
b) Lavatories - Required (m) **25** (f) **25** Provided (m) **76** (f) **77**
c) Bath Tubs or Showers: 52 required, **142 provided**
d) Drinking Fountains: **11** Service Sinks: 5 required, **8 provided**

UNIVERSITY OF UTAH
LASSONDE STUDIOS
CODE ANALYSIS – SCHEMATIC DESIGN PHASE
May 20, 2014

OCCUPANCY/DESCRIPTION	OCC	AREA IN SQ. FT.	OCCUPANT LOAD FACTOR	OCCUPANT LOAD	# OF EXITS REQUIRED
BASEMENT					
Air Handler		1672	300 GROSS ACCESSORY	5.57 USE	1
Tel / Data		340	300 GROSS ACCESSORY	1.00 USE	1
Boiler		869	300 GROSS ACCESSORY	2.89 USE	2
Elevator Machine Room		417	300 GROSS ACCESSORY	1.96 USE	1
Stair		250	300 GROSS ACCESSORY	0.83 USE	1
Hall		636	300 GROSS ACCESSORY	2.12 USE	1
Storage	R2	355	300 GROSS	**1.18**	1
TOTAL BASEMENT				1.18 **(2)**	**1**

OCCUPANCY/DESCRIPTION	OCC	AREA IN SQ. FT.	OCCUPANT LOAD FACTOR	OCCUPANT LOAD	# OF EXITS REQUIRED
LEVEL 1					
Garage	A3	14,113	15 NET	**940.86**	3
Entry Lobby	A3	2,382	15 NET	**158.80**	2
Convenience Store/Dining	A2	1,772	15 NET	**117.2**	2
Conference Room	B	421	20 NET	**21.05**	1
Conference Room	B	592	15 NET	**29.60**	1
Shop	F1	1,969	100 GROSS	**19.69**	1
Spray Booth	F1	90	100 GROSS	**0.9**	1
Laser Cutter	F1	133	100 GROSS	**1.33**	1
Tool & Project Storage	A3	475	300 GROSS	**1.58**	1
Electrical		76	300 GROSS ACCESSORY	0.25 USE	1
Tel / Data		64	300 GROSS ACCESSORY	0.25 USE	2
Storage		302	300 GROSS	**1.01**	1
Tel / Data		58	300 GROSS ACCESSORY	0.40 USE	1
Storage		46	300 GROSS	0.19	1
Mail		84	300 GROSS ACCESSORY	0.28 USE	1
AREC Office	B	171	100 GROSS	**1.71**	1
REC Office	B	178	100 GROSS	**1.78**	1
Shared Office	B	243	100 GROSS	**2.43**	1
Kitchenette	B	57	100 GROSS	**0.57**	1
Storage	B	106	300 GROSS	**0.35**	1
Bike Storage		625	300 GROSS	**2.08**	1
AREC Apartment	R2	626	200 GROSS	**3.13**	1
REC Apartment	R2	586	200 GROSS	**2.93**	2
Trash		395	300 GROSS ACCESSORY	1.32 USE	1
Loading		154	300 GROSS ACCESSORY	0.51 USE	1
Custodial W/D		169	300 GROSS	**0.56**	1

Facilities Break Room	B	243	15 NET	**16.2**	1
Custodial Office	B	167	100 GROSS	**1.67**	1
Storage		256	300 GROSS	**0.85**	1
Plumbing		987	300 GROSS ACCESSORY	3.29 USE	1
Electrical		594	300 GROSS ACCESSORY	1.98 USE	1
Men's		313	300 GROSS ACCESSORY	1.04 USE	1
Women's		327	300 GROSS ACCESSORY	1.09 USE	1
Unisex		67	300 GROSS ACCESSORY	0.22 USE	1
MAIN LEVEL 1 TOTAL				1326.28 **(1,327)**	**4**

OCCUPANCY/DESCRIPTION	OCC	AREA IN SQ. FT.	OCCUPANT LOAD FACTOR	OCCUPANT LOAD	# OF EXITS REQUIRED
LEVEL 2					
Maker Space	A3	4,935	15 NET ACCESSORY	329 USE	2
Shared Kitchen	R2	203	15 NET ACCESSORY	13.5 USE	1
Storage		48	300 GROSS ACCESSORY	0.16 USE	1
Tel / Data		135	300 GROSS ACCESSORY	0.30 USE	1
Custodial		108	100 GROSS	**1.08**	1
Residential Wing Units (West)	R2	3,884	50 GROSS	**77.68**	2
Shared Lounge (West)	R2	664	50 GROSS ACCESSORY	13.28 USE	1
Restrooms (West)	R2	656	50 GROSS ACCESSORY	13.12 USE	1
Laundry	R2	591	50 GROSS ACCESSORY	11.82 USE	1

Storage		64	300 GROSS ACCESSORY	0.21 USE	1
Electrical		90	300 GROSS ACCESSORY	0.30 USE	1
Custodial		113	100 GROSS	**1.13**	1
Residential Wing Units (North)	R2	3,654	50 GROSS	**73.08**	2
Shared Lounge (North)	R2	658	50 GROSS ACCESSORY	13.16 USE	1
Restrooms (North)	R2	656	50 GROSS ACCESSORY	13.12 USE	1
Trash		80	300 GROSS ACCESSORY	0.26 USE	1
Residential Wing Units (East)	R2	5,591	50 GROSS	**111.82**	2
Restrooms (East)	R2	654	50 GROSS ACCESSORY	13.08 USE	1
Loft – 1	R2	1199	200 GROSS	**5.99**	1
Loft – 2	R2	996	200 GROSS	**4.98**	1
Loft – 3	R2	1017	200 GROSS	**5.08**	1
Loft – 4	R2	1020	200 GROSS	**5.10**	1
Loft – 5	R2	988	200 GROSS	**4.94**	1
LEVEL 2 TOTAL				302.7 **(303)**	**2**

OCCUPANCY/DESCRIPTION	OCC	AREA IN SQ. FT.	OCCUPANT LOAD FACTOR	OCCUPANT LOAD	# OF EXITS REQUIRED
LEVEL 3					
Equal to Level 2	“	“	“	“	“
LEVEL 3 TOTAL				302.7 **(303)**	**2**

OCCUPANCY/DESCRIPTION	OCC	AREA IN SQ. FT.	OCCUPANT LOAD FACTOR	OCCUPANT LOAD	# OF EXITS REQUIRED
LEVEL 4					
Equal to Level 2	"	"	"	"	"
LEVEL 4 TOTAL				302.7 **(303)**	**2**

OCCUPANCY/DESCRIPTION	OCC	AREA IN SQ. FT.	OCCUPANT LOAD FACTOR	OCCUPANT LOAD	# OF EXITS REQUIRED
LEVEL 5					
Equal to Level 2	"	"	"	"	"
LEVEL 5 TOTAL				302.7 **(303)**	**2**

BUILDING TOTALS:
2,541 Occupants

TOTAL OCCUPANTS PER 'TYPE OF OCCUPANCY':
A3 1,104 Occupants
A2 117 Occupants
R2 1,218 Occupants
B 77 Occupants
F 23 Occupants

TOTAL OCCUPANTS PER FLOOR LEVEL:
Basement: 2 Occupants
Level 1: 1,327 Occupants
Level 2: 303 Occupants
Level 3: 303 Occupants
Level 4: 303 Occupants
Level 4: 303 Occupants

04.
SUSTAINABILITY STRATEGIES

04.1	Introduction
04.2	Daylight
04.3	Massing & Facades
04.4	Energy
04.5	Water
04.6	Pod Design
04.7	Materials
04.8	LEED Checklist

04.1 INTRODUCTION

PROJECT GOALS

Energy
- 40% reduction in energy cost compared to code-compliant baseline (ASHRAE 90.1-2007)

Water
- 30-40% reduction in domestic water use
- Campus water neutrality by 2020

Benchmarking
- LEED Silver Certification
- Individual LEED Credits
  - WE Credit 1.1: Water Efficient Landscape: Reduce by 50%
  - EA Credit 3: Enhanced Commissioning
  - EA Credit 5: Measurement & Verification
  - EQ Credit 3.1: Construction IAQ Management Plan: During Construction
  - EQ Credit 4.1: Low-Emitting Materials: Adhesives and Sealants
  - EQ Credit 4.2: Low-Emitting Materials: Paints and Coatings

Waste
- 25% reduction by 2015

University of Utah's design priorities for the Lassonde Center include energy use reductions, water conservation, and occupant experience, comfort, and health. The approximately 152,000 square foot building will include dorm rooms, loft apartments, pod living areas, and a collaborative research and development 'garage.' In order to encourage flexibility and collaboration, the garage space will occupy a large open space on the ground floor with direct connection to the HPER Mall.

Sustainable Design Charrette
In early Schematic Design, the University hosted a Sustainability Charrette with Atelier Ten and the
design team.

This meeting established that the primary environmental goal for the project is 40% energy cost savings, compared to an ASHRAE 90.1-2007 baseline. An aspirational target is to reduce electricity consumption by 50%.

The University directed the project team to include infrastructure for future solar installations, either solar thermal or photovoltaic. Inclusion of renewables in the building will be based on lifecycle cost analysis. Natural ventilation will be provided for the residences and the garage space as an energy conservation strategy and to provide an enhanced connection to the outdoors.

The University indicated that students and the local community view water conservation with great interest, especially during summer months. While the University does not have specific goals or targets for water conservation in new buildings, the design team and owner group agreed that an appropriate target is 30-40% reduction in domestic water use (compared to a LEED baseline), with additional reductions for uses such as HVAC equipment and laundry.

Under current policy, water harvested from lavatories and showers can be reused in the building for toilet flushing, but not for irrigation; harvested rainwater can be used for either flushing or irrigation. The owner's group suggested looking into water reuse at a district scale with neighboring buildings. (See the Water section of this report for more
information.)

Human experience factors such as thermal comfort, glare, views, daylight, and occupant health are especially important to the owner's group. Strategies recommended to improve thermal comfort include fenestration design that responds to orientation to prevent overheating, and vestibules to cut drafts through lobbies and the Garage during winter. Glare is particularly important in service areas with full-time employees, such as lobbies with front desks, and in computer labs. Daylight is required in all residential spaces, and in the garage, too, to help users track time and know when to sleep. Housing is particularly focused on healthy materials in sleeping areas, where they can have the greatest health impact. The University is interested in avoiding Living Building Challenge Red List materials, where there are viable material alternatives that meet the program needs and are durable. (See the Materials section of this report for more information.)

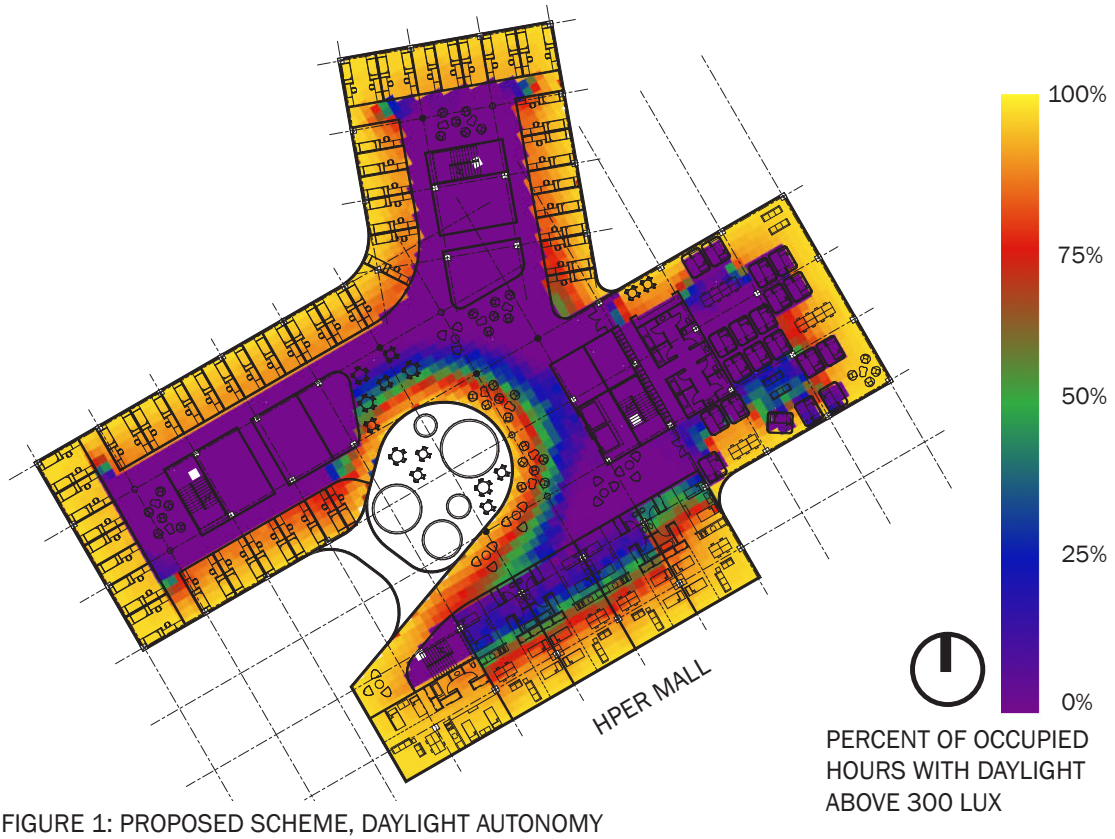


FIGURE 1: PROPOSED SCHEME, DAYLIGHT AUTONOMY

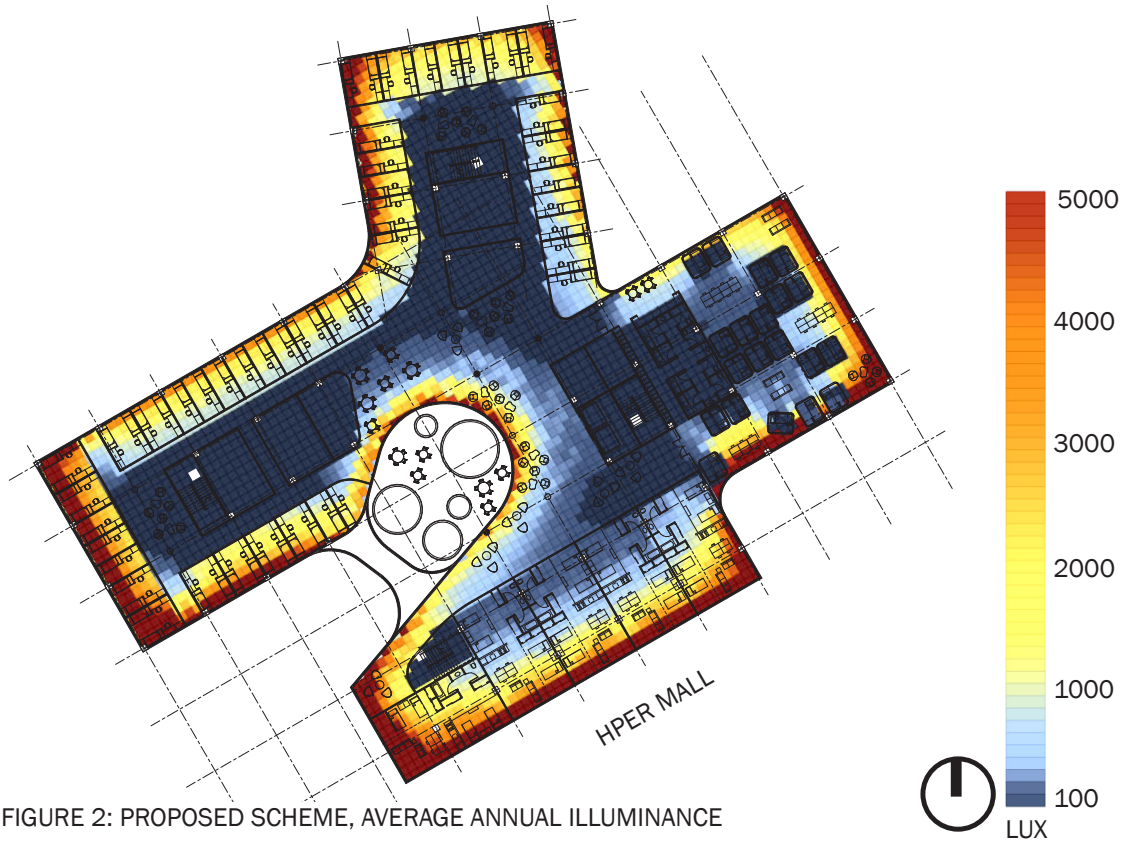


FIGURE 2: PROPOSED SCHEME, AVERAGE ANNUAL ILLUMINANCE

O4.2 DAYLIGHT

During Schematic Design, Atelier Ten worked with Cannon Design and EDA to evaluate the daylight benefits of several different proposed architectural schemes. This collaboration helped develop the schemes, and influenced the design team and owner's group to choose an option with optimized daylight access, producing high-quality interior spaces and resulting in energy savings.

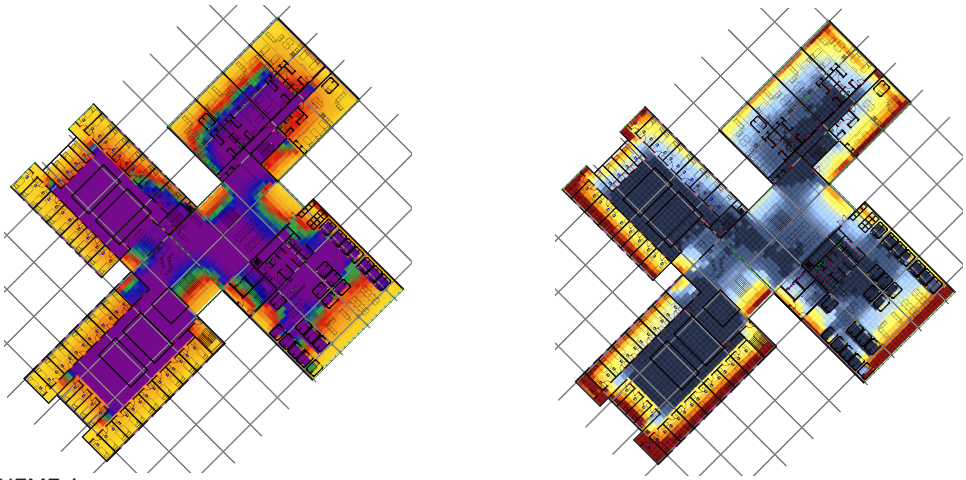
Daylight Metrics
For each scheme, Atelier Ten studied both daylight autonomy and average annual illuminance.

Average Annual Illuminance
Atelier Ten conducted an average annual illuminance study to evaluate the average annual daylight levels reaching the interior. Illuminance is a measure of the amount of light energy hitting a surface and is measured in lux (1 lux is equal to O.O9 footcandles (fc)). Illuminance levels were measured on a grid located 2'-6" above the floor, representing the work plane. Illuminance is measured for each hour of the year using sky conditions from weather data.

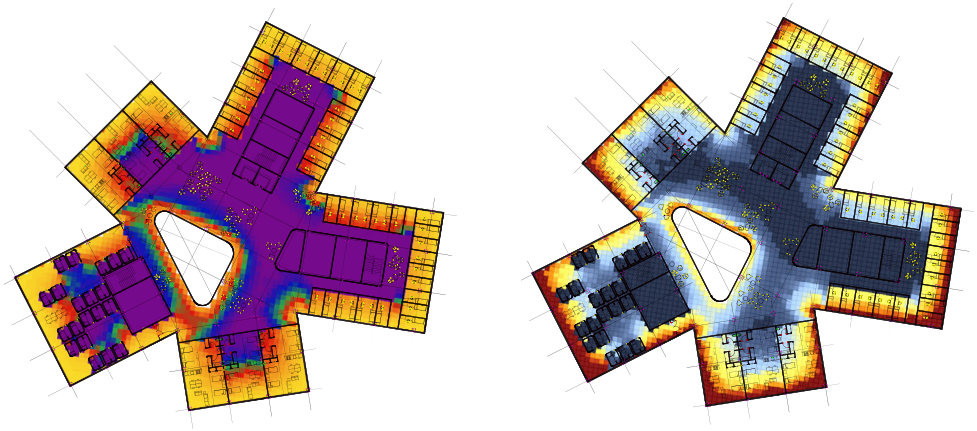
Daylight Autonomy
THe daylight autonomy at a point in a building is a the percentage of occupied hours per year when daylight alone can mee the minimum illuminance target. Daylight autonomy is measured on a scale of O% - 1OO% and a point with a daylight autonomy of 1OO% means that the daylight levels at that point will meet the minimum illuminance criteria for all of the occupied hours of the year without the use of electric light. A high daylight autonomy is therefore a good indicator of the energy saving potential of the daylighting in a space.

Daylight Autonomy is especially useful in evaluating office and work spaces, but also provides an idea of the daylight hours available for study in residential spaces.

Note that daylight autonomy is a binary metric; hours when a point does not meeting the minimum illuminance target are counted as non-compliant. in actuality, although the daylight level at these times does not meet the minimum threshold, there will still be some daylight contribution.



SCHEME 1



SCHEME 2

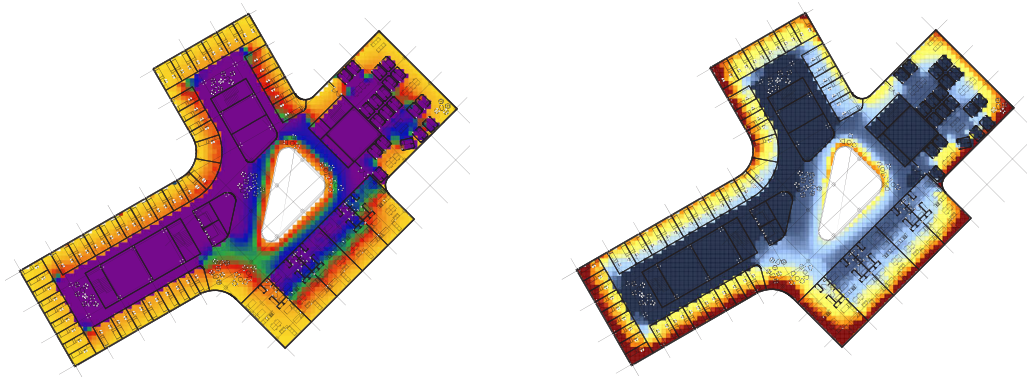
O4.3 MASSING SCHEMES

In Scheme 1, like all the schemes, perimeter spaces, including dorm rooms, loft apartments and pod areas, are well daylit. The central shared collaboration space in not well daylit particularly on lower levels, because of the limited perimeter wall area. These small glazed areas only bring daylight to immediately adjacent areas, but provide a visual connection to the outdoors for more of the space. Daylighting the central area was identified as a goal by the design team.

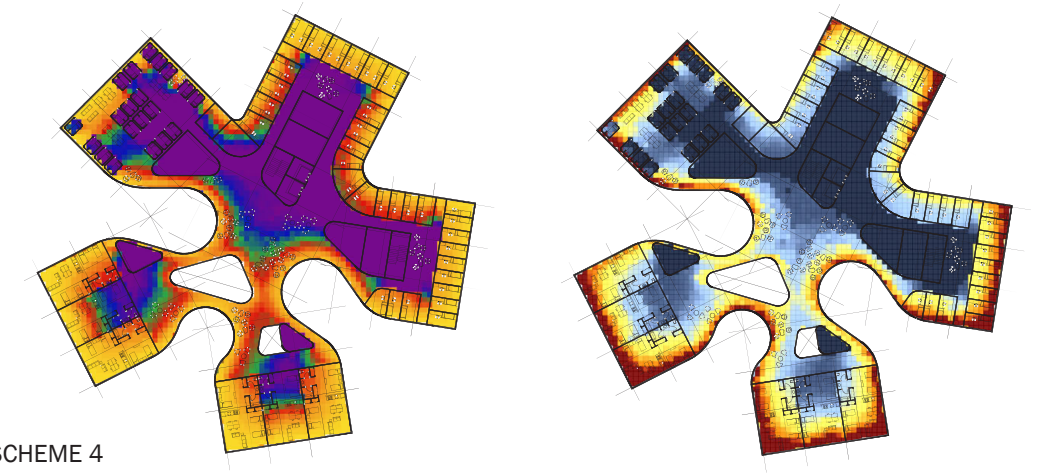
Schemes 2 and 3 show the benefit of the incorporating an open light court to bring daylight into the central space. In addition to usable daylight, occupants will have views of the sky and exterior.

Scheme 4 combines a central light court deep perimeter light courts to begin daylight to a greater portion of the central area. The light court provides direct views to the exterior for the central area.

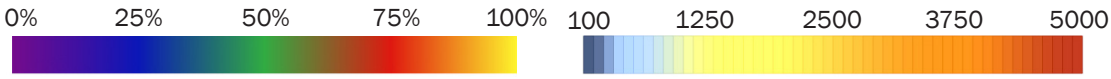
Propsed Scheme
The lessons learned from evaluating these massing schemes were incorporated into the current design, which employs a deeo exterior light court to bring usable daylight and views to the central area. Figures 1 and 2 for daylighting in the porposed scheme.



SCHEME 3



SCHEME 4



O4.4 MASSING AND FACADES

Atelier Ten provided shading reccommendations for the Lassonde Center based on na evaluation of the orientation, hourly incident solar radiation, air temperature and adjacent program.

Annual Incident Radiation
Atelier Ten siulated solar radiation on all building facades based on local conditions, including sky conditions, sun position and the mountain to the east of the site.

Shading by Orientation
Figure 3 looks at the times of day when factors that affect cooling loads occur. One line shows the time of day for every day of the year when peak temperature occurs.

The other line shows the time of eday for each day of the year when the total solar insolation received on all vertical surfaces on the site will be highest. The color scale of each line indicates the realative intensities of each daily peak compared to the whole year.

The hottest period and greatest insolation both occur during the summer moinths in the mid-afternoon. During these times, natural ventilation and ecnomizers will not be effective, but external shading can significantly limit cooling loads. In winter, peak aire temperatures are much lower and solar heat gains will be beneficial by reducing heating demand and increating occupant comfort.

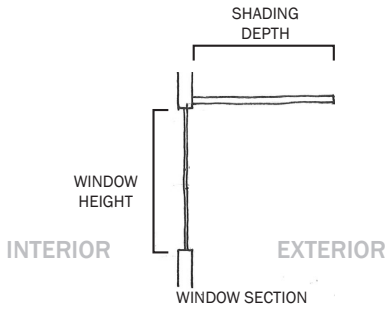


FIGURE 4: SHADING RATIO - SHADING DEPTH : WINDOW HEIGHT

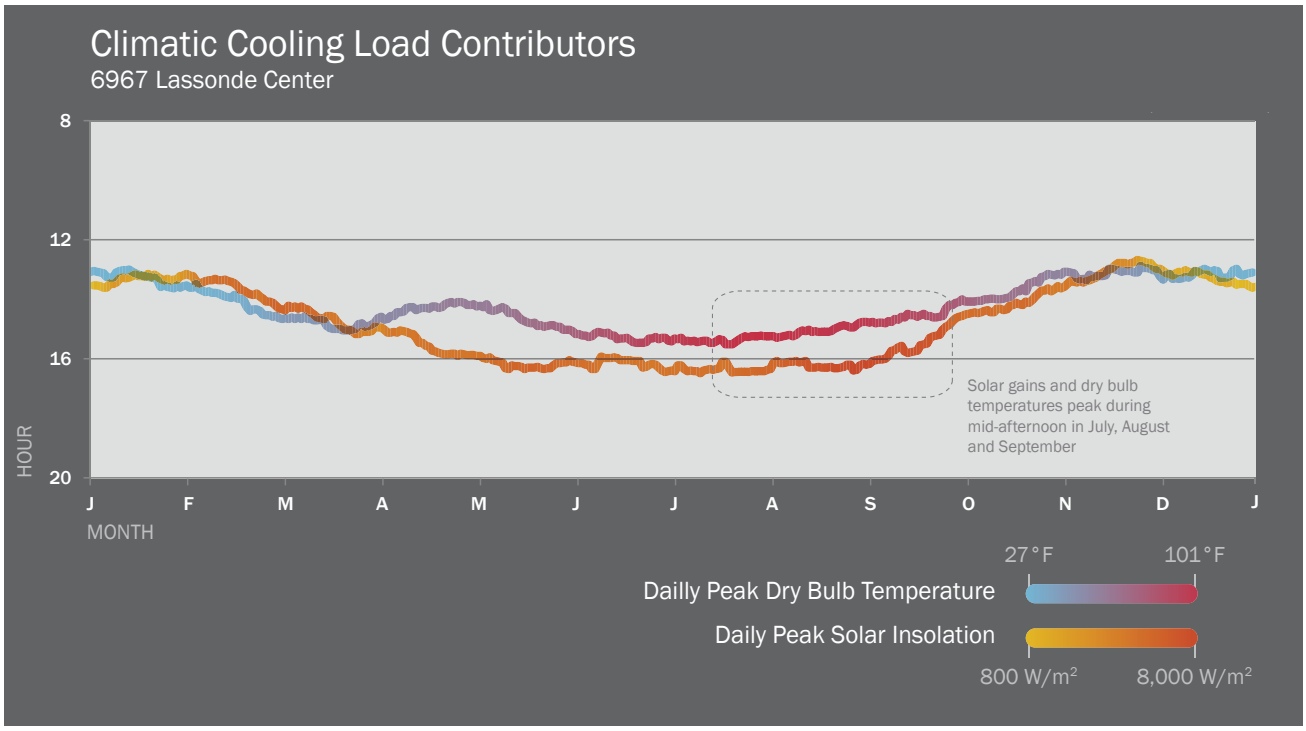


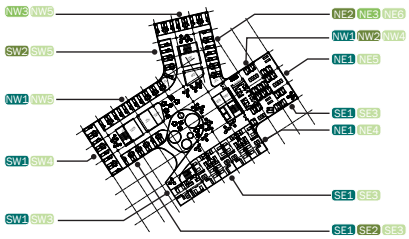
FIGURE 3: PEAK INCIDENT RADIATION AND TEMPERATURE

Figure 5 shows total annual incident radiation (above the x-axis) and peak incident radiation (below the x-axis) on facades for all oreientations on the site. This information was used to inform the orientation of the building and indicates whichf acade exposures should be minimized for different shading scenarios. These peak cooling orenetations are indicated with the circles and dashed bars in figure 5. Becuase the shading design is in progress, the chart includes three potential shaind conditions: unshaded, 1:2 (depth of shade:height of window - see figure 4), and 1:1. Note that the other orientations with peak conditions shift with the additon of shading.

On the south facade, 1:2 shading will reduce annual incident radiation by 53%, leading ti reduced energy consumption, and will reduce the peak incident radiation by 33%, leading to HVAC systems sizing savings.

Atelier Ten uses the incident radiation study to determine the areas of the facade where there is sufficient shalf shading, either from the oberhangs or adjacents building wings. For other regions of the facade, Atleier Ten provides specific shading reccomendation of the following pages.

In general, horizontal external shading will be the most effective shading for this building on most facades by blocking direct sun during the summer while still allowing heat fron the sun to enter the building during the winter.



KEY: ORIENTATIONS OF LASSONDE CENTER

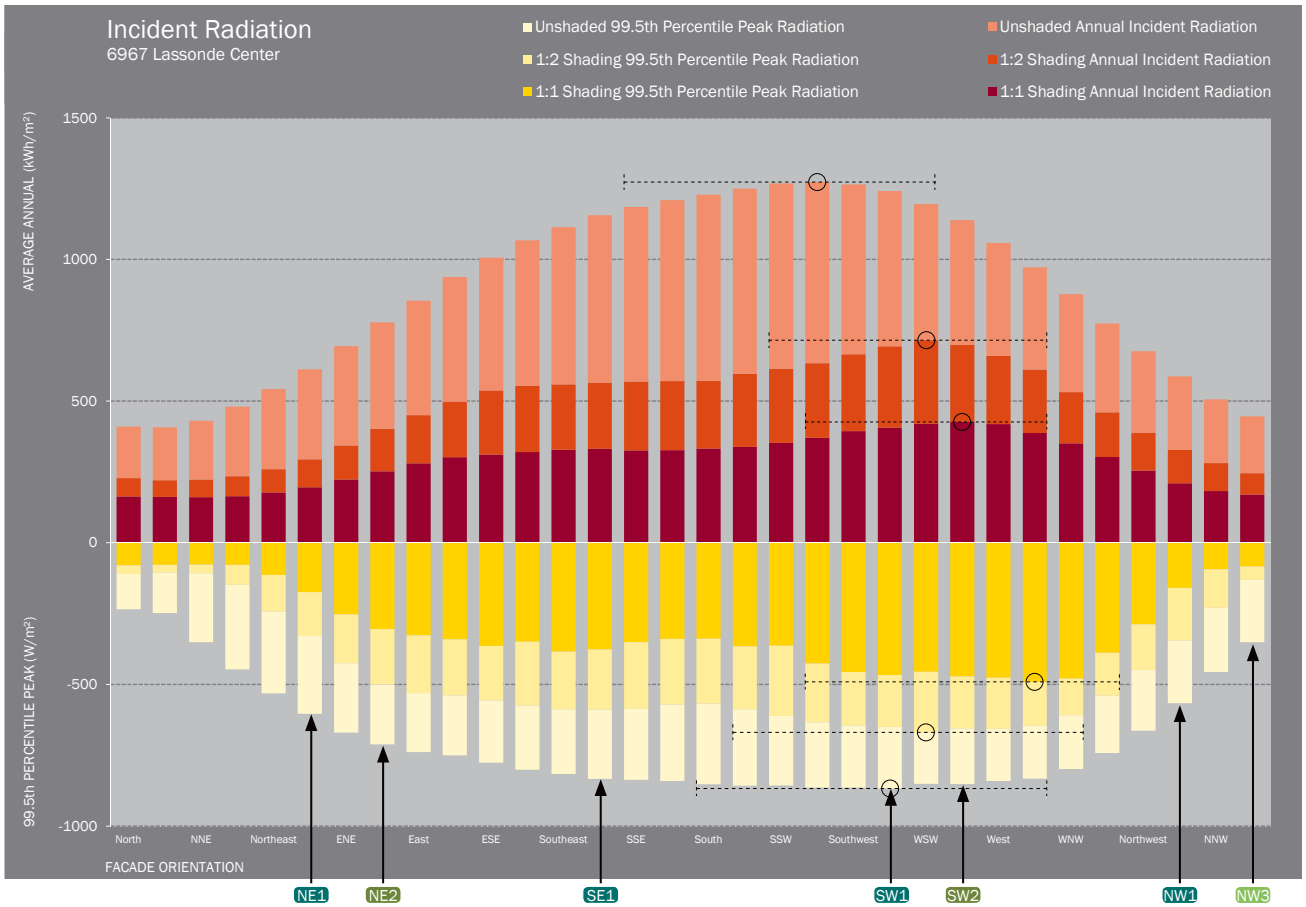
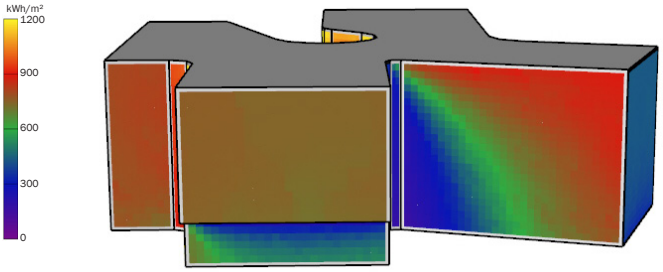


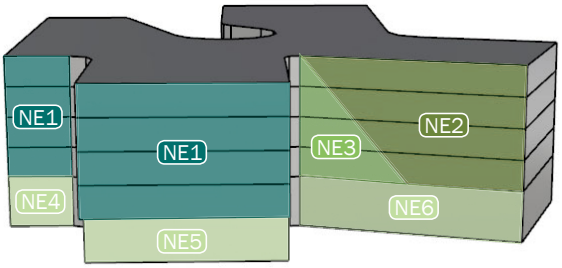
FIGURE 5: INCIDENT RADIATION BY ORIENTATION

Northeast Facade

FACADE REGION	ADJACENT SPACE TYPES	DESIGN TARGETS	
		EFFECTIVE SHADING	SHADING RATIO
NE1	Residential	- Horizontal External Shading.	- 1:2 Shading Depth to Window Height.
NE2		- Horizontal External Shading.	- 1:2 Shading Depth to Window Height.
NE3		- No shading required.	- N/A
NE4	Garage Space	- Horizontal External Shading. - Vegetation/Trees.	- 1:2 Shading Depth to Window Height.
NE5		- No shading required.	- N/A
NE6	Support/Mechanical	- No shading required.	- N/A

INCIDENT RADIATION

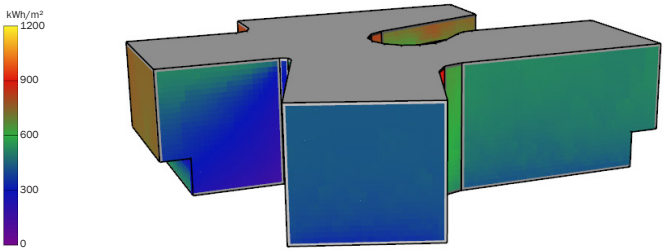


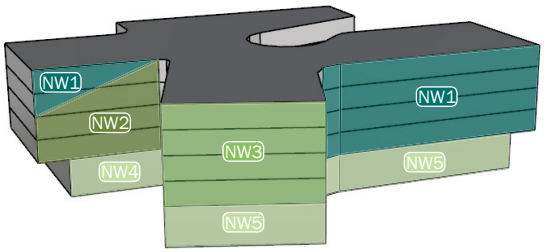


Northwest Facade

FACADE REGION	ADJACENT SPACE TYPES	DESIGN TARGETS	
		EFFECTIVE SHADING	SHADING RATIO
NW1	Residential	- Horizontal External Shading.	- 1:3 Shading Depth to Window Width.
NW2		- No shading required.	- N/A
NW3		- No shading required.	- N/A
NW4	Garage Space	- No shading required.	- N/A
		- No shading required.	- N/A
NW5	Support/Mechanical	- No shading required.	- N/A

INCIDENT RADIATION

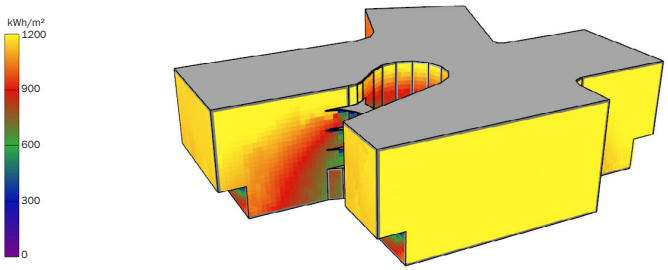


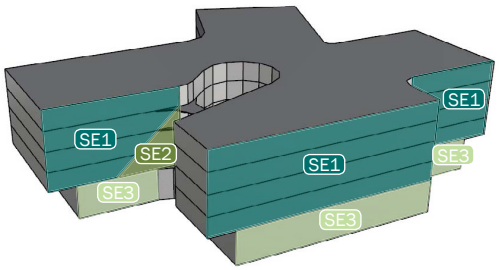


Southeast Facade

FACADE REGION	ADJACENT SPACE TYPES	DESIGN TARGETS	
		EFFECTIVE SHADING	SHADING RATIO
SE1	Residential	- Horizontal External Shading (Preferred) - Parallel Plane Mesh	- 1:1 Shading Depth to Window Height. - 30% Open Mesh
SE2		- Horizontal External Shading (Preferred) - Parallel Plane Mesh	- 1:2 Shading Depth to Window Height. - 50% Open Mesh
SE3	Garage Space	- Horizontal External Shading - Trellis - Building Overhang/Cantilever	- 1:1 Shading Depth to Window Height.

INCIDENT RADIATION

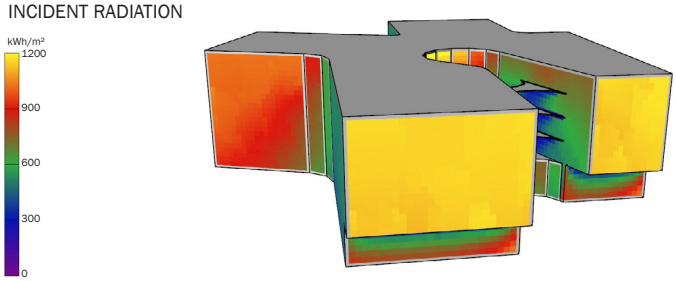


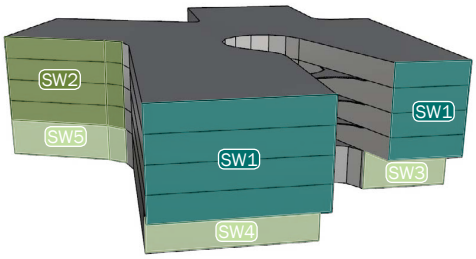


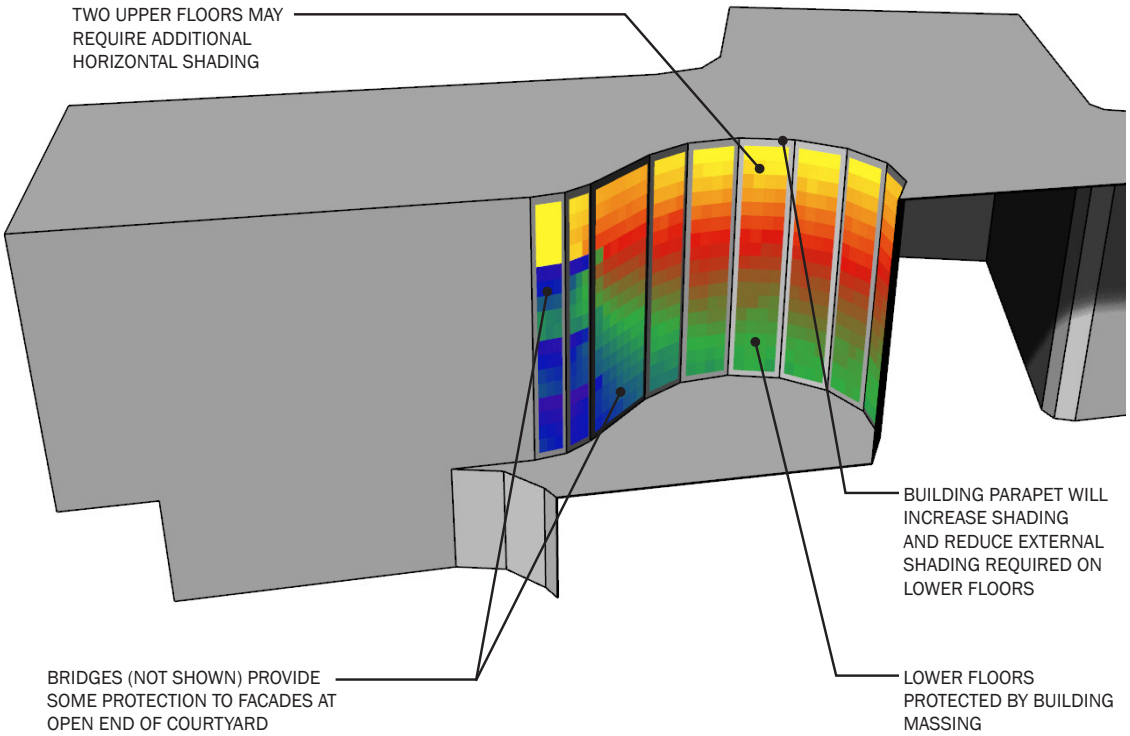
Southwest Facade

FACADE REGION	ADJACENT SPACE TYPES	DESIGN TARGETS	
		EFFECTIVE SHADING	SHADING RATIO
SW1	Residential	- Horizontal External Shading (Preferred) - 'L'-Shaped Shading - Parallel Plane Mesh	- 1:1 Shading Depth to Window Height. - 1:1 Shading Depth to Window Height. - 30% Open Mesh
SW2		- Horizontal External Shading (Preferred) - Parallel Plane Mesh	- 1:1 Shading Depth to Window Height/Width. - 30-50% Open Mesh
SW3	Garage Space	- No shading required.	- N/A
SW4	Directors' Apartments	- No shading required.	- N/A
SW5	Support/Mechanical	- No shading required.	- N/A

INCIDENT RADIATION







Courtyard

ADJACENT SPACE TYPES	DESIGN TARGETS	
	EFFECTIVE SHADING	SHADING RATIO
Collaborative Spaces	- Horizontal External Shading	- 1:2 Shading Depth to Window Height/Width (top two floors only)

04.5 ENERGY

The Lassonde Center is required to achieve 40% energy savings. Currently, the project team has a path to reach just short of the 40% goal, and this section recommends additional strategies to explore in Design Development to reach that goal. At the same time, this means that in order to achieve 40% energy savings target, there will be little flexibility in eliminating energy efficiency as the design progresses.

Various strategies at building level, central plant and on-site generation level will be designed to work in synergy to achieve energy and utility cost savings.

The purpose of this energy analysis is to identify key strategies for the Lassonde Center project to achieve the 40% energy savings goal. In addition, this analysis is intended to provide the project team with an understanding of the types and mix of strategies necessary to reach a high level of energy performance.

The analysis outlined in this report estimates the breakdown of energy use of the Lassonde Center and identifies the energy end-uses which should be targeted for further reduction. The study also provides a series of energy efficiency options that will allow the project team to gauge the cost and complexity associated with achieving various levels of energy performance.

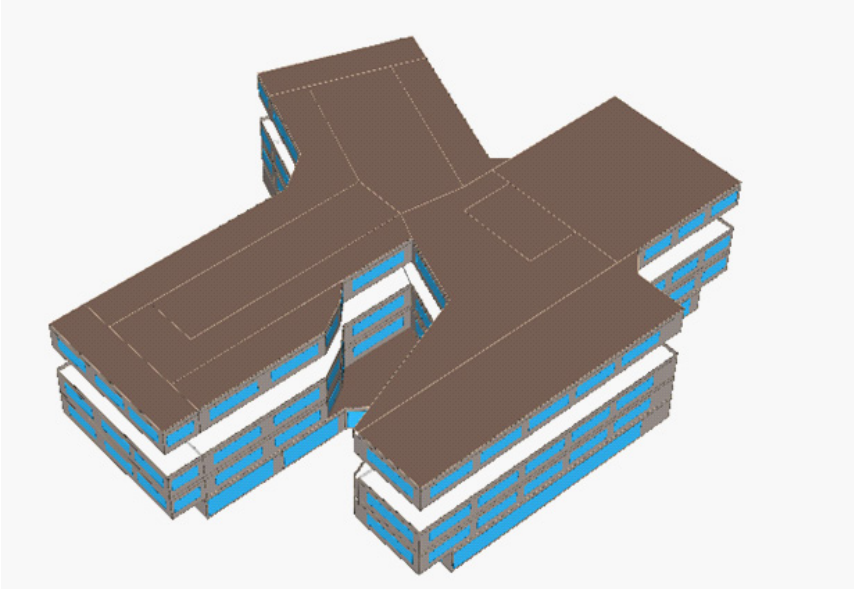


FIGURE 6: GRAPHIC REPRESENTATION OF ENERGY MODEL

ENERGY MODEL DISCLAIMER

ENERGY MODELS ARE REPRESENTATIONS OF THE DESIGNED BUILDING AND ITS FUTURE OPERATIONS. ENERGY MODELING IS A DESIGN OPTIMIZATION TOOL WHICH PREDICTS THE ENERGY PERFORMANCE OF A BUILDING. THE RESULTS FROM THE ENERGY MODEL ARE ACCURATE IN TERMS OF COMPARATIVE EVALUATIONS OF ENERGY OPTIMIZATION MEASURES ASSUMING THAT ALL THE OTHER ASSUMPTIONS REMAIN CONSISTENT. HOWEVER, BECAUSE ENERGY MODEL RESULTS RELY ON MANY ASSUMPTIONS ABOUT BUILDING OCCUPANCY PATTERNS, THEY SHOULD NOT BE CONSTRUED AS AN ABSOLUTE PREDICTION OF FUTURE BUILDING ENERGY USE.

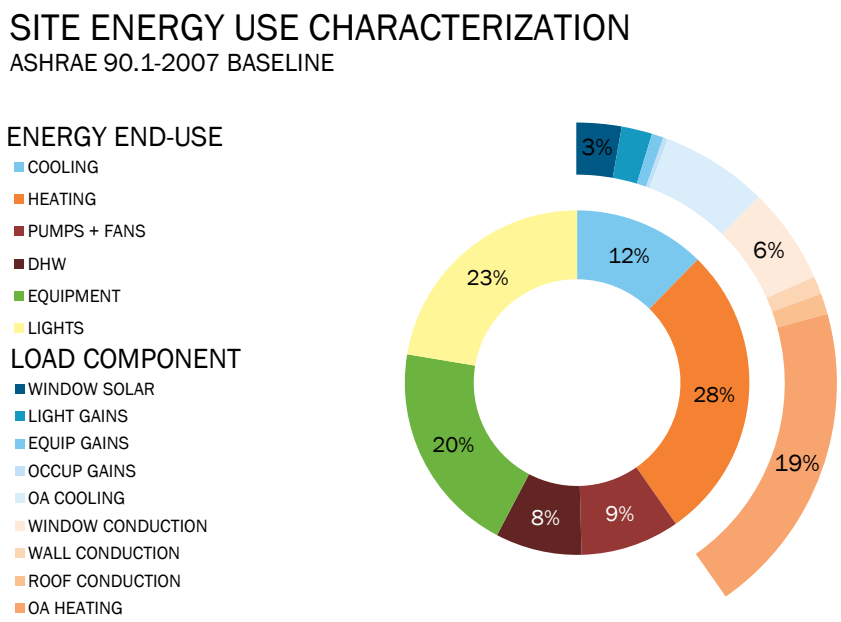


FIGURE 7: ANNUAL SITE ENERGY BREAKDOWN BY END USE- BASELINE DESIGN

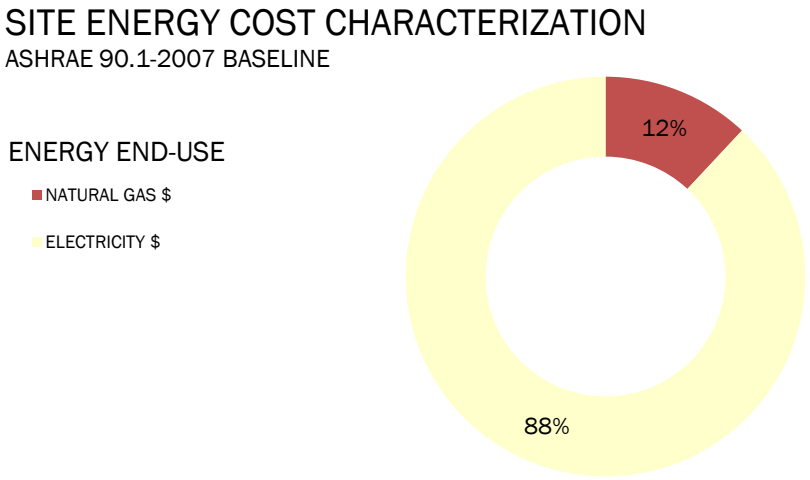


FIGURE 8: ANNUAL ENERGY COST BREAKDOWN- BASELINE DESIGN

04.5.1 BASELINE CHARACTERIZATION

Atelier Ten created several energy models using eQuest v3.64 (DOE-2.2 simulation engine). The first energy model, referred to as the Baseline Design, meets the minimum performance requirements stipulated in Appendix G of ASHRAE 90.1-2007. It is assumed that the energy performance of the current design of Schematic Design is equal to the Baseline Design.

Energy Use

Figure 7 summarizes the end uses for the Baseline Design in terms of the annual site energy. This breakdown indicates that the largest energy consumers are space heating (28%) followed by lights (23%) and equipment (20%). The Baseline Design shows annual site energy use intensity (EUI) of 49 kBtu/ft²/yr. Further investigation into the components reveals that most of the heating energy is used to condition outdoor air (19%) and overcome the conduction heat loss through windows (6%).

Considerable opportunities for energy savings lie in reducing heat transfer across the envelope to minimize heating and cooling energy associated with overcoming heat loss/ gain. Reduction in lighting energy as well as plug loads is also expected to contribute greatly to reducing annual energy consumption.

Energy Costs

Figure 8 presents that purchased electricity constitutes 88% of overall costs in the ASHRAE 90.1-2007 Baseline Design. Natural Gas is significantly cheaper than electricity on a per-unit-energy basis. Therefore, strategies to shift fuel usage to natural gas (on-site or via connection to the University's Central Utility Plant [CUP]) are likely to reduce utility cost of the building.

By combining all the above strategies with on-site renewable energy generation, the project may achieve its 40% energy cost reduction target.

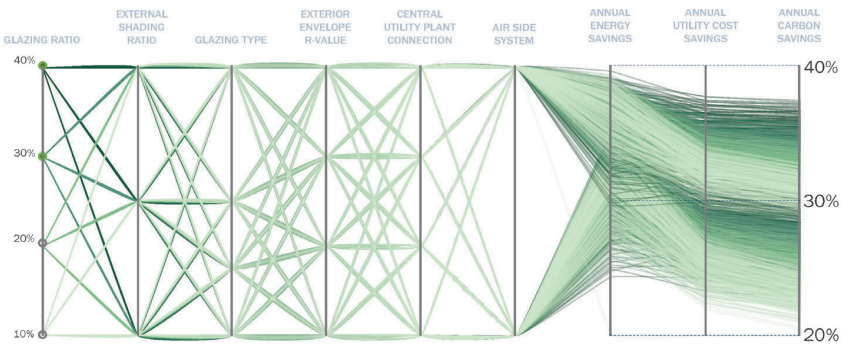


FIGURE 9: PARAMETRIC STUDY DATA MAP. STEP 1: 40% GLAZING RATIO IS SELECTED.

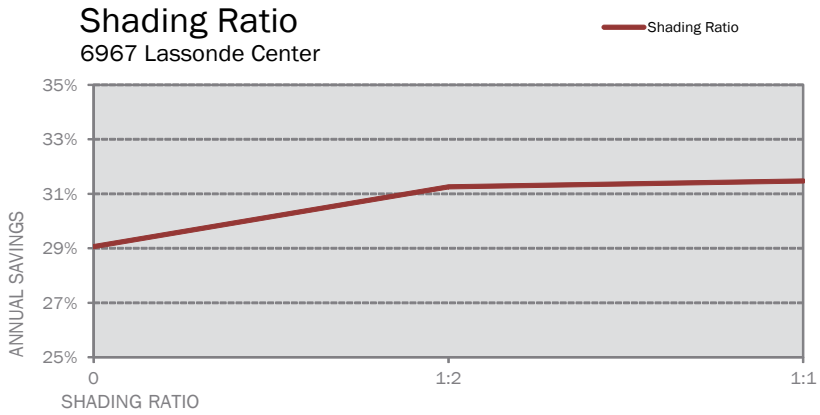


FIGURE 10: SHADING RATIO SENSITIVITY. EXTERNAL SHADING IN A 1:2 CONFIGURATION SIGNIFICANTLY IMPROVES ENERGY PERFORMANCE. ADDITIONAL SHADING YIELDS SLIGHTLY HIGHER RESULTS.

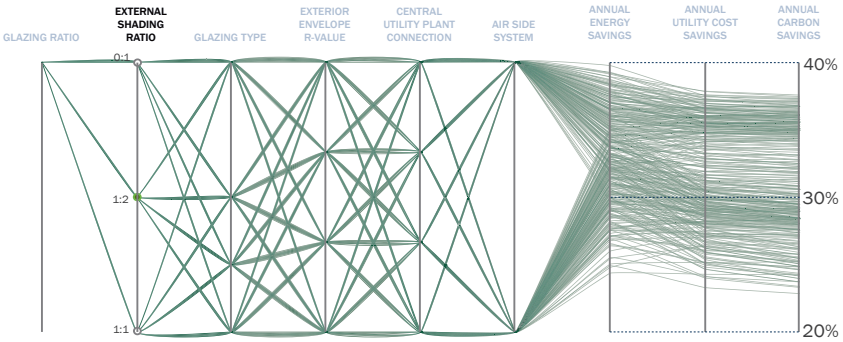


FIGURE 11, STEP 2: 1:2 SHADING IS SELECTED FOR EASE OF CONSTRUCTABILITY AND CAPITAL COST, DESPITE HIGHER PERFORMANCE FROM 1:1 SHADING. ATELIER TEN WILL COORDINATE WITH DESIGN TEAM DURING DD TO OPTIMIZE SHADING PERFORMANCE.

O4.5.2 STEPS TO 4O% SAVINGS

Atelier Ten has worked with the design team to identify key variables in the project's design that will greatly impact the building's overall energy usage. Figure 9 shows a data map of the annual savings for all possible combinations of the identified design variables. The map shows the interrelated effects of the design strategies and their effect on the range of annual energy, cost and carbon savings. Using this parametric study, key elements are isolated and analyzed to determine the optimized combination of strategies.

Building Design Measures

Improving the thermal performance of glazing and opaque constructions reduces the need for space heating and cooling. Several design variables affect this performance and have been studied for analysis.

Window to Wall Ratio (WWR)

Optimizing the building window-to-wall ratio accounts for heat losses and heat gains, daylight availability, visual and thermal comfort, views, and aesthetics. The analysis indicated that although increasing the window area increases the overall heating and cooling energy of the building it in turn decreases the electrical energy required for lighting by providing more daylight in the perimeter spaces.

Energy modeling methodology requires that the baseline and proposed design have the same window-to-wall ratio if the ratio is below 4O%, so the energy model reports that schemes with more glazing have a higher percentage saving than the schemes with less glazing. However, the schemes with less glazing consume less energy overall.

Rather than looking to the energy analysis to optimize facade design, Atelier Ten recommends that the glazing be designed with consideration for visual comfort, thermal comfort, and daylight to enhance human experience in the Lassonde Center.

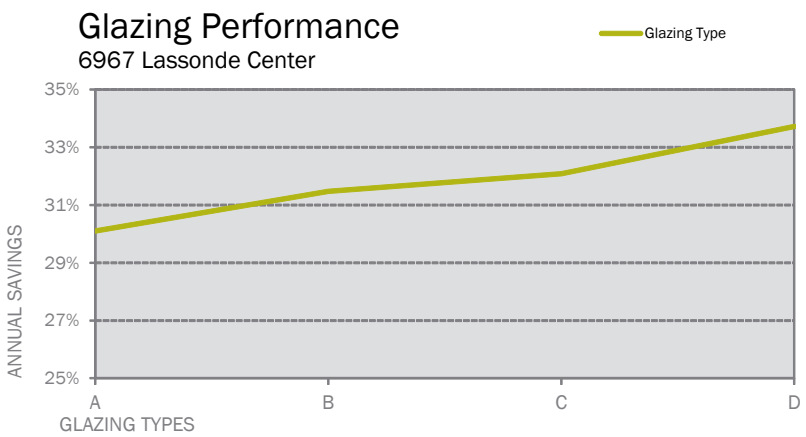


FIGURE 12: ENERGY PERFORMANCE IS HIGHLY SENSITIVE TO GLAZING U-VALUE

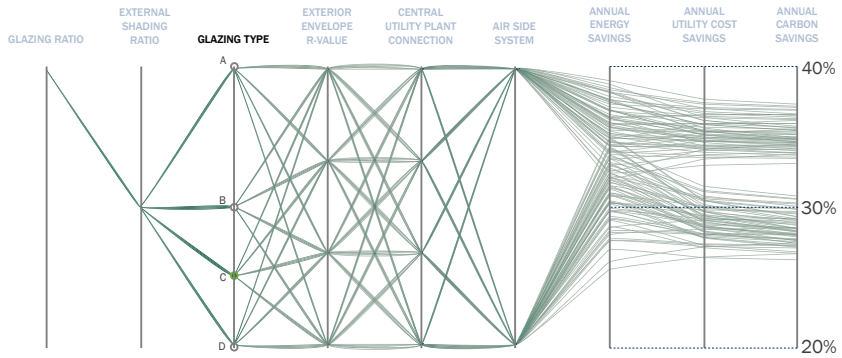


FIGURE 13, STEP 3: TYPE C GLAZING (U-VALUE OF 0.26) IS SELECTED. TYPE D GLAZING (U 0.23) IS RECOMMENDED, BUT REQUIRES A TRIPLE-ELEMENT ASSEMBLY.

For this, Atelier Ten recommends a glazing ratio of 2O% or lower in dorm rooms, and more glazing in garage and collaborative spaces (up to 4O%) to allow more daylight deeper into these larger spaces.

Shading Ratios

As the WWR increases, it is important to mitigate increased solar loads with external shading. With more glass, more external shading is necessary to limit cooling loads.

In this analysis, Atelier Ten tested two shading configurations: a 1:2 shading ratio greatly improves energy performance over the baseline case with nmo shading, but adding additional shading offers little comparative savings.

Atelier Ten will work with the design team in the Design Development phase to refine shading geometrics as required for each exposure.

Glazing

Window glazing selection is crucial for aesthetics, daylight, and energy usage. As glazing area increases, glazing selection becomes even more critical. The four glazing types tested are summarized as:

-A: Baseline Glass (U - O.35)
-B: Basic insulated glazing unit (IGU) (U- O.29)
-C: IGU with low coating (U - O.26)
-D: Triple element (suspended coating) (U - O.23)

Figure 12 shows that highly insulating glazing is very effective in reducing heating load. In selecting glazing, the design team should specify products that have a high ratio of transmitted visible light to solar heat gain coefficient.

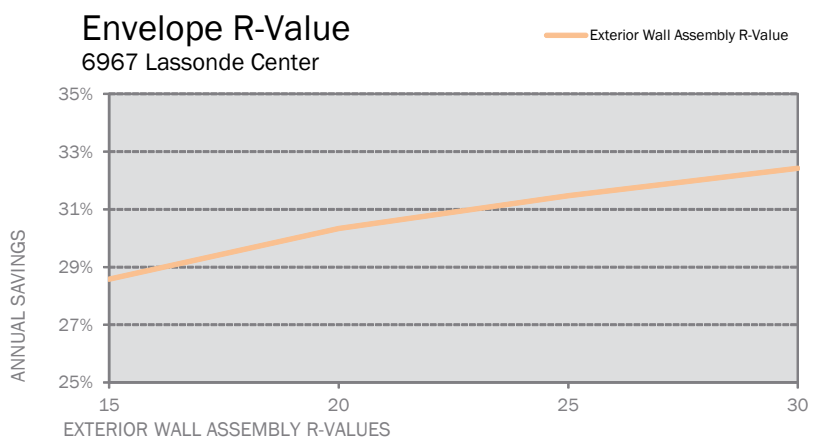


FIGURE 14: HIGH-PERFORMANCE ENVELOPE IS CRITICAL TO ACHIEVING ENERGY TARGETS

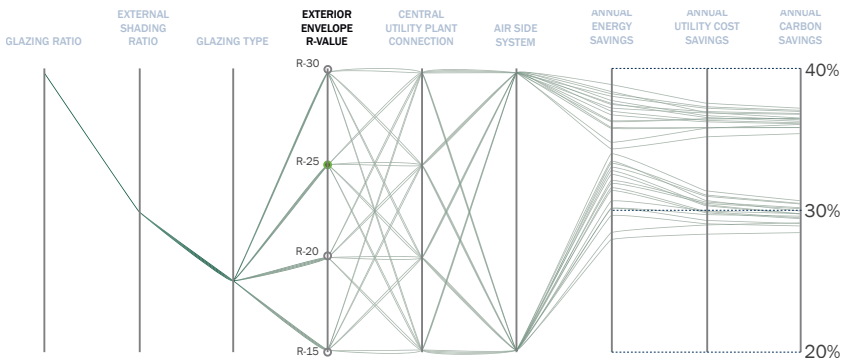


FIGURE 15, STEP 4: ENVELOPE ASSEMBLY WITH OPAQUE WALL PERFORMANCE OF R-25 IS SELECTED. ATELIER TEN RECOMMENDS R-30 WALL ASSEMBLY.

Envelope
Equally important to glazed area is the performance of the opaque construction. In Salt Lake City's cold winter climate, optimizing the exterior insulation is crucial to minimizing the heat load. Figure 14 shows the impact of envelope performance on energy consumption. Atelier Ten recommends minimum wall assembly insulation values between R-25 and R-30. Higher insulation values are also preferable as long as increased insulation doesn't come at the cost of other. More effective energy efficiency measures.

HVAC System Design Measures
Once the building skin has been optimized to minimize external; loads, the HVAC system can be designed to meet the remaining load efficiency.

Central Plant Connection
The building HVAC system can connect into the University's central utility plant (CUP) for heating, cooling, both, or neither. While on-site boilers have a minimal efficiency, the heating energy in the plant is created via a cogeneration turbine (CHP), which produces electricity as well as heat. The electricity and waste heat from the CHP plant generated at the CUP, however, is already consumed elsewhere on University of Utah's campus. The connection to the CUP therefore shows increased energy consumption as the electricity and waste heat cannot be used at the Lassonde Center. The on-site boilers are likely to have significantly higher efficiency than the boilers located at the CUP and therefore offer higher energy as well as cost savings,

The on-site chillers will likely have a comparable coefficient of performance (COP) to those in the central plant. However, the CUP takes advantage of thermal storage to create cooling at night, when the equipment can run more efficiently and at a lower electricity rate, and therefore has potential to offer improved performance and cost savings. Atelier Ten recommends on-site boilers For hot water and connection to CUP For chilled water generation for this Project.

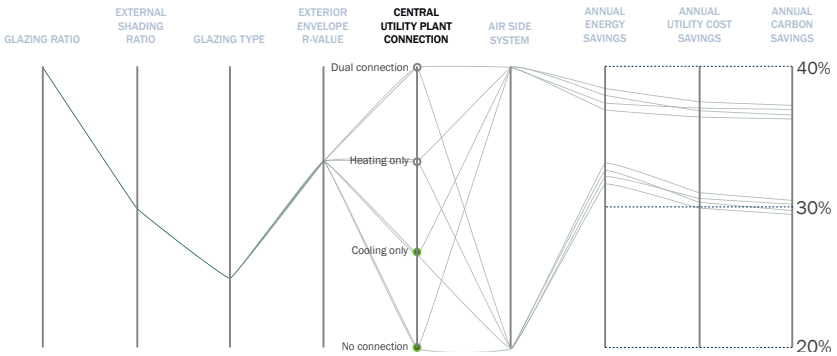


FIGURE 16, STEP 4: CENTRAL UTILITY PLANT CONNECTION. ATELIER TEN RECOMMENDS CONNECTING TO COOLING PLANT ONLY.

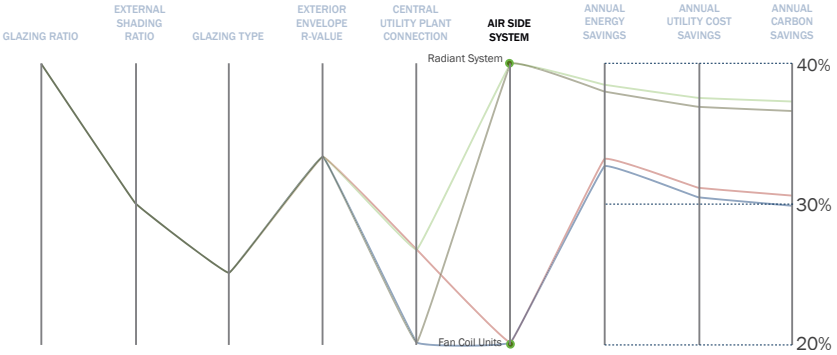


FIGURE 17, STEP 5 HVAC SYSTEM. ATELIER TEN RECOMMENDS RADIANT SYSTEM.

Air Side Systems

Once the heating and cooling generation has been optimized, additional savings can be obtained by conditioning interior spaces in the most efficient means possible. Fan coil units utilize hot and chilled water to condition the space but require constant fan energy to introduce both conditioning air and ventilation air. An in-slab radiant system would utilize a central air handling unit to supply minimum ventilation air while hot or cold water would be circulated through the slab to condition the spaces. Radiant systems save on fan energy and take advantage of thermal mass to maintain comfortable space conditions. Atelier Ten recommends a dedicated outdoor air system for ventilation and radiant system for sensible heating and cooling.

Chilled beams were also tested as a part of this analysis, but were found to be ineffective. The induction ratio (secondary air to primary air ratio) of the chilled beams drives the outside air flow rate significantly above what is required for dormitories, which have relatively low ventilation requirements. Conditioning this additional outside air increases overall energy consumption compared to the other options.

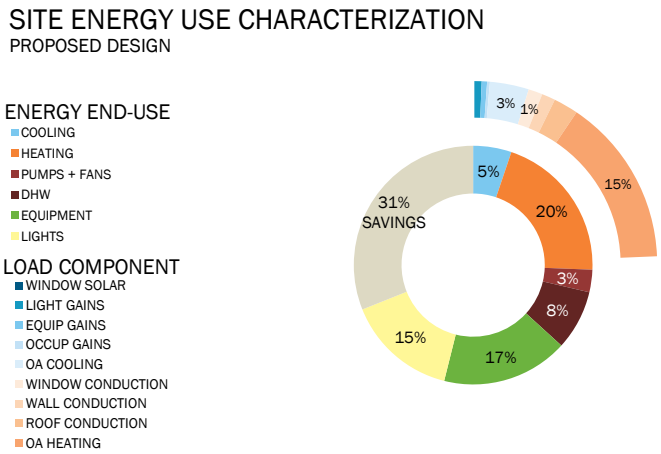


FIGURE 18: ENERGY END USE OF PROPOSED DESIGN, INCLUDING ON-SITE BOILER AND RADIANT SYSTEM

Conclusions

Optimizing the design variables of the Lassonde Center offer sizable energy cost savings compared to the ASHRAE 90.1-2007 Baseline design. Figure 19 shows the possible design configurations that result in the highest potential savings of the measures tested. A summary of recommendations are as follows:

- 30-40% WWR should be designed with external shading and high-performance glazing to optimize daylighting with energy performance.
- Triple element glazing performs slightly better than the other options in terms of overall energy performance, though it reduces daylighting potential. Insulating glazing units that maximize daylighting potential are likely to assist in lowering the energy consumption of the building.
- Envelope R-value should be selected at minimum R-25, up to R-30.
- On-site boilers for heating and connection to CUP for cooling.
- A radiant system with thermal mass has the potential to offer increased energy savings as well as thermal comfort.

Figure 18 shows an end-use characterization for a representative design case. A large portion of the 35% annual energy reduction is achieved via decreased heating and cooling. The reduced cooling load is largely due to external shading and optimized glazing SHGC. The improvement in heating load is largely due to highly insulated exterior construction and improved glazing U-value.

Figure 19 shows the best-case energy savings scenario, given the parameters currently being tested. While the energy cost falls slightly short of its target, energy consumption is nearly 40% below the baseline case.

As the design develops, the 40% energy cost savings goal can be met by incorporating additional energy saving strategies not tested in this analysis, such as:

- Improved lighting efficiency (>25% better than ASHRAE 90.1-2007)
- Demand controlled ventilation
- Plug load reduction
- Energy recovery
- Renewable energy

These strategies should be studied in Subsequent project phases.

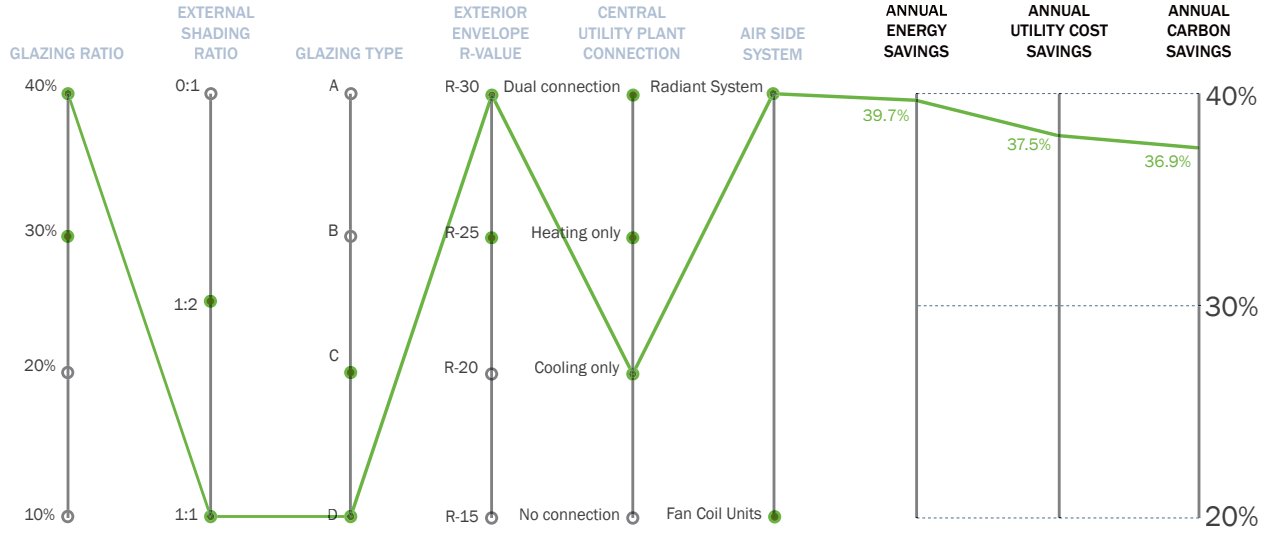


FIGURE 19: ENERGY PERFORMANCE RESULTS OF OPTIMIZED DESIGN SCENARIO

O5.6 WATER

Atelier Ten conducted a preliminary water analysis to estimate the quantity of water which will be used in the Lassonde Center and to recommend methods for reducing potable water consumption. Whole building water use In the Lassonde Center, almost 50% of potable water use is for showers. Flushing uses almost 20% of water and kitchen sinks another 20%. Both hand washing and clothes washing will comprise the smallest quantity of water consumed at around 7% of total consumption each. Water end use breakdown is summarized in figures 21 and 22.

Figure 20 summarizes water demands and potential water supplies on a month to month basis. This chart shows the large potential to meet non-potable demands with water reuse. Greywater from showers, sinks, and washing machines, constitutes the largest potential source of water for reuse. While there is the potential for blackwater reuse, the large amount of greywater available makes this unnecessary. Compared to greywater, rainwater makes up a small amount of available water.

Water Conservation and Reuse
Atelier Ten has looked at conservation and water reuse as ways to significantly reduce the building's environmental footprint. Figures 23 and 24 show the expected reduction in potable water consumption.

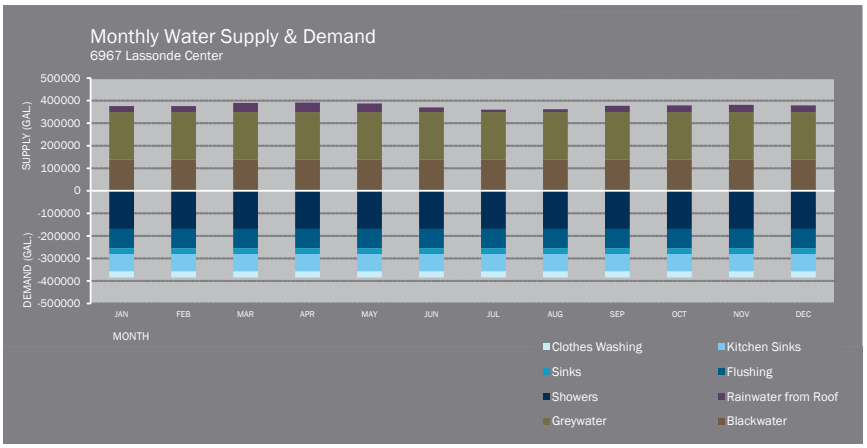


FIGURE 20: MONTHLY WATER SUPPLY & DEMAND

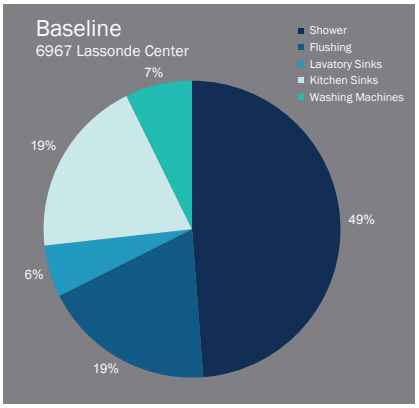


FIGURE 21: BASELINE WATER END USE

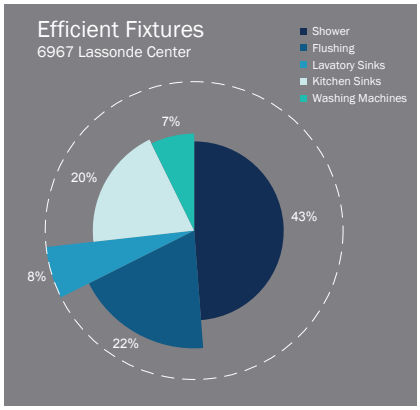


FIGURE 22: CASE 1 WATER END USE

Baseline Case
The baseline case includes no water conservation or reuse strategies and uses the LEED assumptions to estimate use.

Case 1: Efficient Fixtures
Decreasing the demand for potable water is the first step towards sustainable water management. The most cost effective method for reducing potable water use is to specify and install water efficient fixtures throughout the building. This strategy results in an estimated 33% reduction in potable water use overall. The following water use rates were assumed for efficient fixtures:

- Toilets: 1.28 gallons per flush (gpf)
- Urinals: 0.125 gpf
- Lavatory Sinks: 0.5 gallons per minute (gpm)
- Showers: 1.5 gpm
- Kitchen Sinks: 0.5 gpm

Case 2: Rainwater Reuse
Almost 90% of rain falling on the roof of the Lassonde Center could be captured in a 10,000 gallon rainwater storage tank if used for flushing. Only non-potable uses (toilets) will need to be double plumbed. Because of the limited rainwater resources and large demand for flushing water, rainwater capture reduces water consumption by only 4% and meets less than 50% of the sewage conveyance demand. CASE 3:

POTENTIAL LEED WATER POINTS*

CREDIT	CASE 1	CASE 2	CASE 3	CASE 4
WE CREDIT 2 (50% REDUCTION IN SEWAGE CONVEYANCE)	0	0	2	2
WE CREDIT 3 (30%, 35%, 40% REDUCTION IN WATER USE)	2	3	4	4
EP CREDIT WE2 (100% REDUCTION IN SEWAGE CONVEYANCE)	0	0	1	1
EP CREDIT WE3 (45% REDUCTION IN WATER USE)	0	0	1	1
RP WE CREDIT 3 (40% REDUCTION IN WATER USE)	0	0	1	1
TOTAL	**2**	**3**	**9**	**9**

*THIS DOES NOT ACCOUNT FOR WE CREDIT 1: WATER EFFICIENT LANDSCAPING. A POINT IS AVAILABLE FOR A 50% REDUCTION IN LANDSCAPE WATER USE. TWO ADDITIONAL POINTS (INCLUDING ONE REGIONAL PRIORITY CREDIT) ARE AVAILABLE FOR A 100% REDUCTION IN POTABLE LANDSCAPE WATER USE.

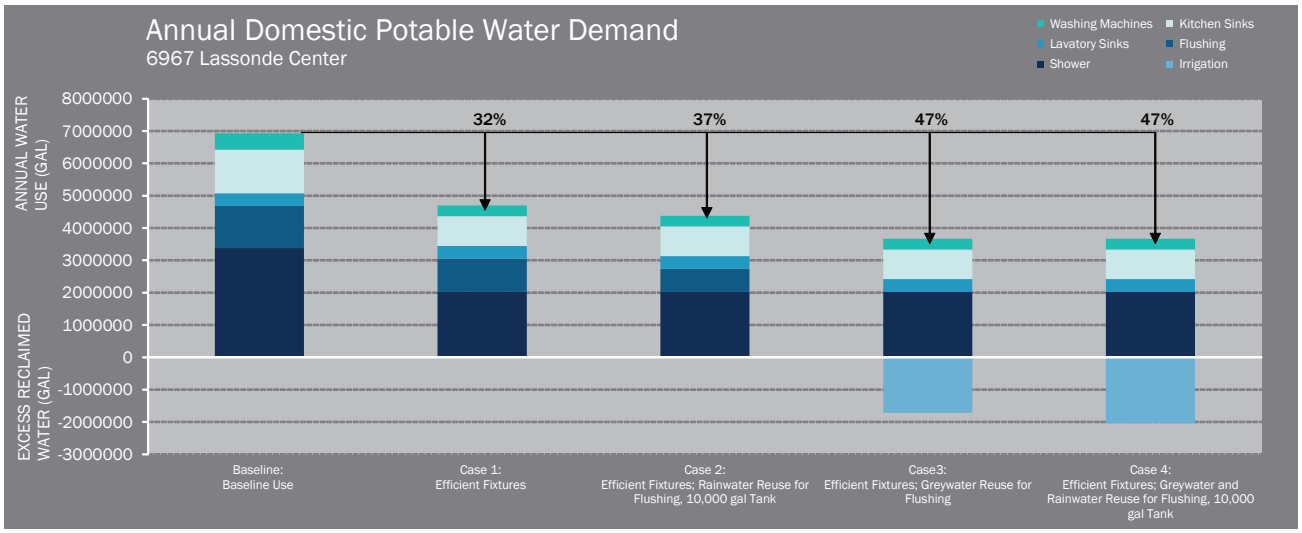


FIGURE 23: ANNUAL DOMESTIC WATER USE

Greywater Reuse
Using greywater for flushing results in a water use reduction of 47% and eliminates potable water use for sewage conveyance, earning an additional Exemplary Performance credit for LEED WEc2. Greywater reuse also requires a smaller storage tank than rainwater because greywater provides a constant water supply which is regularly drawn down by flushing. However, both greywater sources (sinks and showers) and uses (toilets) will need to be double plumbed. A greywater filtration system will also be required. Because greywater availability greatly exceeds reuse demand, excess treated water could potentially be flushing in adjacent buildings.

Case 4: Rain and Greywater Reuse
Capturing rainwater and treating greywater for reuse will not decrease potable water savings within the building beyond case 3, but would increase the amount of water available for flushing in adjacent buildings. The total annual reclaimed water available would be around 2 million gallons.

Irrigation
Irrigation will be an important component of overall water use. As the design develops, the project team can gain a more accurate estimate for the quantity of water which will be necessary to maintain the landscape vegetation.

The project team should consider the use of native or drought-resistant vegetation in combination with a high efficiency irrigation system to minimize the water demand of the landscape.

The University of Utah provides non- potable ground for irrigation. Further reduction in potable water and groundwater use for irrigation may be possible through rainwater reuse for on-site irrigation. Even more ambitious water reduction strategies would include greywater (and potentially blackwater) reuse for irrigation, although this is not currently permitted by the University.

Results and Recommendations
Due to the availability of large amounts of greywater in a residence hall, greywater reuse for flushing provides the greatest opportunity to reduce water consumption in the Lassonde Center. Excess treated water can potentially be provided to adjacent academic or office buildings to reduce their potable water consumption. Atelier Ten recommends including greywater reuse in the Lassonde center.

Next Steps
- Atelier Ten to refine water balance calculations based on anticipated occupancy
- EDA to minimize water use through specification of efficient equipment and low flow fixtures
- U of U to determine greywater reuse feasibility

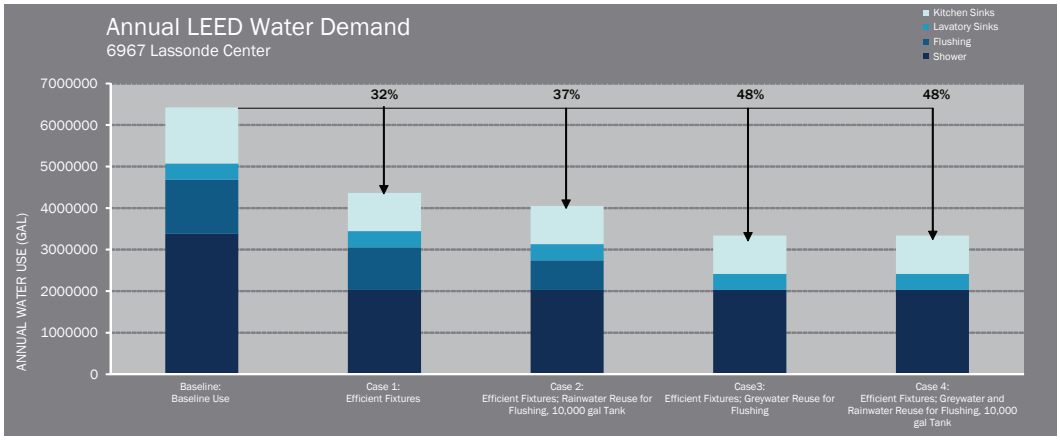


FIGURE 24: LEED WATER USE

O5.7 POD DESIGN

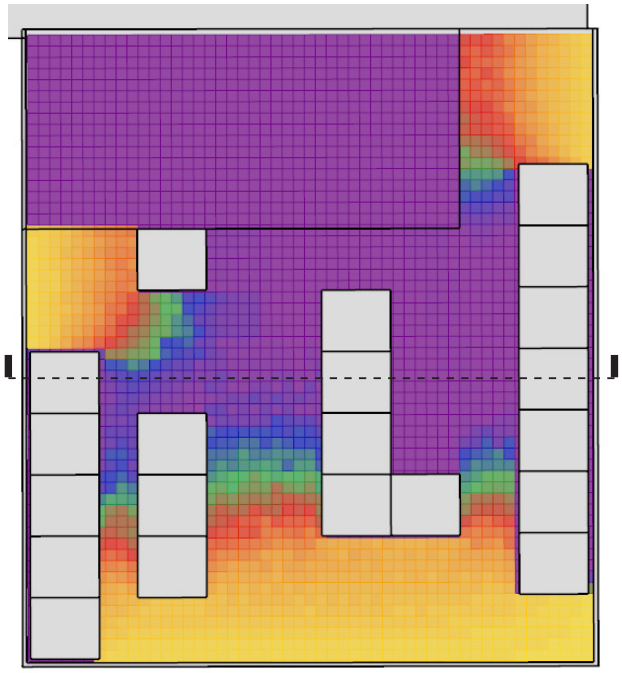
The pod areas of the proposed Lassonde Center present special challenges related to daylight and access to views. Atelier Ten studied a variety of pod massing options and layouts to find strategies that maximize daylight and indoor visual quality.

Individual Pod Design
The chart on the following page compares different pod designs for sectional daylight penetration and views. The baseline case was assumed to be an eight foot tall rectangular cube. Rounding the edges of the cube did not result in a significant improvement in daylight quality in the pod or in the space. Lowering a section of the roof to provide access to light from the clerestory results in the most significant improvement in daylight access in both the angled and dropped pods.

Lowering or sloping a portion of the pod ceiling also allows occupants to see directly out through the clerestory, providing a visual connection to the outdoors.

The angled pod is preferred because the angled surface will be illuminated and visible to occupants, increasing the perceived lightness of the space. Additionally, the angled surface within the pod will be illuminated by daylight from the perimeter (assuming there is glazing), increasing the brightness of the pod interior for occupants.

Daylight Autonomy



Average Annual Illuminance

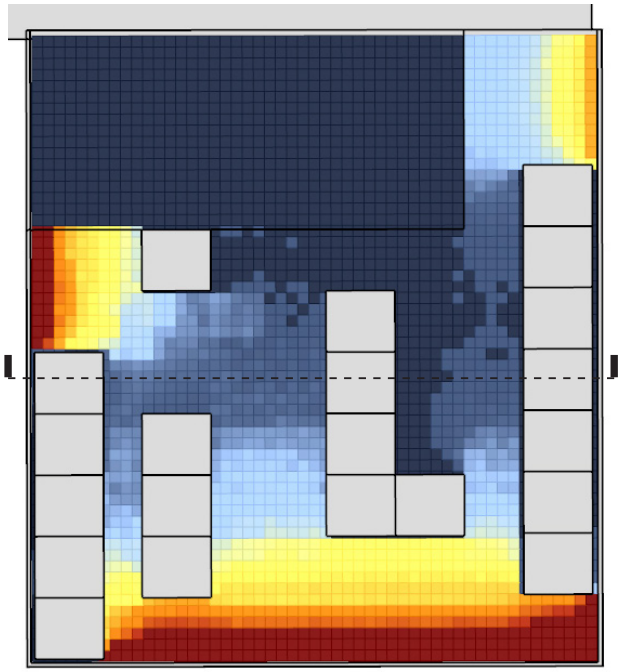
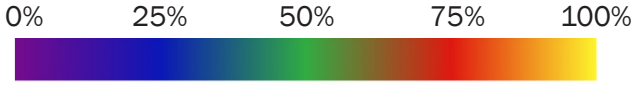
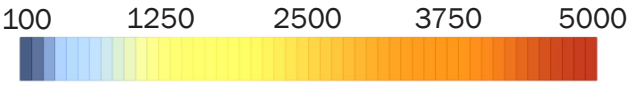


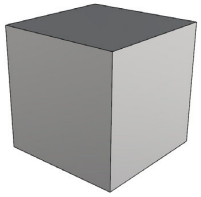
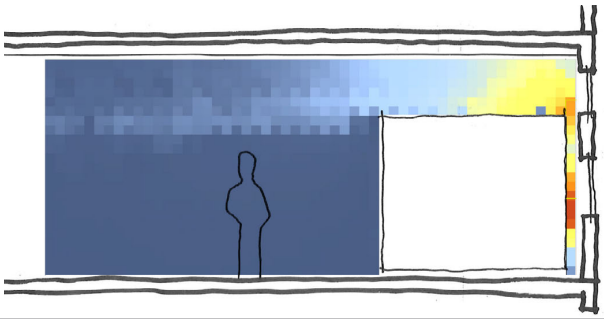
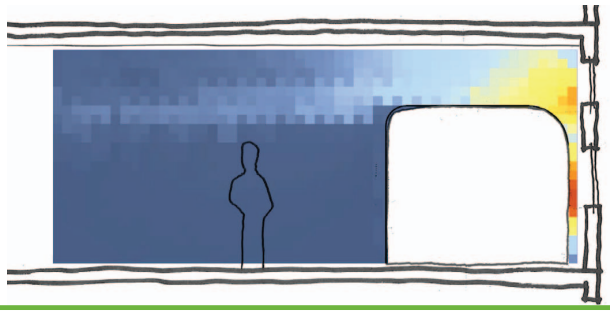
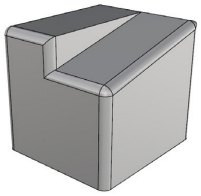
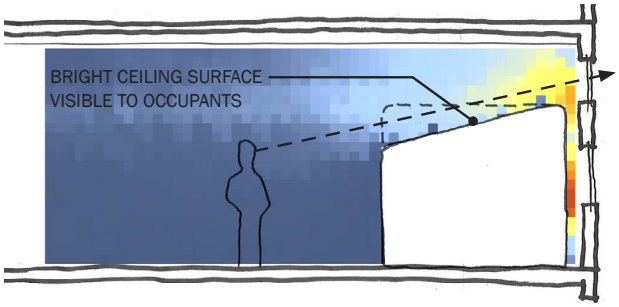
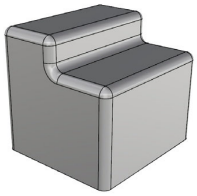
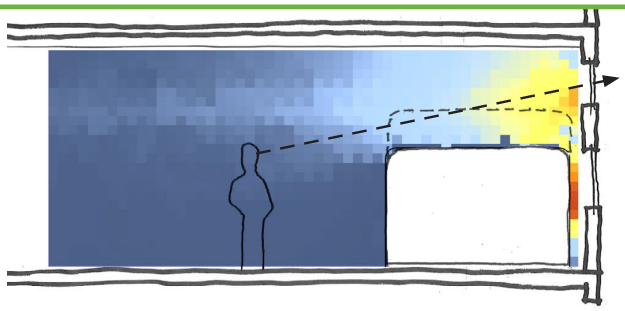
FIGURE 25: PLAN, BASELINE



PERCENT OF BUSINESS HOURS WITH DAYLIGHT ABOVE 300 LUX



LUX

Pod	Sectional Average Annual Illuminance	Notes
 RECTANGULAR		- Baseline case - Full height space inside all of cube - Pods block view of clerestory within pod space
ROUNDED		- No perceptible improvement in daylight levels compared to rectangular case - Full height space inside of cube only slightly restricted
RECOMMENDED  ANGLED		- Clerestory visible to occupants in interior space - Sloped surface on top of cube visible to occupants in central space, creating brighter visual environment - Sloped ceiling surface in inside of cube will reflect more light where windows provided - Interior ceiling height only partially restricted
 DROPPED		- Clerestory visible to occupants in interior space - Brighter ceiling not visible to occupants in center of space - Greatest interior ceiling height restriction

AVERAGE ANNUAL ILLUMINANCE

0 1000 2000 3000 4000 5000

LUX

Daylight Autonomy

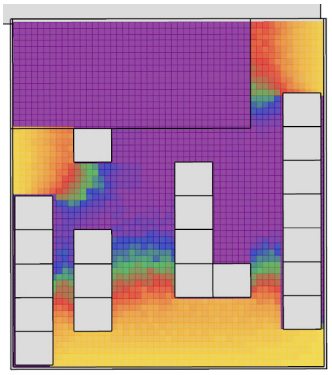


FIGURE 25: BASELINE, SLOPED PODS

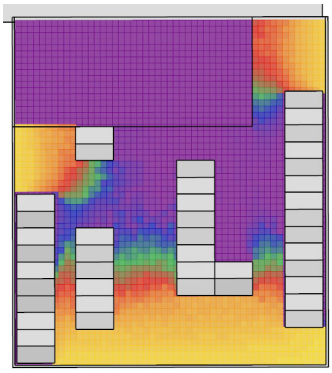


FIGURE 26: BASELINE, SLOPED PODS

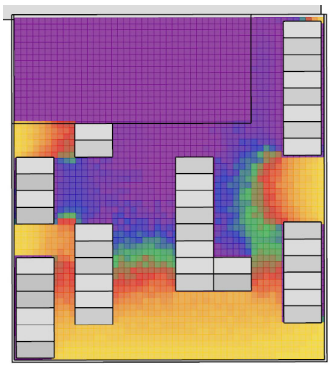


FIGURE 27: ALTERNATE LAYOUT

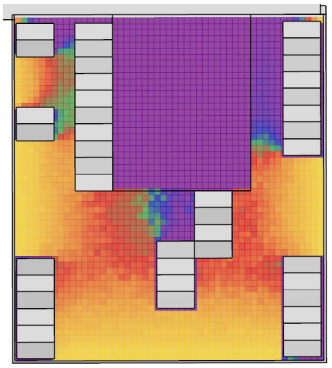
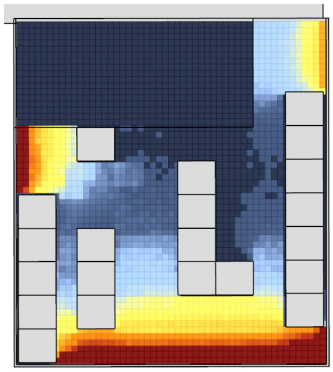


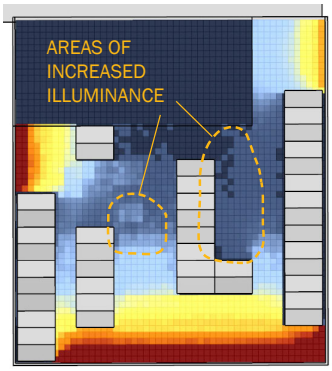
FIGURE 28: ALTERNATE CORE

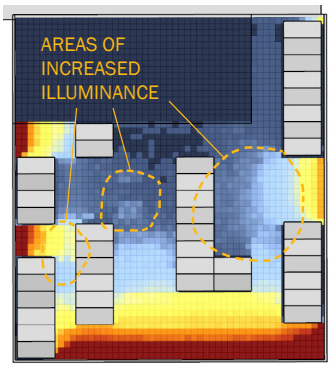
0% 25% 50% 75% 100%

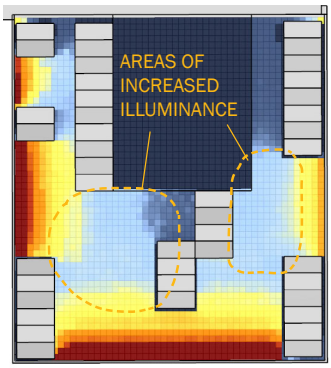
PERCENT OF BUSINESS HOURS WITH DAYLIGHT ABOVE 300 LUX

Average Annual Illuminan









100 1250 2500 3750

LUX

Pod and Core Layout

Figures 25 and 26 show the effect of substituting the angled pods for the rectangular pods. Increased daylight levels can be seen in the areas deeper within the space where daylight did not previously penetrate. While the effect is small in terms of usable daylight, the perceptual effect and improvement in visual connection to the outdoors will be significant.

Pod layout also has a significant effect on the amount of floor area with usable daylight. Figure 27 shows a pod distribution that increases daylight access for all the pods.

Reorienting the core to increase the amount of perimeter space creates the opportunity to provide daylight to a greater number of pods. With careful pod layout, nearly all of the floor area can be effectively daylit. Figure 28 shows a potential core configuration and pod distribution that maximizes usable daylight.

Additionally, placing all pod areas on the top floor, where skylights could be installed, would increase usable daylight in the center of the space.

Next Steps

- Cannon to develop pod design and layout to maximize daylight into pod space and into pods themselves.
- Consider sloping the pod roof ceiling to optimize daylight access.
- Look at adjusting location of core to maximize daylight where it is needed.

O5.8 MATERIALS

Materials selected for the Lassonde Center affect overall environmental impact and contribute to a healthy environment for building occupants. The following section contains a summary of the material strategies identified by Atelier Ten to reduce environmental impact and contribute to a healthy building.

Environmental Impact Selecting materials that contain recycled content, regional content, and are sustainably harvested reduces the environmental impact of the materials. LEED requires that materials with these characteristics are selected for compliance with MRc4: Recycled Content, MRc5: Regional Materials, and MRc7: Certified Wood. Rapidly renewable and salvaged materials are also desirable because of the reduction in resource consumption.

Major Material Packages
Focusing on high volume materials (e.g., steel, concrete, gypsum board) will have the greatest environmental impact. Based on standard construction processes, the following materials have been identified as a priority for the Lassonde Center:

- Concrete: Replace at least 20-25% of cement with fly ash or blast slag. Source all concrete components regionally.
- Structural and Reinforcing Steel: Select steel that contains high percentages of post-consumer content.
- Aluminum Curtain Wall/External Shading: Ensure selected system contains high recycled content.
- External Cladding: Ensure metal panels or shingles contain recycled content.
- Insulation: Consider rock wool insulation with post-industrial recycled content. EPS to contain recycled content.
- Steel Studs: Ensure studs contain recycled content.
- Wood products: Select FSC certified products for wood based materials, including engineered products. Ensure wood doors, ceilings and carpentry is included.
- Glazing: Source regionally if possible.
- Gypsum: Ensure that gypsum in the drywall is recycled.

FLY ASH

Mid-Size Material Packages
While these materials do not appear in as large quantities as the materials in the major material packages, selecting products with recycled content and/ or regional content will contribute to LEED certification and reduce the environmental impact of the project. Mid-size material packages for the Research Building include:
- Carpet Tile: Select carpet that contains a high percentage of recycled content and that can be recycled at the end of its life.
- Acoustic Ceiling Tile: Select ceiling tile that contains recycled content and are regionally sourced.
- Suspended Ceiling Structure: While the steel will contain less recycled content than structural steel, a significant percentage of it can be recycled.
- Internal Blinds: Select a blind that contains recycled content.

See the chart below for recommended minimum recycled content for various materials.

Roof Membrane
White membrane indicated in drawings and specifications. Light colored membrane will reduce cooling loads and limit heat island effect. Walkway pads and other appurtenances should be white or light colored where possible. High solar reflectivity materials that are not white also exist for areas where glare may be a problem (specifically above the vivarium where offices look over the roof). High albedo or green roof are required for LEED SSc7.2: Heat Island Effect, Roof.

MATERIAL TARGETS

MATERIAL	TARGET % RECYCLED	REGIONAL CONTENT	COMMENTS
STRUCTURAL AND REINFORCING STEEL	85-95%	*	POST-CONSUMER, INDUSTRY STANDARD
CONCRETE MIXTURE	15%	*	REPLACE 25% OF CEMENT WITH FLY ASH OR BLAST SLAG, STRUCTURAL ENGINEER TO CONFIRM
GYPSUM BOARD	95%	*	POST-INDUSTRIAL FOR GYPSUM, RECYCLED PAPER FACING ALSO AVAILABLE
STEEL STUDS	30%	*	POST-CONSUMER
ACOUSTIC CEILING TILES	40%	*	POST-INDUSTRIAL
SUSPENDED CEILING STRUCTURE	80%	*	POST-CONSUMER
CARPET	100%		POST-INDUSTRIAL, NYLON CARPET
MINERAL WOOL INSULATION	50%		POST-INDUSTRIAL, LOWER RECYCLED CONTENT TYPICAL
EPS INSULATION	10-60%		POST-INDUSTRIAL
ROOFING MEMBRANE	25%		POST-CONSUMER
TERRAZZO FLOORING	75%		POST-CONSUMER
ALUMINUM CURTAIN WALL/ ETERNAL SHADING	70%		POST-INDUSTRIAL

Indoor Environmental Quality
Providing good indoor environmental quality for occupants, which is a priority for the Lassonde Center, is achievable through health-based material selection strategies. Minimizing materials that contain and release VOCs or SVOCs, avoiding Living Building Challenge Red List chemicals, and selecting non-emitting materials are critical to designing a healthy environment for Lassonde Center residents. The intent of these strategies is to improve indoor environmental quality, reduce toxic chemicals, and ensure occupant health, performance, and satisfaction.

Minimize VOCs and SVOCs
To provide good indoor air quality, minimize materials, finishes, and furnishings that emit volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs).

Occupant exposure to indoor air contaminants released from these building materials and products is associated with adverse health effects.

VOCs including formaldehyde are associated with acute adverse health effects including eye, nose or throat irritation, skin irritation, cough, wheeze, headache, and fatigue symptoms. Chronic adverse health effects associated with long-term exposure to VOCs include asthma, organ damage, and cancer.

SVOCs including phthalates and flame retardants are also a major source of indoor air contaminants because they are released from materials slowly over long periods of time. As a result, longterm exposure to SVOCs is associated with chronic adverse health effects including endocrine disruption and cancer.

Different VOCs and SVOCs have different effects on humans. A single product can contain and emit multiple VOCs, so products should be evaluated for all VOCs. Until recently, the design and construction industry has tended to look at total VOCs (TVOC), a metric which does not take account of the interactive effects of various chemicals on human occupants.

Building materials that are significant sources of VOCs and SVOCs include architectural coatings, composite wood / agrifiber materials, flooring, caulks, sealants, adhesives, ceiling tiles, PVC materials, insulations, fabrics, carpets, gypsum, furnishings, and office equipment.

Related metric:
- LEED 2009 IEQ Credits 4.1-4.4_Low Emitting Materials.

ZERO VOC PAINT

POWDER-COATED METAL

Acoid LBC Red List Chemicals

To reduce toxic chemicals, avoid The Living Building Challenge (LBC) Red List chemicals. The LBC has identified a list of chemicals that are commonly found in building materials that are extremely hazardous to occupant health and the environment. LBC Red List chemicals are difficult to completely eliminate from the project; however, chemicals on the Red List should be avoided in building materials to both improve occupant health and reduce environmental impact, particularly in living and sleeping spaces where occupants spend the most time. Electronic equipment and computers contain LBC Red List chemicals, which is especially important to consider for the Lassonde Center.

The LBC Red List chemicals include: asbestos, formaldehyde (added), halogenated flame retardants, PVC, mercury, CFCs, HCFCs, neoprene (chloroprene), cadmium, chlorinated polyethylene, creosote, arsenic, pentachlorophenol, lead (added), phthalates, petrochemical fertilizers / pesticides.

Related metrics:

- LEED 2009 EA Prerequisite 3 Fundamental Refrigerant Management
- EA Credit 4 Enhanced Refrigerant Management.

Selecting Non-Emitting Materials

To ensure a healthy environment, select non-emitting materials, if possible. Stone, ceramic, powder- coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or untreated solid wood flooring are examples of non-emitting materials if they do not include integral organic-based surface coatings, binders, or sealants. Because these materials do not emit VOCs or SVOCs, selecting them is an effective strategy for designing a healthy environment.

Next Steps

- Contractor to review materials target chart and comment on availability of materials with regional and recycled content available in Salt Lake City.
- EDA to incorporate specific recycled and regional material requirements into the specifications.
- Design team to avoid specifying materials that negatively affect indoor air quality.

LEED-NC

LEED 2009 for NEW CONSTRUCTION and MAJOR RENOVATIONS

Exhibit - E

Contract Targets Checklist
Feb 14, 2014

LEED-NC v3 2009 Project Checklist

LASSONDE LIVE-MAKE CENTER		EDA / CANNON	*LEED v3 2009_Version 02*
U of U, SLC UT	Current Score: 67 = Gold / Owner's Target: Gold = min. 60 Certified 40-49 points Silver 50-59 points Gold 60-79 points Platinum 80 points / above	EDA Architects is anticipated to file LEED documentation not specifically required to be responsibility of specialty consultants. Documentation responsibilities will be refined as project emerges.	

Project Information	Title	General Subject Matter	Doc. Responsibil.	Notes
PI Form 1	Minimum Program Requirements	Compliance with Laws & Regulations, LEED Standards	EDA, Owner	Owner signatures necessary
PI Form 2	Project Summary Details	Area of Bldg & Site; Type(s) of Construction; Utilities; Budget Information; LEED Boundary; FTE Calc's	EDA	
PI Form 3	Occupant and Usage Data	Occupancy & Use Types; Quantities	EDA	
PI Form 4	Schedule and Overview Documents	Construction & LEED Application Schedule	EDA	

Yes	Likely	Doubt-ful	No		Sustainable Sites	26 Points Possible	Attainment Certainty	Challenges / Strategies	Documentation Responsibility & Coordination	Notes
Y				Prereq 1	**Construction Activity Pollution Prevention**	Required	100%		G.C., EDA	
1				Credit 1	**Site Selection**	1	100%		EDA / CANNON	Site assumed to be previously developed
5				Credit 2	**Development Density & Community Connectivity**	5	90%	May need review of pedestrian ways & distances to services	EDA / CANNON	
			1	Credit 3	**Brownfield Redevelopment**	1	N.A.		N.A.	
6				Credit 4.1	**Alternative Transportation**, Public Transportation Access	6	95%	Verify Distance to TRAX stop; may need to engineer more direct route, shuttle bus stop	EDA / CANNON	
	1			Credit 4.2	**Alternative Transportation**, Bicycle Storage & Changing Rooms	1	75%	Verify FTE & transient reqs and distances to nearby public showers.	EDA / CANNON	
		3		Credit 4.3	**Alternative Transportation**, Low-Emitting and Fuel-Efficient Vehicles	3	25%	Preferred parking designation, plug-in hybrid recharging?	EDA / CANNON	Acceptability of preferred parking among faculty/staff?
		2		Credit 4.4	**Alternative Transportation**, Parking Capacity	2	25%	Parking in campus setting? Compare parking provided to required.	EDA / CANNON	
		1		Credit 5.1	**Site Development,** Protect or Restore Habitat	1	25%	Plantings for microhabitat value, including green roof?	LSA	Building & Site as 'Ecotone,' esp. for migratory songbirds
	1			Credit 5.2	**Site Development,** Maximize Open Space	1	50%	Research zoning/open space requirements.	LSA	Depends on building layout, 'LEED Project' delineation
1				Credit 6.1	**Stormwater Design,** Quantity Control	1	90%	Adequate retention, infiltration areas; pervious paving?	NV5	Gravel wetlands planting areas as landscaping complement, stormwater infiltration & filtration mechanisms?
1				Credit 6.2	**Stormwater Design,** Quality Control	1	90%	TSS filtration	NV5	
1				Credit 7.1	**Heat Island Effect,** Non-Roof	1	90%	Paving all concrete, unit pavers and/or reflective asphalt	LSA	
1				Credit 7.2	**Heat Island Effect,** Roof	1	100%	Anticipate combination of membrane, plaza and green roof	EDA / CANNON	
	1			Credit 8	**Light Pollution Reduction**	1	60%	Must delineate site most advantageously	Envision	REGIONAL PRIORITY CREDIT OPPORTUNITY; May be difficult due to light spillover from interior
16	3	6	1	subtotals						

Yes	Likely	Doubt-ful	No		Water Efficiency	10 Points Possible	Attainment Certainty	Challenges / Strategies	Documentation Responsibility & Coordination	Notes
Y				Prereq 1	**Water Use Reduction**	Required	100%		Colvin	Requires min. 20% improvement for building water use over 'baseline,' *excluding* irrigation
2	2			Credit 1	**Water Efficient Landscaping**	2-4	50%	Plantings selection, drip irrigation, possible secondary sourcing	LSA	REGIONAL PRIORITY CREDIT OPPORTUNITY (Op. 2 No Potable Water Use or Irrigation)
	2			Credit 2	**Innovative Wastewater Technologies**	2	10%	Significant reductions in discharges to sewer system possible	Colvin / A10	
3	1			Credit 3	**Water Use Reduction**	2-4	75%		Colvin	REGIONAL PRIORITY CREDIT OPPORTUNITY (40% Reduction)
5	5			subtotals						

Yes	Likely	Doubt-ful	No		Energy & Atmosphere	35 Points Possible	Attainment Certainty	Challenges / Strategies	Documentation Responsibility & Coordination	Notes
Y				Prereq 1	**Fundamental Commissioning of Building Energy Systems**	Required	100%		Owner's CxA	Suggest extending 'basis-of-design' and 'owner's project requirements' to articulation of architectural systems and performance expectations
Y				Prereq 2	**Minimum Energy Performance**	Required	100%		Mechanical & Electrical Engineers, Team	
Y				Prereq 3	**Fundamental Refrigerant Management**	Required	100%		Colvin	
12	3	1	3	Credit 1	**Optimize Energy Performance *ESTIMATED***	1 to 19	75%	dependent upon A10 modeling	A10	REGIONAL PRIORITY CREDIT OPPORTUNITY (Min. 36% > 90.1-2007; Target 40% > 90.1-2007)
	1	1	5	Credit 2	**On-Site Renewable Energy**	1 to 7	25%	Cost-effectiveness, Owner's desire for demonstration	Team, Mech. & Elect. Engineers	REGIONAL PRIORITY CREDIT OPPORTUNITY Consider solar-thermal, PV, "renewables-ready"
2				Credit 3	**Enhanced Commissioning**	2	90%		Owner's CxA	
2				Credit 4	**Enhanced Refrigerant Management**	2	90%		Colvin	
3				Credit 5	**Measurement & Verification**	3	90%		A10, Colvin, Envision	
		2		Credit 6	**Green Power**	2	75%	Quantification of threshold for credit	Owner, ELECT. ENGR., EDA / CANNON	
19	4	4	8	subtotals						

Yes	Likely	Doubt-ful	No		Materials & Resources	14 Points Possible	Attainment Certainty	Challenges / Strategies	Documentation Responsibility & Coordination	Notes
Y				Prereq 1	**Storage & Collection of Recyclables**	Required	100%		EDA / CANNON	
			3	Credit 1.1	**Building Reuse**, Maintain 75% of Existing Walls, Floors & Roof	1-3	N.A.			
			1	Credit 1.2	**Building Reuse**, Maintain Existing Interior Nonstructural Elements	1	N.A.			
2				Credit 2	**Construction Waste Management**	1-2	100%		Gen Contractor	
		2		Credit 3	**Materials Reuse**	1-2	75%		EDA, G.C.	
2				Credit 4	**Recycled Content**	1-2	90%	Ceilings, gyp board, steel, fly ash, etc.	Gen Contractor	

1	1			Credit 5	**Regional Materials**	1-2	90%	Cement, aggregate, structural steel, stone	Gen Contractor	
		1		Credit 6	**Rapidly Renewable Materials**	1	50%	Panel materials, office floor finishes?	Gen Contractor	
	1			Credit 7	**Certified Wood**	1	75%	Doors, office casework, high-value wood items?	Gen Contractor	
5	2	3	4	**subtotals**						
Yes	Likely	Doubt-ful	No	**Indoor Environmental Quality**		15 Points Possible	Attainment Certainty	Challenges / Strategies	Documentation Responsibility & Coordination	Notes
Y				Prereq 1	**Minimum Indoor Air Quality Performance**	Required	100%		Team, Colvin	
Y				Prereq 2	**Environmental Tobacco Smoke** (ETS) **Control**	Required	100%		EDA/OWNER	
1				Credit 1	**Outdoor Air Delivery Monitoring**	1	90%		Colvin	
	1			Credit 2	**Increased Ventilation**	1	75%		Colvin	
1				Credit 3.1	**Construction IAQ Management Plan**, During Construction	1	90%		Gen Contractor	
1				Credit 3.2	**Construction IAQ Management Plan**, Before Occupancy	1	90%		Gen Contractor	
1				Credit 4.1	**Low-Emitting Materials**, Adhesives & Sealants	1	90%		Gen Contractor	
1				Credit 4.2	**Low-Emitting Materials**, Paints & Coatings	1	90%		Gen Contractor	
1				Credit 4.3	**Low-Emitting Materials**, Flooring Systems	1	90%		Gen Contractor	
1				Credit 4.4	**Low-Emitting Materials**, Composite Wood & Agrifiber Products	1	90%		Gen Contractor	
1				Credit 5	**Indoor Chemical & Pollutant Source Control**	1	90%		Gen Contractor	
1				Credit 6.1	**Controllability of Systems**, Lighting	1	95%		Envision	
	1			Credit 6.2	**Controllability of Systems**, Thermal Comfort	1	75%		Colvin	
1				Credit 7.1	**Thermal Comfort**, Design	1	90%		Colvin	
1				Credit 7.2	**Thermal Comfort**, Verification	1	100%		Colvin	
	1			Credit 8.1	**Daylight & Views**, Daylight	1	75%		EDA / CANNON	REGIONAL PRIORITY CREDIT OPPORTUNITY
		1		Credit 8.2	**Daylight & Views**, Views	1	25%			
11	3	1		**subtotals**						
Yes	Likely	Doubt-ful	No	**Innovation & Design Process**		6 Points Possible	Attainment Certainty	Challenges / Strategies	Documentation Responsibility & Coordination	Notes
1				Credit 1.1	**Innovation in Design: Building Process, Story and Performance as Ongoing Educational Tool**	1	75%		EDA / CANNON, OWNER	
		1		Credit 1.2	**Exemplary Performance: System to be designated**	1				
		1		Credit 1.3	**Exemplary Performance: System to be designated**	1	50%			
		1		Credit 1.4	**Innovation in Design**	1				
		1		Credit 1.5	**Innovation in Design: System to be designated**	1				
1				Credit 2	**LEED® Accredited Professional**	1	100%		EDA / CANNON	
2		4		**subtotals**						
Yes	Likely	Doubt-ful	No	**Regional Priority**		4 Points Possible	Attainment Certainty	Challenges / Strategies	Documentation Responsibility &	Notes
1				Credit 1	**EAc1 Optimize Energy Performance**		25%			
	1			Credit 2	**SSc8 Light Pollution Reduction**		50%			
1				Credit 3	**WEc1 Water Efficient Landscaping**		75%			
	1			Credit 4	**WEc3 Water Use Reduction**		75%			
2	2			**subtotals**						
Yes	Likely	Doubt-ful	No							
60	19	18	13	**Project Totals (pre-application estimate)**		Certified 40-49 points Silver 50-59 points Gold 60-79 points Platinum 80 points or above				

O5.
SYSTEMS SELECTION

O5.1 Structural
O5.2 Energy Systems Options

O5.1 STRUCTURAL

During the programming phase a number of structural systems were considered as options to meet the project parameters of: maximum floor to ceiling height, flexibility in space planning and reconfiguration, and durability of finishes. Based on the comparison of finishes two systems were recommended for development: a concrete flat slab with shear walls, and a steel moment frame system. Further research, including cost and schedule comparisons were made; ultimately the concrete flat slab with shear wall system was determined to best fit the needs of the project. See Section 8 Structural for additional information.

O5.2 ENERGY SYSTEMS OPTIONS

One of the first and most pressing decisions faced by the design team was that of building utility service; will the Lassonde Studios be tied into the Campus Utility Systems or be a standalone building. Based on extensive comparative analysis done during the programming and schematic design phase, and in concert with rigorous coordination with University entities and mechanical/sustainability consultants it was determined that the best solution for the Lassonde Studios – cost and energy efficiency as the primary drivers – is to do both; chilled water will be cooled from the north campus chilled water plant, and building heating water and domestic hot water will be provided by condensing boilers located in the building's basement.

Inside the building it is yet determined what the final HVAC system will be. Two systems are currently under consideration; primary factors for selection are cost related to project budget, and energy efficiency. The two systems under consideration are radiant heating/cooling, and four pipe fan coil – both systems utilize outside air for ventilation. The Schematic Design currently has both options developed for selection during the Design Development phase.

See Section 4 Sustainability and Section 9 Mechanical Systems for additional information.

06.
CIVIL

06.1 Culinary Water System
06.2 Storm Drainage System
06.3 Sanitary Sewer System
06.4 Natural Gas
06.5 Site Grading

O6.1 CULINARY WATER SYSTEM

The building will be serviced by an 8” inch water lateral from the existing 8-inch line located just north of the Hyper Mall. The fire line is being serviced from an 18” water line located just north of the Hyper Mall. The 6” fire line will provide the fire line to service the fire sprinkler system inside the building and new fire hydrants located around the building. The University of Utah design standards and the IFC are being used as the basis of design of the culinary water and fire systems.

O6.2 STORM DRAINAGE SYSTEM

The new storm drain system will pick up any foundation drains around the building and site drainage and route it to the bioswales where possible in landscaped areas for detention on site and if feasible into the existing storm water collection ponds located adjacent to the building site. If feasible, the use of dry wells will be incorporated to recharge the groundwater aquifer. Major flood events will be discharged to the Salt Lake City storm water system. Per Salt Lake City standards, the maximum allowable release rate from the site is 0.2 cfs/acre. The University of Utah design standards, Salt Lake City standards and LEED requirements are being used as the basis of design of the storm drainage system.

O6.3 SANITARY SEWER SYSTEM

Sanitary Sewer Systems lines exist on the adjacent building site located just west end of the site. Sewer from the proposed building will tie into one of the existing manholes to the west of the proposed building

O6.4 NATURAL GAS

An existing natural gas line runs north south through the existing parking lot just east of the building site. Natural gas for the new building will tie into this existing line

O6.5 SITE GRADING

The site grading is quite substantial as the site drops about 10 feet across the building footprint. Grading will need to match grade where the proposed improvements meet with the existing Hyper Mall to the south, existing drainage pond to the west, and existing parking lots to the east. In addition, coordination will need to take place to ensure that the proposed grading plan includes a portion of the Shuttle Route to the south of the building site. ADA routes, drainage, finished floor elevations, existing utility locations, grade matching locations at construction limits will be the basis of design for the site grading.

07. LANDSCAPE

07.1 General
07.2 Specific Site Zones
07.3 Accessibility
07.4 Safety and Security
07.5 Utility and Service Equipment
07.6 Fire Access
07.7 Site Materials
07.8 Plant Material
07.9 Irrigation

O7.1 GENERAL

The site and landscape design at the Lassonde Entrepreneur Center are an extension of the form and use of the building. The design represents the Center's use as an academic and instructional facility, student residence, and exploratory hub. Long-term use, quality, and durability considerations have been and will be considered in future design decisions and materials selection.

Connections are important and define the framework of the site design. Managing the pedestrian, bicycle, and shuttle circulation will require special attention based on the site's location on the HPER Mall. The project makes connections to neighboring buildings through minor walkways and connects to the rest of the campus in three primary areas: 1) a plaza space at the project's southwest corner along the HPER Mall and shuttle lane, 2) the proposed high-speed bicycle lane (location pending), and 3) the parking lot to the north.

The style of the site design elements will be based on the building configuration, which will tie the site to the building through flowing lines and outdoor spaces.

O7.2 SPECIFIC SITE ZONES

Several distinct site areas are orchestrated to work seamlessly with the architectural design, adjacent buildings and spaces, and vehicular circulation needs.

O7.2.1 MAIN SOUTHWEST PLAZA

Plaza space at the southwest area of the site will be the point of connection from the main entry of the building to the HPER Mall and shuttle lane to the south. This plaza, directly adjacent to the building will provide an area for seating, studying, socializing, and holding small-scale outdoor events.

The semi-enclosed portion of this plaza in the elbow of the building will create a temperate micro-climate for multi-season use and higher privacy.

Working around the steep slopes on site for this plaza will be both a challenge and an amenity in providing a safe accessible plaza that is enhanced by the grade change in creating a variety of interesting spaces.

O7.2.2 NORTHWEST CAFE AREA

This space is an outdoor dining area adjacent to a café. Moveable tables and chairs, raised planters and the option of being under the building over-hang provides a place for site users with varied comfort levels. The café will be highly visible from two sides making it an appealing area for people-watching and activating the space.

O7.2.3 NORTH PARKING LOT ENTRANCE

A small hardscape plaza area will be provided on the north side of the building to create a sense of arrival at the north entrance.

O7.2.4 OUTDOOR WORKSPACE

On the southeast corner of the building, there will be located an outdoor workspace. This area will function as a 'blank-slate' for students and entrepreneurs to design and build.

O7.2.5 GREENSPACE

Greenspace areas and usable turf will be located intermittently around the building adjacent to entrances and circulation nodes. This will augment the indoor-outdoor relationship on the site and increase the visual connectivity to the U of U campus. These areas will also provide buffer zones between uses like parking, shuttle routes, roads, and plaza space.

O7.2.6 LOADING DOCK

An easily accessible loading dock for services and transport of materials will be located on the east side of the building.

O7.3 ACCESSIBILITY

Providing ADA accessible routes throughout the site is challenging because of the existing grades. Accessible entrances are provided at the main entrance area on the southwest side of the building and on the north side of the building. Both will be ADA options to/from the greater campus.

O7.4 SAFETY AND SECURITY

Safety concerns are centered around the location of the high-speed bike path that will travel around at least on side of the building. Inevitably, paths must be crossed but care will taken to locate this amenity in a way that will minimize pedestrian-bike-shuttle conflicts as much as possible.

O7.5 UTILITY AND SERVICE EQUIPMENT

The landscape plan will be coordinated with mechanical vent locations, transformers, generator(s), dumpster, air conditioning units, fire hydrants, etc. Electrical equipment will be located within a utility yard northeast of the building, and will be screened with a solid wall and plant material.

O7.6 FIRE ACCESS

Access for emergency vehicles is provided via the bus shuttle lane, drive approaches and parking lots.

O7.7 SITE MATERIALS

The materials used in the site design will tie this project into the existing campus, in association with the campus branding and associated with the building materials. Consideration will be given to the selection of the materials and construction detailing, to contribute to the overall sustainability of the project and to minimize extensive long-term maintenance.

All sidewalks that need to be snow-plowed seasonally are designed a minimum of eight feet in width, to accommodate snow plows. Snow storage areas will be considered

O7.8 PLANT MATERIAL

Plant material is selected for its functional use as well as educational and aesthetic purposes, i.e. for qualities that reflect the uses of the building like discovery and leadership through upright growth habit and formal yet moving patterns. Existing trees around the existing facility will be preserved as much as feasible with necessary grading and site improvements.

Selection of trees based on tree-height will be important on the east side of the building to preserve views of the Wasatch Mountains from the site and building.

Simple planting beds will provide ease of maintenance. Native/adapted plants will be located in specific hydro zones and turf will be used sparingly. ArcSitio Design will meet with Sue Pope of the UofU Grounds Department to determine plant palettes and planting schemes as part of the design process.

O7.9 IRRIGATION

The overall goal of the irrigation system is to reduce potable water consumption for irrigation by 50% from a calculated mid-summer baseline case. This can be accomplished through the following means:

- Efficient irrigation system design
- Irrigation system zoned for plant material type

08.
STRUCTURAL

08.1 Codes and Standards
08.2 Site Specific Requirements
08.3 Gravity Loading Area
08.4 Lateral Loading Area
08.5 Structural Design Criteria and Material Strengths

O8.1 CODES AND STANDARDS

The minimum codes and standards that apply to the design of new buildings include current editions of the following:

- International Building Code (Current Edition 2012)
- American Institute of Steel Construction (AISC) with Commentary
- ACI 318 Building Code Requirements for Reinforced Concrete
- American Iron and Steel Institute (AISI) specifications for the Design of Cold Formed Steel Structural Members
- American Welding Society ANSI/AWS D1.1 Structural Welding codes
- Steel Joist Institute (SJI)
- Steel Deck Institute (SDI)
- DFCM Design Criteria
- University of Utah Design Criteria

O8.2 SITE SPECIFIC REQUIREMENTS

The structural systems in the facility are designed to meet specific site driven requirements. Some of these requirements include:

- Soil bearing pressure characteristics based on a site specific. Geotechnical Investigation for the referenced site. (AGEC # 1140032)
- Wind velocity 120 MPH, (3 sec. gust) Exposure C. Internal pressure coefficient 0.18
- Specific roof live load requirements.
- Soil profile characteristics for ground acceleration - used for design.
- Seismic criteria, with soil profile as directed in the Soils Report.
- DFCM Standards and any U of U Campus Standards.

O8.3 GRAVITY LOAD CRITERIA

O8.3.1 FOUNDATION

Based on the soils reports it is assumed that a typical foundation system can be utilized. Such a foundation system consists of continuous strip footings below all exterior walls and spot footings under concrete columns. The width of the strip footings will vary depending upon the final loading but can be assumed to be an average of 3'-0" in width and 16" deep. The spot footings under columns will be on average 10'-0 x 10'-0" x 30" thick. Footings can be placed on suitable natural soils or upon engineered fill extending down to the suitable natural soils. Footings below shear walls will typically be a large mat footing with approximately thickness of 42"

Recommended net bearing pressures will be approximately 2,500 psf. To obtain this bearing pressure value it will be necessary to over excavate down to a layer of natural silty sand (approximately 13 ft below grade), and place engineered structural fill up to footing bearing elevations. As an alternative to the above method, in initial discussions with Geopier a net bearing pressure of approximately 5,500 psf can be provided below footings. For the schematic design, we have assumed that Geopiers or similar system will be utilized to avoid the overexcavation requirement.

A 50% increase in bearing pressure will be permitted for short term loading such as wind and seismic.

Ground water should not impact this site. However the history of this area is that laterally and vertically variable "perched" groundwater conditions can develop. It is therefore necessary to plan for a foundation/chimney drain system. This will consist of a 4-inch perforated pipe with an invert elevation established at least 18" below the top of the lowest adjacent slab.

08.3.2 GROUND FLOOR / BASEMENT

A partial basement area is programmed for mechanical space. The floor system will be similar to that of the slab-on-grade. Use a 6" slab and reinforce with #4 bars at 16" cc each way.

The slab-on-grade shall be designed to satisfy all characteristics of the geotechnical report for the given site. Care should be taken to minimize surface cracks as well as to prevent moisture from permeating from below the slab. The ground level is typically classrooms, dance studios and office spaces. Typical slab on grade thickness will be an unreinforced 4" thick slab.

Studios which are located on grade will have a 4" depression to account for a wood sleeper system that will be designed by the architect. Nosing bars should be placed at the edge of all depressions.

08.3.3 FLOOR FRAMING

Typical roof consists of a 10" two-way reinforced elevated concrete slab.

08.3.4 ROOF FRAMING

Typical roof consists of a 10" two-way reinforced elevated concrete slab.

08.3.5 WALL SYSTEMS

The typical exterior wall system will be non-structural in design and not be required to support any vertical or lateral loads of the building. Such wall systems will require the design of a specialty contractor to resist deflections that are a result of wind, seismic and other system loads. They will also be designed and detailed by the specialty contractor to accommodate vertical and seismic (lateral) drift.

08.4 LATERAL LOADING CRITERIA

08.4.1 LATERAL FORCE RESISTING SYSTEM

Typically, seismic loads will govern a building design of this type. This will be true for both principle axis of design. However, it is important that the various elements of the structure be properly designed to resist the prevailing wind loads. These elements may include overhangs, roof projections, exterior cladding systems, window mullions, etc.

Seismic loads enter a building by way of ground accelerations. These ground accelerations are resisted and absorbed by the lateral force resisting system and other components of the structure. Several different types of structural systems can satisfy these lateral force requirements. Concrete shear walls are the most feasible method for a structure of this type. Lateral elements stack vertically from the top level to the foundation system.

O8.5 STRUCTURAL DESIGN CRITERIA AND MATERIAL STRENGTHS

1. Governing Building Code: IBC 2012 Edition
2. Floor Live Loads
   a. Nonpartitioned Dormitories
      80 psf
   b. 2nd floor balcony
      100 psf
3. Roof Snow Load 35 psf +5 psf rain on snow
4. Wind Load
   a. Basic Wind Speed (3 second gust)
      120 mph
   b. Wind Exposure
      C
   c. Internal Pressure Coefficient
      O.18
5. Earthquake Design Criteria
   5.1 Mapped Spectral Response Accelerations
   a. Short Period Acceleration SS = 1.22
   b. 1-Second Acceleration
S1 = 0.45
   5.2 Spectral Response Coefficients
   a. Short Period Acceleration
SDS = 0.823
   b. 1-Second Acceleration
SD1 = 0.465
   5.3 Site Class (Soil Profile) D
   5.4 Seismic Importance Factor 1.25
   5.5 Seismic Design Category D
   5.6 Effective Weight of Structure W
   5.7 Basic Seismic Force Resisting System Special Reinforced Concrete Shear Walls
   5.8 Response Modification Coefficient R = 6
   5.9 System Overstrength Factor = 2.5
   5.10 Deflection Amplification Factor Cd = 5.0
   5.11 Design Base Shear V = Cs*W
   5.12 Analysis Procedure Modal Response Spectrum

Preliminary Material Strengths
Concrete (28 day)

Footings and Walls: f'c=4,500 psi

Interior Slabs on Grade: f'c=3,500 psi

Suspended Concrete Slabs: f'c=4,000 psi

Steel

Reinforcing Steel: fy=60,000 psi

O9. MECHANICAL & PLUMBING

O9.1 Temperature
O9.2 Humidity
O9.3 Systems
O9.4 Fire Protection
O9.5 Controls

O9.1 CODES AND STANDARDS

The project is designed in accordance with the following codes and standards, or the requirements defined in the program, whichever is more restrictive:

- 2012 IBC
- 2012 IMC
- 2012 IPC
- 2012 IFC
- 2012 IECC
- Division of Facilities Construction and Management (DFCM) Design Manual, University of Utah Supplement, September 21, 2012
- LEED-NC 2009

O9.2 AVAILABLE UTILITIES

O9.2.1 NATURAL GAS

The building boiler system will use natural gas for building heat and domestic water heating.
Anticipated peak demand is 5,000 MBH.

O9.2.2 CHILLED WATER

Chilled water from the north chiller plant is located a short distance from the project. This will be the cooling source, separated from the building piping with a heat exchanger.

Anticipated peak demand is 350 tons.

O9.2.3 CULINARY WATER

New 5” culinary line and an 8” fire protection line.

It is anticipated that the water pressure is approximately 80 psig.

O9.2.4 SANITARY WATER

Sanitary sewer size will be 8"

O9.2.5 STORM SEWER

Storm water will be routed to the South.

O9.3 GENERAL REQUIREMENTS

O9.3.1 TEMPERATURE

Reference DFCM Design Guide, University of Utah Supplement, 3.5-G-6-a:

Site elevation: 4,625 ASL

Outdoor design temperatures:

winter:	0 oF
summer:	97DB/62WB oF
cooling tower:	70WB oF

Indoor Design Conditions:

Room Type	Temperature				Noise
	Summer		Winter		RC Mark II RC(N)
	Occupied	Unoccupied	Occupied	Unoccupied	
Open Public Areas	75	85	72	65	35-40
Private Offices	75	85	72	65	30-35
Open Offices / Shared Space	75	85	72	65	35-40
Conference Rooms	75	85	72	65	25-30
Dorm Rooms	75	85	72	65	25-30
Make / Live Space	75	85	72	65	25-30
Restrooms	75	85	72	65	n/a
Storage	80	85	60	55	n/a
CopY Rooms	75	85	72	65	n/a
Mechanical Rooms / Penthouse	80	80	55	55	n/a
Elevator Rooms	80	85	60	55	n/a

Hours of Operation:

Since the building is used for student housing, it is occupied 24 hours a day, 7 days a week.

O9.3.2 HUMIDITY

No humidification will be provided.

Maximum humidity will be approximately 50%, corresponding to a dew point temperature of 550F at design temperature

O9.3.3 MEASUREMENT AND VERIFICATION

Energy meters to provide local as well as remote readouts, using Modbus RTU protocol.

Continuous metering equipment for the following uses:

Gas: Each boiler will have a submeter provided that connects to campus metering network that will monitor: instantaneous gas usage, totalized gas usage.

Chilled Water: Ultrasonic digital flow meter, equal to Fluxus ADM 7407, providing the following information: Chilled water flow rate, supply and return temperature, instantaneous energy flow rate, totalized energy flow rate

Additionally, the electrical engineer will provide electrical panel sub-metering for lighting and plug circuits.

All three available points of LEED EA Credit 5: Measurement and Verification will be achieved.

O9.3.4 INTERNAL LOADS

The following internal loads form the basis for load calculations:

Room Type	ASHRAE 62.1 Classification	People (Pers/ft²)	Ventilation (cfm/ft²)	OH Lights (Watts/ft²)	Equip (Watts/ft²)	Other
Open Public Areas (Circulation, Lobbies)	General : Corridors	0.000	0.078	0.5	0.00	
Private Offices	Office Building : Office Spaces	0.008	0.130	1.1	0.85	
Open Offices / Shared Space	Office Building : Office Space	0.005	0.111	1.1	0.75	
Garage Space	Educational : Bedroom / Living Room	0.020	0.38	1.3	1	
Dorm Rooms	Dormitories : Bedroom / Living Room	0.010	0.11	1.3	1	
Make / Live Space	Educational : Wood / Metal Shop	0.020	0.38	1.3	1	
Public Restrooms	Table 6-4: Toilets-public	0.000	n/a	0.9	0.00	Exhaust at 75 cfm/fixture
Private Restroom	Table 6-4: Toilets-private	0.000	n/a	0.9	0.00	Exhaust at 50 cfm/fixture
Storage	General : Storage	0.000	0.156	0.8	0.10	
Copy Rooms	Table 6-4: Copy, printing rooms	0.000	n/a	1.5	5.00	Exhaust at 0.50 cfm/ft²
Mechanical Rooms / Penthouse	Misc: Electrical equipment rooms	0.000	0.078	1.5	tbd	
Elevator Rooms	Misc: Electrical equipment rooms	0.000	0.156	1.5	tbd	Ventiation for temp/odor control

Notes: Demand Controlled Ventilation (DCV) in zones with significant variation in occupant loading, or ventilation rates >0.30 cfm/ft2

Ventilation rate per ASHRAE 62.1-2007, with additional 30% to comply with LEED EQ Credit 2 Ventilation Credit

Lighting Power Density per ASHRAE 90.1-2007

Equipment Density per standard design practice

People: 250 Btuh, sensible
200 Btuh, latent

Equipment: 1 laptop PC @ 50 W each per person in garage spaces, dorms, and make-live spaces

1 desktop PC @ 125 W per seat in offices

O9.4.5 VENTILATION / INDOOR AIR QUALITY

Systems will be designed in compliance with ASHRAE Standard 62.1-2010, Ventilation for Acceptable Indoor Air Quality. The pursuit of LEED IEQ Credit 2 (30% increased ventilation) will be evaluated with the energy model to determine its impact on building energy use. Outdoor air intake flow and/or space or zone airflow will be reset as operating conditions change, in accordance with Section 6.2.7 of the Standard, for the zones noted as DCV in the space summaries.

Air change effectiveness will be greater than or equal to 0.9 as determined by ASHRAE 129-1997, following recommended design approaches in ASHRAE 2009 Fundamentals, Chapter 32.

The air distribution system will be via a dedicated outside air system. Branch connections to rooms will be via VAV boxes or constant volume air valves.
All exhaust air and relief air will be ducted to the relief air handler with heat recovery. All branch ducts leading to exhaust openings in restrooms, etc. will connect to the relief air duct system with constant volume air valves to keep exhaust flows constant as pressure in the relief duct system changes to accommodate different outside air flows.

O9.4.6 COMMISSIONING

Coordinate with commissioning agent retained for the project, and comply with requirements for building commissioning detailed in DFCM Solicitation for Commissioning Services.

O9.5 SYSTEMS

O9.5.1 GENERAL DESCRIPTION

The housing department has expressed an interest in utilizing four pipe fan coil units in the living areas. Through the preliminary energy modeling that has been done on this project, the use of radiant heating and cooling has been recommended as the best approach to comply with the energy efficiency requirements of the university. In balancing out these two directions, the schematic design documents include an option for conditioning the dorm spaces with radiant heating/cooling, and an option for conditioning these spaces with fan coils. As the design progresses, the installation cost of these two systems will be compared against the available budget and the energy cost will be examined to determine which system is ultimately chosen.

Dorm Room Radiant Cooling/Heating

For the radiant option, outside air is ducted to the single and double dorm rooms for ventilation and for additional cooling since the radiant cooling slab does not have sufficient capacity to meet all the cooling load. The outside air also helps control humidity in the room, which is critical to prevent condensation on the radiant slab. The make-live spaces also are provided with radiant slabs in this option, with fan coils to provide the required additional cooling capacity that is needed after the radiant cooling slab and the cooling effect of the ventilation air is considered. The loft rooms are provided with fan coils to meet their cooling and heating loads. These spaces are relatively small and don't require much ventilation air. Due to the potential humidity sources with the restrooms and the kitchens within the lofts, the humidity control available through ventilation air may not be sufficient to allow the use of a radiant slab.

Dorm Room Fan Coils
For the fan coil option, each single and double room is provided with a fan coil that stack vertically in closets accessible from the hallways. These spaces do not require ducting in the room; sidewall grilles are used for supply and return air circulation. Outside air can be ducted to the fan coils for ventilation or operable windows could be used to meet minimum ventilation requirements. The loft and make-live spaces are also provided with fan coils and ventilation air ducted to each fan coil system. By stacking fan coils, heating water and chilled water is distributed vertically, thus reducing piping costs.

Ground Level Mechanical System
Ventilation air is ducted to each zone on the ground floor. The ground floor is also divided into radiant heating and cooling slab zones. PEX tubing will be routed in the slabs to manifolds to allow temperature control on the various exposures of the building. In some zones, excess cooling capacity is needed. This cooling capacity will be provided by adding chilled beams or fan coils to the zones.

Air Handling System
The central air handling system in the building is a dedicated outside air system. It delivers 100% outside air to each zone in the building to meet ventilation requirements. Where feasible, demand controlled ventilation controls will be provided to minimize the quantity of outside air. Air will be delivered to each space via a constant airflow valve or a VAV box. All exhaust and relief air will be ducted to a relief air handler in the basement. This will allow preheating or precooling of the outside air in AH-1 via a heat recovery run around loop. The relief air handler will also contain an evaporative media section to maximize the pre-cooling capacity of the heat recovery system.

AH-1
4” double wall construction
6.5” TSP
MERV 13 filter bank, face velocity = 375 fpm
Multiple backward inclined, 12 blade direct drive plenum fans
Heat recovery coil: 5/8” diameter 0.035” thick tubes, 8 rows, 6 fpi, 450 fpm face velocity
Chilled water coil: 5/8” diameter 0.035” thick tubes, 4 rows, 10 fpi, 450 fpm face velocity
12” thick evaporative cooling media

RAH-1
2” double wall construction
3.0” TSP
MERV 7 filter bank, face velocity = 375 fpm
Multiple backward inclined, 12 blade direct drive plenum fans
18” thick evaporative cooling media
Heat recovery coil: 5/8” diameter 0.035” thick tubes, 8 rows, 6 fpi, 350 fpm face velocity

O9.5.2 AIR DISTRIBUTION

Fan sizing calculations will be documented at design development with zone by zone load calculations.

The critical path supply duct pressure loss will be determined and fittings and duct sizing reviewed in order to minimize fan pressure requirements.
Supply (AHU-1) transport energy consumption meets the following criteria:

Load	Maximum Air Transport Energy (bhp/1,000 cfm)
Full Load	0.75
50% Load	0.3

Pressure testing of all duct systems will be in accordance with 2009 IMC.

Each space will be provided with individual room temperature control in compliance with DFCM Design Guide, University of Utah Supplement, 3.5-M . A zoning plan will be developed during design development and reviewed and approved by Campus Planning staff.

O9.5.3 CHILLED WATER

Chilled water will be cooled from the north central campus chilled water plant, with a plate and frame heat exchanger separating the building piping from the plant piping.

The building side chilled water is sized for 16oF temperature rise at the chilled water coil at design wet-bulb hour.

Load	Maximum Water Transport Energy	
	(bhp/1,000 cfm)	(Wgpm)
Full Load	0.05	10.9
50% Load	0.03	8.7

The building-side chilled water transport energy consumption will be:

O9.5.4 HEATING WATER

The building heating water and domestic hot water will be provided by a pair of 2.5 million btu/hr condensing boilers. Heating water will be piped throughout the building in a variable primary piping system.

Heating water transport energy consumption (in the building, exclusive of central plant transport) will be:

Load	Heating Water Transport Energy	
	(bhp/mmbh)	(Wgpm)
Full Load	2.50	19.0
50% Load	1.15	10.7

O9.5.5 PLUMBING

DFCM Design Guide, University of Utah Supplement, 3.5-C and D will be followed for plumbing requirements.

No automatic lavatory or flush valves are provided.

A single electric storage heater will be provided for domestic water heating.

A water softener will be provided for all chilled water and heating water makeup, as well as for domestic hot water. If softener is located in an inaccessible location, it will be provided with a remote filling option for salt brine.

O9.5.6 VARIABLE SPEED DRIVES

Variable speed drives will be scheduled by Division 230000, but specified, furnished and installed by Division 26000.

O9.5.7 FIRE PROTECTION

Fire sprinkler protection will be provided throughout building. System will comply with DFCM Design Guide, University of Utah Supplement, 3.5, NFPA, campus fire marshal, building official, IBC and State of Utah Fire Marshal requirements.

A fire pump is not anticipated, because the flow and pressure requirements can likely be met from the campus system. A fire flow analysis per DFCM criteria will be conducted during the design phase to confirm this assumption.

There will be individual floor control assemblies, including zone check assembly, at each floor.

Sprinkler Occupancy Hazard Classifications are as follows:

Office and Public Areas:	Light Hazard
Serivce Areas:	Ordinary Hazard, Group 1
Mechanical Equipment Rooms:	Ordinary Hazard, Group 1
Building Service Ares:	Ordinary Hazard, Group 1
Electrical Equipment Rooms:	Ordinary Hazard, Group 1
General Storage Areas:	Ordinary Hazard, Group 1

Minimum Density for Automatic-Sprinkler Piping Design are as Follows:

Light Hazard Occupancy:	O.1O gpm over	1500 ft² area
Ordinary-Hazard Group 1 Occupancy:	O.15 gpm over	1500 ft² area

Design areas with quick response heads will be reduced when applicable and design area will be increased for pitched ceilings.

Maximum Protection Area per Sprinkler: As Follows (except as modified by authorities having jursdiction)

Office Space:	225/400 ft².
Storage Areas:	130/400 ft².
Mechanical Equipment Rooms:	130 ft².
Electrical Equipment Rooms:	130 ft².
Other Areas:	According to NFPA 13 reccomendations, unless otherwise indicated.

Components and Installation: Capable of producing piping systems with 175-psig minimum working-pressure rating, unless otherwise indicated. All piping and components are Schedule 40 minimum, and of domestic manufacture.

Class I, standpipe system design will be designed assuming 150 psi available at fire department connection. Pressure and required flow shall be provided by fire pumper truck.

O9.5.8 CONTROLS

A Direct Digital Control (DDC) system will be provided in compliance with DFCM Design Guide, University of Utah Supplement, 3.5-EE.

Sequence of operations are shown on the schematic drawings, and will be shown in both the specifications as well as the drawings as the design progresses.

10. ELECTRICAL

10.1 Codes and Standards
10.2 Electrical Utilities
10.3 Electrical Service
10.4 Electrical Distribution
10.5 Emergency Electrical Distribution
10.6 Uninterruptible Power System (UPS)
10.7 Lightning Protection & Grounding Systems
10.8 Power Quality
10.9 Electrical Room Requirements
10.10 Wire Devices, Conduit, and COnductor Requirements
10.11 Lighting Systems
10.12 Communication / Data Systems
10.13 Auxiliary Systems
10.14 Sustainability and LEED

1O.1 CODES AND STANDARDS

Codes, Standards, and Guidelines, which are applicable to the design of the electrical systems, are listed below. Comply with the currently adopted editions following publications as mandated by the authority having jurisdiction:

- International Building Code (IBC)
- International Fire Code (IBC)
- NFPA, National Fire Protection Association (applicable sections including but not limited to):
    - NFPA 70, National Electrical Code
    - NFPA 72, National Fire Code
    - NFPA 101, Life Safety Code
- ANSI/ASHRA/IES Standard 90.1
- Underwriters Laboratories (UL)
- International Energy Conservation Code (IECC)
- Institute of Electrical and Electronic Engineers (IEEE)
- Illuminating Engineering Society of North America (IESNA) Handbook 9th Edition
- NFPA 780: Standard for the Installation of Lightning Protection Systems
- UL 96A: Installation Requirements for Lightning Protection Systems
- Electronics Industrial Association / Telecommunications Industry Association 568/569 (EIA/TIA)
- ADA Accessibility Guidelines
- Utah OSHA Regulations
- University of Utah Design Standards
- Division of Facilities Construction and Management Design Criteria for Architects and Engineers
- Laws, Rules, and Regulations of the Utah State Fire Marshal

Please note that conflicting requirements may exist among the codes and standards. Where a conflict exists, the most stringent requirement shall govern, unless specific clarification is noted here.

1O.2 ELECTRICAL UTILITES

Medium Voltage Power Distribution
Power for the building will come from the University of Utah's 12,470V distribution system. The most likely source lies directly to the southwest of the existing building along the HPER mall. A new concrete encased ductbank will be required from an existing manhole (MH.331) to a new pad or vault where the building transformers and switch will be located.

The medium voltage equipment will consist of a switch and two transformers. The switch shall be a 15.5kV, 4-section, solid dielectric type with two 600A deadbreak sections and two 200A loadbreak VFI sections. The switch should have the following features:

- Switch position monitoring – all sections
- Voltage monitoring – all 600A sections
- Trip relay indication – all 200A VFI sections
- Provisions for motor operators – all sections
- CADA terminal box with all of the above pre-wired to terminal blocks located in an enclosure mounted on the external of the switch enclosure. Should also include a terminal block for external monitoring points of the transformer(s).

Transformers should be pad-mounted, oil-filled (FR3), loop feed, with 12,470V primary on the windings. Size and secondary voltages should be as described below in the Electrical Service section. Transformers shall have the following accessories:

- Drain valve
- Dial-type thermometer
- Liquid-level gauge
- Pressure-vacuum gauge
- Pressure relief device
- Alarm contacts for gauges and thermometer listed above
- Load break lightning arrestors

The switch and transformers will be located on a pad on the exterior of the building with a screenwall enclosure surrounding them, or installed in an area-well type vault below grade just outside of the building footprint. The vault will be required to be accessible from the surface, for replacement of a transformer or switch, as well as from the building for maintenance.

10.3 ELECTRICAL SERVICE

Two service entrance utility transformers at different system voltages. The transformers shall be 500kVA (120/208V) and 1500kVA (277/480V), though sizes may change during design based on actual calculated loads. The use of these two distribution transformers will reduce the need to have dry-type transformers within the facility and is preferred by the University. Dry-type step-down transformers will still be required for the emergency and stand-by generator backup distribution systems only.

Each of the transformer secondary sides should supply a main distribution section with a main circuit breaker that supplies distribution sections. The main circuit breakers should be electronic type with long term, short term, and instantaneous (LSI) adjustment. If the frame size of the 277/480V service is 1,200 amps or more, ground fault protection will be required per NEC requirements. Circuit breakers in the distribution section should supply major feeders to lighting panels, motor control centers, power distribution panels, transfer switches, and large utilization equipment. Fused switches shall not be used. Each main switchboard shall be provided with Shark 200 type digital meter that is connected by -Ethernet to the main campus utility management system. Each main distribution switchboard shall be provided with at least 50% spare capacity and breaker space. All switchboards shall be provided with silver plated copper bus bars and lugs that are rated for copper only.

For all electrical distribution systems at the University of Utah, short circuit, selective coordination, and arc flash studies shall be completed by the A/E and submitted at least 4 weeks prior to building occupancy. The A/E team shall request available fault current data from the University to use for the calculations. If unable to get data from the University, the A/E shall assume an infinite bus on the primary side of all building service transformers. All equipment shall be rated adequately to withstand the current that may be available during any fault or overload condition. The selective coordination study shall extend to all distribution panels rated at 225A and above for normal distribution and for the entire emergency distribution system. Settings for all adjustable trip breakers as well as arc flash labels shall be provided to the Contractor prior to the electrical system startup

10.4 ELECTRICAL DISTRIBUTION

Panelboards serving normal lighting and appliance circuits shall be located on the same floor as the circuits they serve. These panelboards shall also be fed from distribution panels located on that same level. All distribution panels and appliance branch panelboards shall have copper bussing with lugs that are rated copper only. Distribution panels and appliance panelboards shall be sized with 50% spare capacity and space. All 120/208V distribution panels and branch panelboards shall be provided with a bonded ground bus and an isolated ground bus. Lighting and appliance branch panelboards shall be provided with hinged door-in-door construction. Where panelboards are flush mounted in walls, a minimum of six (6) additional spare ¾" conduits shall be stubbed out of the panel into an accessible ceiling space. Design feeders and distribution equipment as detailed in 3.0 DFCM requirements, 3.6 Electrical.

Different load types should be separated onto different feeders and distribution equipment, such as lighting, motors, utilization equipment, convenience power, and sensitive computer equipment. Panel boards shall be dedicated to serve either lighting or HVAC loads but not both. In general, lighting loads should be served at 277V, single phase; large motors and equipment at 480V, 3 phase; and power outlets and small equipment at 120V, single phase. Distribution feeders shall be sized to limit voltage drop to 2% at full capacity. Feeders shall be copper only, aluminum conductors are not allowed.

10. 5 EMERGENCY ELECTRICAL DISTRIBUTION

An emergency standby power system shall be provided for the building Emergency power shall be provided for life safety systems (egress lighting and fire alarm systems), security and surveillance systems, main Telecommunication equipment racks and HVAC systems serving Communication and electrical rooms. It is not anticipated that other non-critical loads such as main building HVAC, AV equipment or general classroom or office equipment or plug loads will be backed up.

The generator shall be a critical grade diesel unit with a steel skid mounted fuel tank with a minimum fuel capacity to provide 24 hours of operation at full load. The generator shall meet the latest EPA Tier II Standard or above. The generator shall be provided with a minimum level II sound attenuated enclosure rated as required. The generator shall be located outside the building envelope on pad at the ground level or at a sub-surface areaway adjacent to the building.

Four pole automatic transfer switches (ATS) with manual bypass shall be provided. Multiple transfer switches shall be provided for the different life safety and stand-by branches as defined in article 700 of the NEC. A remote annunciator shall be provided and located in a constantly attended location if possible. Emergency distribution and branch panelboards shall meet the same requirements as the normal power systems. A minimal amount of dry-type transformers will be required for the emergency system. All distribution and branch panelboards shall have a minimum 25% spare capacity and breaker space. The emergency generator shall have a minimum 30% spare capacity. Consideration should be given in locating a space to place this equipment. The size of the required generator shall be determined during design based on actual design loads.

10.6 UNINTERRUPTIBLE POWER SYSTEM (UPS)

A building wide uninterruptible power distribution system is not anticipated for the building. If UPS power is required for specific loads a small, standalone UPS system will be provided at the equipment requiring the UPS power.

10.7 LIGHTNING PROTECTION AND GROUNDING SYSTEMS

Once the building shell is designed a UL 96A or NFPA 780 Lightning Protection Assessment shall be performed for this building. Recommendations shall be provided to the owner to determine if a complete lightning protection system shall be installed. If determined that it will be installed, the lighting protection system shall consist of air terminals with down conductors, ground rods, and a ground ring that encircles the building. Provide a UL Master Label and comply with NFPA 780. The lightning protection system shall connect to the main common ground bus located in the main electrical room.

A main common ground bus shall be provided in the main electrical room that is bonded to all grounding electrodes and the telecommunications main grounding bar (TMGB). As a minimum, the grounding electrodes shall consists of building steel, the building cold water pipe, a UFER ground, and a minimum of two ground rods located outside the building. The grounding system resistance to ground should measure 5 Ohms or less. Grounding conductors shall be installed with all feeder and branch circuits. Provide a grounding system riser throughout all communication/data/equipment rooms with a telecommunications ground bar (TGB) in each telecom room.

10.8 POWER QUALITY

For protection against damages to sensitive electronic equipment, due to surges, surge protective devices (SPD's) shall be installed in the service entrance switchboards and any branch panelboards serving sensitive electronic equipment. The SPD devices shall be located integral with the equipment and sized for the level of exposure that is encountered.

Surge suppression shall also be provided on any low voltage copper cable that enters the building including but not necessarily limited to CCTV and access control.

10.9 ELECTRICAL ROOM REQUIREMENTS

A dedicated main electrical room shall be provided with access directly to the corridor not passing through any other spaces. It must not have a dropped ceiling and must allow for a minimum 9' floor to ceiling height to allow conduits to get in and out of the distribution equipment. The main electrical room shall be provided with two entrance/exits. The main electrical room shall be constructed to house the main distribution switchboards and branch circuit panel boards that may be required. The main electrical room shall have a minimum of 25% additional space for future growth and shall be dedicated to electrical distribution and shall not be used for storage or any other purpose. This room should be located as close as practical to the pad-mounted medium voltage transformers and electrical service entrance to reduce the length of conduit and conductors.

An additional main emergency electrical room will be required. This room will house the required emergency distribution switchboard(s) as well as the necessary transfer switches and any branch circuit panelboards that may be required. This room shall be enclosed with not less than a 2-hour fire barrier built in accordance with the IBC

and NFPA 110. This room must be vented directly to and from the exterior. The room should be located as close as practical to the emergency generator, and in close proximity to the main electrical room, in order to reduce the length of conduit and conductors.

An electrical room shall be required on each level of the building. The room should be accessible (above the ceiling) on all four sides to allow for conduit to enter the space as efficiently as possible. The room should be a minimum of 10'x10'. If one centrally located room is not possible, two smaller rooms should be provided on each floor. Each room should be located as centrally as possible between two wings to allow each electrical room to feed two wings. These rooms should be minimum of 7'x8'. Electrical rooms should be vertically stacked and be centrally located to the greatest extent possible to limit the distance to any remote electrical device to a maximum of 150 feet.

All electrical rooms should be dedicated to electrical distribution and should not be used for communication/data equipment, storage, or any other purpose. All electrical rooms shall be provided with out-swinging doors with panic hardware. Rooms shall be sized large enough to allow for future equipment to be installed.

10.10 WIRE DEVICES, CONDUIT, AND CONDUCTOR REQUIREMENTS

In all cases, the location and number of outlets should be coordinated with the building users to ensure that their needs are met. Outlets shall utilize standard NEMA configurations and the minimum rating shall be 20 amps. Acoustical putty pads shall be used to cover the back side of outlet boxes in order to maintain acoustical and fire ratings of the walls. They shall be provided at boxes in shared classroom, conference and computer labs and other areas where directed by the architect and owner.

Offices
For each work station, provide one duplex outlet dedicated to computer terminals. Provide additional duplex outlets one spaced for every 10' of wall space or at least one on each wall for smaller offices.

Conference Rooms
Provide a minimum of two dedicated duplex outlets, located on opposite walls at the front and rear of the room. Provide one or two multi-purpose floor boxes under each table (depending on size) for power and communication/data conveyance for the conference room table. Provide power for AV equipment including, but not limited to LCD flatscreen, ceiling mounted projector, motorized screens, and cabinet mounted AV equipment.

Garage / Teaching Spaces
Provide heavy duty receptacle only floor outlets spaced evenly around the room below movable equipment. Outlets shall be completely flush with finished floor and have durable metal covers so that re-arrangement of equipment will not damage outlets covers if legs are slid across or located directly on top of them. If there is fixed in place casework, locate outlet in the casework. Receptacles are to be used for student laptop power connections only. The design engineer shall coordinate with the user during design to determine outlet locations for specific equipment.

Computer Labs / Computers Classrooms
Provide duplex receptacle at each computer workstation. Provide no more than two workstations per dedicated circuit. Provide floor boxes for power, communications and AV connections to each island workstation area otherwise locate receptacles along perimeter walls at each workstation. Provide power for AV equipment including, but not limited to LCD flat screens, ceiling projectors, teachers podium, facilitators desk chair, smart boards, ceiling mounted document cameras and AV equipment as applicable.

Electrical Rooms
Provide a minimum of one outlet on emergency power for the smaller electrical rooms. For the main electrical rooms, provide a minimum of two outlets on emergency power.

Generator Location
Provide one outlet on emergency power for general maintenance.

Transformer Pad /Vault
Provide one outlet on emergency power.

Communication/Data Rooms
Quadplex power receptacles, with dedicated 20 amp feeders, should be mounted on every wall in the equipment room, spacing should be on six foot (6') centers and located at (84") above finished floor. Confirm during design which outlets shall be on emergency power. Provide (2) 20 amp, 208 volt 1ph, dedicated outlets on emergency power for each data rack provided. These outlets may be fed with either a central UPS or local UPS. Assume a minimum power density of 6000 watts for each rack. Outlets shall be coordinated with equipment racks and wall mounted equipment locations. Provide one outlet on normal power for convenience.

Corridors / Lobbies
Provide at least one outlet every 25', on alternating sides of the corridor or lobby.

Storage Rooms, Janitor Closets
Provide one outlet. For janitor closets, provide a GFCI outlet located at 48" AFF.

All raceways that are designed should be a minimum of ¾" conduit except for HVAC controls and fire alarm which may be ½"conduit. Type MC or AC cables are not allowed. Provide complete raceway systems for all card access, security, CCTV, audio/visual and other technology systems whether furnished in the building construction contract or whether provided by the University/Owner. A 200lb. nylon pull string shall be provided in all empty conduits. Provide rigid metal conduit or intermediate metal conduit in areas where conduit is subject to damage. Provide steel raceways for penetrating structural elements such as manholes and building foundations (minimum 10' on each side). Schedule 40 PVC conduits shall be used in locations below grade or under slabs on grade.

All wiring shall be copper with a minimum of #12 AWG. All wiring shall be in conduit. Aluminum wiring and MC cable will not be acceptable. Generally, branch circuits shall be loaded to not more than 80% of what is allowed by the NEC. Outlets that feed specific equipment shall be sized based on the actual nameplate rating of the equipment. In no case, shall more than four convenience outlets be circuited to a branch circuit that feeds educational or office space. Each branch circuit homerun should have no more than three (3) single phase circuits. Each circuit shall be provided with a dedicated neutral conductor. All branch circuits shall include a code sized equipment ground conductor. The maximum allowable voltage drop from the

branch panelboard to the farthest load shall be 3%. The total allowable voltage drop from the service entrance switchgear to the farthest load in the building shall not exceed 5%. When calculating voltage drop, the load shall be assumed to be 80% of the ampacity of the branch circuit. Branch circuit wiring shall be run overhead to allow for ease and flexibility for future changes and modifications. Branch circuits feeding floor boxes should be the only circuits that are run in concrete slabs.

10.11 LIGHTING SYSTEMS

10.11.1 INTERIOR LIGHTING SYSTEMS

Interior lighting design shall provide for the use of standard lighting fixtures that are highly
Efficient, high quality, and will meet the needs of each type of space within the building. Light fixtures selected should complement the architecture of the space. Fixtures used shall be placed within spaces to allow for ease of maintenance. Do not place fixtures over stairways or at high open ceilings unless there is access from above or planned access from below. Lighting design shall comply with the illumination levels and uniformity criteria of IESNA and its recommended best practices, including RP-1-04 “Office Lighting” and RP-3-00 “Lighting for Educational Facilities”. All lighting design shall meet DFCM’s High Performance Building Standards. Consideration should be given for lighting pollution reduction in order to meet the LEED requirements of Sustainable Sites, Credit 8, Lighting Pollution Reduction

10.11.2 LIGHTING ILLUMINATION AND POWER DENSITY

Adequate lighting levels should be used to ensure that there is enough illumination for the specific use and task of each defined space. Provide the required Illumination levels as recommended by IESNA. These levels should not be compromised for energy use reduction. With the use of sustainable practices, DFCM’s High Performance Building Standards, fixture efficiencies, day light harvesting techniques, task lighting, and lighting control, energy usage can be reduced. The total lighting load for the building should not exceed the calculated lighting power budget. It should be a goal the goal of the lighting designer to reduce the lighting power budget even lower than 10% better than code. The illumination levels shown in the table below are the target levels for the building.

Illuminance Levels:

10.11.3 LIGHT FIXTURE CRITERIA

Spaces	Illuminance (Avg. Footcandles)
Offices	30 (ambient) - 50 (task)
Conference/Meeting Spaces	50
Classrooms/Education Spaces	50
Corridor/Stairways	10
General Storage	20
Mechanical/Electrical Rooms	20
Communication Rooms	50

In general, high efficient, high quality fixtures shall be used. Light sources that may be used include fluorescent, LED, and metal halide. Incandescent lamps should not be used and if used, require approval by DFCM. Where dimming is required, LED fixtures shall be used. Compact fluorescent down lights shall not be used. Lighting fixtures should be selected based on the size, configuration, and specific functional needs of the space. Light fixture cutsheets of proposed fixtures shall be provided with each drawing review.

10.11.4 LAMP AND BALLAST CRITERIA

Premium lamps and ballasts combinations should be used. All fluorescent ballasts shall be programmed start and meet the University of Utah design standards. Lamp and ballast combinations should provide for an efficacy of 75% or higher. Ballasts shall be electronic type with <10%THD and have a universal input voltage of 120-277V. Fluorescent lamps shall be 32 watt, T-8 with a minimum color rendering index (CRI) of 86. Lamp color should be specified based on the requirements of the space. Differing lamp types shall be kept to a minimum for ease of maintenance. Fluorescent lamps should be specified to comply with the EPA TCLP requirements. Dimming of fluorescent fixtures shall not be used. If dimming fixtures LED technology will be required.

10.11.5 LIGHTING CONTROL

Lighting control shall be used to meet energy code requirements and to reduce overall building energy use. To meet the requirements of the International Energy Conservation Code (IECC 2012), a method to automatically shut-off all lighting in a building is required. All interior lighting shall be connected to some system or device that will meet the requirements of the energy code. The system(s) used shall provide for precise control while allowing for simplicity, flexibility (multiple users and departments), and low maintenance.

As a minimum, controls shall include an occupancy sensor and local switch(es) for each space to allow for automatic switching and manual override of the space. A building wide lighting control system complete with manual switches for override capabilities shall be used for building common areas such as, corridors, open office, and lobby spaces. Smaller walled in areas such as classrooms, offices, bedrooms, pods, and mechanical/storage areas shall utilize occupancy sensors or timer switches. In addition, spaces that have light fixtures located within 15’ of exterior fenestrations shall utilize daylighting control techniques to reduce energy usage and meet energy code requirements, and shall be switched separately from other lights in the same area. Consideration should be given for using integral daylight sensors in light fixtures. Conference rooms shall be provided with local dimming provisions to allow for the light levels to be reduced during presentations, note taking, etc. Exact requirements for lighting controls in each space shall be determined during design.

10.11.6 EMERGENCY LIGHTING

Emergency lighting shall be provided for all of the paths of egress. Additionally, emergency lighting shall be provided for the following areas:

- Transformer Vaults / pads
- Emergency Generator Areas
- Main electrical rooms
- Telecommunication Rooms
- Mechanical spaces
- Any other specific location where emergency lighting is deemed necessary and per the University of Utah design standards

10.11.7 EXTERIOR LIGHTING

The University of Utah has standard exterior pole mounted light fixtures for

walkways, plaza and parking areas. Care should be taken when designing the illumination levels and fixture type for exterior building lighting. Up-lighting shall be kept to a minimum and exterior building-mounted lights fixtures shall be classified as full cut-off and not the “wall-pack” type. The number of exterior building mounted fixtures shall be kept to a minimum, near entrance and exit locations only, to ensure that the perceived brightness of the building is low. However, care should be taken to ensure that there are adequate light levels around the perimeter of the building to allow the proper use and operation of closed circuit television cameras (CCTV) and to provide a level of security. It is very important to control the amount of light pollution from the building site for LEED considerations. Close coordination with the landscape architect shall be done to coordinate exterior lights with landscaping in order to reduce the number of lights required.

A minimum of 1-1/4” conduit shall be used for all exterior lighting circuits. Exterior lighting circuits shall be controlled by the building lighting relay control panel via timeclock and photocell. Exterior fixtures should utilize LED lamp sources to the greatest extent possible. Light pole bases shall meet the University’s standard detail.

10.12 COMMUNICATION / DATA ANALYSIS

10.12.1 COMMUNICATION / DATA UTILITIES

Telecommunication utilities will be through the University of Utah. The most likely source lies directly to the south of the existing building along the HPER mall. A new concrete encased ductbank for telecommunication (fiber optic and copper distribution) will be required from two separate locations directly to the main telecommunication room. The two locations will be the existing utility tunnel and telecommunication manhole M.34.

10.12.2 COMMUNICATION / DATA ROOMS

There shall be one main communication room (MDF or ER) that is located on the main level or in the basement. It is best to locate the MDF central to the building to minimize cable lengths. The size of the MDF shall be a minimum of 10’ X 16’, however, the exact size shall be determined during design. This room shall house the main computer, phone and security equipment that serves the building. At least (4) 4” conduits shall be stubbed out from the MDF room to two redundant communication vaults located outside of the building.

Each additional floor shall have at least one communication room (IDF or TR) that shall be sized as a minimum 10’ X 12’, however, the exact size shall be determined during design. These IDF rooms shall be central to the building and stacked to allow for ease of communication/data distribution. A minimum of four (4) 4” conduits shall be run between each level. It is important to ensure that cable lengths do not exceed 90 meters (~270 ft.). Additional IDF rooms should be provided on each level as necessary to keep cable lengths to within industry standard lengths. ¾” AC or better plywood extending 8ft high shall be provided around the telecommunications room.

MDF and IDF rooms should be separated from electrical rooms by a minimum of 6’-0” to help reduce possible interference from electromagnetic interference (EMI). Each MDF and IDF rooms shall have a minimum of three 84’ X 19" floor standing racks. Plywood terminal boards should be installed on all walls. Cable tray should be installed around the perimeter of the room for cable management. Provide dedicated power outlets on UPS power for all communication/data equipment located in the room.

10.12.3 WIRE MANAGEMENT

Each floor shall have a dedicated wire basket cable tray system that connects to the communication room(s) on that level. Generally, the cable tray shall be routed in corridors/hallways and coordinated with ducts, piping, and electrical conduits to ensure easy access in and out of the tray when construction is complete. It is anticipated that a 12" wide by 4" deep minimum wire basket style tray should be sufficient; however, this should be carefully evaluated during design. The tray shall be trapeze-hung and seismically braced; center-hung trays are not allowed. Mechanical fire stop systems should be utilized where the cable tray passes through fire-rated partitions so as to allow for moving, additions, and changes in a flexible and easy manner. Coordination with structural, mechanical, lighting and Basket trays shall be done to minimize basket tray offsets. This tray may be used for the following systems:

- Communication/data
- Card Access Systems
- CCTV System
- Building Management System

All cables that use the cable tray shall be properly labeled and identified. Where communication/data cabling is run through plenum rated space, the cabling shall be plenum rated. Basket tray shall be maintained continuous as it passes over hard lid ceilings between accessible locations.

10.12.4 COMMUNICATION / DATA RACEWAY REQUIREMENTS

Each communication/data outlet shall utilize a 4-11/16" X 4-11/16” X 2-1/8" deep junction box with a single-gang or double-gang mudring. One or two 1" conduits with a nylon pull rope (depending on requirements) shall be run from each junction box up the wall into the ceiling space to the nearest cable tray and a protective bushing should be provided to protect the cables. The conduit system that is provided, shall allow for flexibility and change.
In office locations, provide a minimum of two (2) comm/data jack locations. Each bedroom shall have a minimum of (1) comm/data jack locations per occupant. In the garage spaces provide the required number of locations based on what is needed by the user. Exact locations and quantity shall be coordinated with the users during the design effort. Where telephone/data or power is needed in open areas of suspended floors, provide floor boxes only; poke-through devices should not be used unless fire rating is required to be maintained.

Provide telephone outlets for elevator panels, fire alarm panels, building automation system, security system, and other required equipment. Provide junction boxes and raceways for wireless network points. These locations should be located in corridors and computer lab and classroom spaces. A maximum of 50 users per WAP. Some additional locations may be required for exterior wireless capability. A 2” conduit shall be penetrated through the roof with a weather head to provide exterior Wi-Fi coverage. Coordinate locations with UIT during design.

10.12.5 STRUCTURED CABLING SYSTEM

The structured cabling system will be provided by the University of Utah including all copper and fiber optic cabling (Communication/data) to support the uses within this building.

1O.13 AUXILIARY SYSTEMS

1O.13.1 FIRE ALARM SYSTEMS

The only approved fire alarm manufacturer is FCI furnished and installed by Nelson Fire Systems per the University of Utah design standards. Coordinate the location of the building fire alarm control panel and annunciator panel with the campus fire marshal.

The fire alarm system shall be fully addressable, analog, and shall operate as a non-coded continuous sounding system. The fire alarm system shall be provided with all necessary provisions to allow for automatic reporting of all alarms to the remote station receiving console in building #0301 via telephone lines.

Horn/strobes shall be installed in all public spaces, conference rooms, restrooms, large open office areas, classrooms, computer lab spaces, and mechanical and electrical control rooms. Install additional notification appliance circuit panels on each floor to provide power to the horn/strobes devices associated with that floor. Every level of the building shall have a fire alarm junction box in which all cabling going to the particular level shall be routed through prior to extending out to pick-up fire alarm devices for that level.

Area smoke detectors shall be installed in all paths of egress, outside of living and sleeping units, in all electrical rooms and elsewhere as required. Each room used for sleeping purposes shall have a combination heat/smoke detector with a local sounder. Smoke detection will signal local alarm only. Pull stations shall be installed at each ground level exit. Pull stations shall also be provide on individual floors at the entrance to the exit stair. Provide duct smoke detectors and fan shutdown where required by the NFPA and the IMC, including detection of smoke at all return air shafts that serve multiple floors. All fire extinguishers shall be monitored by the fire alarm system. The building sprinkler system shall be monitored by the fire alarm system through use of flow and tamper switches.

The fire alarm wiring shall be installed in a Class A loop configuration in metal conduit, minimum size of ½". Generally, minimum wire size shall be 16 gauge for audible alarm circuits, and 18 gauge for signal initiation circuits. Strobes shall be wired separately from audible devices.

1O.13.2 CARD ACCESS SYSTEM

A building wide card access system shall be provided to control access in and out of the building as well as spaces within the building. The system shall have total flexibility to allow for multiple users, to add and subtract doors at any time, and to program the system to permit or prevent access by the public or other building users. Verify with the end user and the University how and who shall monitor the system and the type of system that is desired. Regardless of the specific nature of the card access/security system designed, it should adhere to the University's standards.

The card access equipment needed for this system shall be installed at all entrances/exits to the building as well as other rooms as determined during the design. Verify all required locations with owner. Each exterior door shall be equipped with a contact switch to allow for the system to monitor doors that are accessed illegally or left ajar. Card readers should be located at entrances into other areas that are determined to required restricted access. Card readers will be required in the elevators and at the stairwells to restrict travel between floors. The card access system shall interface with the fire alarm system so that, on alarm, doors that are in the path of egress are bypassed and allowed to open.

10.13.3 CLOSED CIRCUIT TELEVISION SYSTEM (CCTV)

Due to the specific nature of this facility and the need for enhanced security, an internet based CCTV system will be provided to monitor entrances/exits and the perimeter of the building. Additional cameras can be added to monitor parking lots or pathways leading away from the building. The system will consist of cameras, and digital video recording devices with internal storage capability. The system will record events when motion is sensed at a camera location. The CCTV will also be integrated with the card access system to allow for a flexible, user-friendly setup. All University of Utah standards will be followed when designing CCTV systems.

Most CCTV cameras will be fixed style although there may be a few PTZ style in specific locations. As with the security system, the CCTV system will be connected to and controlled by OCM security servers.

10.13.4 DISTRIBUTED AMPLIFICATIONS SYSTEM (DAS) / CELL PHONE REPEATER

Once the final building footprint and type of envelope is determined a study of the building shall be performed and conversations with the owner to determine if a DAS shall be provided to improve cell phone coverage within the building itself. If determined necessary the DAS system shall be coordinated closely with the UIT department to determine the type of system and repeater antenna placement. The 800 MHZ emergency channel must be strong within the building.

10. 13.5 AUDIO VISUAL SYSTEMS

Audio and video systems will be part of the building construction work and shall be specified as part of the design. AV design will be a combined effort between UofU IMS department and the design team. Coordinate directly with the user groups to determine specific requirements for each space within the building. Audio/video systems shall be designed and specified in compliance with University standards. Provide all calculations necessary to properly specify the audio and video system for this building in the construction drawings. Provide any audio and video equipment necessary to meet any requirements of the American with Disabilities Act. In general, AV system raceway within shall consist of outlet boxes with conduit routed up the wall cavity with a 90 degree bend and bushing at the top of the wall into the ceiling space.

1O.14 SUSTAINABILITY AND LEED

The project will be designed to achieve a minimum of a LEED Silver certification as required by the DFCM for all new buildings. There are many strategies that will be employed in the design of electrical systems to ensure that sustainability is achieved. One such strategy is the use of high energy efficient light fixtures, which employ lamp and ballast combinations that achieve the highest efficacy possible (lumens/watt). The energy-saving properties that these fixtures provide will be further enhanced by the installation of controls that use energy only when it is required (i.e. when a space is occupied). When these controls are put into use during normal business hours and are combined with daylight harvesting, energy usage will be lowered even more. The controls will be easy to understand and operate, while also providing visual comfort to the end user – a comfort that can be made even more flexible through the use of step-switching or dimming in high-use areas.

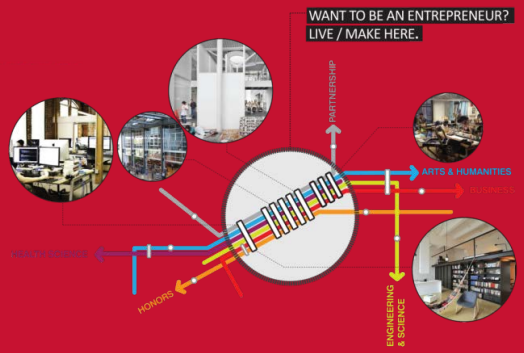
Another important strategy that will be used to increase sustainability is the use of the most efficient transformers for installation in the building. The federal government currently requires transformers that meet TP-1 energy efficiencies; however, transformers with higher efficiencies will be considered. Transformers will be loaded to the greatest extent possible to further increase the efficiency of the transformer.

Variable frequency drives (VFD's), capacitors, and other types of electrical equipment will be used to ensure that mechanical systems utilize only the power that is required and the power that they use is used efficiently.

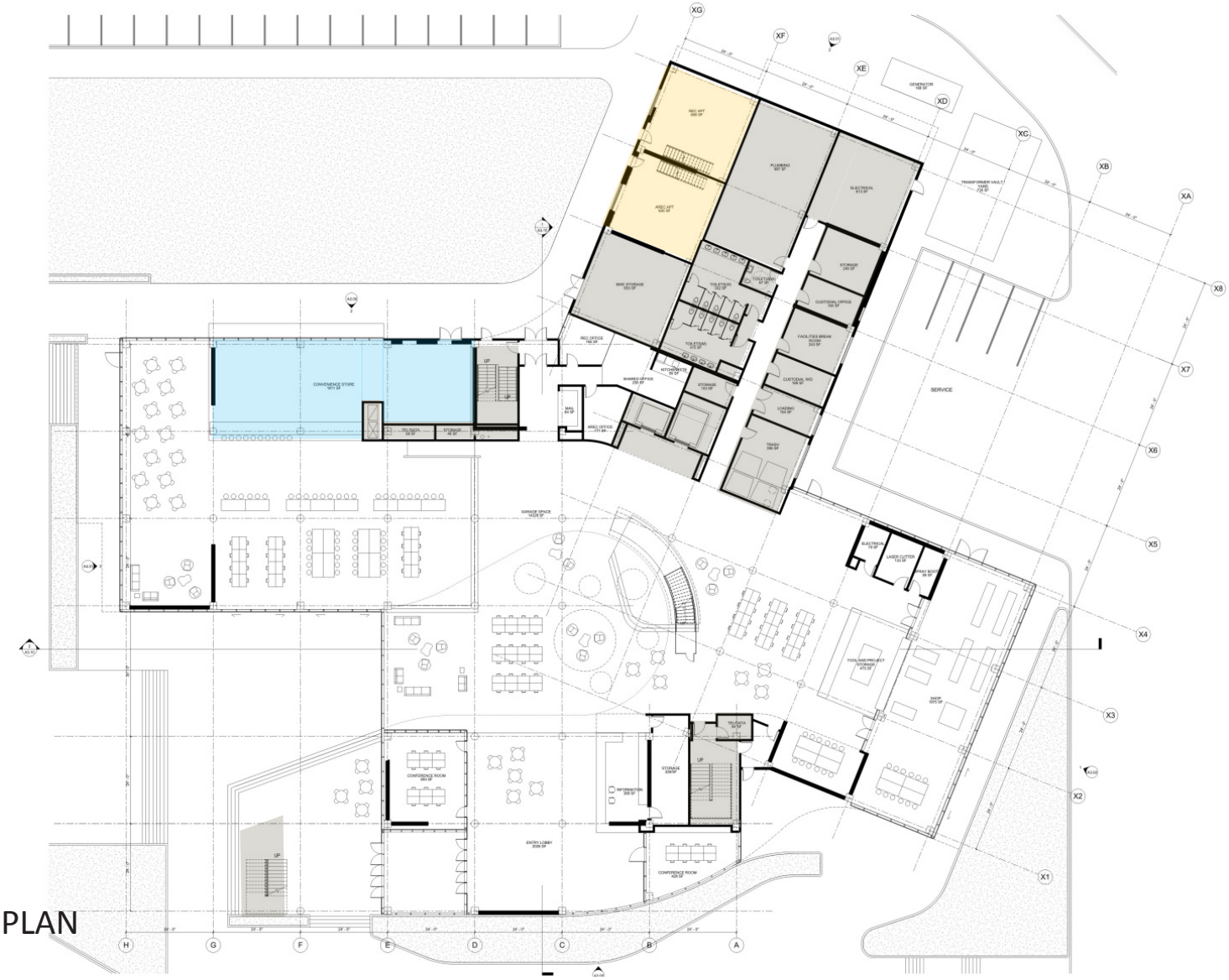
11.
SCHEMATIC DESIGN - FINAL PRESENTATION

LASSONDE STUDIOS

05.20.2014

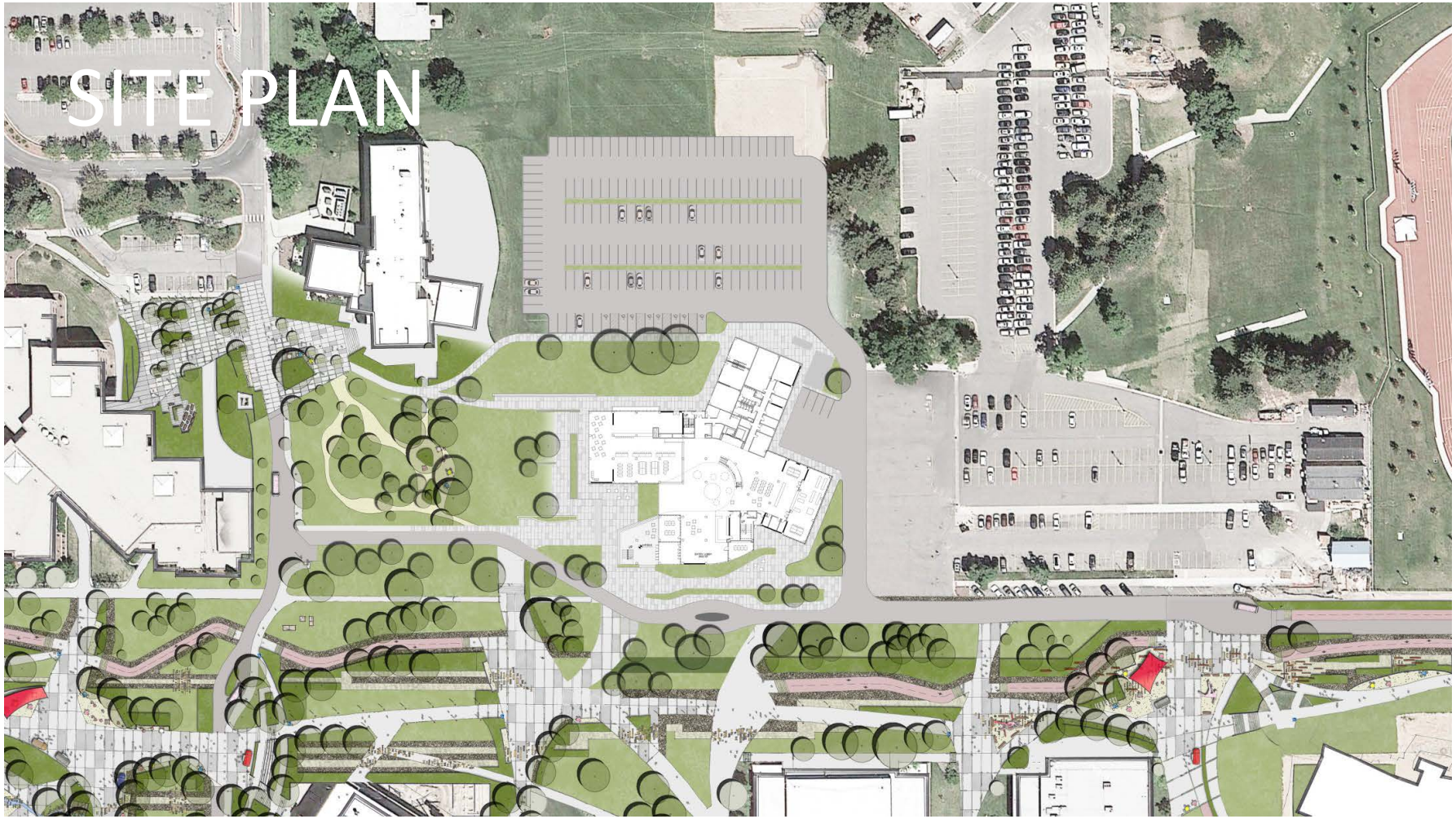


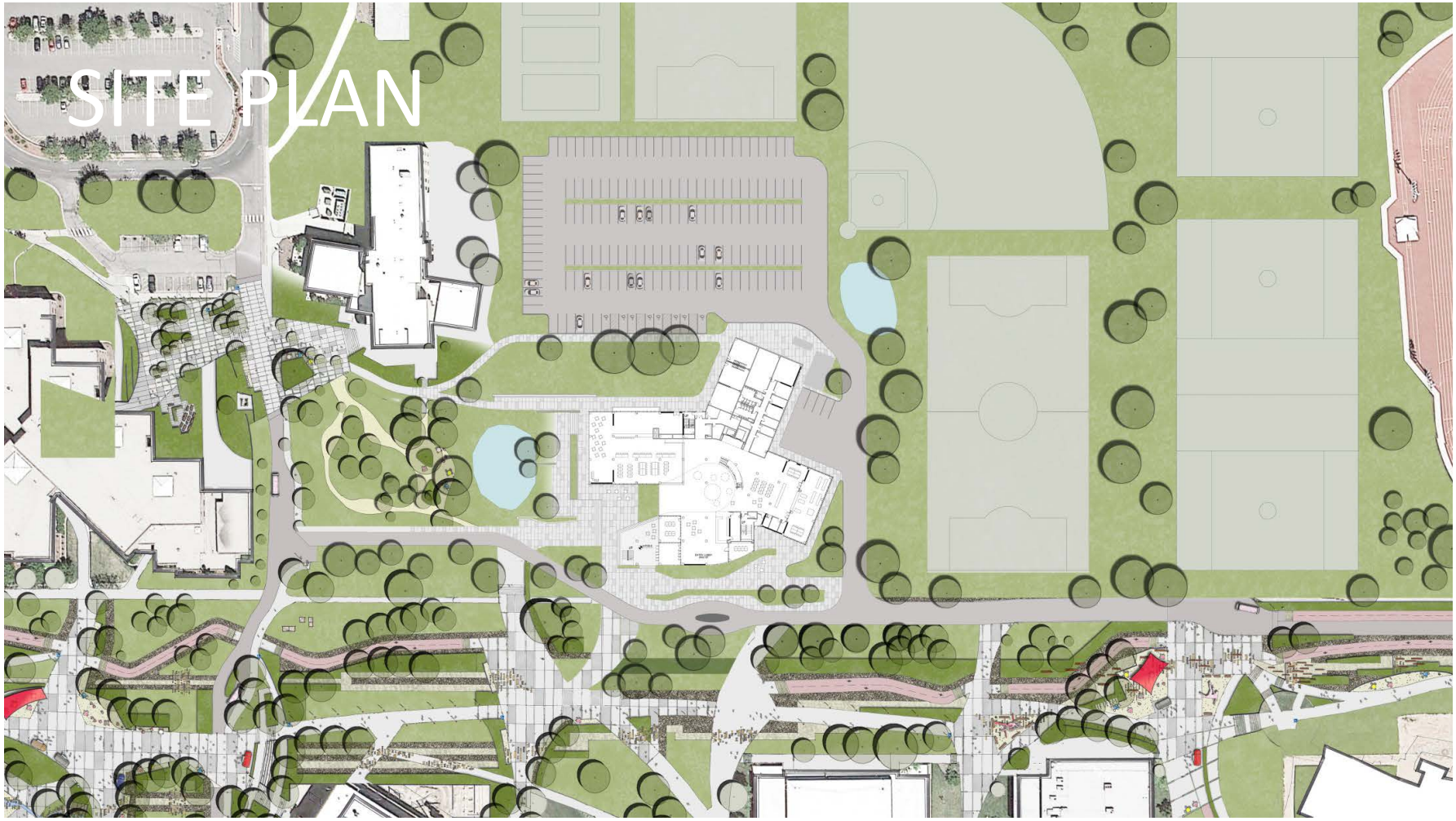
UNIVERSITY OF UTAH
LASSONDE ENTREPRENEUR CENTER
in association with
CANNONDESIGN



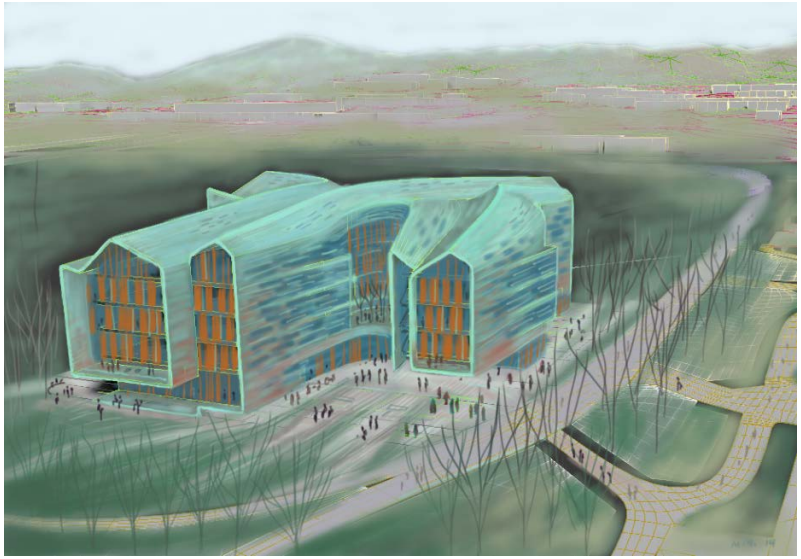
GROUND LEVEL PLAN

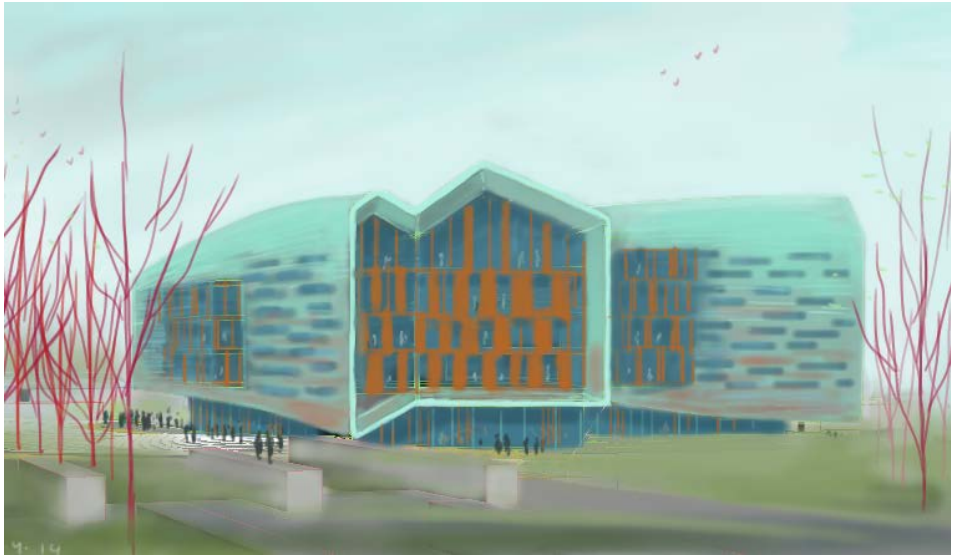
SITE PLAN



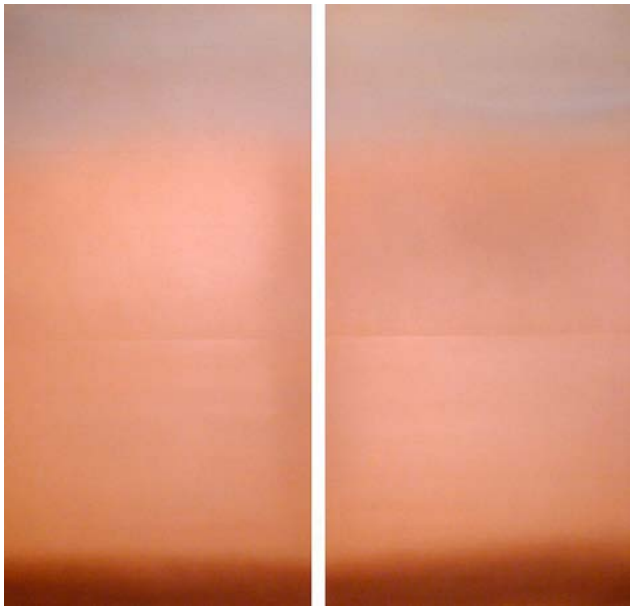

SITE PLAN

CONCEPT DEVELOPMENT





MATERIAL



COPPER

CONCRETE

LOW-E GLASS

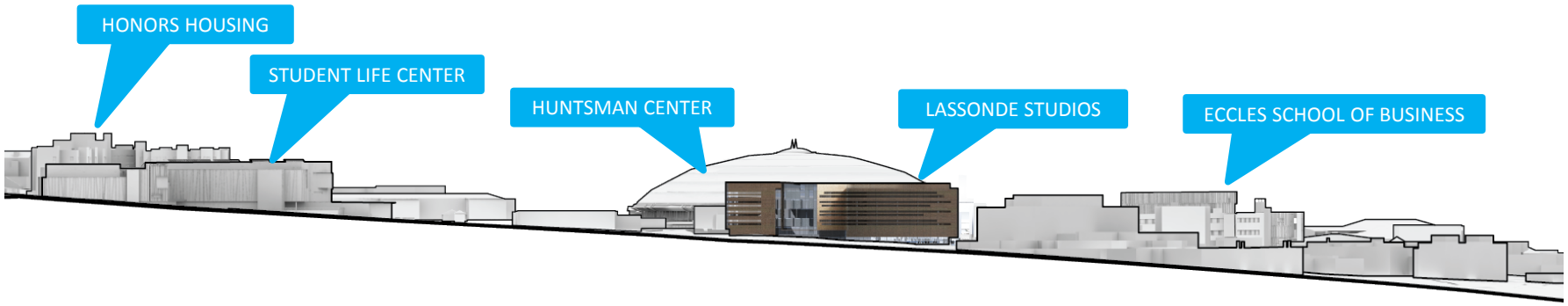
the LIVE/MAKE spectrum

1. proximate
2. connected
3. fused
4. loft
5. modular

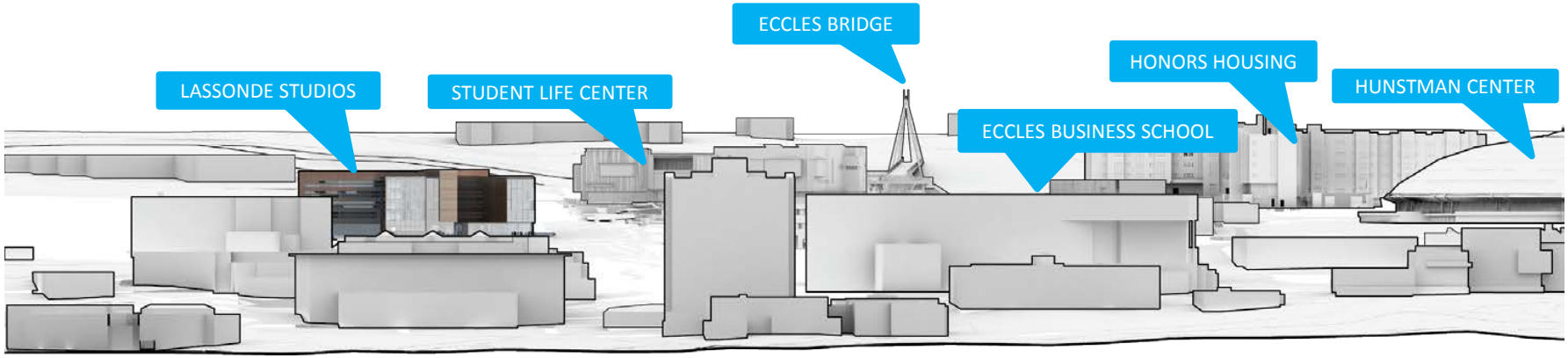
SOUTH ELEVATION

WEST ELEVATION

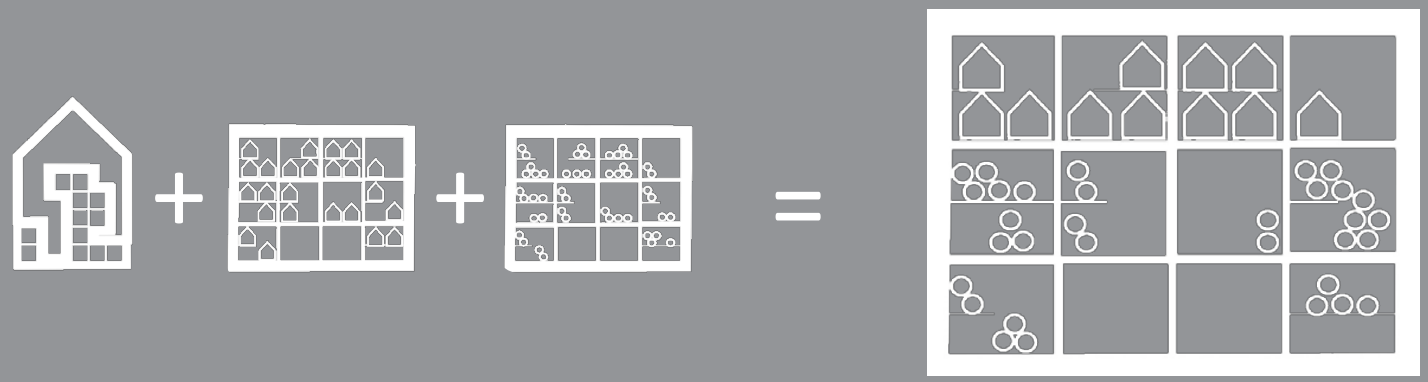
SITE SECTION



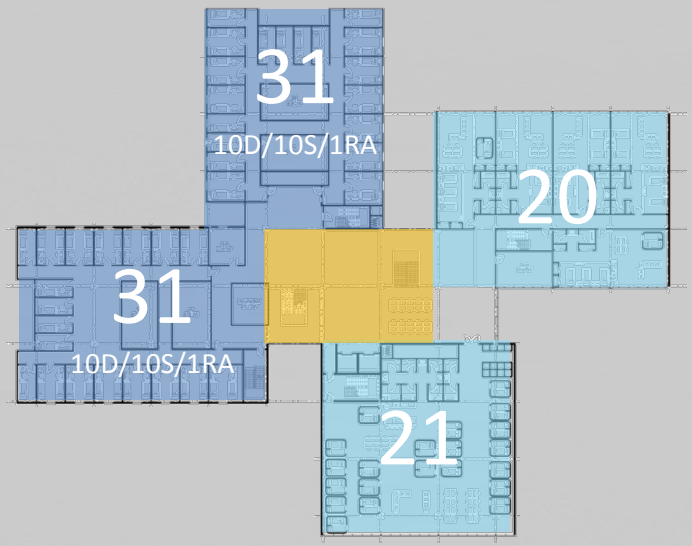
SITE SECTION

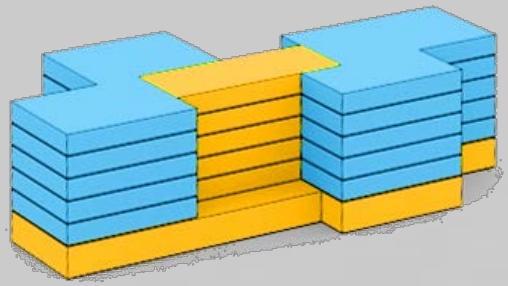


PROTOTYPE



PROTOTYPE (DNA)





TYPICAL FLOOR PLAN

PROTOTYPE (DNA)

[1] FLEXIBILITY (UNIVERSAL GRID)

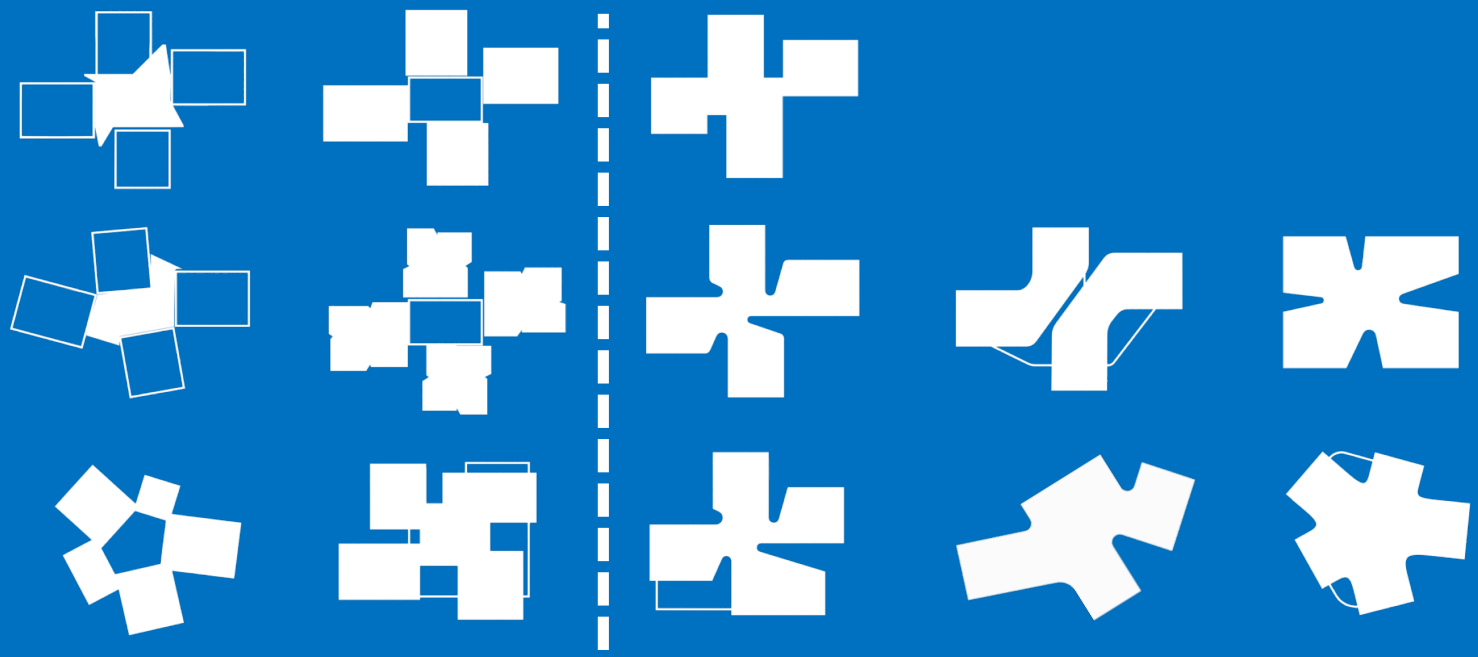
[2] FRESHMEN AND UPPERCLASSMEN SHARE FLOORS TO ENCOURAGE MENTORSHIP

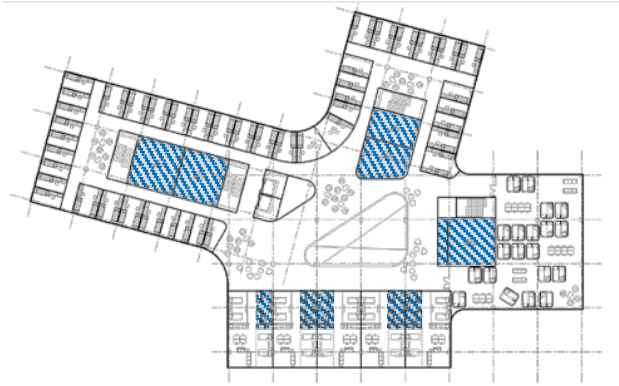
[3] REDUNDANCY OF CREATIVE AND SOCIAL SPACE AT MULTIPLE SCALES

[4] ALLOW FOR COMPARTMENTALIZATION OF FRESHMEN GROUPS TO SUPPORT EXISTING RESIDENTIAL LIFE PROGRAMS

[5] POROUS, INVITING AND VISUALLY PERMEABLE GROUND LEVEL TO ENCOURAGE PARTICIPATION AND ACHIEVE THE LOOK AND FEEL OF AN ACADEMIC RESOURCE BUILDING

MASSING





PROCESS

TYPICAL FLOOR PLAN

- BLANK -

12.
ESTIMATED COST MODEL

GRAMOLL CONSTRUCTION
175 West 1100 North, North Salt Lake, Utah 84054
Phone 801-295-2341 ▪ Fax 801-295-2356 ▪ www.gramoll.com

Job # 641 — **UofU Lassonde Living Learning Center**

Client Company: DFCM/UofU
Contact: Rick James
Project # 13285750
Contract #

Architect: EDA
Contact: John Shuttleworth
Address: 9 Exchange Place
Address: Salt Lake City, Utah 84111
Phone: (801) 531-7600
Fax: (801) 363-3149

		Project Square Footage:	**147,160**	**SQFT**	**$ 207.22**	**$ 30,494,560.70**
		Project Duration:	**20.0**	**MO**	**$ 1,524,728.04**	
CSI Code	Description	Comments	Quantity	Unit	Cost/Unit	Budget
		General Conditions.				
01-3100-2	Project Manager		20.00	MO	$ 14,000.00	$ 280,000
01-3150-2	Project Superintendent		20.00	MO	$ 12,000.00	$ 240,000
01-3155-2	Asst. Superintendent		20.00	MO	$ 10,000.00	$ 200,000
01-3113-2	Project Engineer		20.00	MO	$ 4,000.00	$ 80,000
01-3115-5	Computer expense		20.00	MO	$ 700.00	$ 14,000
01-3151-5	Fuel & Maintenance		20.00	MO	$ 3,500.00	$ 70,000
01-3151-4	Vehicle Expense		20.00	MO	$ 5,000.00	$ 100,000
01-5110-5	Power Costs		20.00	MO	$ 1,000.00	$ 20,000
01-5135-5	Telephone/Fax		20.00	MO	$ 925.00	$ 18,500
01-5200-5	Job Office		20.00	MO	$ 1,500.00	$ 30,000
01-5220-5	Toilets		20.00	MO	$ 875.00	$ 17,500
01-7415-2	Daily Clean Up		20.00	MO	$ 4,800.00	$ 96,000
01-7420-5	Trash Removal		20.00	MO	$ 3,500.00	$ 70,000
01-3157-4	Rented Equipment & Tools		1.00	LS	$ 25,000.00	$ 25,000
01-7115-5	Mobilization		1.00	LS	$ 10,000.00	$ 10,000
01-3230-5	Progress Photos		1.00	LS	$ 5,000.00	$ 5,000
01-3210-2	CPM Schedule & Updates		20.00	MO	$ 1,100.00	$ 22,000
01-4500-2	Quality Control		20.00	MO	$ 3,000.00	$ 60,000
26-0150-5	Temp Power Hook-up		1.00	LS	$ 30,000.00	$ 30,000
01-5125-5	Temporary Lighting		1.00	LS	$ 20,000.00	$ 20,000
01-5140-5	Temp Water Hook-up		1.00	LS	$ 4,500.00	$ 4,500
01-5200-5	Office Supplies		20.00	LS	$ 500.00	$ 10,000
01-5215-5	Safety		20.00	MO	$ 3,000.00	$ 60,000
01-5425-5	Scaffolding		20.00	MO	$ 1,500.00	$ 30,000
01-5525-5	Traffic controls and flagging		20.00	MO	$ 3,400.00	$ 68,000
01-5600-5	Temporary Protection		1.00	LS	$ 30,000.00	$ 30,000
01-5720-5	De-watering & Dust Control		20.00	LS	$ 600.00	$ 12,000
01-5630-5	Site Security		1.00	LS	$ 15,000.00	$ 15,000
01-5730-5	Snow Removal		1.00	LS	$ 12,000.00	$ 12,000
01-5810-5	Project Signs		1.00	LS	$ 7,500.00	$ 7,500
01-7120-2	Building Layout		1.00	LS	$ 42,000.00	$ 42,000
01-7125-2	Interior Layout		1.00	LS	$ 35,000.00	$ 35,000
01-3225-5	Survey		1.00	LS	$ 25,000.00	$ 25,000
01-7425-2	Final Clean Up		147,160.00	SF	$ 0.25	$ 36,790
01-7810-5	Warranty & Punch List		1.00	LS	$ 10,000.00	$ 10,000
01-5250-3	Storage Vans		20.00	MO	$ 750.00	$ 15,000
01-5145-5	Winter Heat		1.00	LS	$ 60,000.00	$ 60,000
01-5420-4	Crane & Hoisting		1.00	LS	$ 80,000.00	$ 80,000
01-5420-4	Tower Crane		1.00	LS	$ 315,000.00	$ 315,000

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01-5420-5	Material lift		1.00	LS	$ 75,000.00	$ 75,000	
01-5625-5	Security Fence		2,000.00	LF	$ 10.00	$ 20,000	
01-5690-5	Winter Protection		1.00	LS	$ 40,000.00	$ 40,000	
01-3330-5	LEED Costs		1.00	LS	$ 90,000.00	$ 90,000	
	Envelope Commissioning		1.00	LS	$ 3,000.00	$ 3,000	
	MEP Commissioning		1.00	LS	$ 50,000.00	$ 50,000	
					General Conditions		$ 2,553,790
			Site Work				
31-2510-5	SWPPP		20.00	MO	$ 1,850.00	$ 37,000	
	Remove Asphalt Parking Lot		90,000.00	Sf	$ 0.69	$ 62,100	
	Remove Curb & Gutter		2,200.00	LF	$ 3.50	$ 7,700	
	Remove Sidewalk		3,000.00	SF	$ 0.89	$ 2,670	
	Concrete saw-Cutting		430.00	LF	$ 2.65	$ 1,140	
	Asphalt saw-Cutting		430.00	LF	$ 1.45	$ 624	
	Clear & Grub Site		90,000.00	SF	$ 0.39	$ 35,100	
	Site Excavation		23,333.00	CY	$ 5.00	$ 116,665	
	Site Grading		90,000.00	SF	$ 0.31	$ 27,900	
	Haul Off Site		23,333.00	CY	$ 6.00	$ 139,998	
	Building Excavation		3,153.00	CY	$ 6.00	$ 18,918	
	Backfill & Compact		1,041.00	CY	$ 12.50	$ 13,013	
	Haul Off Site		2,113.00	CY	$ 6.00	$ 12,678	
	Building Grading		28,379.00	SF	$ 0.31	$ 8,797	
	Gravel Under Slab		590.00	TON	$ 24.00	$ 14,160	
	Storm Drain		970.00	LF	$ 33.65	$ 32,641	
	Detention Storage		1.00	LS	$ 100,000.00	$ 100,000	
	Storm Drain Manholes/ Boxes		15.00	EA	$ 1,150.00	$ 17,250	
	8' Water Line		560.00	Lf	$ 33.65	$ 18,844	
	Sewer Line		660.00	LF	$ 34.65	$ 22,869	
	Gas Line		420.00	LF	$ 39.00	$ 16,380	
	6" High Pressure Gas Re-route		NIC				
	Manhole		2.00	EA	$ 3,680.00	$ 7,360	
	Chilled Water		525.00	LF	$ 200.00	$ 105,000	
	Temp Walk		1.00	LS	$ 50,000.00	$ 50,000	
	Parking		50,000.00	SF	$ 2.25	$ 112,500	
					Site Work		$ 981,307
			Landscaping				
	Landscaping		50,000.00	SF	$ 5.00	$ 250,000	
	Retaining Wall		1.00	LS	$ 125,000.00	$ 125,000	
				SF		$ -	
				LS		$ -	
					Landscaping		$ 375,000
			Concrete				
	Continuous Footings		165.00	CY	$ 305.00	$ 50,325	
	Spot Footings		543.00	CY	$ 315.00	$ 171,045	
	Grade Beam		466.00	CY	$ 480.00	$ 223,680	
	tension Pile/ Deep Foundation System		28,379.00	SF	$ 10.00	$ 283,790	
	Pile Cap		817.00	CY	$ 325.00	$ 265,525	
	Concrete Columns		509.00	CY	$ 580.00	$ 295,220	
	Shear Walls		17,488.00	SF	$ 24.68	$ 431,604	
	Foundation Walls		9,591.00	SF	$ 19.68	$ 188,751	

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	Board Formed/ Architectural Concrete Upgrade		9,427.00	SF	$ 12.65	$ 119,252		
	Slab On Grade		28,379.00	SF	$ 3.89	$ 110,394		
	2-way Slab & Beams		5,149.00	CY	$ 580.00	$ 2,986,420		
	Vapor Barrier Under Slab		28,379.00	SF	$ 0.19	$ 5,392		
	Curb & Gutter		1,400.00	LF	$ 10.00	$ 14,000		
	Concrete Paving		35,000.00	SF	$ 3.50	$ 122,500		
					Concrete			$ 5,267,898
			Metals					
	Penthouse Roof Structure (7 LB/SF)		21,000.00	LB	$ 1.75	$ 36,750		
	Misc. Steel		3,150.00	LB	$ 2.60	$ 8,190		
	Penthouse Roof Deck		3,000.00	SF	$ 2.25	$ 6,750		
	Upgraded Central Stairway		92.00	EA	$ 1,000.00	$ 92,000		
	Metal Pan Stairs		300.00	EA	$ 600.00	$ 180,000		
	Upgrade Freestanding Railing		725.00	LF	$ 275.00	$ 199,375		
	Freestanding Railing		390.00	LF	$ 125.00	$ 48,750		
	wall-Mounted railing		315.00	LF	$ 65.00	$ 20,475		
						$ -		
						$ -		
						$ -		
					Metals			$ 592,290
			Carpentry					
	Wood Plates & Blocking		147,160.00	SF	$ 1.25	$ 183,950		
	Millwork		147,160.00	SF	$ 4.00	$ 588,640		
						$ -		
						$ -		
						$ -		
						$ -		
						$ -		
					Carpentry			$ 772,590
			Thermal & Moisture					
	Ridged Foundation Insulation		9,591.00	SF	$ 1.45	$ 13,907		
	Ridged Wall Insulation		43,751.00	SF	$ 1.65	$ 72,189		
	Rigid Roof Insulation		28,379.00	SF	$ 3.05	$ 86,556		
	R-19 wall Insulation		43,751.00	SF	$ 0.65	$ 28,438		
	Sound Batt		101,938.00	SF	$ 0.44	$ 44,853		
	Single-Ply Roof Membrane		28,379.00	SF	$ 3.15	$ 89,394		
	Air/ Weather Barrier		43,751.00	SF	$ 2.75	$ 120,315		
	Foundation Waterproofing		9,591.00	SF	$ 3.60	$ 34,528		
	Fiberglass Mat Gyp Wall Sheathing		43,751.00	SF	$ 1.65	$ 72,189		
	Metal wall Panel, (70% exterior)		43,751.00	SF	$ 38.00	$ 1,662,538		
	Flashing & Sheet Metal		4,410.00	SF	$ 6.50	$ 28,665		
	Metal Roof Cap		2,205.00	LF	$ 9.65	$ 21,278		
	Firestopping & Caulking		147,160.00	SF	$ 0.25	$ 36,790		
	Caulking & Sealant		147,160.00	SF	$ 0.25	$ 36,790		
	Roof hatch		1.00	EA	$ 850.00	$ 850		

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						$ -	
					Thermal & Moisture		$ 2,349,280
			Doors & Windows				
	Interior Solid Core wood Door - Single		248.00	EA	$ 1,020.00	$ 252,960	
	Interior Solid Core Wood Door - Double		11.00	EA	$ 1,650.00	$ 18,150	
	Sliding Closet door		32.00	EA	$ 850.00	$ 27,200	
	Exterior Double Door		4.00	EA	$ 3,850.00	$ 15,400	
	Exterior Single Door		13.00	EA	$ 1,850.00	$ 24,050	
	Garage overhead Door		1.00	EA	$ 7,650.00	$ 7,650	
	Exterior Curtain wall (30% Exterior)		12,660.00	SF	$ 55.00	$ 696,300	
	Interior Glazing		2,500.00	SF	$ 30.50	$ 76,250	
	Mirrors		1,080.00	SF	$ 10.65	$ 11,502	
						$ -	
						$ -	
						$ -	
						$ -	
					Doors & Windows		$ 1,129,462
			Finishes				
	Interior Partition Wall		101,938.00	SF	$ 2.57	$ 261,981	
	exterior MS Wall		72,919.00	SF	$ 5.61	$ 409,076	
	Gypsum Wallboard		276,795.00	SF	$ 2.00	$ 553,590	
	1st Floor Retroplate		31,200.00	SF	$ 4.50	$ 140,400	
	Floor Coverings		125,500.00	SF	$ 7.00	$ 878,500	
	Sealed Concrete		4,750.00	SF	$ 0.25	$ 1,188	
	Acoustic Ceiling Tile		1,730.00	SF	$ 4.25	$ 7,353	
	Susp. Gyp Ceiling		31,349.00	SF	$ 6.00	$ 188,094	
	Wood Ceiling		6,400.00	SF	$ 30.85	$ 197,440	
	Ceiling Acoustic Treatment		240.00	SF	$ 60.00	$ 14,400	
	Unspecified Ceiling		107,441.00	SF	$ 5.45	$ 585,553	
	Rubber Base		16,990.00	LF	$ 2.20	$ 37,378	
	Paint Ceiling Structure		147,160.00	SF	$ 1.41	$ 207,496	
	Paint Gyp. Walls		308,144.00	SF	$ 0.70	$ 215,701	
	Paint/ Stain Doors		291.00	EA	$ 128.00	$ 37,248	
	Specialty Paint		147,160.00	SF	$ 0.50	$ 73,580	
						$ -	
						$ -	
						$ -	
					Finishes		$ 3,808,978
			Specialties				
	ADA Toilet Partition		10.00	EA	$ 850.00	$ 8,500	
	Toilet Partition		15.00	EA	$ 800.00	$ 12,000	
	Shower Screen/ Partition		30.00	EA	$ 800.00	$ 24,000	
	Grab Bars		10.00	SETS	$ 195.00	$ 1,950	
	Bathroom Accessories		80.00	EA	$ 165.00	$ 13,200	
	Shower Curtain		74.00	EA	$ 95.00	$ 7,030	
	Shower Seat		10.00	EA	$ 265.00	$ 2,650	
	Fire Extinguisher Cabinet		14.00	EA	$ 278.00	$ 3,892	
	Bike Storage		1.00	LS	$ 5,000.00	$ 5,000	
	Identifying Devices		1.00	LS	$ 25,000.00	$ 25,000	
	Stackable Bike Storage (100 Bikes)		1.00	LS	$ 10,000.00	$ 10,000	

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	Mailboxes		1.00	LS	$ 11,000.00	$ 11,000	
					Specialties		$ 124,222
			Equipment				
	Residential Appliances		NIC				
	Laundry Equipment		NIC				
	C-Store/ Coffee Shop Equipment		NIC				
						$ -	
					Equipment		$ -
			Furnishings				
	Loose Furnishings		NIC				
	Roller Shades		6,330.00	SF	$ 8.65	$ 54,755	
	Group 1 Flexible, Movable wall Display System		NIC	SF			
12-4815-5	Entrance Mats & Frames		400.00	SF	$ 8.00	$ 3,200	
					Furnishings		$ 57,955
			Special Construction				
	Premanufactured Bed/Desk Pod		80.00	EA	$ 20,000.00	$ 1,600,000	
					Special Construction		$ 1,600,000
			Conveying Systems				
14-2000-6	Elevator	5 Stop	2.00	EA	$ 150,000.00	$ 300,000	
					Conveying Systems		$ 300,000
			Mechanical				
	Air handler 18,000 CFM		4.00	EA	$ 155,700.00	$ 622,800	
	Air Handler 38,500 CFM		1.00	EA	$ 333,025.00	$ 333,025	
	Air Handler 14,000 CFM		1.00	EA	$ 128,100.00	$ 128,100	
	Air Handler 13,500 CFM		1.00	EA	$ 123,775.00	$ 123,775	
	Air Handler 8,500 CFM		1.00	EA	$ 77,525.00	$ 77,525	
	Air Handler 4,500 CFM		1.00	EA	$ 41,425.00	$ 41,425	
	Chiller 180 Ton		2.00	EA	$ 145,000.00	$ 290,000	
	Boilers 2,340 MBH		2.00	EA	$ 60,000.00	$ 120,000	
	Ductwork		147,160.00	SF	$ 4.85	$ 713,726	
	Duct liner		104,484.00	SF	$ 1.65	$ 172,399	
	Registers/ Grills		470.00	EA	$ 185.00	$ 86,950	
	Crac Unit		2.00	EA	$ 12,500.00	$ 25,000	
	Pumps 335 GPM		4.00	EA	$ 7,850.00	$ 31,400	
	Pumps 165 GPM		4.00	EA	$ 5,650.00	$ 22,600	
	Inline Pumps 190 GPM		4.00	EA	$ 2,650.00	$ 10,600	
	Inline Pumps 65 GPM		4.00	EA	$ 1,950.00	$ 7,800	
	Exhaust Fans		12.00	EA	$ 1,650.00	$ 19,800	
	Air Separator		2.00	EA	$ 2,850.00	$ 5,700	
	Expansion tank		2.00	EA	$ 4,150.00	$ 8,300	
	Chemical Feed		2.00	EA	$ 1,650.00	$ 3,300	
	Cabinet Unit Heaters		8.00	EA	$ 2,650.00	$ 21,200	
	perimeter Heat Radiators		314.00	EA	$ 948.00	$ 297,672	
	Fan Coil Units		19.00	EA	$ 2,950.00	$ 56,050	
	VAV With Re Heat		60.00	EA	$ 1,450.00	$ 87,000	

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	HVAC Piping		147,160.00	SF	$ 2.85	$ 419,406	
	Temperature Controls		147,160.00	SF	$ 2.65	$ 389,974	
	Test and Balance		400.00	HR	$ 64.50	$ 25,800	
	Fire protection		147,160.00	SF	$ 2.85	$ 419,406	
	Water Closet		80.00	EA	$ 782.00	$ 62,560	
	urinal		5.00	EA	$ 702.00	$ 3,510	
	Lavatory		25.00	EA	$ 620.00	$ 15,500	
	Counter-Mount Sink		54.00	EA	$ 650.00	$ 35,100	
	Drinking Fountain		4.00	EA	$ 620.00	$ 2,480	
	Bath Tub/ Shower		54.00	EA	$ 2,450.00	$ 132,300	
	ADA Shower		10.00	EA	$ 1,450.00	$ 14,500	
	Shower		20.00	EA	$ 1,250.00	$ 25,000	
	Double Basin Sink w/ Disposal		31.00	EA	$ 850.00	$ 26,350	
	Supply Outlet		26.00	EA	$ 125.00	$ 3,250	
	Laundry Supply		20.00	EA	$ 125.00	$ 2,500	
	Mop Sink		5.00	EA	$ 440.00	$ 2,200	
	Floor Drain		84.00	EA	$ 125.00	$ 10,500	
	Boiler 2740 MBH		1.00	EA	$ 44,100.00	$ 44,100	
	Domestic Circulation Pumps		2.00	EA	$ 4,650.00	$ 9,300	
	Expansion tank		2.00	EA	$ 4,150.00	$ 8,300	
	Storage tank		2.00	EA	$ 8,650.00	$ 17,300	
	Supply Piping		13,360.00	LF	$ 10.65	$ 142,284	
	Drain, Vent Piping		10,498.00	LF	$ 16.50	$ 173,217	
	Roof Drain		32.00	EA	$ 185.00	$ 5,920	
	Roof Drain Piping		2,560.00	LF	$ 16.50	$ 42,240	
	Clean & Flush Lines		1.00	LS	$ 7,500.00	$ 7,500	
						$ -	
						$ -	
					Mechanical		$ 5,346,644
			Electrical				
	Lighting & Branch Wiring		147,160.00	SF	$ 7.00	$ 1,030,120	
	Devices & Branch Wiring		147,160.00	SF	$ 4.62	$ 679,879	
	Service & Distribution		147,160.00	SF	$ 6.13	$ 902,091	
	Site (Pole Lights, Utilities)		147,160.00	SF	$ 3.30	$ 485,628	
	Fire Alarm		147,160.00	SF	$ 2.66	$ 391,446	
	Security & Card Access		147,160.00	SF	$ 0.20	$ 29,432	
	Dashboard		147,160.00	SF	$ 1.06	$ 155,990	
						$ -	
					Electrical		$ 3,674,585
	Subtotal				$ 28,934,000.70		
01-0061-7	Bond		1.00	LS	$ 170,560.00	$ 170,560	

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01-2100-5	Construction Contingency		1.00	LS	$ 690,000.00	$ 690,000	
01-0050-7	Construction Management Fee		1.00	LS	$ 640,000.00	$ 640,000	
01-3110-2	Pre Construction Services labor		1.00	LS	$ 50,000.00	$ 50,000	
01-3110-5	Pre Construction Services Materials		1.00	LS	$ 10,000.00	$ 10,000	
		Contingency / Management / Bond Fees					$ 1,560,560
	Total					$ 30,494,561	$ 30,494,561
Additional Items							
Basement							
	Basement		1.00	LS	$ 789,098.72	$ 789,099	
						$ -	
						$ -	
					Basement		$ 789,099
Additional Square Footage of Building							
	Added Building Square Footage		10,000.00	SF	$ 207.00	$ 2,070,000	
	LED Lighting Upgrade		161,910.00	SF	$ 3.37	$ 545,637	
				EA		$ -	
				EA		$ -	
				LF		$ -	
		Additional Square Footage of Building					$ 2,615,637
Options							
	Radiant Systems		161,910.00	SF	$ 5.00	$ 809,550	
	Upgraded Exterior		25,603.00	EA	$ 3.00	$ 76,809	
				EA		$ -	
				EA		$ -	
				LF		$ -	
					Options		$ 886,359
						Total Of Additional Items	**$ 4,291,095**
						Revised Grand Total	**$ 34,785,656**

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			Basement				
		Project Square Footage:	**4,750**	**SQFT**	**$ 166.13**	**$ 789,099**	
		Project Duration:	**2.0**	**MO**	**$ 394,549.36**		
Code	Description	Comments	Quantity	Unit	Cost/Unit	Working Budget	
			General Conditions				
	Project Manager		2.00	MO	$ 12,000.00	$ 24,000	
013150	Project Superintendent		2.00	MO	$ 10,000.00	$ 20,000	
013155	Asst. Superintendent		2.00	MO	$ 8,000.00	$ 16,000	
	Project Engineer		2.00	MO	$ 10,000.00	$ 20,000	
013115	Computer expense		2.00	MO	$ 400.00	$ 800	
013151	Fuel & Maintenance		2.00	MO	$ 3,000.00	$ 6,000	
013151	Vehicle Expense		2.00	MO	$ 3,000.00	$ 6,000	
	Subsistence		2.00	MO	$ 2,000.00	$ 4,000	
	Housing		2.00	MO	$ 3,000.00	$ 6,000	
015110	Power Costs		2.00	MO	$ 1,000.00	$ 2,000	
015170	Telephone/Fax		2.00	MO	$ 500.00	$ 1,000	
015205	Job Office		2.00	MO	$ 750.00	$ 1,500	
015220	Toilets		2.00	MO	$ 500.00	$ 1,000	
017420	Daily Clean Up		2.00	MO	$ 3,000.00	$ 6,000	
017425	Trash Removal		2.00	MO	$ 1,500.00	$ 3,000	
015415	Material lift		2.00	MO	$ 3,000.00	$ 6,000	
					General Conditions		$ 123,300
			Demolition				
					Demolition		$ -
			Site Work				
	Building Excavation		4,000.00	CY	$ 17.00	$ 68,000	
	Backfill & Compaction		2,000.00	CY	$ 7.00	$ 14,000	
	Building Grading		4,750.00	SF	$ 0.39	$ 1,853	
	Building Gravel 6"		186.00	CY	$ 27.00	$ 5,022	
					Site Work		$ 88,875
			Landscaping				
					Landscaping		$ -
			Concrete				
	Concrete		650.00	CY	$ 410.00	$ 266,500	
						$ -	
						$ -	
						$ -	
						$ -	
					Concrete		$ 266,500
			Masonry & Stonework				
					Masonry & Stonework		$ -
			Metals				
	Misc. Metals		1.00	LS	$ 20,000.00	$ 20,000	
	Decking		4,750.00	SF	$ 2.75	$ 13,063	
						$ -	
						$ -	
						$ -	
					Metals		$ 33,063
			Carpentry				
					Carpentry	$ -	$ -
			Thermal & Moisture				
	Foundation Waterproofing		5,800.00	SF	$ 2.65	$ 15,370	
	Caulking & Sealants		1.00	LS	$ 1,500.00	$ 1,500	
					Thermal & Moisture		$ 16,870
			Doors & Windows				
	Interior Doors		8.00	EA	$ 1,190.00	$ 9,520	
						$ -	
					Doors & Windows		$ 9,520.00
			Finishes				
	Paint New Doors / Frames		4,750.00	SF	$ 1.65	$ 7,838	

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					Finishes		$ 7,838
Specialties							
	Specialties		1.00	LS	$ 2,000.00	$ 2,000	
					Specialties		$ 2,000
Equipment							
					Equipment		$ -
Furnishings							
					Furnishings		$ -
Conveying Systems							
14-2000-6	Additional basement stop		1.00	LS	$ 50,000.00	$ 50,000.00	
					Conveying Systems		$ 50,000
Mechanical							
	Mechanical		4,750.00	LS	$ 18.00	$ 85,500	
	Fire protection/ sprinklers		4,750.00	SF	$ 4.00	$ 19,000	
					Mechanical		$ 104,500
Electrical							
161000	Electrical sub		4,750.00	SF	$ 12.50	$ 59,375	
					Electrical		$ 59,375
Miscellaneous Costs							
					Miscellaneous Costs		$ -
	Subtotal				$ 761,840.50		
Contingency / Management / Bond Fees							
010061	Bond		1.00	LS	$ 4,403.17	$ 4,403	
012110	Construction Contingency			LS		$ -	
012115	Architectural Design Fee			LS		$ -	
012115	Design Contingency				$ 761,840.50	$ -	
013100	Construction Management Fee		3.0%			$ 22,855	
					Contingency / Management / Bond Fees		$ 27,258
	Total					$ 789,099	$ 789,099
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13. OUTLINE SPECIFICATIONS

13.1 Outline Specification

Outline Specifications

Lassonde Studios

CS Cover Sheet
00 01 10 Table of Contents
00 31 32 Geotechnical Investigation Report
(Final Geotechnical Investigation Report will be included as information to bidders in final Project Manual).

DIVISION 00 – BIDDING AND CONTRACT REQUIREMENTS

00 72 00 General Conditions

00 73 00 Supplemental General Conditions

DIVISION 01 – GENERAL REQUIREMENTS

01 11 00 Summary of Work

A. Project: A new studio housing building to be located on the campus of the University of Utah in Salt Lake City, Utah.

B. Section includes general description of work including:
1. Definitions.
2. Owner occupancy requirements.
3. Reference data.
4. Architectural barriers.
5. Work by Others.

01 21 00 Allowances

A. Section includes provisions for allowances (if any).

01 23 00 Alternates

A. Section includes provisions for alternates.

To be Determined

01 26 13 Contractor's Requests for Information / Interpretation

A. Section includes administrative requirements for requests for information and interpretation of Construction Documents.

01 31 19 Project Meetings

A. Section includes General Requirements for conducting Project progress Meetings.

01 33 00 Submittals

A. Section includes administrative requirements for Submittals including:
1. Construction Schedule.

2. Shop Drawings, Product Data and Samples.
3. Quality Control Submittals.
4. Construction progress photographs.

01 42 00 References

A. Section includes listing of references standards used throughout the Project Manual.

01 45 00 Quality Control

A. Section includes provisions for testing laboratory services and Contractor's quality control testing.

01 50 00 Construction Facilities and Temporary Controls

A. Section includes construction facilities and controls including:
1. Temporary electricity.
2. Telephone service.
3. Temporary water service.
4. Temporary fire protection.
5. Barriers.
6. Construction Fencing.
7. Temporary use of permanent elevators.
8. Noise and dust control.
9. Water control.
10. Exterior enclosures.
11. Interior enclosures.
12. Protection of installed work.
13. On-site construction access roads.
14. Contractor parking.
15. Progress cleaning.
16. Project identification.
17. Field offices and storage sheds.

01 60 00 Material and Equipment

A. Section includes general procedures and requirements for delivery, storage and handling of materials and equipment and administrative requirements for substitutions and product options.

01 73 29 Cutting and Patching

A. Section includes cutting, fitting and patching, including attendant excavation and backfill required to complete Work, and for:
1. Making several parts fit together properly.
2. Uncovering portions of Work to provide for installation of ill-timed Work.
3. Removing and replacing defective and non-conforming Work.
4. Removing samples of installed Work required for testing, as directed by Architect.
5. Providing routine penetrations of non-structural surfaces for installation of piping and electrical conduit.

01 74 19 Construction Waste Management and Disposal

A. Section includes administrative and procedural requirements for the following:
1. Salvaging nonhazardous construction waste.
2. Recycling nonhazardous construction waste.
3. Disposing of nonhazardous construction waste.

B. General: Achieve end-of-Project rates for salvage/recycling of 75 percent by weight of total non-hazardous solid waste generated by the Work. Facilitate recycling and salvage of materials.

01 77 00 Contract Closeout

A. Section includes Project Close-Out Items and Checklist

01 81 13 Sustainable Design Requirements

A. In addition to the prevailing building code, the project is governed by:
1. DFCM Design Standards, including the High-Performance Building Rating System (HPBRS and recent updates)
2. University of Utah Design Standards, including requirements applicable to sustainability and LEED

B. USGBC's LEED-NC v3 2009® will serve as guide and management tool for design and construction choices, creating a widely recognized discipline for environmental accounting. The Lassonde Studios project is required to attain a LEED score sufficient at least to secure 'Silver' Certification (min. 50 points; ref. attached working Checklist v3 February 14, 2014). DFCM and University requirements make mandatory a list of specific LEED credits, emphasizing the following:
1. Water Efficient Landscaping (WEc1, 50% min. reduction)
2. Optimize Energy Performance (EAc1 for min. score of 15 = 40% better than ASHRAE 90.1-2007 for energy cost savings).
3. Enhanced Commissioning (EAc3), including envelope commissioning (project will utilize NIBS Guideline 3-2006 for standards, subject to itemized modification by Project Team)
4. Measurement & Verification (EAc5, requiring a project-specific M&V Plan)
5. Indoor Air Quality Management Plan (EQc3.1, during construction
6. Low-Emitting Materials (VOC minimization in paints & coatings and adhesives & sealants, EQc4)

C. The design process is required to incorporate integrative process elements, specifically:
1. Sustainability Charrette: Early design phase workshop to confirm program adaptation and to assure consensus among design team, owner and users.
2. LCCA: Life cycle cost assessment, not only applied to energy efficiency alternatives evaluation, but also to other critical variables throughout the project design.
3. Energy Model: DOE-2 based whole-building energy simulation to test assemblages of building systems and elements.
4. Instrumentation and monitoring organized through a 'Measurement and Verification Plan' to provide energy consumption data for ongoing 'Energy Star' rating.
5. Inclusion of Owner's Commissioning Authority in design processes from earliest opportunity, but no later than commencement of Design Development.
6. Report all design process requirements to DFCM and the University.

01 91 13 Commissioning

A. The Owner has contracted Commissioning Authority services for the project, executing scope of work to include the following:
1. LEED 'Fundamental Commissioning' and 'Enhanced Commissioning' per ASHRAE Guideline 0-2005 "The Commissioning Process"

2. Including assistance in completion of Owner's Project Requirements (OPRs, design team draft attached for review), and preparation of Basis of Design (BoD) and Commissioning Plan
3. Envelope Commissioning, in accordance with NIBS Guideline 3-2006 "Exterior Enclosure Technical Requirements for the Commissioning Process" (subject to specific modifications by Project Team)
4. Field Testing, utilizing ASTM standard tests, as necessitated case-by-case or for random design concept and quality assurance purposes.

DIVISION 02 – EXISTING CONDITIONS

Not Used

DIVISION 03 - CONCRETE

03 10 00 Concrete Formwork

A. Section Includes:
1. Formwork for cast-in-place concrete, including, but not limited to:
   a. Shoring, Bracing and Anchorage, including openings for other work.
   b. Form Accessories
   c. Form Stripping.

03 20 00 Concrete Reinforcement

A. Section Includes:
1. Reinforcing Steel: ASTM A615, Grade 60, and ASTM A706 with a minimum yield of 60,000 psi.
2. Welded Wire Fabric: ASTM A185 using bright steel wire meeting the requirements of ASTM A82.
3. Chairs: Galvanized steel or plastic tipped.
4. Tie Wire: ASTM A82, 16 gauge or heavier, black annealed.

03 30 00 Cast-In-Place Concrete

A. Section includes cast-in-place concrete including, but not limited to, the following:
1. Foundations and footings.
2. Slab-on-grade.
3. Foundation walls.
4. Suspended slabs including pan joists, post tensioned slabs, and topping slabs.
5. Equipment pads and bases.
6. Curbs.
7. Special finishes.

B. Portland Cement: ASTM C150, Type II/V at all locations.

C. Sealer: VOC compliant, acrylic copolymer type conforming to ASTM C1315, Class B.

03 33 00 Architectural Concrete

A. General: Comply with Division 03 Section "Cast-In-Place Concrete" for formwork and other form-facing material requirements.

B. In addition to ACI 303.1 limits on form-facing panel deflection, limit cast-in-place architectural concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
   1. Class A, 1/8 inch (3.2 mm).

C. Architectural Concrete Finish: Match Architect's design reference sample, identified and described as indicated, including integral color, to satisfaction of Architect.

D. Mockups: Before casting architectural concrete, build mockups to verify selections made under Sample submittals and to demonstrate typical joints, surface finish, texture, tolerances, and standard of workmanship. Build mockups using materials indicated for the completed Work.

DIVISION 04 – MASONRY

04 22 00 Concrete Unit Masonry

A. Concrete Masonry Units: ASTM C 90-00 and as follows:
   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 1900 psi (17.25 MPa).
   2. Weight Classification: Not less than 110 pounds per cubic foot.
   3. Size (Width): Manufactured to the following dimensions:
      a. 8 inches (203 mm) nominal; 7-5/8 inches (194 mm) actual and as detailed.
   4. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.
      a. Where units are to be left exposed, provide color and texture matching the range represented by Architect's sample.

DIVISION 05 - METALS

05 12 00 Structural Steel Framing

A. Section includes structural steel framing including, but not limited to:
   1. Columns
   2. Beams
   3. Braced frames.
   4. Moment frames.
   5. Anchor Bolts
   6. Bearing Plates
   7. Miscellaneous Structural Steel items

B. Materials:
   1. Steel:
      a. Structural Steel: ASTM A572 Grade 50 or ASTM A 992/A 992M Grade 50 (345), except angles, plates and bars shall be ASTM A36 (Fy=36ksi).
      b. Steel Pipe Columns: ASTM A53 Grade B.
      c. Steel Tube Columns: ASTM A500, Grade B, cold formed (Fy=46 ksi).
   2. Bolts: ASTM A325N, unless otherwise indicated.
   3. Anchor Bolts: ASTM F1554, Grade 36, unless otherwise indicated.

4. Welded Anchors and Shear Connectors: ICBO approved, as manufactured by KSM or Nelson.
5. Welding Rods: AWS A5.0, E70 series, low hydrogen type.
6. Metal Primer: VOC compliant.
   a. Exterior Steel (exposed): 2-component, moisture-cured zinc-rich primer conforming to SSPC-PS 12.01.

05 31 00 Steel Decking

A. Steel Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with "SDI Specifications and Commentary for Steel Roof Deck," in SDI Publication No. 29, and the following:
1. Prime-Painted Steel Sheet: ASTM A 611, Grade C minimum, shop primed with gray or white baked-on, lead- and chromate-free rust-inhibitive primer complying with performance requirements of FS TT-P-664.
2. Deck Profile: Type B.
3. Profile Depth: 1-1/2 inches and as scheduled.
4. Design Uncoated-Steel Thickness: Per plan.
5. Span Condition: Triple span or more as indicated.
6. Side Laps: Overlapped or interlocking seam at Contractor's option.

05 40 00 Cold-Formed Metal Framing

A. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:
1. Grade: ST33H, ST230H and as required by structural performance.
2. Coating: G60, Z180, A60, ZF180, AZ50, AZ150, or GF30, ZGF90.

B. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0598 inch (1.51 mm) (16 gauge).
2. Flange Width: Not less than 1-5/8 inches (41 mm).

C. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:
1. Minimum Base-Metal Thickness: 0.0598 inch (1.52 mm) (16 gauge).
2. Flange Width: 1-1/4 inches (32 mm).

D. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:
1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Anchor clips.
4. End clips.
5. Gusset plates.
6. Stud kickers, knee braces, and girts.
7. Hole reinforcing plates.
8. Backer plates.

05 50 00 Metal Fabrications

A. Section includes metal fabrications fabricated from steel shapes, plates, bars, sheet and other items as necessary, including, but not limited to the following:
1. Carpenter’s ironwork.

2. Steel gratings and frames.
3. Steel pipe guards.
4. Steel pipe bollards.
5. Ladders at roofs.
6. Ladder safety cages as necessary.
7. Miscellaneous framing and supports including, but not limited to, the following:
   a. Supports for ceiling suspended items as necessary.
   b. Countertop supports.
   c. Applications where framing and supports are not specified in other sections.
8. Miscellaneous Steel Trim.
9. Exterior canopies, awnings, accents, and ornamentation.
10. Custom wrought iron work.
11. Other items as indicated.

B. Metal Primer:
1. Interior Steel: Zinc alkyd, high solids primer, conforming to FS TT-P-645b.
2. Exterior Steel (exposed): 2-component, moisture-cured zinc-rich primer conforming to SSPC-PS12.01.

C. Concrete Fill: Comply with Section 03 3000.

05 51 00 Steel Stairs

A. Section includes steel-framed stairs with the following types of treads and platforms:
1. Concrete filled metal pan treads.
2. Precast concrete treads.

B. Materials:
1. Structural Steel Shapes, Plates, Bars and Bar-Size Shapes: ASTM A36.
2. Steel Tubing: ASTM A500, Grade B.
3. Steel Pipe: ASTM A53.
4. Structural Steel Sheet: ASTM A569 or ASTM A570, Grade 30
5. Pressure-Locked Steel Grating: NAAMM designation P-11-4 (1 x 3/16) steel with serrated surface.
6. Metal Primer: As specified in Section 05100.

C. Shop fabricate metal stairs to designs and configurations indicated on Drawings and to comply with the “Recommended Voluntary Standards for Fixed Metal Stairs” of NAAMM Standard AMP 510 “Metal Stairs Manual” for Commercial Classification of stairs.

05 52 00 Handrails and Railings

A. Section includes standard steel pipe and tube handrails and railing systems:

B. Materials:
1. Structural Steel Shapes, Plates, Bars and Bar-size Shapes: ASTM A36.
2. Steel Tubing: ASTM A500, Grade B.
3. Gray Iron Castings: ASTM A48, Class 30.
4. Malleable Iron Castings: ASTM A47.
5. Steel Pipe: ATM A53, Grade A standard weight (Schedule 40).
6. Metal Primer: VOC compliant.

a. Interior Steel: Zinc alkyd, high-solids primer, conforming to FS TT-P-645b.
b. Exterior Steel: Galvanizing repair paint.

7. Anchoring Cement: Prepackaged, non-shrink hydraulic anchoring cement, or nonshrink, nonmetallic grout.

C. Fabrication:
1. Conform with AISC Standard Specifications, Rules and Practice in the “Steel Construction Manual”.
2. Galvanize exterior railing, sleeves, brackets and flanges after fabrication.
3. Make connections between members, unless otherwise indicated, with welding.
4. Touch-up paint abrasions, field bolts and field welds.

05 73 13 Ornamental Railings

A. Stainless Steel
1. Tubing: ASTM A 554, Grade MT 304.
2. Pipe: ASTM A 312/A 312M, Grade TP 304.
3. Castings: ASTM A 743/A 743M, Grade CF 8 or CF 20.
4. Sheet, Strip, Plate, and Flat Bar: ASTM A 666, Type 304.
5. Bars and Shapes: ASTM A 276, Type 304.

B. Glass and Glazing Materials
1. Tempered Glass: ASTM C 1048, Kind FT (fully tempered), Condition A (uncoated), Type 1 (transparent flat glass), Quality-Q3. Provide products that have been tested for surface and edge compression according to ASTM C 1048 and for impact strength according to 16 CFR 1201 for Category II materials.
a. Glass Color: Clear.
b. Thickness for Structural Glass Balusters: As required by structural loads, but not less than 12.0 mm.
c. Thickness for Glass Infill Panels: As required by structural loads, but not less than 6.0 mm.

C. Wood Rails: Clear, straight-grained hardwood rails secured to recessed metal subrail.
1. Species: Species as indicated on the drawings.
2. Finish: Transparent polyurethane.
3. Profile: Round, 2-inch (50-mm) diameter.

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

06 10 00 Rough Carpentry

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Provide dressed lumber, S4S, unless otherwise indicated.

B. Certified Wood: Materials shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles

and Criteria for Forest Stewardship.

C. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame spread index of 25 or less when tested according to ASTM E 84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

D. Engineered Wood Products: Provide engineered wood products acceptable to authorities having jurisdiction and for which current model code research or evaluation reports exist that show compliance with building code in effect for Project.
   1. Allowable Design Stresses: Provide engineered wood products with allowable design stresses, as published by manufacturer, that meet or exceed those indicated. Manufacturer's published values shall be determined from empirical data or by rational engineering analysis and demonstrated by comprehensive testing performed by a qualified independent testing agency.

06 41 00 Architectural Woodwork

A. Section includes custom manufactured wood and plastic laminate faced casework and countertops and subtops for stone countertops.

B. Applicable Standard: Perform work in accordance with Architectural Woodwork Institute (AWI) “Architectural Woodwork Quality Standards Illustrated.”
   1. Provide Premium Grade when not otherwise indicated.
   2. Forest Certification: Provide interior architectural woodwork produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship."
   3. Provide materials made with adhesive containing no urea formaldehyde.

C. Materials:
   1. Hardwood Lumber: Premium Grade in accordance with applicable standard specified herein under “Quality Assurance,” average moisture content of 6 percent; species and cut as indicated on Drawings.
   2. Hardwood Plywood: Core materials of particleboard, lumber, or MDF, type of glue recommended for application; face veneer and cuts as indicated on Drawings.
   3. Prefinished Plywood: KorTron/EB as manufactured by Willamette Industries, Inc., KorPINE Division.
   4. Prefinished MDF: Thermofused Roseburg Melamine on core material of MDF as manufactured by Roseburg Forest Products.
   5. Wood Particleboard: Standard in accordance with applicable standard specified herein under “Quality Assurance,” for grade of work specified, composed of wood chips, 45 lb. density, made with water resistant adhesive; of grade to suit application; sanded faces for drawer construction and shelving.
   6. Hardboard: Pressed wood fiber with resin binder, tempered grade, 1/4 inch thick, smooth one side, for drawer bottoms, gables and backs.
   7. Medium Density Fiberboard (MDF): Medite II as manufactured by Medite Corporation, complying with the following:
   8. Plastic Laminate: High pressure decorative type.
   9. Hardware:
      a. Shelf Standards and Supports: K&V 255 Steel and 256 supports, almond

finish, unless otherwise indicated on Drawings, or as approved.

b. Shelf Pins: 5mm almond finish shelf pins.

c. Shelf Standard and brackets: K&V 83 standards and No. 183 brackets, or as approved.

d. Drawer and Door Pulls: Quality QU-813-626, or as approved.

e. Sliding Door Pulls: Hafele 151.35 Series, finish to match pulls.

f. Catches: Ives IV2 aluminum, K&V 984 KA.

g. Drawer Slides: Conforming to ANSI/BiFMA X5.6, UL 1678 and UL 1286.

1) Light and medium duty drawers-24 inch wide or less: Accuride 7432 ball bearing, rail mount, full extension slides with 100 lb./pr. load rating. Provide Accuride 7434 overtravel slides where drawers require full access.

2) Heavy duty drawer – 42 in wide or less: Accuride 3640 ball bearing, rail mount, full extension slides plus 1 inch (25mm) overtravel with 200 lb./pr. load rating.

3) Finish: Clear zinc.

h. Overlay Cabinet Hinges: Blum 170 degree function, or as approved. Other function hinges may be submitted for approval for special circumstances.

i. Sliding Door Track Assemblies: Hafele Clipo 15/H.

j. Locks: National lock removable series N88XX.

k. Closet Rod & Bracket: As selected by Architect.

l. Provide other hardware to fulfill function of architectural woodwork and cabinets as shown on Drawings, subject to approval by Architect.

m. Finishes: As selected by Architect.

E. Fabrications: Fabricate architectural woodwork and cabinets in conformance with Premium Grade Standards where installed within public areas or where exposed To public view and Custom Grade Standards at back of house areas in accordance With referenced standards.

F. Finish work in the factory in accordance with finish system #1b or 2 in accordance With Architectural Woodwork Institute (AWI) “Architectural Woodwork Quality Standards Illustrated.”

G. Solid-Surfacing-Material Countertops:

1. Solid-Surfacing Material: Homogeneous solid sheets of filled plastic resin complying with ISSFA-2.

2. Grade: Premium.

3. Solid-Surfacing-Material Thickness: Minimum 1/2 inch (13 mm).

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

07 14 00 Fluid-Applied Waterproofing

A. Hot Fluid-Applied, Rubberized-Asphalt Waterproofing Membrane: Single component; 100 percent solids; hot fluid-applied, rubberized asphalt.

1. American Hydrotech, Inc.; Monolithic Membrane 6125.

B. Elastomeric Flashing Sheet: 50-mil- (1.3-mm-) minimum, uncured sheet neoprene.

C. Protection Course: Manufacturer's standard, 80- to 90-mil- (2.0- to 2.3-mm-) thick, fiberglass-reinforced rubberized asphalt or modified bituminous sheet.

07 21 00 Building Insulation

A. Section Includes:
1. Thermal Insulation.
2. Safing insulation for fire containment.

B. Materials:
1. Thermal Insulation: Provide the following types as applicable to the various locations. Provide faced insulation where required to provide an integral vapor barrier or in location where exposed to airstreams:
   a. Unfaced, flexible glass-fiber board.
   b. Faced, flexible glass-fiber board.
   c. Unfaced, flexible glass-fiber batts.
   d. Faced, flexible glass-fiber batts.
2. Mineral Fiber Batt Insulation: Flexible preformed batt or blanket, complying with ASTM C 665; friction fit; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E 84.
   a. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E 84.
   b. Manufacturers:
      1) Thermafiber, Inc: www.thermafiber.com.
3. Unfaced, Mineral-Wool Board Insulation: ASTM C 612; with maximum flame-spread and smoke-developed indexes of 15 and zero, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
   a. Nominal density of 6 lb/cu. ft. (96 kg/cu. m), Type II, thermal resistivity of 4.16 deg F x h x sq. ft./Btu x in. at 75 deg F (28.8 K x m/W at 24 deg C).
   b. Fiber Color: Darkened, where indicated.
   c. Manufacturers:
      1) Roxul Inc.
3. Fire safing Insulation: ASTM C24, E119 and E136. Thickness shall be as required by the Manufacturer to provide a fire rating equal to that of the assembly of which it is a part. Where smoke stop protection also is required, install Thermafiber SmokeSeal Caulking Compound as needed to meet UL Standard 1479 and ASTM E814 procedure.
4. Acoustical Batt Insulation: As specified in Section 09 2900.
5. Reinforced-Polyethylene Vapor Retarders: 2 outer layers of polyethylene film laminated to an inner reinforcing layer consisting of either nylon cord or polyester scrim and weighing not less than 25 lb/1000 sq. ft. (12 kg/100 sq. m), with maximum permeance rating of 0.0507 perm (2.9 ng/Pa x s x sq. m).

C. INSULATED BARRIER WALL PANEL
1. Panel Description:
   a. Basis of Design: Kingspan Karrier™ Panel.
   b. Panel thickness: As indicated on the drawings.
   c. Panel width: As indicated on drawings.
   d. Panel Lengths: Minimum 8 feet, maximum 52 feet.
   e. Panel Attachment: Shall consist of fasteners and stainless steel attachment clip completely concealed within the panel side joint.
   f. Horizontal Panel Joint Reveals: 3/8 inch.

g. Vertical Joint Treatment (for horizontal panels): Fill joints with Spray Foam per manufacturer's instructions.
h. Vertical Panel Joint Reveals: 3/8 inch.
i. Exterior and Interior Face of Panel:
1) Material:
a) Steel coil material shall be in accordance with ASTM A755: AZ50 Galvalume®/ Zincalume® (55 percent aluminum, 45 percent zinc) in accordance with ASTM A792.
b) Gauge: 26 gauge.
2) Profile: Shadowline.
3) Exterior and interior panel texture: Non-directional stucco embossed.
4) Paint Finish:
a) Finish System: Modified polyester, dry film thickness of 1.0 mil including primer.

07 25 00 Weather Barriers

A. Building Wrap: ASTM E 1677, Type I air retarder; with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, when tested according to ASTM E 84; UV stabilized; and acceptable to authorities having jurisdiction.
1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
a. DuPont (E. I. du Pont de Nemours and Company); Tyvek CommercialWrap.
2. Water-Vapor Permeance: Not less than 200 g through 1 sq. m of surface in 24 hours per ASTM E 96, Desiccant Method (Procedure A).
3. Allowable UV Exposure Time: Not less than three months.

B. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap.

07 42 43 Composite Metal Wall Panels

A. Copper-Faced Composite Wall Panels: Formed with 14-oz./sq. ft. (0.48-mm-thick) copper sheet facings.
1. Panel Thickness: 0.236 inch (6 mm).
2. Core: Stainless steel.
3. Exterior Finish: Mill.
4. Equal to: Engineered Materials Solutions, CopperPlus.

B. Attachment System Components: Formed from extruded aluminum.
1. Include manufacturer's standard perimeter extrusions with integral weather stripping, panel stiffeners, panel clips and anchor channels.

07 54 00 Thermoplastic Membrane Roofing

A. PVC Sheet: ASTM D 4434, Type III, fabric reinforced.
1. Available Manufacturers:
a. Sarnafil Inc.
b. Other manufacturer's shall submit for approval prior to bidding.
2. Thickness: 60 mils (1.5 mm), nominal.

3. Exposed Face Color: White.

B. Molded-Polystyrene Board Insulation: Where tapered insulation, crickets, saddles, tapered edge strips, or other insulation shapes are indicated or required provide molded-polystyrene board insulation complying with ASTM C 578 Type IX, 1.8-lb/cu. ft. (29-kg/cu. m) minimum density.
1. Available Manufacturers:
a. Manufacturers with a third-party certification program satisfying model building code mandatory requirements for foam plastics and that produce FMG-approved molded polystyrene.

C. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces. Provide in thickness as required to achieve a completed minimum certified Aaged@ value of R-30, when tested according to LTTR-CAN/ULC-S770.
1. Available Manufacturers:
a. Atlas Roofing Corporation.
b. Firestone Building Products Company.
c. GenFlex Roofing Systems.
d. RMAX.

D. Polyisocyanurate insulation shall be installed in two (2) layers with the total thickness meeting the minimum specified R-Value. Where molded-polystyrene tapered insulation, crickets, saddles, tapered edge strips, or other insulation shapes are indicated, the molded-polystyrene board shall be placed between the layers of polyisocyanurate insulation.

07 62 00 Flashing and Sheet Metal

A. Section includes flashings, sheet metal work and related items including, but not limited to:
1. Counterflashing at vertical surfaces.
2. Flashing at roof penetrations.
3. Sheet metal scuppers, gutters and downspouts.
4. Metal copings.

B. Material:
1. Galvanized Steel: ASTM A653, 24 gauge minimum and as indicated, with G-90 coating.
2. Reglets and Counterflashings: Fry Reglet Corporation, Type STX at stucco, Type SM at masonry and Concrete, or fabricated as indicated on Drawings. Provide prefabricated inside and outside reglet and counterflashing corners.

C. Fabrications and Installation:
1. Comply with design and installation methods of SMACNA Architectural Sheet Metal Manual.
2. Comply with the NRCA Roofing and Waterproofing Manual installation details.

07 71 29 Roof Expansion Joint Assemblies

A. Provide manufacturer's assemblies designed to accommodate seismic movement. Provide prefabricated units for corner and joint intersections and horizontal and vertical transitions including those to other building expansion joints, splicing units, inner seals,

adhesives, coatings, and other components as recommended by roof expansion assembly manufacturer for complete installation. Fabricate assemblies specifically for roof-to-wall applications.

B. Extruded Seals: Two continuous, single-layered elastomeric profiles made of a vinyl inner seal and Santoprene outer seal, both seals retained in a pair of compatible extruded-aluminum frames.
   1. Available Products:
      a. MM Systems Corporation; Series RWSS-400.
   2. Exterior Seal Color: Black.

07 72 00 Roof Accessories

A. Roof Hatches: Fabricate roof hatches with insulated double-wall lids, polycarbonate dome and insulated double-wall curb frame with integral deck mounting flange and lid frame counterflashing. Fabricate with welded or mechanically fastened and sealed corner joints. Provide continuous weathertight perimeter gasketing and equip with corrosion-resistant or hot-dip galvanized hardware.
   1. Available Manufacturers:
      a. Babcock-Davis; a Cierra Products Inc. Company.
      b. Bilco Company (The).
      c. Dur-Red Products.
      d. Milcor Inc.; a Gibraltar Company.
      e. Precision Ladders, LLC.
      f. Wasco Products, Inc.
   2. Loads: Fabricate roof hatches to withstand 40-lbf/sq. ft. (1.9-kPa) external and 20-lbf/sq. ft. (0.95-kPa) internal loads.
   3. Type and Size: Single-leaf lid, 48 by 48 inches.
   4. Curb and Lid Material: Galvanized steel sheet, 0.079 inch (2.0 mm) thick.
      a. Finish: Prime painted.
   5. Insulation: Glass-fiber board.
   6. Interior Lid Liner: Manufacturer's standard metal liner of same material and finish as outer metal lid.
   7. Exterior Curb Liner: Manufacturer's standard metal liner of same material and finish as metal curb.
   8. Fabricate units to minimum height of 12 inches (300 mm), unless otherwise indicated.
   9. Sloping Roofs: Where slope or roof deck exceeds 1:48, fabricate hatch curbs with height tapered to match slope to level tops of units.
   10. Hardware: Galvanized steel spring latch with turn handles, butt- or pintle-type hinge system, and padlock hasps inside and outside.
   11. Safety Railing System: Manufacturer's standard complete system including rails, clamps, fasteners, safety barrier at railing opening, and all accessories required for a complete installation.

07 84 00 Firestopping

A. Section includes firestopping for the following applications:
   1. Penetrations through all fire-resistance-rated construction.
   2. Penetration through all smoke barriers and construction enclosing compartmentalized areas.
   3. Sealant joints in fire-resistance-rated construction.
   4. Penetrations: Empty openings, cables, pipes, ducts, and conduits.

5. Firestopping system produced and installed to resist spread of fire and passage of smoke and other gasses.

B. Firestop System Materials – General: Appropriate for penetration.
1. Include every component required for code approved installation, including but not limited to:
   a. Firestopping putties or compound and backing materials.
   b. Wrap strips.
   c. Primer, clips and collars.
   d. Forming and damming materials.
   e. Sealant and solvent cleaner.

07 92 00 Joint Sealers

A. Section includes sealants, primers, back-up materials, preformed joint fillers, bond breakers and related materials shall be compatible with adjoining materials.

B. Materials: The selection of proper sealant for a particular joint shall be in accordance with current published recommendations of the manufacturer.
1. Types: See Schedule for the location where each type of sealant is to be provided.
   a. Type “A”: 2-part or 3-part (self-leveling) urethane, conforming to ASTM C920, Type M, Grade P, Class 25, use T: Pecora NR-200 Urexpan Sealant or Dynatred, Tremco THC-900/901, Vulkem 45/245, Sikaflex 2c SL (self-leveling) Dow Corning Parking Structure Sealant (FC, NS or SL as applicable) and Sonneborn SL-2.
   b. Type “B”: 3-part chemically curing polyurethane sealant conforming to ASTM C920, Type M, Grade NS Class 25, use NT, M, A, O, and capable of withstanding movement of 50% in extension and compression, and sustained temperatures of 250 degrees F in service. Tremco Dymeric 511 Sealant, Pecora Dynatrol II, Vulkem 922, Sikaflex 2c NS (non-sag) and Sonneborn NP-2.
   c. Type “C-1”: One-part low modulus moisture cure silicone rubber sealant conforming to FS TT-S-001543A, Class A, FS TT-S-00230C, Type II, Class A and ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, G, A, and 0, and capable of withstanding movement of 100% in extension 50% in compression in service. Dow Corning 790 Silicone Glazing Sealant, Tremco Spectrem 1 and Pecora 890.
   d. Type “C-2”: One-part medium modulus neutral cure silicone rubber sealant conforming to FS TT-S-001543A, Class A, FS TT-S-00230C, Type II, Class A and ASTM C 920, Type S, Grade NS, Class 25, Use NT, M, G, A, and), and capable of with standing movement of 50% in extension and 50% in compression in service. Tremco Spectrem 2, Pecora 895, Dow Corning 795, Dow Corning 791, and GE Silpruf.
   e. Type “D”: ASTM C920, Type S, Grade NS, Class 25, Use NT, M, A, 0. Sika Sikaflex 1A, Pecora Dynatrol 1, Tremco DyMonic, Pecora 345 and Sonneborn NP-1.
   f. Type “E”: Silicone rubber sealant with mold inhibitor. General Electric Sanitary 1700, Tremco Proglaze, Dow Corning 999, Pecora 863 or 898, Sonneborn Omni-Plus.
   g. Type “F”: Tremco Acoustical Sealant and Pecora BA-98.
2. Sealants at fire penetrations: As specified in Section 07840.

3. Color: Provide standard or custom colors as selected by Architect. In general, colors shall match adjacent materials.
4. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
5. Joint cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
6. Joint Filler (Backer): ASTM D1565; round closed cell polyethylene, urethane or neoprene foam rod; oversized 30 to 50 percent; “SofRod” as manufactured by A.E.T.
7. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.
8. Gloss Reducer: Silica sand No. 20, color to match adjacent surface. Gloss reducer shall be provided at traffic sealant applications.
9. Other materials: Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor and approved by the sealant manufacturer as compatible, subject to the review of the Architect.

C. Schedule:
1. Expansion and Control Joints:
   a. Horizontal traffic: Type “A”. Provide gloss reducer.
   b. Masonry, concrete to concrete, steel and wood: Type “B”.
   c. Glass (except insulating glass or special coated glass), aluminum, E.I.F.S., Natural and Synthetic Stone, and plastics: Type “C-1”.
   d. Glass (including insulating glass or special coated glass), aluminum and plastics: Type “C-2”.
2. Non-expanding Joints:
   a. Glass (except insulating glass or special coated glass), aluminum, E.I.F.S., Natural and Synthetic Stone, and plastics: Type “C-1”.
   b. Glass (including insulating glass or special coated glass), aluminum and plastics: Type “C-2”.
   c. Concrete to concrete, masonry, aluminum, steel, and wood: Type “D”.
3. Mechanical (ductwork and air conditioning): Type “D”.
4. Plumbing Fixtures and Other “Wet” areas (around toilet, bath, kitchen fixtures, and food service equipment): Type “E”.
5. Acoustical (acoustical applications where sealant is required): Type “F”.

07 95 00 Expansion Control

A. General: Provide joint systems of design, basic profile, materials, and operation indicated. Provide units with the capability to accommodate joint widths indicated and variations in adjacent surfaces.
1. Furnish units in longest practicable lengths to minimize number of end joints. Provide hairline mitered corners where joint changes directions or abuts other materials.
2. Include closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint systems.
3. Frames for Strip Seals: Designed with semiclosed cavity that provides a mechanical lock for seals of type indicated.

DIVISION 08 – OPENINGS

08 11 00 Steel Doors and Frames

A. Section includes hollow metal steel doors and frames:
   1. Doors: Furnish Level, Model and Physical performance level in accordance with ANSI A250.8/SDI-100.
      a. Level: Level 4, 14 gauge at interior doors and Level 4, 14 gauge at exterior doors.
      b. Physical Performance level: Level A at interior doors and Level A at exterior doors.
      c. Model: Model 2, Seamless.
   2. Core: Honeycomb, Polystyrene, Polyurethane, or Vertical steel stiffener core. Core shall be as allowed by UL 10 © for fire rated doors. Provide polystyrene or polyurethane core at exterior doors.
   3. Frames: ANSI A250.8/SDI 100, 14 gauge steel at interior doors and 14 gauge steel at exterior doors steel.
   4. Prime Paint: Non-lifting, rust-inhibitive grey primer meeting ANSI A224.1, compatible with field finish specified in Section 09900, applied after bonderizing.

B. Construct hollow metal doors, flush and vision lite types as schedule on Drawings, in accordance with ANSI A250.8/SDI-100 with core as specified above. Reinforce top and bottom of doors horizontally by 16 gauge steel end channels, full width, spot welded to each face at least 3 inches on center. Bevel edge of lock stile.
   1. Door Edge Joint and Treatment: Joints at the edges of doors shall have manufacturer's standard eedge construction with continuously welded seam, filled and dressed smooth.

C. Frames: Construct to shapes and sizes shown, meeting various wall thicknesses in accordance with ANSI/SDI-100.
   1. Fully Welded Frames (All low-rise and back-of-house areas, unless otherwise indicated): Weld, fill, grind and dress smooth face frome miters.

D. Bonderize and prime doors and frames with one shop coat of rust inhibitive primer.

08 11 19 Stainless-Steel Doors and Frames

A. Doors: Stainless-steel doors, not less than 1-3/4 inches (44 mm) thick, of seamless, hollow-metal construction. Construct doors with smooth, flush surfaces without visible joints or seams on faces.
   1. Face Sheets: Fabricate from 0.062-inch- (1.59-mm-) thick, stainless-steel sheet.
   2. Core Construction: Fabricate doors with core indicated.
      a. Welded Steel-Stiffened Core: 0.034-inch- (0.86-mm-) nominal thickness metallic-coated steel vertical stiffeners extending full-door height, spaced not more than 6 inches (152 mm) apart, spot welded to face sheets a maximum of 5 inches (127 mm) o.c. Fill spaces between stiffeners with mineral-fiber insulation.
      b. Fire-Rated Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

B. Frames: Fabricate stainless-steel frames of construction indicated, with faces of corners mitered and contact edges closed tight.
   1. Door Frames: Machine mitered and full (continuously) welded.

C. Performance: Level A, ANSI A250.4.

08 14 00 Wood Doors

A. Section Includes:
1. Solid core doors with wood veneer faces.
2. Factory machining for hardware.
3. Louvers.

B. Interior Solid Core Doors:
1. Grade: Premium.
2. Veneer: Natural White Maple.
3. Finish: Transparent, opaque or plastic laminated faces.
4. Fire rated Type.
5. Veneer Matching: Center balance at transparent finishes.
6. Louvers: Wood at transparent finish and painted aluminum elsewhere.
7. Factory Finish:
   a. Transparent
      1) Grade: Premium.
      2) Type: Catalyzed polyurethane.

08 31 00 Access Doors and Frames

A. Section includes access doors for walls and ceilings.

B. Materials:
1. Doors: Sizes as shown on the Drawings.
   a. Finish: Prime painted steel for field-applied finish.
   b. Door Type: Flush type typical, recessed pan type for application of ceiling tile or other finish as required.
2. Door and Frame: 16 gauge steel.
3. Locking: Provide screw driver operated cam.
4. Access Doors in Fire Rated Construction:
   a. UL or Warnock Hersey labeled.
   b. Walls: 1-1/2 hour fire rated.
   c. Ceilings: 1 hour fire rated.

08 32 13 Sliding Aluminum-Framed Glass Doors

A. Provide sliding aluminum-framed glass doors of performance indicated that comply with AAMA/WDMA/CSA 101/I.S.2/A440.
1. Performance Class and Grade: HC50.
2. Clear, insulating-glass units.

B. Provide manufacturer's standard hardware, fabricated from a corrosion-resistant material compatible with aluminum complying with AAMA 907 and designed to smoothly operate, tightly close, and securely lock sliding aluminum-framed glass doors. Do not use aluminum in frictional contact with other metals. Where exposed, provide die-cast zinc with special coating finish or nonmagnetic stainless steel.

08 33 23 Overhead Coiling Doors

A. Section includes commercial type overhead coiling doors.

1. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
2. Door Curtain Material: Zinc-coated (galvanized), cold-rolled structural steel (SS) sheet.
3. Door Curtain Slats: Flat profile slats of 1-1/4-inch (32-mm) center-to-center height.
4. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.
5. Hood: Galvanized steel.
6. Shape: Round.
7. Mounting: As shown on Drawings.
8. Locking Devices: Equip door with locking device assembly.
9. Locking Device Assembly: Single-jamb side locking bars, operable from inside and outside with cylinders.
10. Motorized Door Operator: Manufacturer's standard motorized operator.
11. Door Finish: Field painted.

08 41 00 Aluminum Entrances and Storefronts

A. Section includes aluminum doors and window wall frames of type indicated on Drawings.

B. Materials and Fabrication:
1. Framing members, transition members, mullions, adapters, and mountings: Extruded 6063 T5 aluminum alloy (ASTM B221 – Alloy G.S. 10aT5).
2. Screws, miscellaneous fastening devices, and internal components: Aluminum, stainless steel, or zinc plated steel in accordance with ASTM B633. Perimeter anchors shall be aluminum or steel, providing the steel is properly isolated from the aluminum.
3. Glazing gaskets: Elastomeric extrusions as required to provide specified performance. PVC glazing gaskets are not acceptable.
4. Steel Sections: ANSI/ASTM A36; shaped to suit mullion sections.
5. Shop and Touch Primer for steel Components: SSPC 15, Type 1, red oxide.
6. Touch-up Primer for Galvanized Steel Surfaces: SSPS 20, zinc rich type.
7. Component Sizes and Profiles: The required sizes for doors and frame units, and profile requirements, are shown.
   a. Frames: Fabricate tubular assemblies as shown, with either welded or mechanical joints in accordance with manufacturer’s standards, with concealed fasteners wherever possible.
      1) Provide members of the size, shape, and profile shown.
   b. Doors (Swinging)
      1) Major portions of the door stiles shall be 0.125 inch in thickness and glazing molding shall be 0.050 inch thick.
      2) Construction: Medium Stile. Fillet weld and mechanical clip fastening corner construction.
   c. Hardware: Provide the following items:
      1) Weatherstripping and door bottom/sweep: Aluminum Door Manufacturer’s standard.
      2) Hinges, Push-Pulls, Locks, Closers, and Cylinders: As specified in Section 08710.
   d. Slot Ventilators (Trickle Ventilators): Trimvent Supervent, manually

operated aluminum construction air-inlet trickle ventilator with integral screen as manufactured by Titon Inc.

1) Size as required by mechanical design.

8. Flashings and Miscellaneous Trim: Provide interior sills, exterior ill (or subsills) with end dams, closures, flashings, trim and other elements in conjunction with or adjacent to storefront system as required for watertightness and aesthetics.
9. Cut, reinforce, drill and tap frames as required to receive hardware except do not drill and tap for surface-mounted items until the time of installation at the Project Site.
10. Aluminum Finishes:
    a. Finish: Fluropolymer (PVDF), 70 percent, 1.0 mil dry film thickness kynar 500/Hylar 5000 paint coating conforming with the requirements of AAMA 2605.2 with clear coat.
    b. Color: Custom color as selected by Architect.

08 42 29 Automatic Entrances

A. Provide manufacturer's standard automatic entrances including doors, sidelites, framing, headers, carrier assemblies, roller tracks, door operators, activation and safety devices, and accessories required for a complete installation.

08 44 13 Glazed Aluminum Curtain Walls

A. Section includes aluminum curtain wall frames of type indicated on Drawings.

B. Materials and Fabrication:
1. Framing members, transition members, mullions, adapters, and mountings: Extruded 6063 T5 aluminum alloy (ASTM B221 – Alloy G.S. 10aT5).
2. Screws, miscellaneous fastening devices, and internal components: Aluminum, stainless steel, or zinc plated steel in accordance with ASTM B633. Perimeter anchors shall be aluminum or steel, providing the steel is properly isolated from the aluminum.
3. Glazing gaskets: Elastomeric extrusions as required to provide specified performance. PVC glazing gaskets are not acceptable.
4. Steel Sections: ANSI/ASTM A36; shaped to suit mullion sections.
5. Shop and Touch Primer for steel Components: SSPC 15, Type 1, red oxide.
6. Touch-up Primer for Galvanized Steel Surfaces: SSPS 20, zinc rich type.
7. Component Sizes and Profiles: The required sizes for doors and frame units, and profile requirements, are shown.
    a. Frames: Fabricate tubular assemblies as shown, with either welded or mechanical joints in accordance with manufacturer’s standards, with concealed fasteners wherever possible.
        1) Provide members of the size, shape, and profile shown.
8. Flashings and Miscellaneous Trim: Provide interior sills, exterior ill (or subsills) with end dams, closures, flashings, trim and other elements in conjunction with or adjacent to storefront system as required for watertightness and aesthetics.
9. Cut, reinforce, drill and tap frames as required to receive hardware except do not drill and tap for surface-mounted items until the time of installation at the Project Site.
10. Aluminum Finishes:
    a. Finish: Fluropolymer (PVDF), 70 percent, 1.0 mil dry film thickness kynar 500/Hylar 5000 paint coating conforming with the requirements of AAMA 2605.2 with clear coat.

b. Color: Custom color as selected by Architect.

08 71 00 Door Hardware

A. Section includes hardware and related items for interior and exterior doors, other than specified in specific door sections.

B. Products:
1. Butts: Ball bearing, Stanley, Hager.
2. Pivot Hinges: Rixson.
3. Exit Devices: von Duprin.
4. Locksets: Schlage with interchangeable core.
5. Closers: LCN
6. Automatic Door Operators: LCN
7. Stops, Kickplates, Flush Bolts, Auto Flush Bolts, Coordinators: Ives.
8. Push/Pull Latches: ABH, BBW, Trimco.
9. Pulls, Pushplates: Quality, Custom Designed.
10. weatherstripping, Smoke and Sound Seals, Door Bottoms, Astragal, Thresholds: Pemko.

C. Hardware Schedule: To be determined.

08 80 00 Glazing

A. Section includes glass and glazing materials.

B. Glass Materials:
1. Float Glass: ASTM C1036, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select; 1/4 inch thick minimum.
2. Safety Glass: ASTM C1048, Kind FT fully tempered with horizontal tempering Condition A uncoated, Type 1 transparent flat, Class 1 clear, Quality q3 glazing select; conforming to ANSI Z97; 1/4 inch thick minimum.
3. Glass Type: Low-E-coated, clear insulating glass.
   a. Basis-of-Design Product: PPG, SolarBan 70XL.
   b. Overall Unit Thickness: 1 inch.
   c. Minimum Thickness of Each Glass Lite: ¼ inch.
   d. Outdoor Lite: Ultraclear (Starphire) annealed/heat-strengthened/fully tempered float glass.
   e. Interspace Content: Air.
   f. Indoor Lite: Clear annealed/heat-strengthened/fully tempered float glass.
   g. Low-E Coating: Sputtered on second surface.
   h. Winter Nighttime U-Factor: 0.28 maximum.
   i. Summer Daytime U-Factor: 0.26 maximum.
   j. Visible Light Transmittance: 64 percent minimum.
   k. Solar Heat Gain Coefficient: 0.27 maximum.
   l. Shading Coefficient: 0.32 maximum.
   m. Safety glazing required.

DIVISION 09 - FINISHES

09 22 16 Non-Structural Metal Framing

A. Section includes formed metal stud framing, furring, suspension systems and

accessories.

B. Studs, Runners and Furring Channels: ASTM C 645, electro-galvanized to meet ASTM A 591, manufactured from steel supplied in accordance with ASTM A 653, Structural Quality Grade 33; G60 designation galvanized sheet steel.
1. Studs: C-shaped, non-load bearing rolled steel, punched for utility access, of size shown on Drawings, minimum 20 gauge.
2. Resilient Furring Channels: RC-1 channels, or equivalent.
3. Ceiling Runners: Cold or hot-rolled steel, meet ASTM C754.
4. Hanger and Tie Wire: Meet ASTM C754.
5. Compression Struts: C-shaped steel studs in minimum thickness as required to adequately resist the vertical component induced by the bracing wires.
6. Furring and Bracing Members: Of same gauge, material and finish as studs, thickness to suit purpose.
7. Clips, Brackets: Galvanized wire or sheet metal designed for attachment of framing, furring and bridging members.
8. Fasteners: GA 203, self-drilling, self-tapping screws.
9. Anchorage Devices: Power driven, powder actuated, drilled expansion bolts or screws with sleeves as required for positive anchorage.
10. Acoustic Sealant: As specified in Section 09250.
11. Primer: FS TT-P-645, for touch-up of galvanized surfaces.
12. Backing: “Notch-Tite” and “Flush Mount” as manufactured by Metal Lite, Inc.

09 21 16.23 Gypsum Board Shaft Wall Assemblies

A. Basis-of-Design Product: As indicated on Drawings by design designation of a qualified testing and inspecting agency.

B. Sustained Air-Pressure Loads: 5 lbf/sq. ft. (0.24 kPa).

C. Deflection Limit: L/240.

D. Studs: Manufacturer's standard profile for repetitive members and corner and end members and for fire-resistance-rated assembly indicated.
1. Depth: Not less than 2-1/2 inches (63.5 mm).
2. Minimum Base Metal Thickness: Manufacturer's standard thicknesses that comply with structural performance requirements for stud depth indicated.

E. Track (Runner): Manufacturer's standard J-profile track with long-leg length as standard with manufacturer, but at least 2 inches (51 mm), in depth matching studs.
1. Minimum Base Metal Thickness: Manufacturer's standard thicknesses that comply with structural performance requirements for stud depth indicated.

F. Jamb Struts: Manufacturer's standard J-profile strut with long-leg length of 3 inches (76.2 mm), in depth matching studs, and not less than 0.0359 (20 gauge) thick.

G. Gypsum Liner Panels: Manufacturer's proprietary liner panels in 1-inch (25.4-mm) thickness and with moisture-resistant paper faces.

H. Room-Side Finish: Gypsum board.

I. Shaft-Side Finish: As indicated by fire-resistance-rated assembly design designation.

J. STC Rating: Minimum 50 STC.

K. Cavity Insulation: Sound attenuation blankets.

09 28 16 Exterior Gypsum Sheathing

A. Section includes glass-mat faced exterior sheathing:
   1. Glass Matt Exterior Sheathing Board: Dens-Glass Gold Sheathing complying with ASTM C1177 as manufactured by G-P Gypsum Corporation.
      a. Thickness: 5/8 inch.
   2. Fasteners: Type S-12, bugle head, self-tapping, with organic-polymer or other protective coating, fine thread for heavy gauge steel (12 to 22), or steel type Exterior Screws as manufactured by USG.

09 29 00 Gypsum Board

A. Section includes gypsum board and installation accessories.

B. Materials:
   1. Standard Gypsum Board: ANSI/ASTM C36 or ASTM C1396; 1/2 inch thick, maximum permissible length; ends square cut, tapered edges. Provide sag-resistant type for ceiling applications.
   2. Fire Rated Gypsum Board: ANSI/ASTM C36 or ASTM C1396; fire resistive type, UL rated; 5/8 inch, maximum permissible length; ends square cut, tapered edges.
   3. Moisture Resistant Gypsum Board: ANSI/ASTM C630 or ASTM C1396; 5/8 inch thick, maximum permissible length; ends square cut.
   4. Exterior Gypsum Sheathing Board: As specified in Section 09253 – Exterior Gypsum Sheathing.
   5. Cementitious Backer Units (Ceramic Tile Backer Board): Provide cementitious backer units conforming to ANSI A118.0.
   6. Accessories for Gypsum Board:
      a. Adhesive: ASTM C557.
      b. Acoustical sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board, as recommended by Board Manufacturer.
      c. Corner Beads: GA216; Type CB; electro-galvanized steel.
      d. Edge Trim: GA216; Type L bead; electro-galvanized steel and Type LC rolled-formed zinc. Provide Milcore No. 66 J-metal edge, or similar type edge as approved by Architect, where indicated at unfinished gypsum board edges terminating against other finish materials.
      e. Control Joint: U.S. Gypsum No. 093, roll-formed zinc.
      f. Joint Materials: ANSI/ASTM C475; reinforcing tape, joint compound, adhesive, water, and fasteners. for coated board and gypsum sheathing, use material recommended by Board Manufacturer.
      g. Screw: ASTM C1002 for steel drill screws. Type G for fastening to gypsum board, Type S for fastening to light gauge steel framing and Type W for fastening to wood framing.
   7. Drywall Primer:
      a. Paint material specifically formulated to fill the pores and equalize the suction difference between gypsum board surface paper and the compound used on finished joints, angles, fastener heads and accessories and over skim coatings.

b. Drywall primer which is applied to the finished surface of the work specified in this section shall be provided as specified under Sections 09900 and 09720 as applicable.

8. Accessories for Cementitious Backer Units:
   a. Joint Materials for Cementitious Backer Units: As recommended by cementitious backer unit manufacturer and complying with ANSI A118.9 and ANSI A108.11.
   b. Fasteners: Galvanized or coated steel drill screws of size and type recommended my cementitious backer unit manufacturer for fastening cementitious backer units to metal studs as indicated.
   c. Portland Cement Mortar: Comply with Section 09310.

09 30 00 Tile

A. Section includes ceramic tile and setting accessories.

B. Materials:
1. Tile Sizes, Colors and Patterns: To be Determined.
2. Trim Shapes: Provide bases, caps, stops, returns, trimmers, and other shapes indicated or necessary to produce a completely finished installation.
3. Marble Thresholds: Where indicated to be Marble, provide marble thresholds complying with Marble Institute of America, Class A, color and variety as selected by Architect, shaped to provide a comfortable transition between tile and other floor finishes, with smooth matte surface finish and in the thickness and dimensions shown on the drawings.
4. Setting Materials:
   a. Thin Set Mortar: Latex-Portland cement mortar per ANSI A118.4.
   b. Latex Grout: Conforming to ANSI 118.6 and the TCA Handbook, by an approved Manufacturer. Grout shall be sealed as recommended by manufacturer.
   c. Cleavage Membrane: Dal-Tile TC or Nobleseal 150. Adhesive for application of membrane shall be compatible with substrate.
5. Anti-Fracture Membrane: Provide one of the following:
   a. Laticrete 9235 fluid applied membrane with fabric reinforcement; Laticrete international.
   b. Trowel & Seal Waterproofing and Anti-Fracture Membrane, Custom Building Products.
   c. PRP M19, Mapei corporation.
6. Cementitious Backer Units (Ceramic Tile Backer Board): As specified in Section 09 29 00.
7. Expansion/Control Joint Sealant: Provide in colors selected by the Architect, complying with requirements of Section 07 92 00.
8. Edge and Transition Strips: Solid brass, extruded aluminum, or roll-formed stainless steel edge strips, height as indicated; with integral perforated anchoring leg for setting the strip into the setting material.
9. Waterproof Membrane for Thin-Set Applications: Provide one of the following:
   a. PRP 315 two-component synthetic polymer anti-fracture and waterproofing membrane and as manufactured by Mapei Corporation, meeting ANSI A118.10, trowel-applied.
   b. Schluter KERDI sheet waterproofing membrane.

C. Installation:
1. Thin Set: Where indicated to be thin-set, install tile using TCA Method for substrate condition and type for latex-Portland cement mortar, and as follows:
a. Floors: TCA F113 at interior locations. At above grade structural slabs provide manufacturer's recommended latex modified Portland cement mortar recommended for use at structural slabs.
b. Floors: TCA F122, at wet area floors other than showers.
c. Walls: TCA W243.
d. Walls: TCA W244, at wet area walls over cement backer board (showers and other wet walls).

09 51 00 Acoustical Ceilings and Noise Control Panels

A. Section includes lay-in acoustical panels and exposed suspension systems for ceilings.

B. Materials:
1. Ceiling Suspension System: Intermediate duty with components formed from commercial quality cold rolled steel electro-zinc coated.
a. Width: 15/16 inch.
2. Hanger Wire: Galvanized steel conforming to federal Specification FF-QQ-W-461, Finish 5, Class 1 annealed, and not less than 12 gauge).
3. Suspension system shall support the ceiling system specified with a maximum deflection of 1/360 of the span.
4. Wall Moldings: 24 MSG painted steel with a minimum one inch wide lower flange, finish and configuration to match grid.
5. Acoustical Ceiling Panels:
a. Size: 24 inch x 24 inch and 24 inch x 48 inch
b. Type: Reveal edge, white painted finish, unless otherwise indicated on Drawings.
c. Specialty Panels: Decorative specialty panels for feature areas as selected.

09 54 43 Stretched-Fabric Ceiling Systems

A. Stretched-Fabric Ceiling System: Manufacturer's standard system consisting of facing material stretched taught over a frame and core material and secured in the frame.
1. Core: Glass-fiber board or Glass-fiber blanket.
2. Frame-Edge: Chamfered (beveled) profile.
a. Fabric-Insertion Point: Bottom-load.
b. Nominal Frame Thickness: Match core thickness.
3. Reveals between Panels: Recessed reveals as selected by Architect from manufacturer's full range.
4. Facing Material: As selected by Architect from manufacturer's full range.
5. Acoustical Performance: Sound absorption NRC of 0.80 to 0.90 according to ASTM C 423 for Type A mounting according to ASTM E 795.

09 65 13 Resilient Base and Accessories

A. Resilient Base:
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. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
b. Johnsonite.

c. VPI, LLC; Floor Products Division.
2. Resilient Base Standard: ASTM F 1861.
a. Material Requirement: Type TP (rubber, thermoplastic).
b. Manufacturing Method: Group I (solid, homogeneous).
c. Style: Cove (base with toe).
3. Minimum Thickness: 0.125 inch (3.2 mm).
4. Height: 4 inches (102 mm).
5. Outside Corners: Preformed.
6. Inside Corners: Job formed.
7. Finish: Satin.

09 65 16 Resilient Flooring

A. Rubber Sheet Floor Covering
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. Johnsonite.
b. Nora Rubber Flooring, Freudenberg Building Systems, Inc.
c. R.C.A. Rubber Company (The)
2. Unbacked Rubber Sheet Floor Covering: ASTM F 1859.
a. Type: Type I (homogeneous rubber sheet).
b. Thickness: As standard with manufacturer.
3. Hardness: Manufacturer's standard hardness, measured using Shore, Type A durometer per ASTM D 2240.
4. Wearing Surface: Smooth.
5. Sheet Width: Not less than 6 feet (1.8 m).

09 67 23 Resinous Flooring

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. Crossfield Products Corp.; Dex-O-Tex.

B. VOC Content of Resinous Flooring: Provide resinous flooring systems, for use inside the weatherproofing system, that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
1. Resinous Flooring: 100 g/L.

C. Resinous Flooring: Abrasion-, impact- and chemical-resistant, decorative-aggregate-filled, epoxy-resin-based, monolithic floor surfacing designed to produce a seamless floor and integral cove base.

D. System Characteristics:
1. Wearing Surface: Manufacturer's standard wearing surface.
2. Overall System Thickness: Not less than 1/8 inch (3.2 mm).

E. Body Coats:
1. Resin: Epoxy.
2. Formulation Description: 100 percent solids.
3. Application Method: Troweled or screeded.
a. Thickness of Coats: 1/16 inch (1.6 mm).
b. Number of Coats: Two.

F. Topcoat: Sealing or finish coats.
1. Resin: Epoxy.
2. Formulation Description: 100 percent solids.
3. Type: Clear.
4. Finish: Matte.
5. Number of Coats: One.

09 68 13 Carpet Tile

A. Section includes carpet tile materials and installation.

B. Materials:
1. Commercial Carpet Tile: As selected by Architect, 24 inch x 24 inch.
2. Underlayment: Portland cement-latex concrete floor filler for leveling concrete floor as recommended by Carpet Manufacturer.
3. Adhesive: Acceptable to carpet tile manufacturer, low-odor adhesive without solvent, VOC compliant.
4. Edge Strip: Metal or vinyl reducer strip for areas, doorways and other areas where edge of carpet is exposed.
5. Rubber Base: See Section 09652. Base shall be installed after carpet.

09 81 16 Acoustical Insulation

A. Section includes acoustical insulation ceilings and partitions.

B. Sound Control Batts: ASTM C665, Type 1 (unfaced), glass or mineral fiber batts, with a Fire Hazard Classification of 25-50 or less when tested in accordance with ASTM E-84.
1. Thickness: As indicated on Drawings, generally 3-1/2 inches.

09 90 00 Architectural Paint Finishes

A. Section includes surface preparation and field painting of exposed exterior and interior items and surface except glass factory finished items and hardware.

B. Exterior Paint Schedule:
1. Concrete and Plaster:
a. Flat acrylic: 2 coats over primer.
b. Semi-gloss, acrylic-enamel: 2 coats over primer.
2. Concrete Masonry Units:
a. Flat acrylic: 2 coats over block filler.
3. Ferrous Metal:
a. Full-gloss alkyd-enamel: 2 coats over rust –inhibitive primer.
b. Deep-color, full-gloss, alkyd-enamel: 2 coats over rust –inhibitive primer.
4. Zinc-Coated Metal:
a. Full-gloss alkyd-enamel: 2 coats over galvanized metal primer.
5. Aluminum:
a. Full-gloss alkyd-enamel: 2 coats over primer.

C. Interior Paint Schedule:
1. Concrete and Masonry:
a. Flat acrylic: 2 coats over primer.
b. Semi-gloss, alkyd-enamel: 2 coats over primer.
2. Concrete Masonry Units:

a. Flat acrylic: 2 coats over block filler.
b. Semi-gloss, alkyd-enamel: 2 coats over undercoat and filled surface.

3. Gypsum Board:
   a. Flat acrylic: 2 coats
   b. Semi-gloss, alkyd-enamel: 2 coats over primer.
4. Plaster:
   a. Flat acrylic: 2 coats.
   b. Semi-gloss, alkyd-enamel: 1 coat over undercoat and primer.
5. Acoustical Plaster:
   a. Flat, acrylic-latex: 2 coats.
6. Woodwork:
   a. Semi-gloss, alkyd-enamel: 2 coats over primer.
   b. Full-gloss, alkyd-enamel: 2 coats over wood undercoater.
7. Stained Woodwork:
   a. Alkyd-based, satin-varnish: 2 coats clear-satin varnish over sealer and wood stain.
   b. Water-based, full-gloss, varnish: 2 coats full-gloss varnish over sealer and wood stain.
   c. Alkyd-based stain, wax-polished finish: 3 coats paste wax over sealer and wood stain.
8. Natural-Finish Woodwork:
   a. Alkyd-based, satin-varnish: 2 coats clear-satin varnish over sealer.
   b. Wax-polished finish: 3 coats paste wax over sealer.
9. Ferrous Metal:
   a. Full-gloss, acrylic-enamel: 2 coats over primer.
10. Zinc-Coated Metal:
   a. Full-gloss, alkyd-enamel: 1 coat over undercoater and primer.

DIVISION 10 - SPECIALTIES

10 14 00 Identifying Devices

A. Section includes the following:
   1. Code required identification signage.
   2. Room identification signs.
   3. Directional signs.
   4. Exterior identificational signs.
   5. Dedication plaque.

10 21 13 Metal Toilet Compartments

A. Section includes stainless steel toilet compartments and urinal screens as shown on Drawings and
as specified of the following type:
   1. Compartment Style: Floor mounted, overhead braced.
   2. Screen Style: Wall hung.

B. Materials and Fabrication: Provide manufacturer's standard overhead braced type partitions and screens fabricated from sound insulated, seamless, stainless steel facing sheets pressure laminated to core material; with continuous, interlocking molding strip or lapped-and-formed edge closures; corners secured by welding or clips and exposed

welds ground smooth. Exposed surfaces shall be free of pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections.

1. Stainless-Steel Finish: No. 4 bright, directional polish on exposed faces.
2. Hardware and accessories: Manufacturer's standard heavy-duty units and accessories with polished chrome finish.

10 26 00 Wall and Door Protection

A. Surface-Mounted, Metal Corner Guards: Fabricated from one-piece, formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.

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. Arden Architectural Specialties, Inc.
   b. Balco, Inc.
   c. Construction Specialties, Inc.
   d. IPC Door and Wall Protection Systems; Division of InPro Corporation.
   e. Pawling Corporation.
2. Material: Stainless steel, Type 304.
   a. Thickness: Minimum 0.0625 inch (1.6 mm) (16 gauge).
   b. Finish: Directional satin, No. 4.
3. Wing Size: Nominal 3-1/2 by 3-1/2 inches (90 by 90 mm).
4. Corner Radius: 1/8 inch (3 mm).
5. Mounting: Flat-head, countersunk screws through factory-drilled mounting holes.

10 28 00 Toilet Accessories

A Section includes toilet and shower accessories.

B. Paper Towel Dispenser: Products: Provided by Owner and installed by Owner.

C. Toilet Tissue Dispenser: Products: Provided by Owner and installed by Owner.

D. Soap Dispenser: Products: Provided by Owner and installed by Owner.

E. Waste Receptacle: Bobrick, B-275.

1. Surface-Mounted Type: With seamless exposed walls; continuously welded bottom pan; and minimum 20-gal. (75.7-L) capacity, reusable, vinyl liner secured at not less than four points with grommets and hooks.

F. Paper Towel Dispenser: Bobrick, B-4262.

1. Surface-Mounted Type: Sized for minimum of 400 C-fold or 525 multifold paper towels without using special adapters; with hinged front equipped with tumbler lockset; and with refill indicators that are pierced slots at sides or front.

G. Soap Dispenser: Bobrick, B-2112

1. Liquid Soap Dispenser, Tank Type: Surface-mounted type, minimum 40-oz. (1182.9-mL) capacity tank with stainless-steel piston, springs, and internal parts designed to dispense soap in measured quantity by pump action; and stainless-steel cover with unbreakable window-type refill indicator.
   a. Soap Valve: Designed for dispensing soap in liquid form.

H. Grab Bar: Bobrick, B-6806 Series

1. Stainless-Steel Nominal Thickness: Minimum 0.05 inch (1.3 mm).
2. Mounting: Concealed with manufacturer's standard flanges and anchors
3. Gripping Surfaces: Manufacturer's standard slip-resistant texture
4. Outside Diameter: 1-1/2 inches (38 mm) for heavy-duty applications

I. Sanitary Napkin Vendor: Hospital Specialty Co.; Dual #1 Vendor.
1. General: Fabricate cabinet of all-welded construction. Provide seamless door with returned edges and secured by tumbler lockset. Provide identification reading "Napkins" and "Tampons"; brand-name advertising is not allowed.
2. Mounting: Surface mounted.
3. Operation: Single-coin operation, 25 cents.

J. Sanitary Napkin Disposal Unit: Hospital Specialty Co.; #250K.
1. Surface-Mounted Type: With seamless exposed walls; self-closing top cover; locking bottom panel with stainless-steel, continuous hinge; and removable, reusable receptacle.

K. Mirror Unit: Bobrick, B-290 Series.
1. Stainless-Steel, Angle-Framed Mirror: Fabricate frame from minimum nominal 0.05-inch- (1.3-mm-) thick stainless-steel angles, with square corners mitered, welded, and ground smooth.

L. Mop and Broom Holder: Bobrick, B-224x36
1. Mop and Broom Holder with Utility Shelf: 36-inch- (914-mm-) long unit fabricated of minimum nominal 0.05-inch- (1.3-mm-) thick stainless steel with shelf; support brackets for wall mounting; three hooks for wiping rags; four spring-loaded, rubber hat, cam-type, mop/broom holders mounted on front of shelf; and approximately 1/4-inch- (6-mm-) diameter, stainless-steel rod suspended beneath shelf for drying rags.

M. Shower Curtain Rod: Bobrick, B-6106 Series.
1. Stainless-Steel Nominal Thickness: Minimum 0.05 inch (1.3 mm).
2. Mounting: Exposed with manufacturer's standard flanges and anchors.
3. Gripping Surfaces: Smooth, satin finish.
4. Outside Diameter: 1-1/2 inches (38 mm) for heavy-duty applications.

N. Shower Curtain: Where this designation is indicated, provide shower curtain complying with the following:
1. Fabric Duck Shower Curtain: Minimum 8-oz. (227-g), white, mildew resistant with integral antibacterial agent, 100 percent cotton duck material with hemmed edges and double stitched with pocket at top to fit over/around curtain rod.
   a. Size: Minimum 6 inches (152 mm) wider than opening by 72 inches (1828 mm) high.
   b. Color: As selected by Architect from mfr's full range.

O. Folding Shower Seat: Where this designation is indicated, provide heavy-duty hinged seat designed to fold up against wall when not in use with stainless-steel support braces, hinges, frame, and fasteners; of all-welded construction; and complying with the following:
1. Products: Available products include the following: Bobrick, B-5181.
2. Configuration: L-shaped seat, designed for wheelchair access.
3. Seat Material: Phenolic or polymeric composite of slat-type or one-piece

construction. Color as selected by Architect from mfr's full range.

P. Robe Hook: Bobrick, B-7672.
1. Double-Prong Unit: Stainless-steel, double-prong robe hook with rectangular wall bracket and backplate for concealed mounting.

Q. Towel Holder: Bobrick, B-550.
1. Stainless-Steel Nominal Thickness: Minimum 0.05 inch (1.3 mm).
2. Mounting: Concealed with manufacturer's standard flanges and anchors.
3. Gripping Surfaces: Manufacturer's standard slip-resistant texture.
4. Outside Diameter: 1-1/4 inches (32 mm) for extar-heavy-duty applications.

R. Diaper-Changing Station: Bobrick, B-2210.
1. Horizontal, Surface-Mounted Unit: Diaper-changing station with surface-mounted, mildew-resistant, molded polyethylene body that folds horizontally against wall when not in use; projects not more than 4 inches (100 mm) from wall when closed; and is engineered to support a minimum of 250-lb (113-kg) static weight when opened. Provide unit with pneumatic shock-absorbing operating mechanism and built-in dispenser for sanitary liners.

S. Underlavatory Guard: Truebro, Inc.
1. Insulating Piping Coverings: White, antimicrobial, molded-vinyl covering for supply and drain piping assemblies intended for use at accessible lavatories to prevent direct contact with and burns from piping. Provide components as required for applications indicated with flip tops at valves that allow service access without removing coverings.

10 51 00 Lockers

A. Section includes standard multi-tier box type factory-finished metal lockers.

B. Lockers: Standard 2 tier box configuration as follows:
1. Size: 12 inches wide x 12 inches deep x 30 inches high individual boxes in 2-tier configuration. 60 inch overall height.
2. Trim: Furnish sloping tops and corners as required, and with fillers at front surfaces to close space between lockers and wall surfaces where required.
3. Body of the lockers to be 24 gauge steel. Doors and door frames and end of row uprights for non-recessed lockers to be 16 gauge steel. Doors to have louvers top and bottom.
4. Provide consecutively numbered embossed number plates for each locker.
5. Provide built-in, master key controlled combination lock with manually locking deadbolt or automatically locking spring bolt as standard with manufacturer.
6. Finish: Baked-on enamel, color as selected by Architect from Manufacturer’s standard colors.

C. Locker Benches: Manufacturer's standard one-piece units, with rounded corners and edges.

1. Size: Minimum 9-1/2 inches wide by 1-1/4 inches thick (241 mm wide by 32 mm thick) except provide minimum 20-inch- (508-mm-) wide tops where accessible benches are indicated.

2. Laminated clear hardwood with one coat of clear sealer on all surfaces and one coat of clear lacquer on top and sides.

10 44 00 Fire Protection Specialties

A. Section includes fire extinguishers, cabinets and mounting brackets.

B. Extinguisher: Multi-Purpose Dry Chemical, 5lb and 10 lb sizes as scheduled on Drawings.

C. Wall Bracket: Manufacturer's standard J-type for wall hung extinguishers.

D. Fire Extinguisher Cabinet:
1. Model "Embassy" series as manufactured by J.L. Industries, or equivalent.
2. Trim Style and Projection:
   a. Fully Recessed: 1-1/2 inch trim.
   b. Semi-Recessed: 4 inch trim.
   c. Surface Mounted: Standard surface mounted box.
3. Door: Vertical Duo.
   a. Trim and Door (Steel): Tubular, hollow metal design as follows:
      1) Back of House: One-piece, constructed of cold-rolled steel with manufacturer's standard baked enamel or powder coated finish in standard white color.
      2) Public Areas: One-piece, constructed of solid brass or stainless steel with brushed finish as selected.
   b. Door glazing: Glass, clear, 1/8 inch thick DSA.

E. Electronically Monitored System: MIJA, Inc.

DIVISION 11 - EQUIPMENT

11 01 00 Owner Furnished Equipment

A. The Owner will furnish and install certain equipment items as indicated. The Owner will furnish certain other equipment items to be installed by the Contractor. The Work includes providing support systems to receive Owner's equipment, and mechanical and electrical connections.
1. Items to be furnished by the Owner and installed by the Owner include but are not limited to the following:
   a. Items of equipment identified as being Owner furnished and Owner Installed.
2. Items to be furnished by the Owner and installed by the Contractor include but are not limited to the following:
   a. Items of equipment identified as being Owner furnished and Contractor installed.

B. Other items of equipment are identified to be furnished and installed by the Contractor. The documents specify and detail those items which are Contractor furnished and installed.

11 24 23 Window Washing Systems

A. Structural Load: All structural supports, anchors, bolts, eyes, davits, sockets, socket

bases, and other work shall be capable of carrying a live load of 1,500 pounds at the point to cause greatest stress with a factor of safety of at least four.

B. Welding: All welding shall comply with AWS requirements and shall be performed by welders qualified in accordance with AWS procedures.
   1. Testing: Visually inspect all welds. Perform ultrasonic inspection of full penetration welds. Make written reports, and effective repairs.

C. Bolting: Comply with AISC Code of Standard Practice.

D. Materials: All work including bolts and fasteners shall be fabricated from Type 304 or 3316 structural stainless steel.

E. Cables: Provide solid stainless steel cable assemblies including 7 X 19 stainless steel wire rope, swages, fittings, tensioners, anchors, and all components and accessories to create a complete structural assembly.

F. Tie back lifeline Anchors
   1. Anchoring system shall be capable of resisting with out fracture or pull out with a force of 5,000 lbs. applied in any direction.
   2. Safety anchoring eye shall be made of not less than 3/4 inch diameter material or equivalent with an eye opening not less than 1.5 inch diameter or equivalent. The anchor eye shall be made of stainless steel or other corrosion resistant material. Bolts and connecting hardware shall be made of stainless steel or hot dipped galvanized material.
   3. All steel bases shall be hot dipped galvanized mild steel.
   4. Deformed threads of all safety anchor studs behind nuts after nuts have been tightened.
   5. Multiple cast in place anchors studs shall be made of hot dipped galvanized mild steel. Single insert anchor stud securement bolt must be made of stainless steel.
   6. Drilled concrete anchors shall only be adhesive epoxy anchors manufactured by U-pat or Hilti. Mechanical fasteners should not be used. If adhesive securement is considered 100% of the inserts are to be tested 5,000 lbs.
   7. Weldment roof anchors must be attached to steel that is large enough to accept a 4 inch diameter tube complete with 100% weld. The structure or a plate must be provided to accept this anchor and must be a minimum 5 inches wide.
   8. All wall anchors must be properly flashed into the surface to which they are applied.
   9. All roof anchors must be properly roofed in. All stand alone metal roof anchors must be directly flashed into the roofing in a manner compatibly with the existing roofing. Flashings for metal roof anchors are to be spun aluminum and seamless. Top of anchor to be sealed with mastic tape and heat shrink rubberized membrane. Rubber gaskets, worm gears, grommets and pitch pans must not be used.

11 52 13 Projection Screens

A. Suspended, Electrically Operated Screens with Automatic Ceiling Closure: Motor-in-roller or end-mounted motor units with bottom of case composed of two panels: one panel designed to open and close automatically, the other removable or openable for access to interior of case.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
   a. Motor in Roller or End-Mounted Motor:
      1) Da-Lite Screen Company.
      2) Draper Inc.
2. Provide screen case constructed to be installed with underside flush with ceiling.

DIVISION 12 - FURNISHINGS

12 48 13 Entrance Floor Mats

A. Roll-up, Aluminum-Rail Hinged Mats: Extruded-aluminum tread rails 1-1/2 inches (38 mm) wide by 3/8 inch (9.5 mm) thick, sitting on continuous vinyl cushions.
   1. Tread Inserts: 1/4-inch- (6-mm-) high, 28-oz./sq. yd. (950-g/sq. m) weight, level-cut, nylon-pile, fusion-bonded carpet.
   2. Colors, Textures, and Patterns of Inserts: As selected by Architect from manufacturer's full range.

B. Recessed Frames:
   1. Extruded Aluminum: ASTM B 221 (ASTM B 221M), Alloy 6061-T6 or Alloy 6063-T5, T6, or T52.

12 24 13 Roller Window Shades

A. Section includes roller window shades.

B. Shade Band Material: PVC-coated polyester.
   1. Material Width: Not less than 96 inches (2440 mm).
   2. Bottom Hem: Straight.
   3. Material Openness Factor: Not less than 5%
   4. Material Color: As selected by Architect from manufacturer's full range.

C. Audiovisual Light-Blocking Shades: Designed for eliminating all visible light gaps when shades are fully closed; fabricated from blackout shade band material with fascia 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, including sill light seal attached to bottom bar, for eliminating light gaps when shades are closed.

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

E. Provide factory-assembled motorized shade operation systems designed for lifting shades of type, size, weight, construction, use, and operation frequency indicated. Provide operation systems of size and capacity and with features, characteristics, and accessories suitable for Project conditions and recommended by shade manufacturer, complete with electric motors and factory-prewired motor controls, remote-control stations, remote-control devices, power disconnect switches, enclosures protecting controls and all operating parts, and accessories required for reliable operation without

malfunction. Include wiring from motor controls to motors. Coordinate operator wiring requirements and electrical characteristics with the building electrical system.

12 93 00 Site Furnishings

A. Summary
1. Section includes seating, bicycle racks, trash receptacles, and urns.

DIVISION 13 – SPECIAL CONSTRUCTION

Not Used

DIVISION 14 – CONVEYING SYSTEMS

14 21 13 Electric Traction Freight Elevators

A. Basis-of-Design Products: The design for each electric traction elevator specified is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.
1. Provide machineroom-less traction service elevators from ThyssenKrupp Elevator. The control system and car design shall be based on materials and systems manufactured by ThyssenKrupp Elevator. Specifically, the system shall consist of the following components:
a. An AC gearless machine using embedded permanent magnets mounted at the top of the hoistway.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering electric traction elevators that may be incorporated into the Work include, but are not limited to, the following:
1. Montgomery KONE Inc.
2. Otis Elevator Company.

C. Elevator for Service and Equipment:
1. Type: Gearless traction.
2. Rated Load: 5000 lb (2270 kg).
3. Rated Speed: 200 fpm (1.03 m/s).
4. Operation System: Group automatic operation, two-car group.
5. Auxiliary Operations:
a. Standby power operation.
b. Loaded-car bypass.
c. Automatic dispatching of loaded car.
d. Nuisance call cancel.
e. Earthquake Emergency Operation: Comply with requirements in ASME A17.1.
6. Car Enclosures: As follows:
a. Inside Width: 102 inches (2591 mm).
b. Inside Depth: 71 inches (1803 mm).
c. Inside Height: 96 inches (2439 mm).
d. Front Walls: Satin stainless steel with integral car door frames.
e. Car Fixtures: Satin stainless steel.
f. Side and Rear Wall Panels: Satin stainless steel.

g. Reveals: Satin stainless steel.
h. Door Faces (Interior): Satin stainless steel.
i. Door Sills: Nickel silver.
j. Ceiling: Luminous ceiling.
k. Handrails: Satin stainless steel, at side and rear walls.
l. Floor prepared to receive resilient tile flooring.

7. Hoistway Entrances (Front and Rear Opening): As follows:
   a. Width: 54 inches (1372 mm).
   b. Height: 84 inches (2134 mm).
   c. Type: Two-speed side sliding.
   d. Frames: Satin stainless steel.
   e. Doors: Satin stainless steel.
   f. Sills: Nickel silver.
8. Hall Fixtures: Satin stainless steel.
9. Additional Requirements: As follows:
   a. Provide inspection certificate in each car, mounted under acrylic cover with satin stainless-steel frame.
   b. Provide protective blanket hooks in all cars and two complete sets of full-height blankets.

14 21 23 Electric Traction Passenger Elevators

A. Basis-of-Design Products: The design for each electric traction elevator specified is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified.
   1. Provide machineroom-less traction passenger elevators from ThyssenKrupp Elevator. The control system and car design shall be based on materials and systems manufactured by ThyssenKrupp Elevator. Specifically, the system shall consist of the following components:
      a. An AC gearless machine using embedded permanent magnets mounted at the top of the hoistway.

B. Available Manufacturers: Subject to compliance with requirements, manufacturers offering electric traction elevators that may be incorporated into the Work include, but are not limited to, the following:
   1. Montgomery KONE Inc.
   2. Otis Elevator Company.

C. Elevator for Passengers and Equipment:
   1. Type: Gearless traction.
   2. Rated Load: 3500 lb (1589 kg).
   3. Rated Speed: 200 fpm (1.03 m/s).
   4. Operation System: Group automatic operation, two-car group.
   5. Auxiliary Operations:
      a. Standby power operation.
      b. Loaded-car bypass.
      c. Automatic dispatching of loaded car.
      d. Nuisance call cancel.
      e. Earthquake Emergency Operation: Comply with requirements in ASME A17.1.
   6. Car Enclosures: As follows:
      a. Inside Width: 80 inches (2032 mm).

b. Inside Depth: 65 inches (1651 mm).
c. Inside Height: 96 inches (2439 mm).
d. Front Walls: Satin stainless steel with integral car door frames.
e. Car Fixtures: Satin stainless steel.
f. Side and Rear Wall Panels: Satin stainless steel.
g. Reveals: Satin stainless steel.
h. Door Faces (Interior): Satin stainless steel.
i. Door Sills: Nickel silver.
j. Ceiling: Custom design.
k. Handrails: Satin stainless steel, at side and rear walls.
l. Floor prepared to receive stone tile.

7. Hoistway Entrances (Front Opening Only): As follows:
   a. Width: 42 inches (1067 mm).
   b. Height: 84 inches (2134 mm).
   c. Type: Single-speed center opening.
   d. Frames: Satin stainless steel.
   e. Doors: Satin stainless steel.
   f. Sills: Nickel silver.
8. Hall Fixtures: Satin stainless steel.
9. Additional Requirements: As follows:
   a. Provide inspection certificate in each car, mounted under acrylic cover with satin stainless-steel frame.
   b. Provide protective blanket hooks in all cars and two complete sets of full-height blankets.

DIVISION 21 – FIRE SUPPRESSION

21 10 00 Fire Protection

A. Fire Protection:

1. Provide fire protection water services extensions and connections to on-site utility. Include all connection charges, tap fees, and all other costs required to provide service to the building. Include utility charges for work done and materials installed by the utility company. Provide all pads, vaults, manholes, covers, valve enclosures, valves, service boxes, and other accessories in conformance with the requirements of the serving utility company and local jurisdictional authorities.

2. Design and install fire protection system in accordance with the current requirements of NFPA 13 and the local AHJ.

3. Buried piping: Ductile iron, mechanical joint with screw retainer glands; PVC, mechanical joint, ductile fittings, joint restraints.

4. Piping, above ground: Black steel or galvanized steel, threaded or roll grooved, schedule 40, ASTM A-135 or A-53; in accordance with NFPA 13.

5. Sprinkler heads; offices, corridors, toilets, and other finished areas: recessed, 165°F, chrome finish.

21 08 00 Fire Suppression Commissioning

A. The contractor shall participate fully in commissioning as specified in Division 019113 “Commissioning”. See Div 019113 for a specific list of equipment and systems to be covered by the commissioning process.

DIVISION 22 - PLUMBING

22 08 00 Plumbing Commissioning

A. The contractor shall participate fully in commissioning as specified in Division 01 9113 “Commissioning”. See Div 01 9113 for a specific list of equipment and systems to be covered by the commissioning process.

22 1410 PLUMBING PIPING

A. PLUMBING PIPING

1. Water piping, exterior buried: Copper tube (ASTM B 42-1998), Type K, soldered or brazed joints; PVC ASTM D2241, SDR-26, gasket joints ASTM D3139.

2. Water piping, interior buried: Copper tube (ASTM B 42-1998), Type K annealed, soldered or brazed joint, brazed joints only below floor structure.

3. Water piping, interior: Copper tube ASTM B88, Type L, soldered or brazed joints.

4. Drain waste vent pipe, interior buried: Cast iron ASTM A74 and CISPI HS, service weight, hub and spigot, or No-Hub extra heavy couplings with elastometric gaskets, or PVC DWV pipe and fittings with solvent welded joints.

5. Drain waste vent pipe, interior: Cast iron ASTM A888 and CISPI 301, service weight, No-Hub.

B. COMPRESSED AIR

1. 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. Screwed joints may be used on piping under 4" diameter. Press fittings shall conform to material requirements of ASME B16.18 or ASME B16.22 and performance criteria of IAPMO PS 117.

22 1411 DISINFECTING WATER SUPPLY SYSTEM

A. WORK INCLUDED

1. Disinfection of Domestic Water Supply System

B. REGULATORY AGENCY REQUIREMENTS

1. Comply with requirements of Local and State Regulations.

C. SUBMITTALS

1. Submit printed data for the following items:
   a. Disinfection Report.
   b. Bacteriological Report.

22 1430 PLUMBING SPECIALTIES

A. WORK INCLUDED
1. Drains and drainage products.
2. Downspout nozzle.
3. Cleanouts.
4. Safe pans and drain flashings.
5. Sillcocks, hose bibbs.
6. Pressure gauges, thermometers, and test plugs.
7. Shock arrestors.
8. Pressure reducing valves.
9. Pressure and temperature relief valves.
10. Washer and dryer wall boxes.

B. FLOOR DRAINS (FD)
1. Acceptable Manufacturers: Wade series 1100, J.R. Smith series 2005, Josam series 30000, Zurn series Z-415.

2. Schedule:

Plan Code	FD-1	FD-1
Typical Use	Note 2	Note 2
Style	Round	Round
Material	Cast Iron	Cast Iron
Pipe Size	2” - 3”	4”
Top Size	5” min.	7” min.
Strainer	Nickel Bronze	Nickel Bronze
Vandal Proof Security Screws	Yes	Yes
Sediment Bucket	No	No
Seepage Flange	Yes	Yes
Flashing Clamp	Note 1	Note 1
Trap Primer Fitting	Where Required	Where Required
Funnel	No	No
Deep Seal (4”) Trap	Yes	Yes

Note 1: Provide flashing clamp device for drains in areas with waterproof membrane and all drains above slab-on-grade.

Note 2: Finished areas, showers, toilets, etc.

C. FLOOR SINKS (FS)
1. Acceptable Manufacturers: Wade series 9110/9140, J.R. Smith series 3100/3150, Josam series 49000/49040, Zurn series Z-1900/Z-1910.

2. Schedule:

Plan Code	FS-1
Typical Use	Note 3
Style	Square
Size	12”x12”x8”D
Material	Cast Iron

Plan Code	FS-1
Finish	Enamel Interior
Grate	Note 1 Cast Iron
Dome Strainer	No
Sediment Bucket	Yes
Seepage Flange	Yes
Flashing Clamp	Note 2
Vandal Resistant Security Screws	No
Trap Primer Fitting	No
Funnel	No

Note 1: Provide full grate unless otherwise noted, provide 1/2 or 3/4 grate where indicated on Drawings.

Note 2: Provide flashing clamp device for drains in areas with waterproof membrane and all drains above slab-on-grade.

Note 3: Indirect waste and floor drainage for mechanical equipment rooms.

D. ROOF DRAINS

1. Acceptable Manufacturers: Wade series 3000/3200, J.R. Smith series 1010/1330, Josam series 21500/22080, Zurn series Z-100/Z-125.

2. Schedule:

Plan Code	RD
Material	Cast Iron
Size	8” nom.
Dome	Poly
Flashing Clamp	Yes
Deck Clamp	Yes
Bearing Pan/Receiver	Yes
Vandal Proof Security Screws	Yes
Adjustable Extension	No
Pipe Size	2”-4”

E. OVERFLOW DRAIN

1. Acceptable Manufacturers: Wade series 3000/3200, J.R. Smith series 1010/1330, Josam series 21500/22080, Zurn series Z-100/Z-125.

2. Schedule:

Plan Code	OD-2
Material	Cast Iron
Size	8” nom.
Dome	Poly
Flashing Clamp	Yes

Plan Code	OD-2
Deck Clamp	Yes
Bearing Pan/Receiver	Yes
Vandal Proof Security Screws	Yes
Stand Pipe	Note 1
Dam	Note 1

Note 1: Provide overflow drains with 2" high stand pipe or dam as appropriate for the style of drain furnished.

F. DOWNSPOUT NOZZLES

1. Acceptable Manufacturers: Wade series 3940, J.R. Smith series 1770, Josam series 25010, Zurn series Z-199.

2. Schedule:

Plan Code	DSN
Material	Bronze
Wall Flange	Yes
Size	2”-8”

G. FLOOR CLEANOUTS

1. Acceptable Manufacturers: Wade series 6000, J.R. Smith series 4020/4100,4200, Josam series 56000, Zurn series Z-1400.

2. Cast iron adjustable body, ABS plug.

H. WALL CLEANOUTS

1. Acceptable Manufacturers: Wade series 8560 with 8480R, J.R. Smith series 4530, Josam series 58790, Zurn series 1446.

2. Cast iron cleanout tee, ABS plug, stainless steel cover with screw.

I. SAFE PANS AND DRAIN FLASHINGS

1. Provide one of the following systems:
   a. 4 lb./sq.ft. sheet lead with 15 lb. asphaltic felt sub pan (underliner).

   b. #24 B&S gauge (0.021”) minimum sheet copper with 15 lb. asphaltic felt sub pan (underliner).

   c. 0.040” non-plasticized chlorinated polyethylene sheet with 30 lb. felt underliner.

   d. 3 ply 15 mil polyvinylchloride sheet with 30 lb. felt underliner.

J. WATER HEATER SAFETY PAN (WHSP)

1. Provide Shamrock Industries Inc. or equivalent gray polyethylene pan 2" larger than heater diameter with side or bottom drain fitting as required by drawings on electric water heaters installed above ceilings, under counters or on wood flooring.

2. Provide Ruud Mfg. Co. "Heater Pan" or equivalent spun aluminum pan with side or bottom drain fitting as required by drawings on gas fired water heaters installed on combustible foundations with 3/4" thick fire proof liner between pan and combustible construction.

K. SILLCOCK, EXPOSED, NON-FREEZE

1. Acceptable Manufacturers: Woodford series 65, J.R. Smith series 5609, Josam series 71200, Zurn series Z-1310, Wade series 8600.

2. Schedule:

Plan Code	SC-1
Freeze Proof	Yes
Vacuum Breaker	Yes
Material	Brass
Finish	Chrome
Outlet	¾” Hose Thread
Operator	Loose Key
Wall Clamp	Yes

L. HOSE BIBBS

1. Acceptable Manufacturers: As listed in Schedule.

2. Schedule:

Plan Code	HB-1	HB-2	HB-3
Typical use	Note 1	Note 2	Note 3
Material	Brass	Brass	Brass
Finish	Polished Chrome	Polished Chrome	Rough Brass
Vacuum Breaker	Yes	Yes	Yes
Outlet	3/4" Hose Thread	3/4" Hose Thread	3/4" Hose Thread
Operator	Loose Key	Lever or Tee	Tee or Wheel
Wall Flange	Yes	Yes	Yes
Chicago Faucet	No. 952	No. 13	No. 13T
Woodford	-----	24 P	24
T & S Brass	B-720	B736-POL	-----

Note 1: Toilet rooms, Janitor's mop station, etc.

M. STATIONARY PRESSURE GAUGES

1. Acceptable Manufacturers: Trerice 600C series, Weksler Regal series.

2. Schedule:

Plan Code	PG
Type	4-1/2” Dial

Plan Code	PG
Bourbon Tube/Socket	Phosphor Bronze Tube Brass Socket
Accuracy	ANSI B40.1 Grade 1A 1% F.S. over middle half of range
Case	Cast Aluminum
Window	Clear Glass
Snubber	Yes
Coil Syphon	For Steam Service
Gauge Cock	Yes
Set Hand	No
Silicone Filled	No
Weatherproof	No

3. Range: Select gauges for the following standard ranges unless otherwise indicated on drawings, or as required for special systems.
   a. Domestic Water0 to +160 psi

N. STATIONARY THERMOMETERS
1. Acceptable Manufacturers: Trerice Industrial Series, Ametek Industrial Series.

2. Schedule:

Plan code:	T-1
Type	Adjustable angle
Case	9" cast aluminum
Window	Clear acrylic
Tube	Red mercury
Stem	Aluminum, insertable
Separable Socket	Brass

3. Range: Select thermometers, for the following standard ranges unless otherwise indicated on Drawings, or as required for special systems.
   a. Heating water 30 to 240 °F
   b. Domestic cold water 0 to 100 °F
   c. Domestic hot water 30 to 240 °F

O. TEMPERATURE AND PRESSURE TEST PLUGS (T&PTP)
1. Acceptable Manufacturers: Trerice, Fairfax, Peterson Equipment (Pete's Plug).

2. Plugs suitable for vacuum to 600 psig and temperature of –20°F to 300°F with cap and extension for insulated pipe where required.

P. SHOCK ARRESTORS FOR WATER (SA)
1. Acceptable Manufacturers: Precision Plumbing Products Co., Wade Shokstop, J.R. Smith series 5000, Josam series 75000, Zurn Z-100.

2. Schedule:

Plan Code	"P.D.I." Size	Fixture Units
SA-A	A	1-11
SA-B	B	12-32
SA-C	C	33-60
SA-D	D	61-113
SA-E	E	114-154
SA-F	F	155-330

Q. REDUCED PRESSURE BACKFLOW PREVENTER
1. Acceptable manufacturers: Conbraco Series 40-200, Watts series 009 and 909, Febco series 825Y, Hersey series FRP-II.

2. Bronze body, independent spring loaded check valves, diaphragm type differential pressure relief valve, air gap drain fitting, shut-off ball valves, strainer, test cocks. Suitable for water temperature range of 33-140 °F.
3. Approved under ASSE 1013 and AWWA C511.

4. Backflow preventer test kit: Provide complete test kit including pressure gauge, test valves, high pressure hoses, adaptor fittings, mounting strap, and instructions, in a corrosion resistant carrying case.

R. PRESSURE REDUCING VALVE (PRV)
1. Acceptable Manufacturers: Watts series 25AUB, Conbraco series 36.

2. 300 psi bronze body, replaceable seat, strainer, adjustable outlet pressure, thermal expansion bypass. Suitable for water temperature up to 160°F.

3. Approved under ASSE 1003 and IAPMO.

S. TEMPERATURE AND PRESSURE RELIEF VALVES (T&P)
1. Acceptable Manufacturers: Kunkle, Watts, Conbraco, McDonnell and Miller.

22 4440 PLUMBING FIXTURES

A. SECTION INCLUDES
1. Plumbing Fixtures and Trim.

2. Plumbing Fixture Accessories.

B. REFERENCES
1. Comply with the applicable provisions and recommendations of the following:
a. ANSI A112.19.2 – Vitreous China Plumbing Fixtures.

b. ANSI A112.19.3 – Stainless Steel Plumbing Fixtures.

C. QUALITY ASSURANCE
1. Qualification:

a. Provide fixtures trim and specialties in accordance with style, type, quality and function as established by the named manufacturer and model specified for each item.

b. Provide all installations in accordance with jurisdictional code and health authorities standards, restrictions and recommendations.

c. Provide all fixtures and trim using a single manufacturer where possible, deviation will be allowed only where specifications indicate otherwise.

D. ACCEPTABLE MANUFACTURERS

1. Cast iron and vitreous china: Kohler – Eljer – American Standard – Crane - Toto.

2. Stainless steel sink 302 18-gauge minimum: Elkay – Just.

3. Terrazzo: Fiat – Florestone – Stern Williams – Bradley.

4. Water Mixing Valves Thermostatic, or Pressure Balanced: Leonard – Symmons – Kohler – Powers – Lawler.

5. Flush Valves: Sloan Royal – Delany Flushboy – Zurn.

6. Toilet Seats: Olsonite – Beneke – Sperzel – Bemis – Church.

7. Traps, Stops, Supplies, Airgaps, Drains: Kohler- Eljer – American Standard – Bridgeport – Brasscraft – Dearborn – Sayco – Frost – Eastman.

8. Chair Carriers: Josam – J. R. Smith – Zurn – Wade.

9. Faucets: Kohler – Eljer – American Standard – Bradley – Valley – Elkay – Chicago – Delta – Cambridge Brass.

10. Kitchen Equipment Trim: Fisher – Chicago Faucet – T & S Brass – Cambridge Brass.

E. PLUMBING FIXTURES: SEE DRAWINGS FOR SCHEDULES

F. LAVATORY THERMOSTATIC MIXING VALVES

1. Adjustable high temperature limit stop (factory set for 110°F), thermostatic type, inlet checkstops. Provide recessed locking stainless steel cabinet where indicated.
2. Provide valves of sizes and capacities scheduled on Drawings.
3. Models:
   a. Exposed: Leonard 210-SB, Symmons Series 5.
   b. S.S. Cabinet: Leonard TA-254-STSTL, Symmons Series 5B.

G. FIXTURE SUPPLIES & STOPS

1. Schedule:

DF & Lavatory Supplies:		(L.K. Stops, 12" Riser, 1/2 x 3/8)		
Make:	Brass Craft	Bridgeport	Frost	Dearborn

Model:	SCR 1912	1694 LK	7824-2LK	2712 KCW
DF & Lavatory Supplies:		(W.H. Stops, 12" Riser, 1/2" x 3/8")		
Make:	Brass Craft	Bridgeport	Frost	Dearborn
Model:	CR 1912	1694	7824-2	2712 SCW
Bidet & Sink Supplies:		(L.K. Stop, 20" Riser, 1/2" x 1/2")		
Make:	Brass Craft	Bridgeport	Frost	Dearborn
Model:	SCR 3920	1666 or 1786 8135-2/8218-2 None		
Bidet & Sink Supplies:		(W.H. Stop, 20" Riser, 1/2" x 1/2")		
Make:	Brass Craft	Bridgeport	Frost	Dearborn
Model:	CR 3920A	1695 MOD	7816-2	None
Water Closet Tank Supplies:		(L.K.) Stop. 12" Riser, 1/2 x 3/8)		
Make:	Brass Craft	Bridgeport	Frost	Dearborn
Model:	SCR 1912 DL	1770 LK	7925-2LK	3112 KCW
Water Closet Tank Supplies:		(W.H. Stop, 12" Riser, 1/2 x 3/8)		
Make:	Brass Craft	Bridgeport	Frost	Dearborn
Model:	CR 1912 DL	1170	7925-2	3112 SCW

H. FIXTURE CONNECTIONS

1. Provide supply and waste connections for fixtures in accordance with the following table of minimum sizes or larger as required by jurisdictional codes, or drawings.

Fixture Description:	Hot Water:	Cold Water:	Waste:	Vent:
Water Closet (WC)				
Flush Valve:	NA	1”	4”	2”
Water Closet (WC)				
Tank Operated:	NA	½”	4”	2”
Lavatory (L):	½”	½”	1-1/4”	1-1/4”
Urinal (U):				
Flush Valve:	NA	3/4”	2”	1-1/2”
Service Sinks (SS):	½”	½”	3”	1-1/2”
Sink (S):	½”	½”	1-1/2”	1-1/2”
Electric Water Cooler (EWC):	NA	½”	1-1/4”	1-1/4”

22 4450 PLUMBING EQUIPMENT

A. WATER SOFTENERS

1. Duplex, alternating water softener with brine tank and electronic regeneration controls.

22 4460 SPECIAL PLUMBING EQUIPMENT SYSTEMS

A. RELATED REQUIREMENTS

1. 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.

2. Section 230500 - Basic Mechanical Requirements.

B. SUBMITTALS
1. Submit Shop Drawings, Product Data and printed Operating Instructions and Maintenance Data.

C. WARRANTIES
1. Provide original warranties for specific equipment of term specified and in accordance with Section 230500 - Basic Mechanical Requirements.

D. GREASE INTERCEPTORS (Drawing Code GI)
1. Provide grease interceptors for outside installation, constructed of precast concrete with epoxy finish on inside in accordance with jurisdictional authorities requirements.

2. Interceptors shall be gravity type and rated for continuous flow with 4 minute minimum retention capacity at rated flow rate.

DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING

23 0500 BASIC MECHANICAL REQUIREMENTS

A. OPERATING AND MAINTENANCE DATA (O&M Manual)
1. Division 23 Contractor shall submit (3) typed and bound copies and (3) electronic (indexed pdf) copies of the operations and maintenance manual to the Owner.

B. COORDINATION
1. General: Coordinate and order the progress of mechanical work to conform to the progress of the work of the other trades. Complete the entire installation as soon as the condition of the building will permit.

2. Utility Interruptions: Coordinate mechanical utility interruptions with the Owner and the Utility Company. Plan work so that duration of the interruption is kept to a minimum.

3. Each Division 23 subcontractor shall coordinate with other contractors to make certain that any of his equipment, piping or ductwork, which is mounted on isolators or flexibly connected, does not become “grounded” by another contractors work (e.g. walls, ceiling, etc.).

C. CLEANING AND FINISHING
1. Provide cleaning in accordance with the General Conditions of the Contract and Division 1.

2. Cleaning shall include but not be limited to removing grease, dirt, dist, stains, labels, fingerprints, and other foreign materials from sight-exposed piping, ductwork, equipment, fixtures and other such items installed under Division 23 of the work. If finishes have been damaged, refinish to original condition and leave everything in proper working order and of intended appearance.

D. WARRANTIES

1. Warranty: Provide a written warranty to the Owner covering the entire mechanical work to be free from defective materials, equipment and workmanship for a period of one year after Date of Acceptance. During this period provide labor and materials as required to repair or replace defects. Provide certificates for such items of equipment, which have warranties in excess of one year. Submit to the Construction Manager/General Contractor for delivery to the Architect. Include a copy of all warranties in the Operation of Maintenance Manual.

2. This warranty will be superseded by the terms of any specific equipment warranties or warranty modifications resulting from use of equipment for construction heat or ventilation.

E. CERTIFICATES AND KEYS

1. Certificates: Upon completion of the work, deliver to the Construction Manger/General Contractor one copy of Certificate of Final Inspection.

2. Keys: Upon completion of work, submit keys for mechanical equipment, panels, etc. to the Construction Manager/General Contractor.

23 0529 BASIC MECHANICAL MATERIALS AND METHODS

A. MOTORS

1. Constructed to NEMA MG-1; 40°C, continuous duty at full load; Design “B” Polyphase induction type for 3 horsepower and larger; permanent split capacitor single phase type for ½ horsepower and smaller; open drip-proof for indoor locations, totally enclosed type for outdoor installation; Ball or roller bearings; Derate motors for project altitude (5600 ft.); High efficiency type in accordance with NEMA MG-1, except motors that are an integral part of packaged equipment may be manufacturer’s standard.

B. STARTERS

1. Provide starters for operation of all mechanical equipment; conform to Division 26 specifications.

C. IDENTIFICATION

1. Identify all service valves using brass tags indicating service and location.

2. Identify all piping using pressure sensitive markers or semi-rigid plastic markers indicating pipe contents and flow direction.

3. Identify all mechanical equipment, controls, starters, and similar equipment using engraved nameplates.

D. WARRANTIES

1. Provide original copies of all warranties and extended warranties for specific equipment where specified and in accordance with Section 230500.

23 0540 MECHANICAL SOUND AND VIBRATION CONTROL

A. RELATED WORK

1. Requirements: Provide Mechanical Sound and Vibration Control in accordance with the Contract Documents.

B. QUALITY ASSURANCE

1. The Division 23 Contractor shall be responsible for assuring that all the following sound pressure level criteria are met. Sound pressure level tests shall be carried out by the Section 230593 Contractor in compliance with the Section 230593 specifications.

2. Acoustical Criteria:

a. Noise levels due to equipment and ductwork to permit attaining sound pressure levels in all 8 octave bands in occupied spaces conforming to RC curves:

All occupied spaces ---------- RC-35

except

Occupied spaces within 15 foot radius from mechanical rooms, main supply and return duct shafts ---------- RC-40

Lobbies, Toilets, Commons Area ---------- RC-40

Kitchen ---------- RC-45-50

Garage ---------- RC-40-50

Mechanical Rooms ---------- RC-60-80

C. SUBMITTALS

1. Shop Drawings: Submit Shop Drawings and Product Data for the following items in accordance with the General Conditions of the Contract.

a. Each type of isolator including spring diameters, deflections, compressed spring height and solid spring height.
b. Sound Attenuators.
c. Sound Lining.
d. Inertia Bases.

2. Test Reports: Submit certified test reports showing compliance in accordance with General Conditions of the Contract of the following items:

a. Pressure drop and insertion loss ratings for sound attenuators.
b. Certification that sound lining meets erosion test method described in UL Publication No. 181.

D. PIPING AND EQUIPMENT ISOLATION

1. Manufacturer: Mason Industries, Inc., Vibro-Acoustics.

2. Other acceptable manufacturers offering equivalent products: Korfund, Amber/Booth Co., Vibration Mountings and Control Co., Kinetics.

3. Neoprene Mounting Pads (Specification Schedule Type 1)

a. Kinetics Noise Control Type NPD.

4. Double Deflection Neoprene Mountings (Specification Schedule Type 2)

5. Spring Isolator Mountings (Specification Schedule Type 3)

6. Restrained Spring Isolator Mountings (Specification Schedule Type 4)

7. Vibration Hangers (Specification Schedule Type 6)

8. Integral Structural Steel Base (Specification Schedule Type B)

9. Steel Rail Base (Specification Schedule Type B)

10. Concrete Inertia Bases (Specification Schedule C)

11. Flexible Butyl Hose Pipe Connectors (Up to 2")

12. Flexible Neoprene Sphere Pipe Connectors (2" to 12")

13. Braided Flexible Connectors (Drawing Code "FC")

14. Acoustical Pipe Riser Anchors:

E. SOUND ATTENUATORS

F. SOUND LININGS

1. Acceptable Manufacturer: Johns Manville Permacote, Linacoustic and Spiracoustic.

2. Other acceptable manufacturers offering equivalent products: Knauf, CertainTeed ToughGuard R.

3. Product: Fibrous glass, acrylic surface coating, stenciled NFPA, conforming to ASTM C1071, ASTM G21 and ASTM G22.

G. ADHESIVE AND SEALER

1. Acceptable Products: Adhesive, Benjamin Foster "81-99", or accepted equal, Sealer, Benjamin Foster "82-07" or accepted equal.

2. In conformance with NFPA 90A.

H. NON-HARDENING CAULKING

1. Acceptable Products: Tremco "Polybutene", Schuller or accepted equal.

I. VIBRATION DAMPERING COMPOUND

1. Acceptable Manufacturers: Soundcoat GP-1 Vibration Damping Compound, Korfund Dynamics Corporation Vibro-damp 80A, Kinetics, Vibro-Acoustics.

23 0548 MECHANICAL SEISMIC CONTROL

A. MECHANICAL SEISMIC CONTROL

1. Provide all vibration isolators, flexible connections, rigid steel frames, anchors, inserts, hangers, attachments, supports, snubbers, and bracing to comply with the current edition of the International Building Code; Provide seismic restraints of all equipment, duct, and piping. Furnish mechanical equipment with bases designed to receive seismic bracing or anchorage required for project site. Seismic engineer shall field inspect final installation and certify that bracing and anchorage are in conformance with his design.

23 0593 TESTING, ADJUSTING, AND BALANCING

A. QUALITY ASSURANCE

1. Work under this section shall be executed under the direct supervision of a Registered Professional Engineer having an established professional office in the State of Utah and having an experience record of not less than five (5) years in the mechanical contracting industry, engaged in testing, balancing and adjusting of air and hydronic mechanical systems for not less than two (2) years of that time, or, under the direct supervision of a qualified testing, adjusting and balancing supervisor, possessing certification from the National Environmental Balancing Bureau (NEBB) or from the Associated Air Balance Council (AABC).

23 0700 MECHANICAL INSULATION

A. INSULATION

1. Domestic Hot Water, Circulating, and Tempered Water: Fiberglass; entire system. Domestic Cold Water: Fiberglass; vapor barrier; horizontal piping above ceiling. Roof Drain: Fiberglass; vapor barrier; horizontal mains and vertical to drain bowl; drain bowls only on overflow drain system.

2. Heating Water: Fiberglass; entire system.

3. Outside Air Duct: Fiberglass board; vapor barrier; exterior surfaces. Supply Duct, Concealed: Rectangular duct: branch duct and round runouts – No insulation, “acoustical lining”.

4. All insulation thicknesses in accordance with current edition of the (IECC) International Energy Conservation Code.

5. Jackets: Exterior – 0.016-inch corrugated aluminum. Interior, exposed piping – all purpose insulation jacket.

6. Handicap Lavatory Insulation: Pre-molded closed cell foam insulation kit.

23 0900 ELECTRONIC CONTROLS

A. SYSTEM DESCRIPTION

1. The work includes but is not limited to the following:
   a. The automatic temperature control system shall be electronic analog, digital or a combination of both. PID (Proportional Integral, Derivative) control algorithms shall be applied on all temperature and pressure applications as called for hereinafter in the control sequences.
   b. The system shall include all control devices, valves and automatic dampers, wire, conduit, etc., as specified and required and connected so

as to perform all functions and operate according to the specified sequences.

B. QUALITY ASSURANCE

1. Manufacturing and Installation Qualifications:

a. The Controls Subcontractor firm executing the work of this section shall have 3 years experience in work of similar scope and nature to that specified.

2. This work includes all material, equipment and appurtenant accessories necessary for or incidental to the installation of a complete solid-state electromagnetic system of Automatic Temperature Controls as manufactured by Johnson, Trane, or Honeywell (installed by Wasatch Controls).

C. SUBMITTALS

1. Shop Drawings: Submit Shop Drawings and manufacturer's data.
2. Operating Instructions and Maintenance Data: Submit printed Operating Instructions and Maintenance Data
3. Certificate: ATC Contractor shall submit a letter certifying completion of the control system in accordance with the Contract Documents.

D. SENSORS & SWITCHES

E. FACILITY MANAGEMENT CONTROL SYSTEM (FMCS)

1. THE FACILITY MANAGEMENT CONTROL SYSTEM (FMCS) SHALL BE COMPRISED OF A NETWORK OF INTEROPERABLE, STAND-ALONE DIGITAL CONTROLLERS.

2. Graphical User Interface (GUI), which includes the hardware and software necessary for a user to interface with the control system and devices.

F. GRAPHICAL USER INTERFACE SOFTWARE (GUI)

1. Command of points from multiple manufacturers shall be transparent to the operator.

2. The software shall provide a multi-tasking type environment that allows the user to run several applications simultaneously. The GUI software shall run on a Windows XP 32-bit operating system. The operator shall be able to work in Microsoft Word, Excel, and other Windows based software packages, while concurrently annunciating on-line FMCS alarms and monitoring information. If the software is unable to display several different types of displays at the same time, the FMCS contractor shall provide at least two operator workstations at each location specified.

G. WEB BROWSER CLIENTS

1. The system shall be capable of supporting an unlimited number of clients using a standard Web browser such as Internet Explorer® or Netscape Navigator®. Systems requiring additional software (to enable a standard Web browser) to be resident on the client machine, or manufacture-specific browsers shall not be acceptable.

H. FIELD DEVICES

1. Provide automatic control valves, automatic control dampers, thermostats, clocks, sensors, controllers, and other components as required for complete installation.

I. GENERAL

1. Installation of the automatic control system shall be made and supervised by mechanics who are full time employees of the Controls Subcontractor.

2. All installation work shall be scheduled and coordinated with other trades to expedite job progress.

3. The installation shall match erection of slabs and walls such that no damage, cutting or patching will be required.

J. FREEZE PROTECTION THERMOSTATS

1. Provide freeze stat on the discharge of each unit to stop the fan and close the outside damper upon sensing any one foot section below 40°F.

K. ELECTRIC WIRING

1. All control and interlock wiring shall be as specified in "Electric Wiring" paragraph in Section 230529 - Basic Mechanical Materials and Methods. Provide diagrams and coordinate all work with the Division 26 contractor as required.

L. SERVICE AND WARRANTY

1. The control system herein specified shall be free from defects and workmanship and material under normal use and service.

2. The controls contractor shall after completion, provide any service incidental to the proper performance of the control system under guarantees outlined in Division 1 for the period of one year.

3. Fine Tuning Clause

a. Upon completion, the controls contractor shall provide to the owner ## hours of service to be used at the owner's discretion. These hours can be used for service, emergency service, over-the-phone assistance, repair, periodic remote or on site system monitoring, trouble-shooting, warranty issues, additional graphic modification or creation, sequence of operation modifications, loop retuning, training (whether onsite or at another location), state of the industry training, energy and/or system analysis, necessary or optional software upgrades/modifications, data trending assistance, alarm creation or maintenance service, as-built correction or modification, travel to and from the site for afore mentioned services, or other professionally reasonable owner requests.

b. Any unused hours expire 5 years after the completion of the project.

c. Hours usage shall be logged by the controls contractor and shall be divisible by a minimum of 30 minute increments.

d. The log shall include time/date of service/phone call, individual requesting the service, individual performing the service, description of the request, description of service, amount of time used to complete the service, a running total of hours used as well as hours remaining. All items shall be

cumulative so that any time a log is viewed, every service provided/requested since the project completion is shown.

e. A copy of the log shall be sent to the customer every time 5 or more hours usage has accumulated as well as on the yearly anniversary of the project's completion date.

f. The controls contractor has the option to bill for reasonable travel costs if the project is located more than 50 miles from the principal office of the controls contractor, but not the travel time. The travel time shall be subtracted from the hours of service remaining.

g. Should the all the hours be used before the end of the traditional (1) year warranty period, warranty-only items shall still be taken care of by the controls contractor at no cost to the owner.

h. The contractor shall have the option of offering additional blocks of service time hours to the customer at a rate lower than their normal service-call rate at the end of the traditional (1) year warranty period or when the initial block of service hours have been used, whichever occurs last.

i. The contractor shall have the option of reporting perceived abuses of this system by any party to the General Contractor and Engineer of Record at which time it shall be decided whether or not to nullify the remaining service hours of the initial block of service hours.

M. INSTRUCTION AND ADJUSTMENT

1. On completion of the job the controls contractor shall have completely adjusted the entire control system. He shall arrange to instruct the Owner's representative on operation of the control system and supply him with three (3) copies of the control operating and instruction manuals. He shall obtain from the owner's representative a signed receipt that he has received the instruction manuals and complete instructions on the operation of the system.

2. Record Drawing: At completion of the job the controls contractor shall furnish two (2) copies of corrected wiring diagrams, one enclosed in laminated plastic and mounted on wall of the main mechanical room or as directed.

3. Contractor Adjustments: At the completion of the job the controls contractor must submit to the Architect a letter stating that he has made final calibrations and adjustments to the system and that the owner's operating personnel have been instructed in its use.

23 1123 NATURAL GAS SYSTEM

A. NATURAL GAS PIPING

1. Provide natural gas supply from existing main on site to all new gas consuming equipment and fixtures. Include all piping, meters, valves, unions, dirt legs, hangers, supports, anchors, expansion compensators, and regulators. Include all fees and charges and costs of work done and materials furnished by utility company.

2. Interior pipe: Black steel, ASTM A53, Schedule 40, Type E Grade B or Type S Grade B, forged steel or malleable iron fittings, threaded or welded or approved corrugated stainless steel (CSST).

23 2113 HVAC PIPING AND SPECIALTIES

A. HVAC PIPING

1. Heating, Chilled and Condenser water: Black steel, ASTM A53, Type E or S, Grade B, Schedule 40, 2” and smaller screwed, larger than 2” welded or roll grooved mechanical joint coupling; copper tube ASTM B88, Type L hard drawn, smoldered or brazed. At Contractor’s option, PVC or CPVC piping with solvent welded joints may be used for the chilled and condenser water system where piping is not located inside of a return air plenum space and selected piping is capable of withstanding the system pressure.

2. Equipment Drains: Galvanized steel ASTM A53, Schedule 40, screwed; copper tube ASTM B88, Type M, hard drawn, soldered.

B. SPECIALTIES

1. Air separators: Steel, ASME rated for 125 psig, integral strainer, with automatic vent valve, blowdown connection.

2. Expansion tanks: Compression type, welded steel, ASME Section 8D tested and stamped for 125 psig, EPDM diaphragm.

C. PUMP SUCTION FITTINGS

1. Pump suction fitting shall match specified pump provided by Contractor.

D. GLYCOL FILL SYSTEM

1. Mixing Tank: 45 gallon poly drum with fittings suitable for filling, low level switch, and electric pump for charging. Pressure switch actuated controls with pre-wired control panel. Control panel shall include pump H-O-A switch and push button to silence low level alarm.

E. FLOW MEASURING STATIONS (VENTURI)

1. Venturi stations shall be one-piece bronze threaded 1/2" through 3". Sizes 2-1/2" through 8" shall consist of one-piece cadmium plated cast steel Venturi with weld neck or flanged ends.

F. BALANCING VALVES (TERMINAL EQUIPMENT)

1. Furnish and install calibrated balancing valves with screwed, sweated, or flanged connections suitable for 125 psig. Maximum working temperature shall be 250°F. Valves shall be equipped with brass readout valves fitted with an integral EPT insert and check valves designed to minimize system fluid loss during the balancing and monitoring process. Each balancing valve shall have a calibrated nameplate to assure specific valve settings, be constructed with internal seals to prevent leakage and be supplied with preformed Polyurethane insulation suitable for use on heating and cooling system.

23 2123 HVAC PUMPS

A. CENTRIFUGAL PUMPS

1. In-line: Cast iron, bronze fitted, mechanical seal, motor in accordance with 230529 and selected to be non-overloading.
2. Base Mounted: Single stage, cast iron bronze fitted, enclosed impeller, mechanical seal, flexible coupler, motor in accordance with 230529 and selected to be non-overloading.

23 2500 HVAC WATER TREATMENT

A. HVAC WATER TREATMENT

1. Pre-startup Cleaning: Clean all HVAC water systems with liquid alkaline dispersant cleaner.

B. CHEMICAL FEED

1. Closed Systems, Chilled Water: Bypass pot feeder, 175 psig working pressure, liquid borate nitrite corrosion inhibitor, azole inhibitor.

23 3300 DUCTWORK AND ACCESSORIES

A. DUCTWORK

1. Galvanized steel sheets, ASTM A527, G90 zinc coating to ASTM A525, fabricate in accordance with SMACNA duct construction standards, 1.5 radius elbows, 45 degree take-offs.

2. Flexible duct: Nonmetallic, insulated, UL 181 Class 1 air duct, polyethylene core, galvanized steel wire helix, fiberglass insulation, reinforced polyester vapor barrier, 6-inch w.g. working pressure.

3. All ductwork, hangers, fasteners, dampers, diffusers, etc. located in the NMR Labs shall be aluminum.

B. VOLUME DAMPERS

1. Rectangular, 16-gauge galvanized steel hat channel frame, 16-gauge galvanized steel blades maximum 8-inches wide, opposed blade action, suitable for velocity to 1500 fpm and pressure to 2.5-inch w.g., locking indicating quadrant regulators.

C. CONTROL DAMPERS

1. Rectangular, 16-gauge galvanized steel hat channel frame, galvanized steel double skin air foil blades maximum 6-inches wide, opposed blade action, elastometric blade edge seals, metal jamb seals.

D. MATERIALS

a. 1. Nonmetallic air ducts and connectors shall conform to UL 181 Class 0 or Class 1.

2. Steel Ducts: ASTM A525 and ASTM A527 galvanized steel sheet, lock-forming quality, having G90 zinc coating each side in conformance with ASTM A90.

b. 3. Stainless Steel Ducts: ASTM A167, Type 304.

c. 4. PVC coated steel ducts: UL 181 class 1, G60 galvanized steel sprial lockseam duct or sheets coated with polyvinyl chloride 4-mil (0.004-inch) thick on both sides. Factory fabricate fittings of same material as duct with welded seams or stainless steel rivets and PVC sealant.

a. Acceptable manufacturers: Foremost manufacturing; Norlock Metal Products; United McGill; Wheeling Service and Supply.

d. 5. Fiberglass reinforced polyester (FRP) ducts: Filament wound or hand lay-up fabrication in accordance with NBS PS 15-69 and NFPA91; visual defects shall be in accordance with ASTM D2563 Acceptance Level II; minimum 30-mil thick inner

corrosion liner; select resin for compatibility with temperature, pressure, exposure, and air stream contaminants.

a. Acceptable manufacturers: ATS Products Inc., Peabody Spunstrand.

E. LOW PRESSURE DUCTWORK

1. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards and ASHRAE handbooks, except as indicated. Provide duct material, gauges, reinforcing, and sealing for operating pressures specified or as indicated on drawings.

F. MEDIUM PRESSURE DUCTWORK

1. Fabricate and support in accordance with SMACNA HVAC Duct Construction Standards and ASHRAE handbooks, except as indicated. Provide duct material, gauges, reinforcing, and sealing for operating pressures specified or as indicated on drawings.

23 3400 AIR HANDLING FANS

A. CABINET FANS

1. Cabinet shall be constructed of steel with removable panels for access to all internal parts.

B. CENTRIFUGAL FANS, UTILITY SET

1. Type: To be of the centrifugal type, completely assembled with fan, fan cscroll, motor, belt drive, motor mount and motor housing.

C. CENTRIFUGAL FANS

1. Type: The fans to be backward inclined air-foil type completely assembled with fan, fan scroll, motor, belt, drive, belt guard and motor mount, capacity and arrangement as shown on the Drawings, and certified performance tests by Air Moving and Conditioning Association (AMCA) to be submitted with the shop drawing.

D. PROPELLER TYPE VENTILATION FAN

1. Type: Shall be of the belt driven type.

E. POWER ROOF VENTILATORS

1. Furnish and install power roof ventilators of model, size, and capacity as shown on drawings.

F. EXHAUST FANS (CEILING TYPE)

1. Type: Shall be of the centrifugal fan, integral grille and housing type, all completely self-contained with backdraft damper and UL listed.

23 3600 AIR TERMINAL UNITS

A. VAV LOW PRESSURE ZONE TERMINAL UNITS

1. Terminal units designated of sizes shown on drawings or terminal unit schedule. Units shall have factory catalog performance ratings which conform to cfm, static pressure, discharge and radiated sound power and attenuation designated.

23 5100 BREECHINGS, CHIMNEYS, STACKS, AND FLUES

A. TYPE B FLUE VENTS

1. General: Provide double wall gas vents, UL-listed for Type B, consisting of double wall metal construction pipe sections and fittings and accessories required for complete installation.

B. POSITIVE PRESSURE CHIMNEY AND MANIFOLD SYSTEM
1. General: Provide double wall metal chimney, UL-listed for use with building heating equipment burning gas, solid or liquid fuels as described in NFPA 211, Section 2-3.1, and Appendix A.

23 5200 BOILERS

A. CONDENSING BOILER
1. Description: Factory-fabricated, -assembled, and -tested, condensing boiler with heat exchanger sealed pressure tight, built on a steel base; including insulated jacket; flue-gas vent; combustion-air intake connections; water supply, return, and condensate drain connections; and controls. Water heating service only.

23 5700 HEAT TRANSFER

A. UNIT HEATER (HORIZONTAL BLOW)
1. Type: Unit heater shall be of the horizontal blow thru propeller fan type with hot water heating coil, capacities as shown on the drawings.

B. PLATE AND FRAME HEAT EXCHANGERS
1. Heat exchangers shall be plate and frame type, with frame sized to accommodate 50% extra plates. Frame shall be bolted to facilitate disassembly for cleaning. Provide gaskets between plates compatible with fluids in each piping system.

C. RADIANT FLOOR HEATING AND COOLING SYSTEM
1. Pipe shall be crosslinked polyethylene rated at 180°F maximum working temperature and 100 psi working pressure. Pipe shall be nominal 5/8” diameter and shall be manufactured in accordance with ASTM Standard F876877.

D. FAN COIL UNITS
1. Units shall consist of coils, drain pan assembly, filter, and centrifugal fan with drive mounted in a common cabinet for independent air delivery from a single unit. Units shall be complete except for controls. All oiling connections shall be extended to exterior of casing to facilitate maintenance without removing sound proofing on exterior of unit.

23 7410 AIR HANDLING UNIT WITH COILS

A. CUSTOM AIR HANDLING UNITS
1. Manufactured Units: General Description: Factory assembled, consisting of fans, motor and drive assembly, coils, dampers, plenums, filters, drip pans, evaporative media sections, and mixing dampers. Provide factory-fabricated and factory-tested air-handling units of sizes and capacities as scheduled.

DIVISION 25 - INTEGRATED AUTOMATION

Not Used

DIVISION 26 - ELECTRICAL

Not Used - See Basis of Design Section 10

DIVISION 27 - COMMUNICATIONS

Not Used

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

Not Used

DIVISION 31 - EARTHWORK

31 11 00 Clearing and Grubbing

A. Section Includes:
1. Protection of site improvements not scheduled for clearing which might be damaged by construction.
2. Clearing and grubbing of designated vegetation, debris, rubbish and site improvements.
3. Temporary erosion control, siltation control and dust control.
4. Temporary protection of adjacent property, structure, benchmarks and monuments.
5. Removal of foundations, footings and other previous building residue.
6. Temporary water control facilities.
7. Removal and legal disposal of cleared materials.
8. Top soil removal and storage.
9. Removal of asphalt and Portland cement concrete.

31 20 00 Earthwork

A. Section includes:
1. Site preparation and grading.
2. Building excavating and backfilling.
3. Trenching, backfilling and compacting for building, site improvements and site utilities.
4. Rock/caliche excavation without blasting unless authorized.
5. Materials for subbase, drainage fill, and backfill for slabs, pavements and improvements.
6. Supply of additional materials from off-site if required.
7. Excavation and grading for site paving, curbs and sidewalks.
8. Removal and legal disposal of excavated materials.
9. Finish grading.

B. Materials
1. Subbase Material: As recommended in the Geotechnical Investigation Report.
2. Fill and Backfill Materials: Satisfactory soils materials free of clay, rock or gravel,

not larger than 2 inches in any dimension, free of debris, waste, vegetation and other unsuitable materials.

3. Drainage Fill: Washed, evenly graded mixture of crushed stone and gravel, with 100 percent passing a 1-1/2 inch sieve and not more than 5 percent passing a No. 4 sieve or as recommended in the Foundation Investigation Report and Recommendations.

31 31 00 Soil Treatment

A. Section Includes:
1. Pretreatment to provide chemical barrier to protect buildings and contents against attack by subterranean termites.
2. Treatment of site and areas as indicated to remove vegetation growth.

B. Applicator Qualifications: Registered applicator with 5 years experience and licensed by the applicable agency in the State of Utah.

C. Regulatory Requirements: Chemicals shall be approved for use and registered by Environmental Protection Agency (EPA) and the applicable agency in the State of Utah.

D. Warranty
1. Warrants effectiveness of the soil treatment against subterranean termite infestation for a period of not less than 5 years from acceptance and completion date of Project.
2. Warrants effectiveness of soil treatment against vegetation growth for a period of six (6) months.

E. Termite Treatment: Apply one of the following chemicals as a water emulsion (no oil solutions permitted):
1. Dragnet FSR (Permethrin), FMC Corporation.
2. Torpedo (Permethrin); ICI Americas, Inc.
3. Biflex TC (3rd generation synthetic pyrethroid), FMC Corporation
4. Prelude (Permethrin); Zeneca Professional Products, Wilmington DE
5. Prevail FT (Cypermethrin); FMC Corporation
6. Talstar (Bifenthrin), FMC Corporation.
7. Termidor (Fipronil)
8. Premise (Imidacloprid)
9. Demon TC (Cypermethrin)

F Vegetation Treatment:
1. Chemical Control: Roundup or Doomsday.
2. Pre-Emergent: Surflan, Dacthal or approved equal.

G. Termite Control Application: In accordance with Manufacturer's recommendations, and local codes and regulations.
1. Provide applicator trucks with approved measuring flow meters.
2. Apply chemicals on soils and compacted ABC fill materials under entire subsurfaces of concrete floor slabs and slabs abutting building walls in quantities and locations stated on label.

H. Vegetation Control Application: Apply chemical to on-site landscape areas and landscape portions of public street right-of-ways of site.

1. Chemical Control: Prior to planting operations, provide 2 applications over unwanted vegetation.
2. Pre-emergent: Post landscape planting operations. Comply with manufacturers label for application and protection of existing landscape planting.

31 50 00 Excavation Support and Protection

A. Soldier Piles: Install steel soldier piles before starting excavation. Extend soldier piles below excavation grade level to depths adequate to prevent lateral movement. Space soldier piles at regular intervals not to exceed allowable flexural strength of wood lagging. Accurately align exposed faces of flanges to vary not more than 2 inches (50 mm) from a horizontal line and not more than 1:120 out of vertical alignment.

1. Install wood lagging within flanges of soldier piles as excavation proceeds. Trim excavation as required to install lagging. Fill voids behind lagging with soil, and compact.

B. Sheet Piling: Before starting excavation, install one-piece sheet piling lengths and tightly interlock to form a continuous barrier. Accurately place the piling, using templates and guide frames unless otherwise recommended in writing by the sheet piling manufacturer. Limit vertical offset of adjacent sheet piling to 60 inches (1500 mm). Accurately align exposed faces of sheet piling to vary not more than 2 inches (50 mm) from a horizontal line and not more than 1:120 out of vertical alignment. Cut tops of sheet piling to uniform elevation at top of excavation.

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 12 16 Asphaltic Concrete Paving

A. Section includes asphaltic concrete (hot-mixed) paving and Aggregate Base Course over Prepared Subbase:

1. On-site Roadways.
2 Parking areas.
3. Driveways.

B. Materials:

1. Aggregate Base Course: Type II with 85% minimum fractured faces per USSPWC.
2. herbicide Treatment: commercial chemical for week control registered by EPA and acceptable to authorities having jurisdiction.
3. Prime and Tack Coats:
   a. Prime coat: Homogenous, medium curing, liquid asphalt MC-70 per USSPWC.
   b. Tack coat: Homogenous, slow setting, liquid asphalt SS-1h or CCS-1h per USSPWC.

4. Asphaltic Concrete Paving:
   a. Asphalt cement: Conform to the requirements of AI PCD-7 in accordance with schedule below. Mixing temperature to be not less than 250 degrees F., or higher than 325 degrees F.

Grade	Time of Asphalt Placing
AR40	October through May
AR80	June through September

b. Aggregate for Bituminous Base and Surface Course Mix: Type 3 aggregate, USSPWC Section 705.03 (1/2 inch maximum aggregate size). The maximum allowable water absorption of coarse and fine aggregate shall not exceed 2.5 percent when tested in accordance with ASTM C127 for coarse aggregate and ASTM C128 for fine aggregate.

c. Normal amount of asphalt cement to be added to the aggregate, by weight, to be 5.0 to 6.0 percent of the weight of the admixture.

d. Job-mix formula shall indicate percentage passing for each specified sieve size of mineral aggregate and percent of asphalt to be used for each asphalt concrete mixture to be incorporated on Project. Job-mix formula (gradation), with allowable tolerances for a single test, to be used for job control. Single test variation tolerance is shown in following table. In no event shall less than 2 percent of mineral aggregate pass a No. 200 sieve.
No. 4 and larger: +/- 7
No. 30: +/- 5
No. 200: +/- 2
Asphalt, percent by weight of mix: +/- 4

C. Installation: Base and asphaltic concrete paving thickness in accordance with recommendations of the Geotechnical Investigation Report.

D. Construction Tolerances:
1. Aggregate Base Course Thickness: 1/2 inch variance.
2. Surface Course Thickness: 1/4 inch variance.
3. Base Course Smoothness: 1/4 inch over 10 foot straightedge.
4. Surface Course Smoothness: 3/16 inch over 10 foot straightedge.
5. Crowned Surfaces: 3/16 inch variance from 10 foot template.

32 13 13 Concrete Curbs Gutters, Sidewalks and Driveways

A. Section includes cast-in –place concrete paving over Prepared Subbase for:
1. Driveways.
2. Vehicular entrances.
3. Walkways.
4. Curbs and gutters.
5. Dock parking.

B. Concrete Materials and Mixing: Comply with USSPWC and the following:
1. Portland Cement: ASTM C150, Type V.
a. Aggregate: ASTM C33, normal weight.
b. Water: Potable.
c. Design Mix: ASTM C94, 3000 psi, 28 day minimum compressive strength.
d. Slump Limits: 8 inches minimum with superplasticizer, 3 inches otherwise.
e. Air Content: 5 to 8 percent.
f. Finishes: Broom finish, integral colored, stamped, sandblasted and other

special finishes, as selected by Architect.

2. Reinforcing Materials: As specified in Section 03200.
3. Expansion/contraction joint: Preformed, PVC clad.
4. Pavement Joint Sealants and Backer Materials: In accordance with Section 07900.

C. Joints: 1/8 inch wide by 1-1/2 inch deep tooled (or sawcut) joints at 8'-0" center maximum, each direction.

D. Construction Tolerances:
1. Grade and alignment of top of forms: 1/8 inch in 10'-0".
2. Vertical face on longitudinal axis: 1/4 inch in 10'-0".

32 17 13 Parking Bumpers

A. Section includes precast concrete parking bumpers with anchor pins for attachment to asphalt pavement surfaces or epoxy type adhesive for attachment to concrete pavements.

32 17 23 Pavement Markings

A. Section includes traffic marking and striping for pavement and curbs.

B. Traffic Surface Paint: Provide one of following or as approved.
1. Dunn-Edwards: Vin-L-Stripe W8D1 Series acrylic latex.
2. Sherwin-Williams: Acrylic Waterborne Traffic Marking Paint.
3. ICI Dulux: 22683 (white), 22685 (yellow), 26564 (red) or 20090 (handicap blue) ICI Performance Coatings waterborne traffic paint.
4. Frazee: 502 Traffic Line Paint – Acrylic.
5. Pervo: 3080 (white), 3082 (yellow), 3083 (green) or 3084 (black) Water Borne Traffic Coating and 3033 Dark Handicap Blue Traffic Line Paint – Waterborne.

C. Traffic Marking Tapes: 3M Series A3801 Tape, L3801 Sheeting and SMS-L3801 Precut Symbols

D. Colors: As follows, unless otherwise indicated on Drawings.
1. Stall Striping and Traffic Markings: Traffic White. Traffic Yellow at "No Parking" areas.
2. Accessible Parking Markings: Traffic Blue for symbols and Traffic Yellow for line markings as indicated.
3. Fire Lanes: Red
4. Roadways: Per Drawings and USSPWC.

E. Reflectorized Raised Pavement Markers: Comply with USSPWC.

32 30 00 Traffic Control Signs

A. Section Includes:
1. Fire lane signs.
2. ADA parking signs.
3. Stop signs.
4. other required traffic control signs.

B. Materials:
1. Metals: New stock, free from defects impairing strength, durability or appearance.
2. Plastics: New stock, free from defects and of the best quality available.
3. Paints: Type made for the surface material on which it is to be applied and recommended by the manufacturer of the paint. No paint that will fade, discolor or delaminate as a result of proximity to UV light sources or heat therefrom shall be used.
4. Signage Supports: Steel pipes with welded steel caps. Paint with acrylic polyurethane enamel.

C. Fabricate in accordance with Standard Details and as indicated on drawings.

32 31 19 Ornamental Fences and Gates

A. Section includes prefinished square steel tube fences and gates fabricated from stock components.

B. Materials: Commercial quality steel strip, degreased and hot dipped zinc coated on interior and exterior surfaces. Basic shapes shall be cold rolled and electrically welded with welded areas protected by a zinc rich paint to prevent corrosion.
1. Steel: ASTM A36, hot-rolled sections for bars, angles, channels and other miscellaneous steel.
2. Steel Pipe: ASTM A53.
3. Tube: ASTM A500, Grade B.
4. Anchor and Expansion Bolts: ASTM A307 anchor bolts, unless otherwise noted. Expansion bolts to have I.C.B.O. rating for material into which the installation takes place. Furnish anchor and expansion bolts with steel washers.
5. Paint: VOC compliant rust-inhibitive primer for exterior application.

32 80 00 Landscape Irrigation System

A. Section includes the following for landscape irrigation system:
1. General Requirements
2. Products:
a. Pipe
1) All piping, (except flex swing pipe) shall be Schedule 40 P.V.C.
2) Main Line Pipe 2 1/2” and smaller shall be Schedule 40, P.V.C.
3) Main Line Pipe 3 inches inside diameter and larger shall SDR-21, Class 200, 200 psi pipe, withHarco ductile iron fittings
4) All gasketed pipe fittings must be thrust-blocked
5) Lateral Pipe shall be either solvent weld or threaded connections.
6) Flex Swing Pipe shall be Thick-Walled Poly Pipe
b. Sleeves
1) Minimum sleeve size shall be 4 inch,PVC Class 200 SDR 21.
c. Irrigation Fittings
1) Main Line Pipe 2 1/2” and smaller solvent weld fittings on PVC main lines shall be schedule 80. Harco ductile iron fittings are required for all change of direction on 2-1/2” or larger PVC IPS main lines.
2) All PVC threaded connections in and out of valves shall be made using Schedule 80 toe nipples and Schedule 40 couplers or socket fittings.

3) Lateral Pipe 2 1/2” and smaller shall be solvent weld fittings on Schedule 40 PVC

d. Backflow Preventer and Enclosure
1) Reduced Pressure Principle Backflow Preventer installed above ground in an enclosed stainless steel enclosure.
2) Manual Drains shall be located upstream and downstream of the Assembly.
3) A Quick Coupler shall be located near the backflow preventer assembly, just downstream of the manual drain. Installation shall be as per the Drawings.

e. Master Valve
f. Electric Remote Control Valves
g. Isolation Valve.
h. Stop and waste
i. Hose bibs
j. Quick Coupler Valve
k. Valve Boxes
l. Electric Controller
1) The controller shall be a Rain Bird Maxicom System
m. Wire
n. Washed Aggregate
o. Irrigation Heads
p. Thrust Block

3. Execution:
a. General.
b. Pipe and Fitting Installation.
c. Pipe Sleeving Installation.
d. Mainline Isolation Valve Installation.
e. Valve Box Installation.
f. Wire Installation.
g. Controller Installation.
h. Check / Text / Start-Up Adjust.
i. Winterization.
j. Cleaning and Adjusting.
k. Acceptance and Operation by Owner.
l. Guarantee.
m. Clean Up.

32 93 00 Landscaping

A. Section includes the following for landscape planting:
1. General Requirements
2. Products:
a. Turf.
b. Tree and Shrub.
c. Groundcover and Perennial.
3. Execution:
a. Examination.
b. Preparation.
c. Lawn Preparation and Sodding.
d. Lawn Renovation.
e. Satisfactory Lawns and Guarantee.

f. Plant Bed Establishment.
g. Tree and Shrub Excavation and Planting.
h. Tree and Shrub Pruning.
i. Mulching.
j. Clean Up and Protection.
k. Disposal.

32 94 00 Soil Preparation and Soil Mixes

A. Section includes the following for Soil Preparation and Fine Grading:
1. General Requirements
2. Products:
a. Topsoil.
1) Existing soil may be considered for use as topsoil borrow (in lieu of imported topsoil) if the following requirements are met:
a) Topsoil Analysis for the existing soil is provided as required in this specification.
b) All other requirements for imported topsoil listed in this section are also met.
2) Topsoil borrow shall meet all specifications below for either "Ideal" or "Acceptable" categories. Soil that falls within the "Not-Acceptable" range shall not be used.

B. TOPSOIL QUALITY

Category	**pH**	**Soluble Salts dS/m or**	**Sodium Absorption Ratio (SAR)**	**Organic Matter %**	**Sand %**	**Silt %**	**Clay %**	**Texture Class**
Ideal	5.5-7.5	<2	<3	≥2.0	<70	<70	<30	Loam (L), Silt Loam (SiL)
Acceptable	5.0-8.2	<4	3 to 7 SiL, SiCL, CL 3 to 10 SCL, SL, L	≥1.0	<70	<70	<30	Sandy Clay Loam (SCL) Sandy Loam (SL) Clay Loam (CL) Silty Clay Loam (SiCL)
Not-Acceptable	<5.0 >8.2	>4	>10	<1.0	≥70	≥70	≥30	Loamy Sand (LS) Sandy Clay (SC) Silty Clay (SiC) Sand (S), Silt (S), Clay (C)

1. Organic Soil Ammendments.
a. Peat Moss
b. Compost
c. Fertilizer

d. Mulch
2. Execution:
a. Examination
b. Preparation.
c. Fine Grading.

32 95 00 Tree Protection

A. Section includes on protection of Existing Trees per University of Utah Guidelines.

DIVISION 33 - UTILITIES

33 05 05 Ductile Iron Pipe

A. Section Includes:
1. Ductile iron pipe, couplings, fittings, and joint materials.

B. Products:
1. Pipe and Fittings
a. Buried Applications
b. Above Ground Applications
2. Coverings

C. Installation:

33 05 06 Polyethylene Pipe

A. Section Includes:
1. Polyethylene pipe, couplings, fittings and joint materials

B. Products:
1. Smooth Wall Pipe Systems
2. Corrugated Wall Pipe Systems
3. Nuts and Bolts

C. Installation:

33 05 07 Polyvinyl Chloride Pipe

A. Section Includes:
1. Polyvinyl Chloridee pipe, couplings, fittings and joint materials

B. Products:
1. Gravity Systems
2. Pressure Systems
3. Perforated Pipe Systems
4. Solvent Welds

C. Installation

33 05 25 Pavement Restoration

A. Section Includes:
1. Aggregate Base Restoration
2. Concrete Base Restoration

3. Surface Restoration

B. Submittals:
1. Mix Design
2. Manufaturer's chemical additive data sheets
3. LEED Submittals

C. Products:
1. Materials

D. Execution:
1. Preparation
2. Aggregate Base or Flowable Fill Base
3. Concrete Substrate
4. Asphalt Concrete Patch
5. Portland Cement Concrete Patch
6. Concrete Pavers
7. Pavement Markings

33 08 00 Commissioning of Water Utilities

A. Section Includes:
1. Testing Requirements for Potable and non-potable water piping systems.

B. Submittals:
1. Pipeline Test Report

C. Project Conditions:

D. Warranty:

E. Products:
1. Testing Materials

F. Execution:
1. Preparation
2. Alignment and Grade Test
3. Pressure Test
4. Obstruction and Deflection Test
5. Infiltration Test
6. Pipe Testing Schedule

33 11 00 Water Distribution and Transmission

A. Section Includes:
1. Water distribution and transmission system identification, valves, boxes, service connections and accessories
2. Potable and non-potable water pressure systems

B. Performance Requirements:
1. Depth of cover
2. Removal of existing pipeline
3. Conflicts

C. Submittals
1. Product Data
2. Commissioning
3. Record Documents
4. Operating and Maintenance
5. LEED Submittals

D. Products
1. Pipes and Fittings
2. Valves
3. Valve Boxes
4. Valve Chambers
5. Mortar, Grout and Concrete
6. Tapping Saddles
7. Service Connection
8. Accessories

E. Execution:
1. Examination
2. Preparation
3. Location Potable Water Pipe
4. Installation – Pipe and Fitting, Concrete Thrust Blocks, Valves, Valve Boxes, Taps, Service Lines, Disinfection, Backfilling, Surface Restoration

33 12 16 Water Valves

A. Section Includes:
1. Gate, Butterfly, plug, check, pressure reducing, pressure relief, control valves and their installation.

B. Submittals:
1. Technical Information
2. LEED Submittals

C. Products:
1. Valves – Gate, Butterfly, Eccentric Plug Valves, Check Valves, PRV, Control Valves

D. Installation:

33 12 19 Hydrants

A. Section Includes:
1. Dry-Barrel fire hydrants, valves, piping and accessories.

B. General:
1. Product Handling
2. Submittals
3. Job conditions

C. Products:
1. Dry-Barrel Fire Hydrant
2. Piping and Fittings

3. Valves
4. Accessories

D. Execution:
1. Preparation
2. Installation
3. Backfilling
4. Paint
5. Field Quality Control

33 12 33 Water Meter

A. Section Includes:
1. Water Meters, Service Connections, Materials.

B. General:
1. References
2. Submittals

C. Products:
1. Meters for System Piping
2. Meters for Service Piping
3. Service Line, Valves, and Fittings
4. Meter Boxes

D. Execution:
1. Installation

33 13 00 Disinfection

A. Section Includes:
1. Disinfection of potable water
2. Test and Report Results

B. General:
1. References
2. Submittals
3. Quality Assurance
4. Product Handling
5. Regulatory Requirements

C. Products:
1. Disinfectant
2. Alkali
3. Acid

D. Execution:
1. Preparation
2. Disinfection of Water Lines
3. Field Quality Control

33 31 00 Sanitary Sewer Systems

A. Section Includes:

1. Gravity Sewer Systems

B. General:
1. References
2. Performance Requirements
3. Project Conditions
4. Acceptance

C. Products:
1. Piping and Fittings
2. Mortar, Grout and Concrete
3. Manholes

D. Execution:
1. Preparation
2. Installation – Pipe, Fittings, Manholes
3. Abandoned Utilities
4. Tap Connections – 6 Inches and Smaller, Larger than 6 Inches
5. Joints
6. Backfilling
7. Cleaning
8. Surface Restorations

33 41 00 Storm Utility Drainage Piping

A. Section includes gravity and forced storm piping, underground structures and specialties outside the building.
1. Storm drain piping materials
   a. Reinforced concrete pipe
   b. High density polyethylene pipe
2. Components
   a. Cleanouts
   b. Trench drains with cast iron grate
   c. Manholes
   d. Catch basins
   e. Storm water detention structures
   f. Pipe outlets

33 46 00 Subdrainage

A. Section includes drainage for foundations, underslabs, plaza decks, retaining walls and landscaped areas.
1. Materials
   a. Perforated HDPE pipe and fittings
   b. Perforated PVC pipe and fittings
   c. Solid wall HDPE pipe and fittings
   d. Solid wall PVC pipe and fittings
   e. Cleanouts

END OF OUTLINE SPECIFICATION

LASSONDE STUDIOS

UNIVERSITY OF UTAH ◦ SALT LAKE CITY, UTAH

STATE OF UTAH - DEPARTMENT OF ADMINISTRATIVE SERVICES

DIVISION OF FACILITIES CONSTRUCTION AND MANAGEMENT
DFCM PROJECT NO. 13285750
UNIVERSITY OF UTAH PROJECT NO. 21388
SCHEMATIC DESIGN SUBMITTAL
05/23/2014

OWNER
DFCM
DEPARTMENT OF ADMINISTRATIVE SERVICES
DIVISION OF FACILITIES CONSTRUCTION
AND MANAGEMENT
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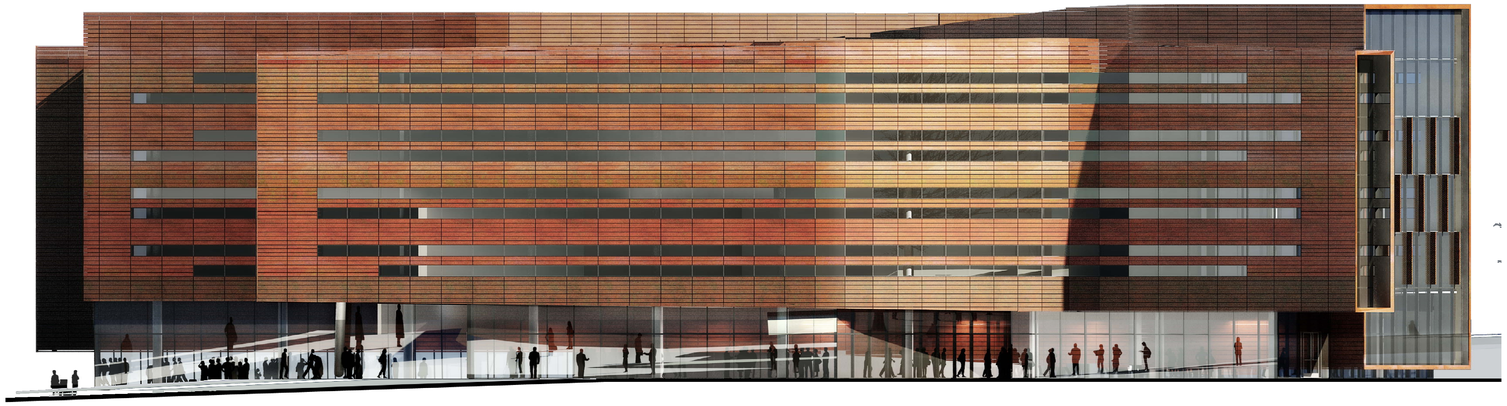
WWW.EDAARCH.COM



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Issue Date
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UNIVERSITY OF UTAH Project Name

GENERAL NOTES

1.GENERAL NOTES
A. ALL WORK SHALL CONFORM TO THE GOVERNING CODE AND THE CONTRACT DOCUMENTS.
B. WHERE ONLY PART OF THE WORK IS INDICATED, SIMILAR PARTS SHALL BE CONSIDERED REPETITIONS. WHERE ANY DETAIL IS SHOWN AND THE COMPONENTS ARE DESCRIBED ELSEWHERE SIMILAR DETAILS SHALL BE CONSTRUCTED AS DESCRIBED IN ORGINAL DETAILS. IF CONSTRUCTION DOCUMENTS ARE NOT CONSISTENT WITH SPECIFICATIONS, VERITY IWTH UNIVERSITY REPRESENTATIVE AND ARCHITECT FOR CLARIFICATION.
C. DRAWINGS ARE GENERIC IN NATURE. CONTRACTOR SHALL FULLY COORDINATE ALL ASPECTS OF THE WORK PERFORMED. DETAILS ARE NOT INTENDED TO SHOW METHOD AND MANNER OF ACCOMPLISHING THE WORK.
D. VERIFY ALL DIMENSIONS, ELEVATIONS, AND ALL EXISTING CONDITIONS AT THE SITE BEFORE COMMENCING WORK AND REPORT ANY DISCREPANCIES TO THE ARCHITECT AND UNIVERSITY.
E. SHOULD A CONFLICT BE DISCOVERED WITHIN THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL BE DEEMED TO HAVE INCLUDED IN THE WORK THE HIGHEST QUALITY WAY OF PERFORMING THE WORK UNLESS A DECISION IN WRITING FROM THE ARCHITECT AND UNIVERSITY IS ASKED FOR AND OBTAINED.
F. FIELD ENGINEERING BY CONTRACTOR: PROVIDE ALL SURVEY WORK REQUIRED FOR HORIZONTAL AND VERTICAL LOCATION OF WORK OF THIS PROJECT.
G. FIELD REPORTS: WHEN REQUESTED BY THE UNIVERSITY'S REPRESENTATIVE, OR REQUIRED BY THE SPECIFICATIONS, PROVIDE MANUFACTURER'S FIELD REPORTS DOCUMENTING THE MANUFACTURER'S REPRESENTATIVE'S SITE VISITS.
H. CONSTRUCT FIRE AND/OR SMOKE RATED ASSEMBLIES IN THEIR ENTIRETY PRIOR TO NON-RATED ASSEMBLIES.
I. PROVIDE ACCESS PANELS OF APPROPRIATE SIZE, TYPE, AND FIRE RATING FOR ALL CONCEALED ITEMS THAT REQUIRE ADJUSTMENTS, MAINTENANCE, MONITORIING, ETC. COORDINATE LOCATION WITH ARCHITECT.

2. CODES
A. ALL CONSTRUCTION SHALL COMPLY WITH THE APPLICABLE CODES AS ADAPTED BY THE REGIONAL, STATE, AND NATIONAL AUTHORITIES HAVING JURISDICTION. SEE APPLICABLE CODES LISTED ON THIS SHEET.
B. LIFE SAFETY PATH OF EGRESS FROM FLOOR LEVEL TO EXTERIOR IS INDICATED ON CODE ANALYSIS SHEETS.
C. FIRE ACCESS/ACCESSIBILITY COMPLIANCE SITE PLAN IS SHOWN ON SITE PLAN.
D. ACCESSIBILITY COMPLIANCE DETAILS SHALL BE APPLIED WHEREVER APPLICABLE, WHETHER OR NOT REFERENCED ON THE PLANS.

3. COORDINATION AND VERIFICATION
A. THE DRAWINGS ARE DIVIDED INTO SEPARATE SHEETS AND THE PROJECT SPECIFICATION INTO SEPARATE SECTIONS FOR GENERAL CONVENIENCE ONLY. SHEET DESIGNATION OR NUMBERS SHALL NOT BE CONSIDERED TO LIMIT AREAS OF WORK, RESPONSIBILITY OR TRADES. COORDINATE THE WORK SHOWN ON THE DRAWINGS AND IN THE PROJECT SPECIFICATION IN ORDER TO COMPLETE THE PROJECT AS DESIGNED.
B. VERIFY ALL SIZES OF, AND PREPARE WORK FOR, EQUIPMENT OF OTHERS AND COORDINATE WORK ON THIS CONTRACT WITH ITEMS OR WORK NOT IN CONTRACT (N.I.C.) OR WORK FURNISHED BY OTHERS.
C. LOCATIONS AND SIZES OF MECHANICAL, ELECTRICAL, PLUMBING AND FOOD SERVICE EQUIPMENT ARE BASED ON AVAILABLE INFORMATION. PROVIDE AND COORDINATE THE EXACT DIMENSIONS, SIZES AND POSITIONS.
D. PROVIDE AND COORDINATE THE EXACT DIMENSIONS, SIZES AND POSITIONS OF OPENINGS IN SLABS AND WALLS NECESSARY FOR THE INSTALLATION OF THE WORK. SEE EDGE OF SLAB DRAWINGS IN ARCHITECTURAL SERIES.
E. PROVIDE REINFORCING STEEL, MESH, AND DOWELS REQUIRED BY THE STRUCTURAL GENERAL NOTES AND DRAWINGS FOR ARCHITECTURAL DETAILS INDICATED ON THE ARCHITECTURAL DRAWINGS.
F. QUANTITIES INDICATED ON THE DRAWINGS ARE APPROXIMATE. CONTRACTOR SHALL VERIFY QUANTITIES AND INCLUDE ACCURATE QUANTITIES AS PART OF THE WORK.
G. NOTES ON DETAILS: SPECIFIC NOTES OR KEYNOTES ON DETAILS APPLY TO SIMILAR CONDITIONS ON OTHER DETAILS ON ALL DRAWINGS UNLESS SPECIFICALLY NOTED OTHERWISE.
H. COORDINATE THE WORK OF ALL TRADES WITHIN THE SAME AREA. CRITICAL AREAS ARE TYPICALLY THOSE WHICH MAY BE CONGESTED, INCLUDING, BUT NOT LIMITED TO, AREAS ABOVE THE CEILING, BELOW GRADE, ELECT. ROOMS, MECH. ROOMS, CORRIDORS, AND SHAFTS.
I. BEFORE BEGINNING WORK REQUIRING MULTI-TRADE COORDINATION, CONTRACTOR SHALL PREPARE COORDINATION DRAWINGS FOR REVIEW. THESE DRAWINGS SHALL DEPICT THE ACTUAL CONDITIONS, INCLUDING ALL ELEMENTS, FOR A COMPLETE INSTALLATION, INCLUDING ALL PERTINENT TRADES.

4. UTILITIES AND DEMOLITION
A. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR LOCATION AND PROTECTION OF ALL EXISTING UTILITY LINES.
B. THE DRAWINGS SHOW DIAGRAMMATICALLY THE APPROXIMATE LOCATION OF UNDERGROUND UTILITIES WHERE INFORMATION IS AVAILABLE, BUT THE DRAWINGS MAY NOT BE EXACT AS TO THE QUANTITY, EXTENT, OR LOCATION.
C. CONTRACTOR SHALL POTHOLE TO LOCATE EXISTING UTILITIES PRIOR TO START OF DIGGING, TRENCHING, OR ANY TYPE OF SITE EXCAVATION.
D. THE CONTRACTOR SHALL MAINTAIN UTILITIES TO EXISTING ADJACENT BUILDINGS OR PROVIDE TEMPORARY SERVICE CONNECTIONS
E. CONTRACTOR SHALL MAINTAIN UTILITIES TO EXISTING BUILDINGS DURING TOTAL DEMOLITION AND CONSTRUCTION PHASE.
F. ALL SITE DEMOLITION INFORMATION IS SHOWN ON CIVIL DRAWINGS.

5. DIMENSIONS AND LAYOUT
A. DO NOT SCALE DRAWINGS.
B. ELEVATIONS AND VERTICAL DIMENSIONS ON ARCHITECTURAL DRAWINGS ARE TO TOP OF FINISH CONCRETE SLAB, EXCEPT FOR DEPRESSED SLAB AREAS FOR FLOOR TILE WHERE ELEVATION HEIGHTS ARE TO FACE OF FINISH MATERIAL.
C. DIMENSIONS ARE GIVEN TO FACE OF WALL (SEE PARTITION TYPE SHEETS A10.00 SERIES), UNLESS NOTED OTHERWISE BY FOLLOWING:
1. COLUMN CENTER LINE -
2. CENTER LINE OF STUD -
3. FACE OF CONCRETE - F.O.C.
D. AT DOOR JAMB CONDITIONS, WALLS PERPENDICULAR TO DOOR OPENINGS ARE POSITIONED BY THE TYPICAL/STANDARD DIMENSION ON THE DETAIL UNLESS OTHERWISE LOCATED BY FLOOR PLAN DIMENSION OR DETAIL.
E. DIMENSIONS ON SMALL SCALE PLANS ARE NOMINAL UNLESS OTHERWISE NOTED.
F. DIMENSIONS ON LARGE SCALE PLANS ARE ACTUAL UNLESS OTHERWISE NOTED.

6.FIRE PROTECTION
A. FIRE PROTECTION SYSTEM:
THE SYSTEM INDICATED IN THESE DRAWINGS SHALL BE USED FOR BIDDING PURPOSES ONLY. IT SHALL NOT BE USED FOR CONSTRUCTION. THE DRAWINGS INDICATE
SPRINKLER HEAD LOCATIONS IN ARCHITECTURAL FINISH CEILING AREAS ONLY. CONTRACTOR TO PROVIDE A COMPLETE CODE COMPLIANT LIFE SAFETY SYSTEM.
SYSTEM SHOP DRAWINGS SHALL BE SUBMITTED TO THE CSU LB FIRE MARSHAL FOR APPROVAL PRIOR TO INSTALLATION. DRAWINGS SHALL BE STAMPED AND/OR SIGNED BY A LICENSED C-16 SPECIALTY CONTRACTOR.
B. FIRE DETECTION AND ALARM SYSTEM:
THE SYSTEM INDICATED IN THESE DOCUMENTS SHALL BE USED FOR BIDDING PURPOSES ONLY. IT SHALL NOT BE USED FOR CONSTRUCTION.
SYSTEM SHOP DRAWINGS SHALL BE SUBMITTED TO THE CSU LB STATE FIRE MARSHAL FOR APPROVAL PRIOR TO INSTALLATION.
C. THE FIRE SPRINKLER/FIRE HYDRANT UNDERGROUND PIPING SYSTEM INDICATED IN THESE DRAWINGS SHALL BE USED FOR BIDDING PURPOSES ONLY. IT SHALL NOT BE
USED FOR CONSTRUCTION.
FIRE SPRINKLER/FIRE HYDRANT UNDERGROUND PIPING SHOP DRAWINGS SHALL BE SUBMITTED TO THE CALIFORNIA STATE FIRE MARSHAL FOR APPROVAL PRIOR TO
INSTALLATION. DRAWINGS SHALL BE STAMPED AND/OR SIGNED BY A LICENSED A GENERAL CONTRACTOR, OR C-16, C-34 OR C-36 SPECIALTY CONTRACTOR.
D. FIRE HYDRANT AND WATER MAINS:
ALL FIRE HYDRANTS MUST BE INSTALLED, TESTED, FLUSHED, PAINTED, AND PLACED INTO SERVICE PRIOR TO ANY COMBUSTIBLE MATERIALS BEING BROUGHT ONTO
THE PROJECT SITE.
E. FIRE DEPARTMENT ACCESS TO EXISTING BUILDINGS:
THROUGHOUT CONSTRUCTION, FIRE DEPARTMENT ACCESS TO EXISTING CAMPUS BUILDINGS SHALL BE MAINTAINED IN A MANNER ACCEPTABLE TO THE CSU LB FIRE
MARSHAL.
OTHERWISE LOCATED BY FLOOR PLAN DIMENSION OR DETAIL.
E. DIMENSIONS ON SMALL SCALE PLANS ARE NOMINAL UNLESS OTHERWISE NOTED.
F. DIMENSIONS ON LARGE SCALE PLANS ARE ACTUAL UNLESS OTHERWISE NOTED.

7.PENETRATION OF RATED ASSEMBLIES
A. MECHANICAL DUCTS, ETC. PENETRATING FIRE-RATED CEILINGS AND FIRE WALLS SHALL BE CORRESPONDINGLY RATED OR DAMPERED. CABINETS, ELECTRICAL PANELS, LIGHTS, ETC. RECESSED INTO FIRE-RATED WALLS OR CEILINGS SHALL BE BACKED WITH CORRESPONDING FIRE-RESISTIVE CONSTRUCTION AS REQUIRED TO MAINTAIN THE INTEGRITY OF THE FIRE PROTECTION.
B. FIRE RESISTIVE ASSEMBLIES FOR PROTECTION OF OPENINGS SHALL COMPLY WITH CODE OF JURISDICTION.
C. PENETRATION OF FIRE RATED ASSEMBLIES WHICH REQUIRE OPENING PROTECTION SHALL BE FIRE STOPPED. FIRE STOPPING SHALL BE IDENTICAL TO AN APPROVED UNDERWRITERS LABORATORIES (UL) LISTED ASSEMBLY WITH AN 'F' OR 'T' RATING. PENETRATIONS MUST ALSO CONSIST OF APPROVED MATERIALS FOR THROUGH-WALL PENETRATIONS FIRE STOP SYSTEMS AS PRESCRIBED IN CBC 2007 CHAPTER 7. FIRE RATING FOR FIRE STOP SYSTEMS SHALL BE EQUAL TO THE ASSEMBLY PENETRATED. (709.6, CBC)
D. SHAFT ENCLOSURES: OPENINGS EXTENDING VERTICALLY THROUGH FLOORS SHALL BE ENCLOSED IN A SHAFT OF MINIMUM 2-HOUR FIRE RESISTIVE ENCLOSURE FOR TYPE 1A CONSTRUCTION, AS INDICATED ON DRAWINGS. SHAFTS SHALL INCLUDE A GYPSUM BOARD HORIZONTAL TERMINATION AT BOTTOM, ENGINEERED BY GENERAL CONTRACTOR. PROTECTION FOR EXIT STAIRWAYS SHALL BE IN MINIMUM 2-HOUR FIRE RESISTIVE ENCLOSURE.
E. STRUCTURAL SLABS WHICH HAVE ELECTRICAL FLOOR BOXES SET INTO RATED SLAB ASSEMBLY SHALL BE SPRAYED FIREPROOFED FROM UNDERSIDE TO MAINTAIN ASSEMBLY RATING.

8.ELECTRICAL BACKBOARDS
A. REFER TO ELECTRICAL AND TELEPHONE/DATA DRAWINGS FOR LOCATION OF PLYWOOD BACKBOARDS REQUIRED IN ELECTRICAL AND COMMUNICATION ROOMS. THESE REQUIRED PLYWOOD BACKBOARDS HAVE NOT BEEN SHOWN ON THE ARCHITECTURAL DRAWINGS, BUT MUST BE FURNISHED AND INSTALLED AS PART OF THE OVERALL CONTRACT. BACKBOARDS SHALL BE PAINTED WHITE.

9. LIGHT FIXTURES AND RECEPTACLES
A. LIGHT FIXTURES ARE LOCATED AND DIMENSIONED ON THE ARCHITECTURAL CEILING PLANS.
B. ELECTRICAL RECEPTACLES WHERE IMPORTANT TO DESIGN ARE LOCATED ON ARCHITECTURAL FLOOR PLANS AND INTERIOR ELEVATIONS.

DRAWING INDEX

SHEET NUMBER	SHEET NAME
G0.00	COVER SHEET
G0.01	GENERAL INFORMATION
G0.02	ACCESSIBILITY COMPLIANCE DETAILS
G0.03	ACCESSIBILITY COMPLIANCE DETAILS
G0.04	SYMBOLS AND ABBREVIATIONS
CIVIL	
C000	COVER SHEET
C001	GENERAL NOTES
C100	DEMOLITION PLAN OVERALL
C200	SITE PLAN OVERALL
C300	GRADING PLAN OVERALL
C301	GRADING PLAN SW
C302	GRADING PLAN SE
C303	GRADING PLAN NE
C304	GRADING PLAN NW
C310	DRAINAGE PLAN AND PROFILE
C311	DRAINAGE PLAN AND PROFILE
C400	UTILITY PLAN OVERALL
C401	SEWER PLAN AND PROFILE
C500	DETAILS
C501	DETAILS
C600	EROSION CONTROL PLAN
C700	ADA ACCESSIBILITY PLAN
C701	FIRE ACCESS PLAN
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A1.00	SITE PLAN
A2.00	BASEMENT FLOOR PLAN
A2.01	LEVEL 01 FLOOR PLAN
A2.02	LEVEL 02 FLOOR PLAN
A2.03	TYPICAL FLOOR PLAN
A3.00	BUILDING ELEVATION
A3.01	BUILDING ELEVATION
A3.02	BUILDING ELEVATION
A3.10	BUILDING SECTIONS
A9.00	ROOM AND FLOOR PLATE SCHEDULE
STRUCTURAL	
S101	GENERAL STRUCTURAL NOTES
S102	GENERAL STRUCTURAL NOTES
S103	GENERAL STRUCTURAL NOTES
S201	FOOTING AND FOUNDATION PLAN
S202	LEVEL 02 FRAMING PLAN
S203	LEVEL 03 FRAMING PLAN
S204	LEVEL 04 FRAMING PLAN
S205	LEVEL 05 FRAMING PLAN
S207	ROOF FRAMING PLAN
MECHANICAL	
M001	MECHANICAL LEGEND, SYMBOLS & ABBREVIATIONS
MH100	BASEMENT MECHANICAL HVAC FLOOR PLAN
MH101	GROUND LEVEL MECHANICAL HVAC OVERALL PLAN
MH102-A	LEVEL 2 MECHANICAL HVAC FAN COIL OPTION
MH201	AIR HANDLER SCHEMATICS
MH202	CHILLED WATER SCHEMATICS
MH203	MECHANICAL SCHEMATICS
MH204	MECHANICAL SCHEMATICS
MH601	MECHANICAL SCHEDULES
MH602	MECHANICAL SCHEDULES
MP101	GROUND LEVEL RADIANT ZONES
MP101-A	GROUND LEVEL MECHANICAL PIPING FAN COIL OPTION
MP102	LEVEL 2 RADIANT ZONES
MP102-A	LEVEL 2 MECHANICAL PIPING FAN COIL OPTION
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MP203	WEST RADIANT SCHEMATIC
MP204	NORTH RADIANT SCHEMATIC
MP205	INTERIOR RADIANT SCHEMATIC
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PL601	PLUMBING SCHEDULES
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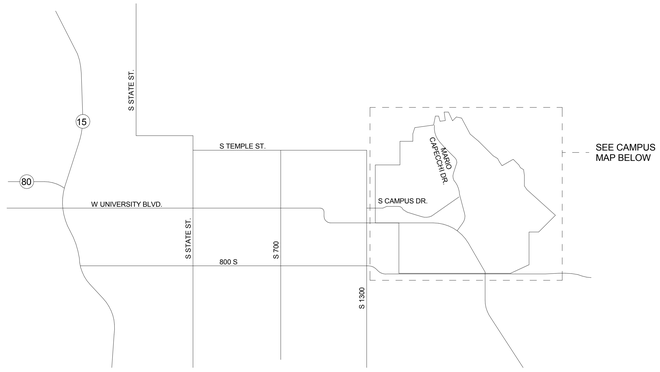
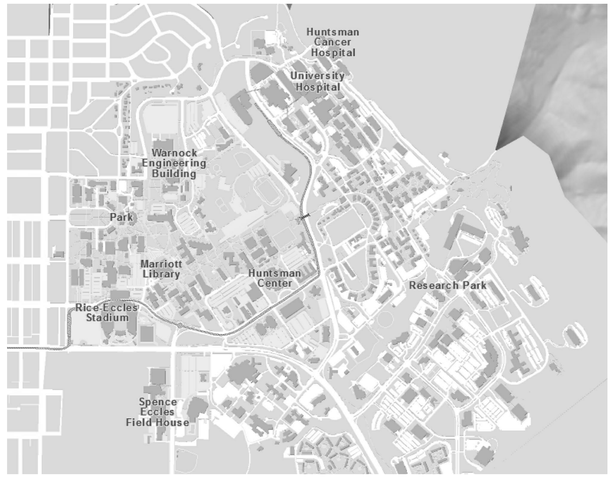
EP701	ONE-LINE DIAGRAM
EP702	ONE-LINE DIAGRAM
EP703	ONE-LINE DIAGRAM
ES100	ELECTRICAL SITE PLAN
EY701	FIRE ALARM RISER DIAGRAM - 1
EY702	FIRE ALARM RISER DIAGRAM - 2
EY703	FIRE ALARM RISER DIAGRAM - 3
EY704	FIRE ALARM DETAILS AND SCHEDULES
EY705	CARD ACCESS RISER DIAGRAM
EY706	CCTV RISER DIAGRAM

VICINITY MAP



CAMPUS MAP



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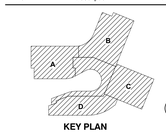
No.	Description	Date
1 -	REVISED 2	00 MAR 2011
-	RELEASE 1	00 JAN 2011



KEY PLAN

Drawing Title:

GENERAL INFORMATION

Project No.: 004345.00 Checked by: Checker

G0.01

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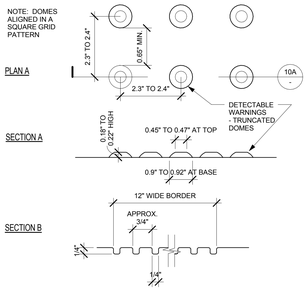
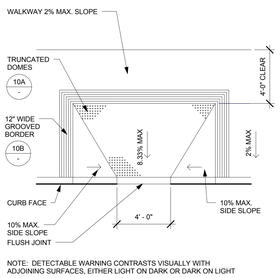
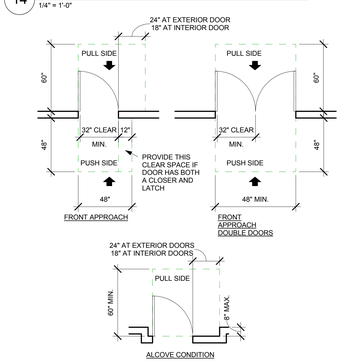


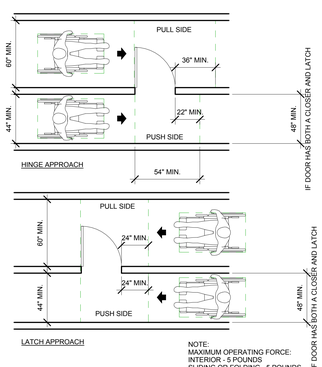
15 TRUNCATED DOMES AND GROOVING
6" = 1'-0"



NOTE: DETECTABLE WARNING CONTRASTS VISUALLY WITH ADJOINING SURFACES, EITHER LIGHT ON DARK OR DARK ON LIGHT

14 CURB RAMP
1/4" = 1'-0"

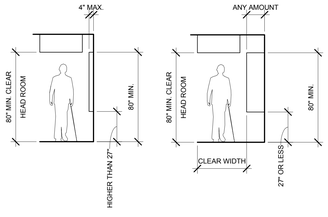




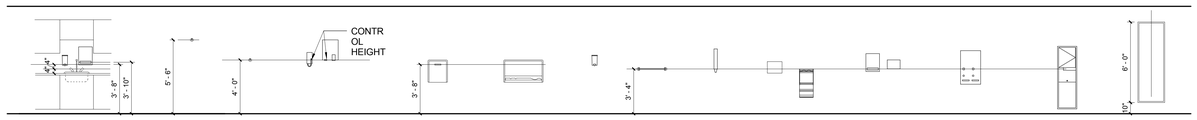
NOTE:
MAXIMUM OPERATING FORCE:
INTERIOR - 5 POUNDS
SLIDING OR FOLDING - 5 POUNDS
EXTERIOR - 5 POUNDS
FIRE DOOR - 15 POUNDS

13 DOOR CLEARANCES
1/4" = 1'-0"

NOTE:
PROTRUDING OBJECTS MAY NOT REDUCE THE REQUIRED CLEAR WIDTH OF AN ACCESSIBLE ROUTE OR MANEUVERING SPACE



12 PROTRUDING OBJECTS
1/4" = 1'-0"



NOTE: ALL DIMENSIONS INCLUDE ALL OPERABLE LEVERS, INCLUDING COIN SLOTS

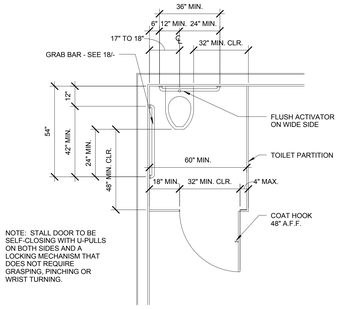
EQUIPMENT AND ACCESSORIES
1/4" = 1'-0"

X IS LESS THAN OR EQUAL TO 25"
Z IS GREATER THAN OR EQUAL TO X
WHEN X IS LESS THAN 20" THEN Y IS 48" MAX.
WHEN X IS 20" TO 25" THEN Y IS 44" MAX.

11 ACCESSIBLE REACH
1/4" = 1'-0"

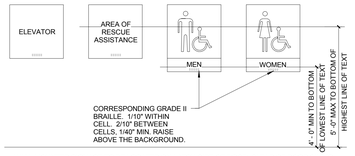
NOTES:
1. IF ALCOVE DEPTH (X) IS GREATER THAN 24", THEN ALCOVE WIDTH (Y) MUST BE A MINIMUM OF 36".
2. LEVER OR PUSH BAR TYPE IS LOCATED 6" MAX. FROM FRONT EDGE.
3. STREAM FROM BUBBLER TO BE A MINIMUM OF 4" HIGH AND 5" IN FRONT OF UNIT.
4. WHERE SPOUTS ARE LESS THAN 3" FROM FRONT OF UNIT THE ANGLE OF THE WATER STREAM SHALL BE 30 DEGREES MAX.
5. IF SPOUT IS 3" TO 5" THEN WATER STREAM SHALL BE 15 DEGREES MAX.

8 ACCESSIBLE WATER FOUNTAIN
1/2" = 1'-0"



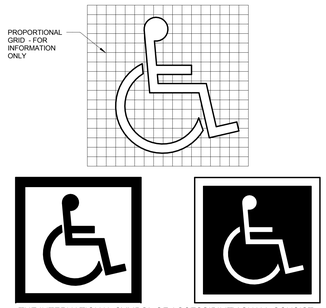
NOTE: STALL DOOR TO BE SELF-CLOSING WITH U-PULLS ON BOTH SIDES AND A LOCKING MECHANISM THAT DOES NOT REQUIRE GRASPING, PINCHING OR WRIST TURNING.

7 TOILET STALL - DOOR OUT AT FRONT
3/8" = 1'-0"



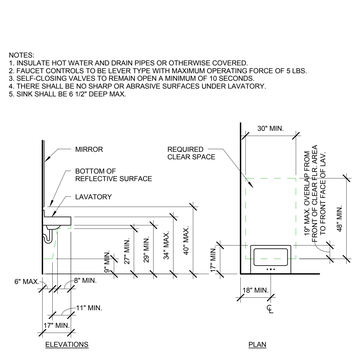
WALL MOUNTED SIGNAGE TO BE LOCATED ON LATCH SIDE OF DOOR, CLEAR OF DOOR SWING.

CODE SIGNAGE ADA DETAILS
1 1/2" = 1'-0"



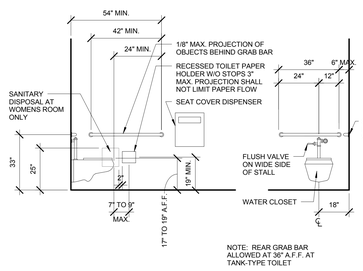
THE INTERNATIONAL SYMBOL OF ACCESSIBILITY SHALL CONSIST OF A WHITE FIGURE ON A BLUE BACKGROUND. THE BLUE SHALL BE EQUAL TO COLOR NO. 15090 IN FEDERAL STANDARD 595B.

4 INTERNATIONAL SYMBOL OF ACCESSIBILITY
1" = 1'-0"



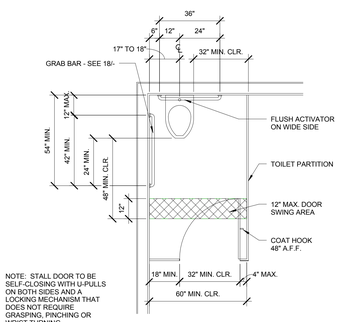
9 LAVATORY
3/8" = 1'-0"

NOTE: FLUSH CONTROLS SHALL BE OPERABLE WITH ONE HAND AND SHALL NOT REQUIRE TIGHT GRASPING, PINCHING OR TWISTING OF THE WRIST AND SHALL BE MOUNTED NO MORE THAN 44" ABOVE THE FLOOR. THE FORCE REQUIRED TO ACTIVATE CONTROLS SHALL BE NO GREATER THAN 5 LBF (22.2N). ELECTRONIC AUTOMATIC FLUSHING CONTROLS ARE ACCEPTABLE AND PREFERABLE. (CAL ACCESS COMPLIANCE REFERENCE MANUAL - DSA, 11IB.2.1.1.2)



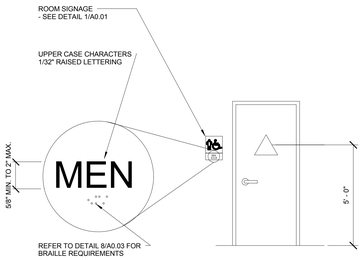
NOTE: REAR GRAB BAR ALLOWED AT 36" A.F.F. AT TANK-TYPE TOILET

10 TOILET ELEVATION
3/8" = 1'-0"

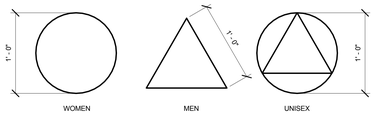


NOTE: STALL DOOR TO BE SELF-CLOSING WITH U-PULLS ON BOTH SIDES AND A LOCKING MECHANISM THAT DOES NOT REQUIRE GRASPING, PINCHING OR WRIST TURNING.

6 TOILET STALL - DOOR OPENING IN AT FRONT
3/8" = 1'-0"



3 SIGNAGE FOR SANITARY FACILITIES
3/8" = 1'-0"



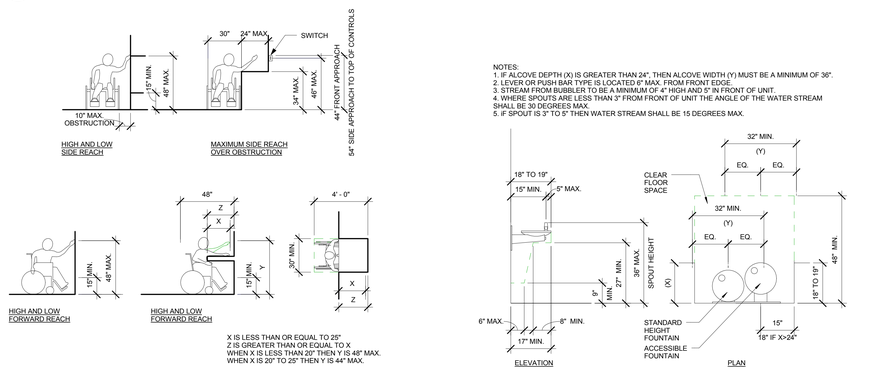
1. PICTOGRAMS AND/OR LETTERING ARE NOT REQUIRED ON DOOR MOUNTED SIGNAGE.

2. SEE DETAIL 3/- FOR MOUNTING REQUIREMENTS.

3. THE INTERNATIONAL SYMBOL OF ACCESSIBILITY SHALL CONSIST OF A WHITE FIGURE ON A BLUE BACKGROUND. THE BLUE SHALL BE EQUAL TO COLOR NO. 15090 IN FEDERAL STANDARD 595B.

4. EDGES SHALL BE ROUNDED, CHAMFERED OR EASED. MINIMUM RADIUS OF SIGN CORNERS TO BE 1/8-INCH.

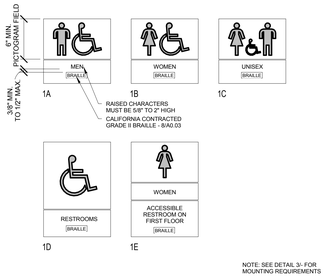
2 DOOR SIGNAGE FOR SANITARY FACILITIES
1 1/2" = 1'-0"



THE DIAGRAM ILLUSTRATES A U-SHAPED GRAB BAR THAT WRAPS AROUND THE STALL. THE GRAB BAR SHALL BE BETWEEN 33 TO 36 INCHES HIGH. THE CONTROLS ARE PLACED IN AN AREA BETWEEN 38 INCHES AND 48 INCHES ABOVE THE FLOOR. IF A FOLDING SEAT IS INCORPORATED INTO THE SHOWER, THEN THE CONTROLS ARE LOCATED ON THE BACK (LONG) WALL THEY SHALL BE LOCATED 27 INCHES FROM THE SIDE WALL WHERE THE SEAT IS LOCATED. IF NO FOLDING SEAT IS INCORPORATED, THE SHOWER HEAD AND CONTROL AREA MAY BE LOCATED ON EITHER SIDE WALL.

ACCESSIBLE SHOWERS
1/4" = 1'-0"

5 SINGLE OCCUPANCY TOILET
3/8" = 1'-0"

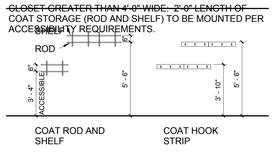


NOTE: SEE DETAIL 3/- FOR MOUNTING REQUIREMENTS

1 ROOM SIGNAGE
1 1/2" = 1'-0"

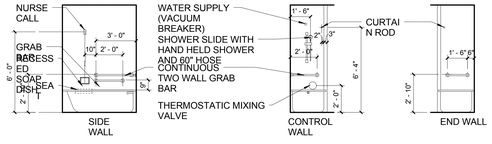
NOTE: CLOSET 4'-0" WIDE AND LESS: ALL COAT STORAGE (ROD AND SHELF) TO BE MOUNTED PER ACCESSIBILITY REQUIREMENTS.

~~CLOSET GREATER THAN 4'-0" WIDE: 2'-0" LENGTH OF~~ COAT STORAGE (ROD AND SHELF) TO BE MOUNTED PER ACCESSIBILITY REQUIREMENTS.

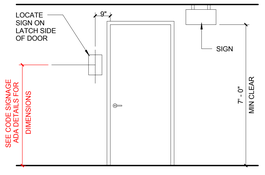


COAT HANGING
1/4" = 1'-0"

NOTE: SHOWER HOSE VACUUM BREAKER SHALL BE LOCATED A MINIMUM OF 6" ABOVE HAND SPRAY AT UPPERMOST POSITION ON SLIDE BAR



ACCESSIBLE BATHTUB
1/4" = 1'-0"



SPACE SIGNAGE
3/8" = 1'-0"

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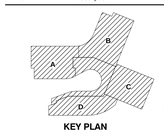

KEY PLAN

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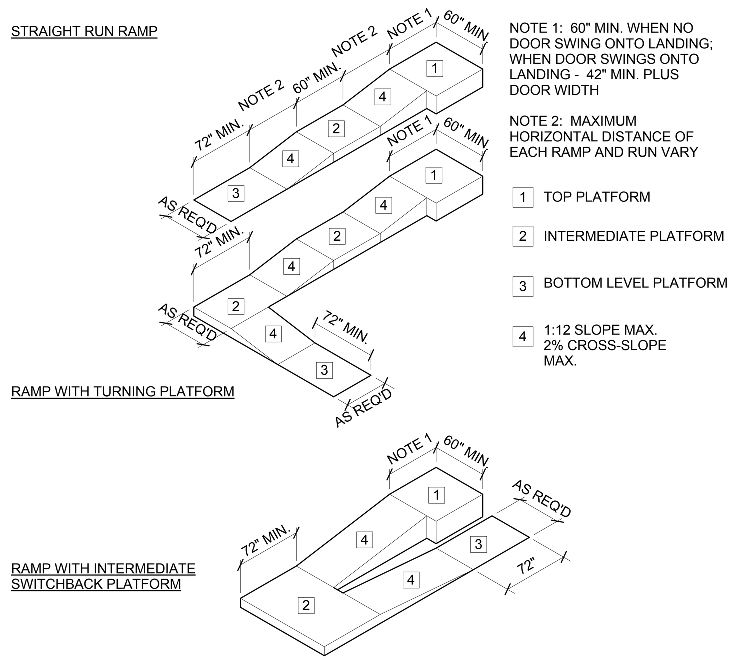
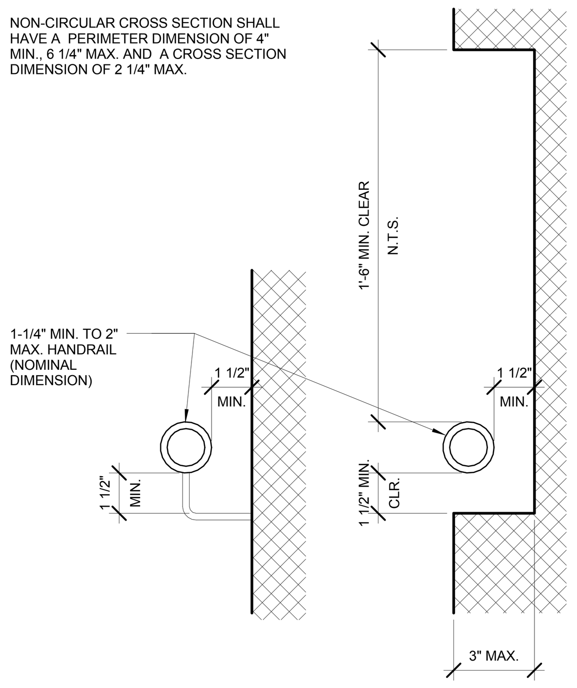
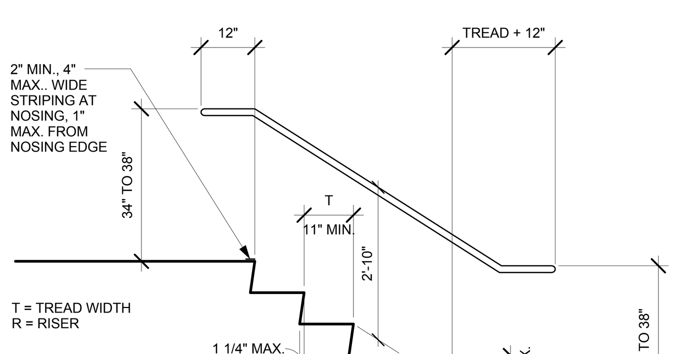


9 RAMP
1/4" = 1'-0"

NON-CIRCULAR CROSS SECTION SHALL HAVE A PERIMETER DIMENSION OF 4" MIN., 6 1/4" MAX. AND A CROSS SECTION DIMENSION OF 2 1/4" MAX.

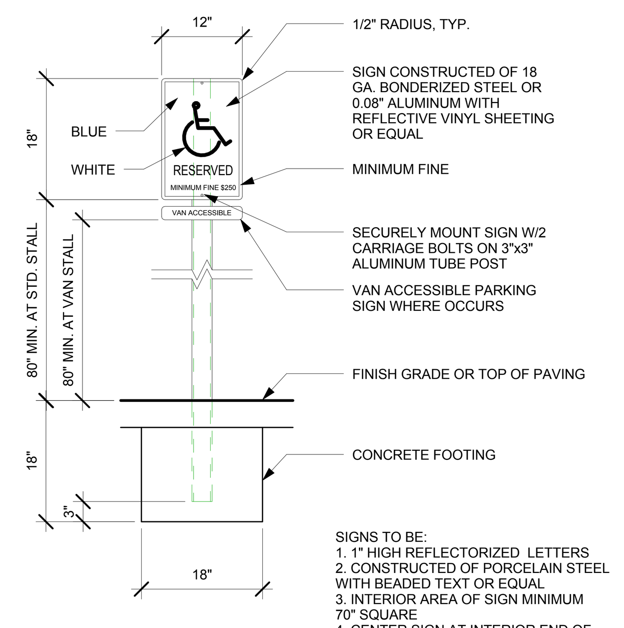


8 STAIR HANDRAIL
3" = 1'-0"



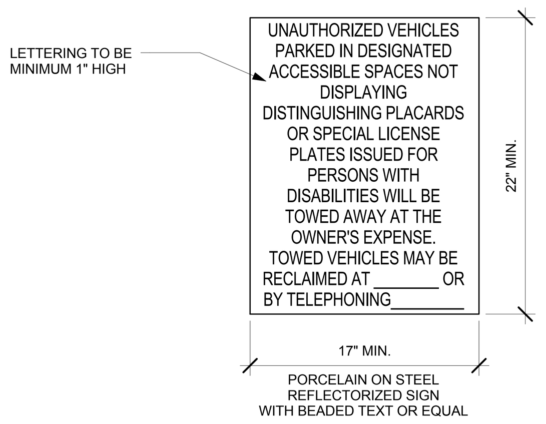
STRIPING FOR THE VISUALLY IMPAIRED:
1. THE UPPER APPROACH AND THE LOWER TREAD OF EACH STAIR SHALL BE MARKED BY A STRIP OF CLEARLY CONTRASTING COLOR 2-INCHES MIN., 4" MAX. WIDTH, PLACED PARALLEL TO AND AT THE NOSE OF THE STEP OR LANDING TO ALERT THE VISUALLY IMPAIRED.
2. THE STRIPE SHALL BE OF THE MATERIAL THAT IS AT LEAST AS SLIP-RESISTANT AS THE OTHER TREADS OF THE STAIRS.
3. FOR INTERIOR STAIRS, WARNING STRIPES ARE REQUIRED AT THE UPPER APPROACH AND LOWER TREAD AND AT ALL TREADS FOR EXTERIOR STAIRS.

7 STAIRWAYS
1/2" = 1'-0"



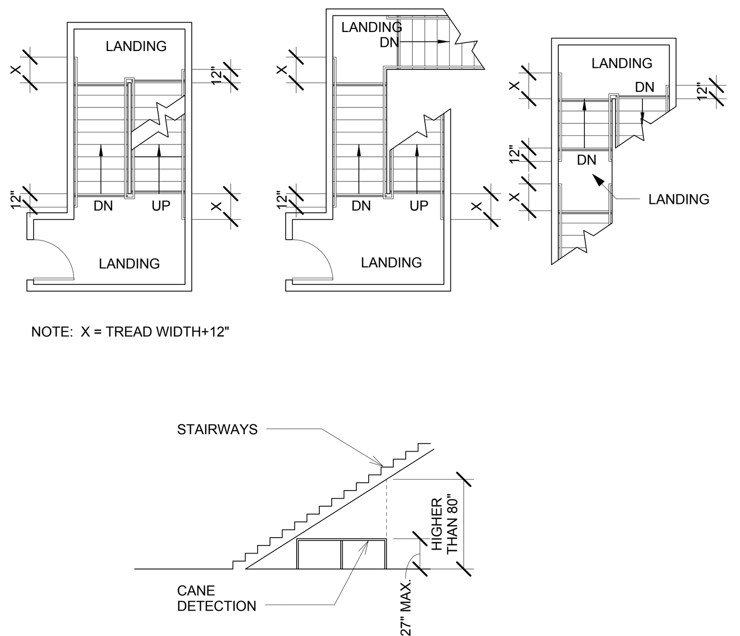
SIGNS TO BE:
1. 1" HIGH REFLECTORIZED LETTERS
2. CONSTRUCTED OF PORCELAIN STEEL WITH BEADED TEXT OR EQUAL
3. INTERIOR AREA OF SIGN MINIMUM 70" SQUARE
4. CENTER SIGN AT INTERIOR END OF PARKING SPACE

11 PARKING SIGN
3/4" = 1'-0"



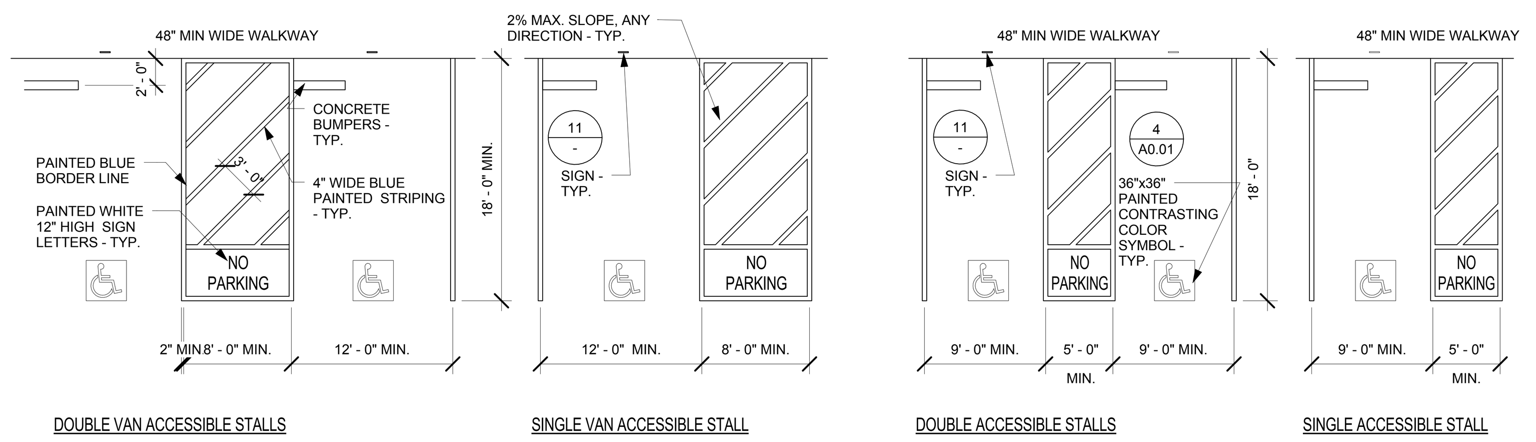
NOTE:
1. TO BE PLACED AT EACH ENTRANCE TO OFF-STREET PARKING OR IMMEDIATELY ADJACENT TO AND VISIBLE FROM EACH STALL.
2. SEE PLAN FOR LOCATION.

10 TOWAWAY SIGN
1 1/2" = 1'-0"



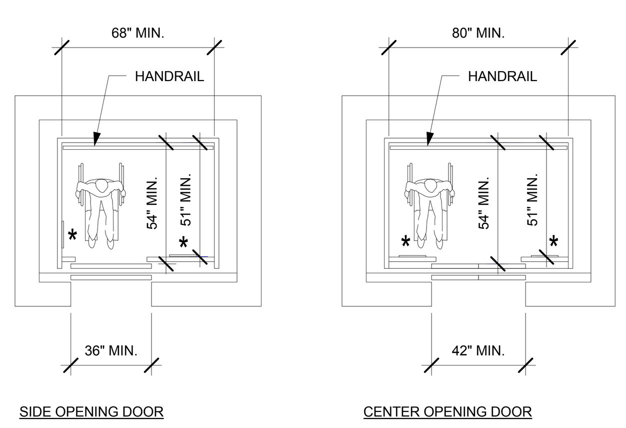
6 HANDRAILS AMD STAIRWAYS
1/8" = 1'-0"

NOTE:
1. PARKING SPACES, ACCESS AISLES AND VEHICULAR ROUTE - VERTICAL CLEARANCE OF 8'-2" CLEAR - TYP.
2. DIMENSION TO CENTERLINE OF STRIPE, TYPICAL

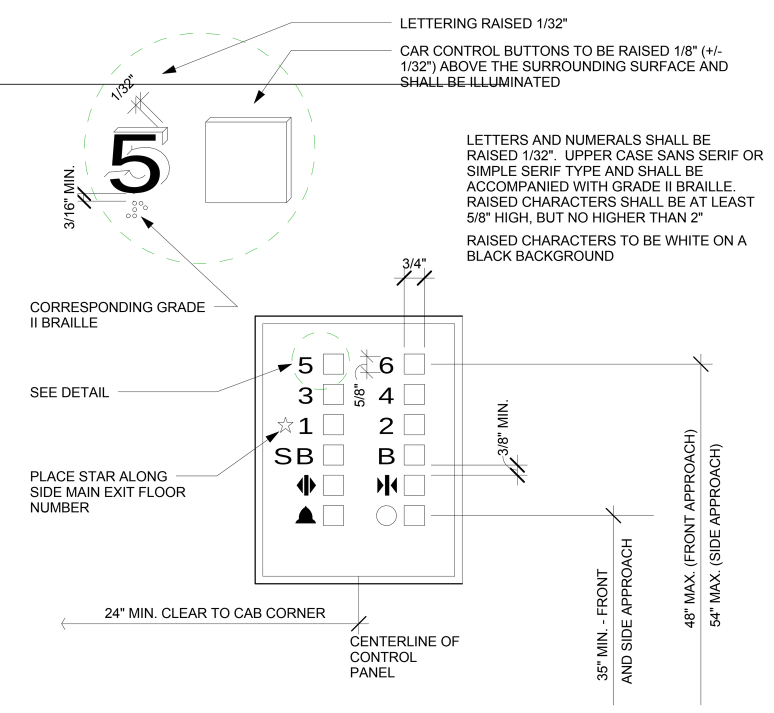


5 PARKING STALLS
1/8" = 1'-0"

* ALTERNATE LOCATION OF CONTROL PANEL



3 ELEVATOR CARS
1/4" = 1'-0"



4 ELEVATOR CONTROL PANEL
3" = 1'-0"

DOOR JAMB MARKING NOTES:
1. PASSENGER ELEVATOR LANDING JAMBS ON ALL ELEVATOR FLOORS SHALL HAVE THE NUMBER OF THE FLOOR ON WHICH THE JAMB IS LOCATED .
2. DOOR JAMB MARKING SHALL BE ON BOTH SIDES OF THE DOOR SO THAT THEY ARE VISIBLE FROM WITHIN THE ELEVATOR.
3. ON THE GRADE LEVEL, A RAISED FIVE POINTED STAR SHALL BE PLACED TO THE LEFT OF THE RAISED CHARACTER. THE OUTSIDE DIAMETER OF THE STAR SHALL BE 2 INCHES.

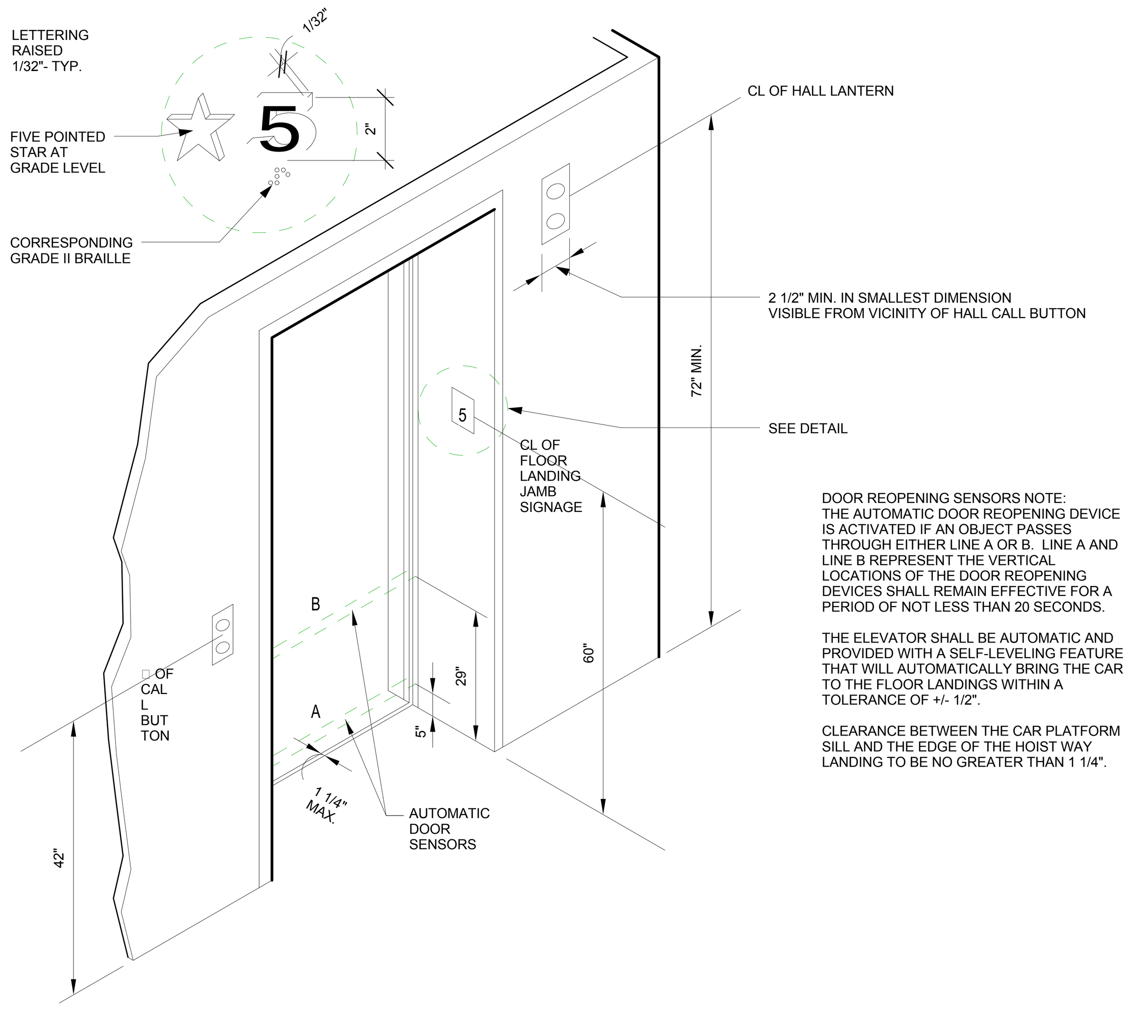
HALL LANTERN:
A VISUAL AND AUDIBLE SIGNAL SHALL BE PROVIDED AT EACH HOISTWAY ENTRANCE INDICATING TO THE PROSPECTIVE PASSENGER THE CAR ANSWERING THE CALL AND ITS DIRECTION OF TRAVEL.

ILLUMINATION:
THE MINIMUM ILLUMINATION AT THE CAR CONTROLS THRESHOLD AND THE LANDING WHEN THE CAR AND LANDING DOORS ARE OPEN SHALL NOT BE LESS THAN 5 FOOT.

EMERGENCY HAND SET:
PROVIDE AN EMERGENCY HAND SET IN EACH ELEVATOR CAB. THE HAND SET SHALL BE POSITIONED NO HIGHER THAN 4'-0" A.F.F. AND THE HAND SET CORD SHALL BE A MIN. OF 2'-5" IN LENGTH.

HALL BUTTON:
DIRECTIONS BUTTONS, EXCLUSIVE OF BORDER, SHALL BE A MIN. OF 3/4" VISUAL INDICATION SHALL BE PROVIDED TO SHOW EACH CALL REGISTERED AND EXTINGUISHED WHEN THE CALL IS ANSWERED. HALL CALL BUTTONS SHALL BE INTERNALLY ILLUMINATED WITH A WHITE LIGHT OVER THE ENTIRE SURFACE OF THE BUTTON. DEPTH OF BUTTON WHEN OPERATED SHALL NOT EXCEED 3/8".

THE MIN. TIME FROM NOTIFICATION THAT A CAR IS ANSWERING A CALL (LANTERN AND AUDIBLE SIGNAL) UNTIL THE DOORS OF THE CAR START TO CLOSE SHALL BE CALCULATED BY: (T=D/1.5 ft/s)
T=TOTAL TIME IN SECONDS
D=DISTANCE FROM A POINT IN THE LANDING AREA 60 INCHES DIRECTLY IN FRONT OF THE FARTHEST CALL BUTTON CONTROLLING THAT CAR TO THE CENTERLINE OF ITS HOIST WAY DOOR.



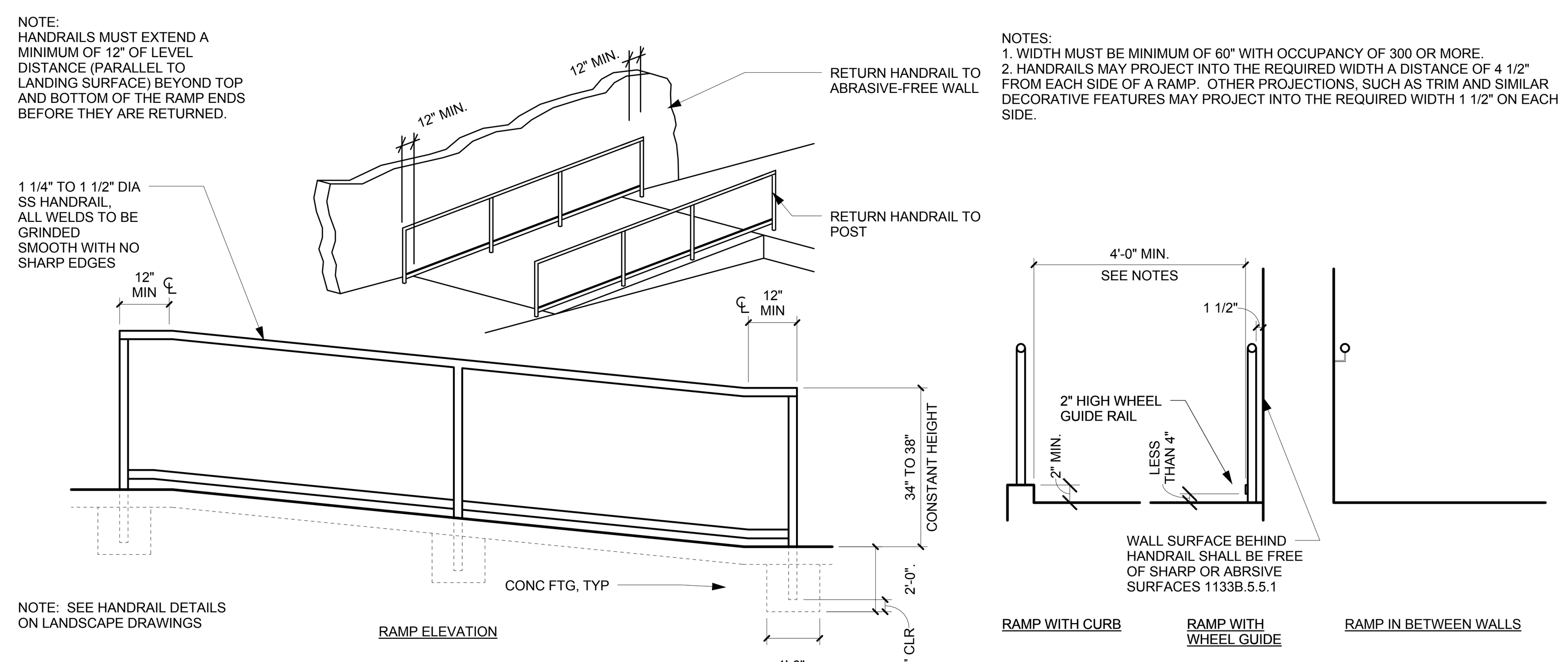
DOOR REOPENING SENSORS NOTE:
THE AUTOMATIC DOOR REOPENING DEVICE IS ACTIVATED IF AN OBJECT PASSES THROUGH EITHER LINE A OR B. LINE A AND LINE B REPRESENT THE VERTICAL LOCATIONS OF THE DOOR REOPENING DEVICES SHALL REMAIN EFFECTIVE FOR A PERIOD OF NOT LESS THAN 20 SECONDS.

THE ELEVATOR SHALL BE AUTOMATIC AND PROVIDED WITH A SELF-LEVELING FEATURE THAT WILL AUTOMATICALLY BRING THE CAR TO THE FLOOR LANDINGS WITHIN A TOLERANCE OF +/- 1/2".

CLEARANCE BETWEEN THE CAR PLATFORM SILL AND THE EDGE OF THE HOIST WAY LANDING TO BE NO GREATER THAN 1 1/4".

2 ELEVATOR AT FLOOR LANDING
1/2" = 1'-0"

NOTE:
HANDRAILS MUST EXTEND A MINIMUM OF 12" OF LEVEL DISTANCE (PARALLEL TO LANDING SURFACE) BEYOND TOP AND BOTTOM OF THE RAMP ENDS BEFORE THEY ARE RETURNED.



NOTES:
1. WIDTH MUST BE MINIMUM OF 60" WITH OCCUPANCY OF 300 OR MORE.
2. HANDRAILS MAY PROJECT INTO THE REQUIRED WIDTH A DISTANCE OF 4 1/2" FROM EACH SIDE OF A RAMP. OTHER PROJECTIONS, SUCH AS TRIM AND SIMILAR DECORATIVE FEATURES MAY PROJECT INTO THE REQUIRED WIDTH 1 1/2" ON EACH SIDE.

NOTE: SEE HANDRAIL DETAILS ON LANDSCAPE DRAWINGS

1 HANDRAIL AT RAMP
1/2" = 1'-0"

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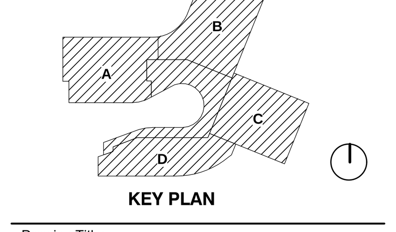

KEY PLAN

Drawing Title:

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ABBREVIATIONS

AC	AIR CONDITIONING
ACC	ACCESSIBLE
ACM	ASBESTOS CONTAINING MATERIAL
ADJ	ADJACENT
AFF	ABOVE FINISHED FLOOR
AGF	ARCHITECTURAL GLASS FLOORING
AHU	AIR HANDLING UNIT
ALUM	ALUMINUM
ALT	ALTERNATE
APC	ACOUSTICAL PANEL CEILING
APPROX	APPROXIMATE
ARCH	ARCHITECT(URAL)
ASN	ABRASIVE STAIR NOSING
ATC	ACOUSTICAL TILE CEILING
AUTO	AUTOMATIC
AWP	ACOUSTICAL WALL PANEL
BLDG	BUILDING
BLKG	BLOCKING
BRG	BEARING
BSMT	BASEMENT
C	COURSE
CFCI	CONTR-FURN/CONTR-INST
CF	CONDUCTIVE FLOORING
CG	CORNER GUARD
CIP	CAST-IN-PLACE
CJ	CONTROL JOINT
CL	CENTERLINE
CLG	CEILING
CLO	CLOSET
CLR	CLEAR(ANCE)
CLRM	CLASSROOM
CMT	CERAMIC MOSAIC TILE
CMTB	CERAMIC MOSAIC TILE BASE
CMU	CONC MASONRY UNIT
CO	CLEAN OUT
COL	COLUMN
COMM	COMMUNICATION
CONC	CONCRETE
CONF	CONFERENCE
CONT	CONTINUOUS
CONTR	CONTRACT(OR)
CORR	CORRIDOR
CPT	CARPET(ING)
CR	CRASH RAIL
CT	CERAMIC TILE
CTB	CERAMIC TILE BASE
CUH	CABINET UNIT HEATER
CW	CASEWORK
DEMO	DEMOLISH(ITION)
DEPT	DEPARTMENT
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DN	DOWN
DS	DOWNSPOUT
EA	EACH
EIFS	EXTERIOR INSUL FINISH SYSTEM
EJ	EXPANSION JOINT
ELEC	ELECTRIC(AL)
EL	ELEVATION
ELEC	ELECTRICAL
ELEV	ELEVATOR
EM	ENTRANCE MATS
EMB	ELECTRONIC MARKER BOARD
EMER	EMERGENCY
EOS	EDGE OF SLAB
EQ	EQUAL
EQUIP	EQUIPMENT
ER	EPOXY RESIN
EST	ESTIMATE(D)
EXH	EXHAUST
EXIST	EXISTING
EXP	EXPANSION
EXPD	EXPOSED
EXT	EXTERIOR
EWC	ELECTRIC WATER COOLER
FD	FLOOR DRAIN
FDTN	FOUNDATION
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FG	FOOT GRILLE
FHC	FIRE HOSE CABINET
FIN	FINISH(ED)
FLR	FLOOR
FT	FOOT/FEET
FTG	FOOTING
FURN	FURNISH(ED)(INGS)
FWP	FABRIC WRAPPED PANEL
GA	GAUGE / GAGE
GALV	GALVANIZED
GFRC	GLASS FIBER REINF CONCRETE
GFRG	GLASS FIBER REINF GYPSUM
GL	GLASS
GLMT	GLASS MOSAIC TILE
GLMU	GLASS MASONRY UNIT
GLT	GLASS TILE
GST	GLASS STAIR TREAD
GWB	GYPSUM WALL BOARD
GYP	GYPSUM
HDW	HARDWARE
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HOSP	HOSPITAL
HP	HIGH POINT
HPC	HIGH PERFORMANCE COATING
HPL	HIGH PRESSURE DECORATIVE LAMINATE
HR	HANDRAIL
HSS	HOLLOW STRUCTURAL SECTION
HT	HEIGHT
HVAC	HEATING-VENTILATING-AIR CONDITIONING
HWB	HEAT WELDING BEAD
ID	INSIDE DIAMETER
INST	INSTALL(ED)
INSUL	INSULATION(ED)
INT	INTERIOR
JAN	JANITOR
JT	JOINT
KIT	KITCHEN
LAB	LABORATORY
LAM	LAMINATE(D)
LAV	LAVATORY
LGT	LENGTH
LH	LEFT HAND
LIN	LINOLEUM
LP	LOW POINT
LT	LIGHT
LTWT	LIGHTWEIGHT
LVT	LUXURY VINYL TILE
MACH	MACHINE
MARB	MARBLE
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MB	MARKER BOARD
MECH	MECHANICAL
MES	METAL EDGE STRIP
MEZZ	MEZZANINE
MFR	MANUFACTURER(D)
MIN	MINIMUM
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MPC	METAL PANEL CEILING
MSS	METAL SUSPENSION SYSTEM
MTL	METAL
MW	MILLWORK
NIC	NOT IN CONTRACT
NO	NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OFCI	OWNER FURN/CONTR INST
OFF	OFFICE
OFOI	OWNER FURN/OWNER INST
OH	OVERHEAD
OPNG	OPENING
OPP	OPPOSITE
ORD	OVERFLOW ROOF DRAIN
PBD	PARTICLE BOARD
PCC	PRECAST CONCRETE
PCF	POUNDS PER CUBIC FOOT
PCONC	POLISHED CONCRETE
PERF	PERFORATE(D)
PL	PLATE
PLP	PLASTIC PANEL
PLYWD	PLYWOOD
PREFAB	PREFABRICATED
PREFIN	PREFINISHED
PRT	POLY RESIN TILE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PLSHD	POLISHED
PMT	PORCELAIN MOSAIC TILE
PNT	PAINT(ED)
PT	PORCELAIN TILE
PTB	PORCELAIN TILE BASE
QT	QUARRY TILE
QTB	QUARRY TILE BASE
QTY	QUANTITY
R	RISER
RAD	RADIUS
RAF	RESILIENT ATHLETIC FLOORING
RBF	RUBBER FLOORING
RBRT	RUBBER TILE
RCP	REFLECTED CLG PLAN
RD	ROOF DRAIN
REF	REFER(ENCE) TO
REFG	REFRIGERATOR
REINF	REINFORCED(ING)
REQD	REQUIRED
RES	RESILIENT
RESB	RESILIENT BASE
REV	REVISE (ISION)
RF	RESINOUS FLOORING
RFG	ROOFING
RH	RIGHT HAND
RM	ROOM
RO	ROUGH OPENING
ROW	RIGHT OF WAY
RSN	RESILIENT STAIR NOSING
RST	RESILIENT STAIR TREAD
RT	RESILIENT TILE
RTU	ROOF TOP UNIT
RV	RIGID VINYL
S	SEALED
SDF	STATIC DISSIPATIVE FLOORING
SECT	SECTION
SGT	STRUCTURAL GLAZED TILE
SHR	SHOWER
SHT	SHEET
SIM	SIMILAR
SM	SPECIALIZED METAL
SOG	SLAB-ON-GRADE
SP	SAFETY PAD
SPEC	SPECIFY(ICATION)
SQ	SQUARE
SS	SOLID SURFACE(ING)
SST	STAINLESS STEEL
ST	STONE
STC	SOUND TRANSMISSION CLASS
STD	STANDARD
STL	STEEL
STOR	STORAGE
STRUCT	STRUCTURE(AL)
SUSP	SUSPENDED
SV	SHEET VINYL
SWC	SPECIAL WALL COATING
T	TREAD
TB	TACK BOARD
TBD	TO BE DETERMINED
TEMP	TEMPORARY
TER	TERRAZZO
TERB	TERRAZZO BASE
TEXT	TEXTURE
THK	THICK(NESS)
TLT	TOILET
TOS	TOP OF STEEL
TOW	TOP OF WALL
TP	TANGENT POINT
TS	TACKABLE SURFACE
TRSLT	TRANSLUCENT
TYP	TYP(ICAL
T&G	TONGUE & GROOVE
UC	UNDERCOUNTER
UPH	UPHOLSTERY
UNO	UNLESS NOTED OTHERWISE
VAC	VACUUM
VCT	VINYL COMPOSITION TILE
VEST	VESTIBULE
VET	VINYL ENHANCED TILE
VIF	VERIFY IN FIELD
VNL	VINYL
VTR	VENT THROUGH ROOF
VWC	VINYL WALL COVERING
WAF	WOOD ATHLETIC FLOORING
WC	WATER CLOSET
WCV	WALL COVERING
WD	WOOD
WDWTR	WINDOW TREATMENT
WP	WORK POINT
WPC	WOOD PANEL CEILING
WT	WEIGHT

REFLECTED CEILING PLAN SYMBOLS

CEILING HEIGHT — 9'-0" — HEIGHT OF CEILING ABOVE FINISHED FLOOR

LAY IN PANEL

ACCESS DOOR

SURFACE OR RECESSED LUMINAIRE

WALL WASH LUMINAIRE

PENDANT HUNG LUMINAIRE

TRACK LIGHT

STRIP LUMINAIRE

COVE LUMINAIRE

EXIT LUMINAIRE

SURGICAL LIGHT/ EQUIPMENT BOOM PENDANT SPRINKLER HEAD

AIR DEVICE - SUPPLY

AIR DEVICE - LINEAR SUPPLY

AIR DEVICE - RETURN

AIR DEVICE - EXHAUST

RADIANT PANEL

OCCUPANCY SENSOR — P

SMOKE DETECTOR — S

HEAT DETECTOR — H

MOTION / SECURITY DETECTOR — M

CAMERA

CLOCK — C

SPEAKER — S

FIRE ALARM SPEAKER — F

DAYLIGHT SENSOR — D

NURSE CALL DOME LIGHT — N

IV / CURTAIN TRACK

PLAN SYMBOLS

EXISTING CONSTRUCTION TO REMAIN

EXISTING CONSTRUCTION TO BE REMOVED

NEW CONSTRUCTION

REFERENCE SYMBOLS (ARCHITECTURAL)

ROOM NAME AND NUMBER — OFFICE 1125 — ROOM NAME; ROOM NUMBER

PARTITION — A1 — PARTITION TYPE

INTERIOR DOOR ASSEMBLY — 1125A — ROOM NUMBER SERVED BY DOOR; SUFFIX ADDED IF MULTIPLE DOORS SERVE SAME ROOM

EXTERIOR DOOR ASSEMBLY — E103 — DENOTES EXTERIOR OPENING; NUMBERED SEQUENTIALLY

BORROWED LIGHT — 1125A — ROOM NUMBER; SUFFIX ADDED IF MULTIPLE OPENINGS SERVE SAME ROOM

EXTERIOR GLAZED OPENINGS — E45 — DENOTES EXTERIOR OPENING; NUMBERED SEQUENTIALLY

LOUVER — L10

SHEET NOTE — 21 — DEMOLITION; 21 — CONSTRUCTION

KEYNOTE — 042000 - UNIT MASONRY — SPECIFICATION SECTION; SPECIFIED ITEM

CASEWORK — 1'-0" 10/100 M M — WIDTH; TYPE; TYPE MODIFICATION; MATERIAL; SPECIFICATION SECTION

EQUIPMENT — EQ-02 — EQUIPMENT IDENTIFIER

REFERENCE SYMBOLS (ALL DISCIPLINES)

WALL SECTION — 1 A0401 SIM — DETAIL/ SECTION NUMBER; SIMILAR INDICATION; SHEET NUMBER

BUILDING SECTION — 1 A0401 SIM; 1 A0401 SIM — DETAIL/ SECTION NUMBER; SHEET NUMBER

DETAIL SECTION — 1 A0402 SIM — DETAIL NUMBER; SHEET NUMBER

EXTERIOR ELEVATION — A0301 — ELEVATION NUMBER; SHEET NUMBER

INTERIOR ELEVATION — 3 A0601 1 2 — ELEVATION NUMBER; SHEET NUMBER

LARGE SCALE BLOWUP OF PLAN OR DETAIL — 1 A0402 SIM — PLAN OR DETAIL NUMBER; SHEET NUMBER

LEVEL REFERENCE — LEVEL 02 118'-6" — LEVEL DESCRIPTION; LEVEL ELEVATION

NEW STRUCTURAL GRID — R — GRID REFERENCE; GRID LINE

EXISTING STRUCTURAL GRID — 2 — EXISTING GRID REFERENCE; EXISTING GRID LINE

MATCH LINE — 1 / A0103; 1 / A0102 — SHEET NUMBER; MATCH LINE; SHEET NUMBER

REVISION — 1 — REVISION NUMBER (SHEET SPECIFIC); CLOUDED AREA OF REVISION

NORTH ARROW

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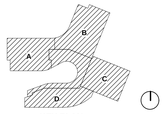
No.	Description	Date
-	RELEASE 2	00 MAR 2011
-	RELEASE 1	00 JAN 2011



KEY PLAN

Drawing Title:

SYMBOLS AND ABBREVIATIONS

Project No.: 004345.00 Checked by: Checker

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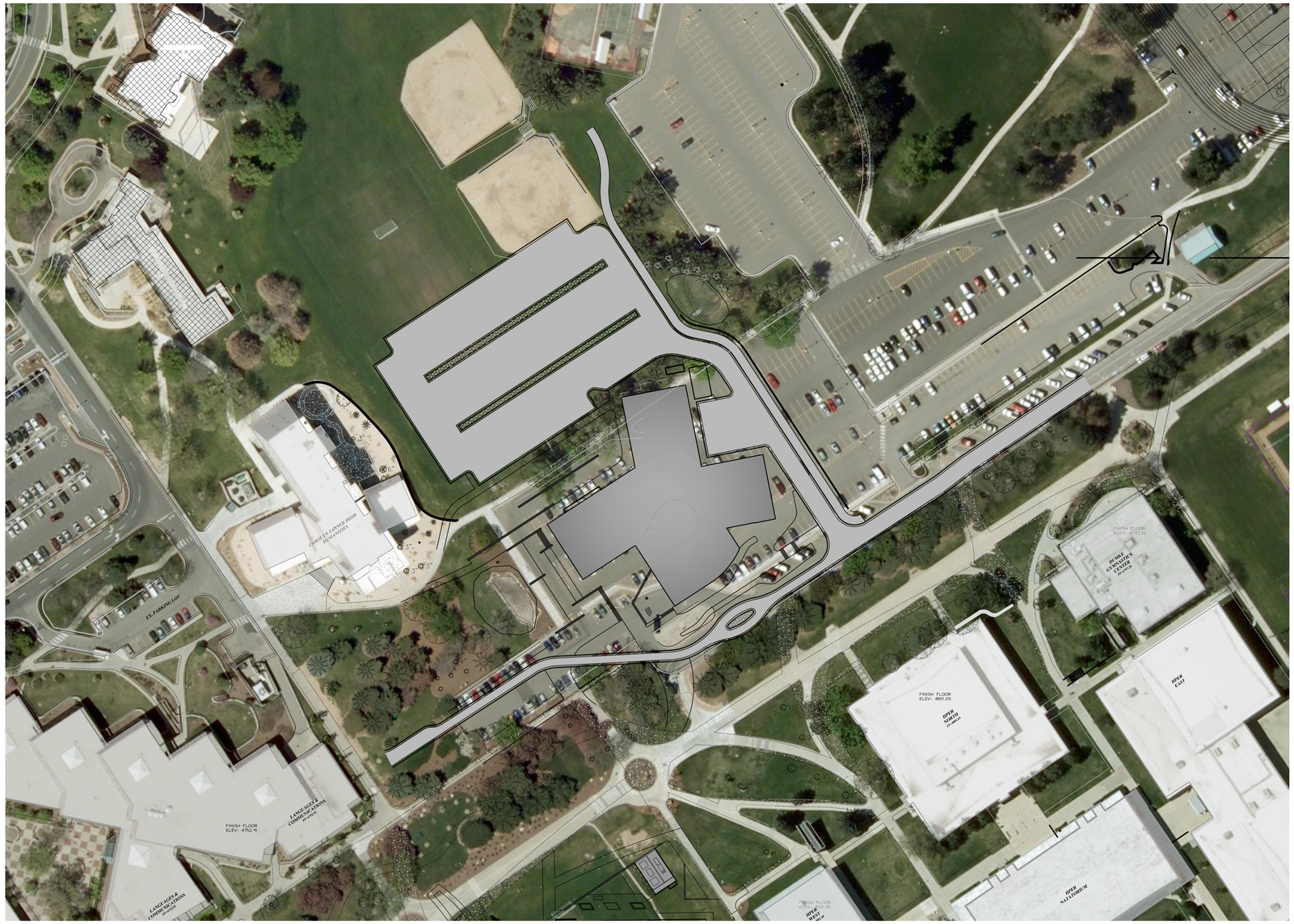
LASSONDE CENTER

UNIVERSITY OF UTAH

SALT LAKE CITY, UTAH



VICINITY MAP

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SCALE

HORIZONTAL: 1" = 50'

0 12.5' 25' 50' 75'

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No.	Description	Date
-	RELEASE 2	00 MAR 2011
-	RELEASE 1	00 JAN 2011

KEY PLAN

Drawing Title:

COVER SHEET

Project No.: 004345.00 Checked by: Checker

C-000

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GENERAL NOTES

1. ALL CONSTRUCTION MUST STRICTLY FOLLOW THE STANDARDS AND SPECIFICATIONS SET FORTH BY: THE UNIVERSITY OF UTAH, INDIVIDUAL PRODUCT MANUFACTURERS, AMERICAN PUBLIC WORKS ASSOCIATION (APWA), AND THE DESIGN ENGINEER. THE ORDER LISTED ABOVE IS ARRANGED BY SENIORITY. IF A CONSTRUCTION PRACTICE IS NOT SPECIFIED BY ANY OF THE LISTED SOURCES, CONTRACTOR MUST CONTACT DESIGN ENGINEER FOR DIRECTION.
2. PROJECT MUST FOLLOW THE BUILDING CODES: 2009 IBC, 2003 ANSI 117.1, AND 1994 ADAAG.
3. CONTRACTOR TO STRICTLY FOLLOW THE SOILS REPORT DATED NOV. 30, 2011 AND THE ADDENDUM LETTER DATED FEB. 27 2012 FOR THIS PROJECT. ALL GRADING INCLUDING BUT NOT LIMITED TO CUT, FILL, COMPACTION, ASPHALT SECTION, SUBBASE, TRENCH EXCAVATION/BACKFILL, SITE GRUBBING, AND FOOTINGS MUST BE COORDINATED DIRECTLY WITH THE SOILS REPORT.
4. TRAFFIC CONTROL, STRIPING & SIGNAGE TO CONFORM TO CURRENT UNIVERSITY OF UTAH STANDARDS, CONTACT CAMPUS DESIGN AND CONSTRUCTION AND DAVID MOYES AT COMMUTER SERVICES, 801-585-9657, TO SET UP A MEETING PRIOR TO ANY STRIPING.
5. ANY AREA OUTSIDE THE LIMIT OF WORK THAT IS DISTURBED SHALL BE RESTORED TO ITS ORIGINAL CONDITION AT NO COST TO OWNER.
6. CONSULT ALL OF THE DRAWINGS AND SPECIFICATIONS FOR COORDINATION REQUIREMENTS BEFORE COMMENCING CONSTRUCTION.
7. AT ALL LOCATIONS WHERE EXISTING PAVEMENT ABUTS NEW CONSTRUCTION, THE EDGE OF THE EXISTING PAVEMENT SHALL BE SAW CUT TO A CLEAN, SMOOTH EDGE.
8. ALL CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE MOST RECENT, ADOPTED EDITION OF ADA ACCESSIBILITY GUIDELINES
9. CONTRACTOR MUST VERIFY ALL EXISTING CONDITIONS BEFORE BIDDING AND BRING UP ANY QUESTIONS BEFOREHAND.
10. CONTRACTOR IS RESPONSIBLE FOR SCHEDULING AND NOTIFYING ENGINEER OR INSPECTING AUTHORITY 72 HOURS IN ADVANCE OF COVERING UP ANY PHASE OF CONSTRUCTION REQUIRING OBSERVATION.
11. ALL DIMENSIONS, GRADES & UTILITY DESIGNS SHOWN ON THE PLANS SHALL BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO PROCEEDING WITH CONSTRUCTION FOR NECESSARY PLAN OR GRADE CHANGES.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR ALL FLAGGING, CAUTION SIGNS, LIGHTS, BARRICADES, FLAGMEN, AND ALL OTHER DEVICES NECESSARY FOR PUBLIC SAFETY.
13. THE CONTRACTOR SHALL, AT THE TIME OF BIDDING, AND, THROUGHOUT THE PERIOD OF THE CONTRACT, BE LICENSED IN THE STATE OF UTAH AND SHALL DEMONSTRATE CURRENT BONDING ABILITY FOR AN AMOUNT EQUAL TO OR GREATER THAN THE AMOUNT BID AND TO DO THE TYPE OF WORK CONTEMPLATED IN THE PLANS AND SPECIFICATIONS. CONTRACTOR SHALL BE SKILLED AND REGULARLY ENGAGED IN THE GENERAL CLASS AND TYPE OF WORK CALLED FOR IN THE PLANS AND SPECIFICATIONS.
14. THIS DRAWING SET IS NOT AN ALL-INCLUSIVE SET OF DRAWINGS. CONTRACTOR TO COORDINATE WITH ALL OTHER DISCIPLINES, INCLUDING BUT NOT LIMITED TO: SOILS REPORT, LANDSCAPE PLANS, SITE ELECTRICAL AND LIGHTING PLANS, MECHANICAL PLANS, & ARCHITECTURAL PLANS.
15. CONTRACTOR SHALL INSPECT THE SITE OF THE WORK PRIOR TO BIDDING TO SATISFY THEMSELVES BY PERSONAL EXAMINATION OR BY SUCH OTHER MEANS AS THEY MAY PREFER, OF THE LOCATION OF THE PROPOSED WORK, AND OF THE ACTUAL CONDITIONS OF AND AT THE SITE OF WORK. IF, DURING THE COURSE OF THEIR EXAMINATION, A BIDDER FINDS FACTS OR CONDITIONS WHICH APPEAR TO THEM TO BE IN CONFLICT WITH THE LETTER OR SPIRIT OF THE PROJECT PLANS AND SPECIFICATIONS, THEY SHALL CONTACT THE ENGINEER FOR ADDITIONAL INFORMATION AND EXPLANATION BEFORE SUBMITTING THEIR BID. SUBMISSION OF A BID BY THE CONTRACTOR SHALL CONSTITUTE ACKNOWLEDGMENT THAT, IF AWARDED THE CONTRACT, THEY HAVE RELIED AND ARE RELYING ON THEIR OWN EXAMINATION OF (1) THE SITE OF THE WORK, (2) ACCESS TO THE SITE, AND (3) ALL OTHER DATA AND MATTERS REQUISITE TO THE FULFILLMENT OF THE WORK AND ON THEIR OWN KNOWLEDGE OF EXISTING FACILITIES ON AND IN THE VICINITY OF THE SITE OF THE WORK TO BE CONSTRUCTED UNDER THIS CONTRACT. THE INFORMATION PROVIDED BY THE ENGINEER IS NOT INTENDED TO BE A SUBSTITUTE FOR, OR A SUPPLEMENT TO THE INDEPENDENT VERIFICATION BY THE CONTRACTOR TO THE EXTENT SUCH INDEPENDENT INVESTIGATION OF SITE CONDITIONS IS DEEMED NECESSARY OR DESIRABLE BY THE CONTRACTOR. CONTRACTOR SHALL ACKNOWLEDGE THAT THEY HAVE NOT RELIED SOLELY UPON OWNER OR ENGINEER FURNISHED INFORMATION REGARDING SITE CONDITIONS IN PREPARING AND SUBMITTING THEIR BID.
16. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE ALL WATER, POWER, SANITARY FACILITIES AND TELEPHONE SERVICES AS REQUIRED FOR THE CONTRACTOR'S USE DURING CONSTRUCTION.
17. THE CONTRACTOR SHALL BE HELD RESPONSIBLE FOR ANY FIELD CHANGES MADE WITHOUT PRIOR WRITTEN AUTHORIZATION FROM THE OWNER, ENGINEER, UTAH DEPARTMENT OF FACILITIES MANAGEMENT AND/OR THE UNIVERSITY OF UTAH.
18. THE CONTRACTOR SHALL EXERCISE DUE CAUTION AND SHALL CAREFULLY PRESERVE BENCH MARKS, CONTROL POINTS, REFERENCE POINTS AND ALL SURVEY STAKES, AND SHALL BEAR ALL EXPENSES FOR REPLACEMENT AND/OR ERRORS CAUSED BY THEIR UNNECESSARY LOSS OR DISTURBANCE.
19. THE CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOBSITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR SHALL DEFEND, INDEMNIFY AND HOLD THE OWNER AND ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT, EXCEPTING FOR LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF THE OWNER OR THE ENGINEER.
20. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ADEQUATELY SCHEDULING INSPECTION AND TESTING OF ALL FACILITIES CONSTRUCTED UNDER THIS CONTRACT. ALL TESTING SHALL CONFORM TO THE UTAH DEPARTMENT OF FACILITIES MANAGEMENT REQUIREMENTS. ALL TESTING AND INSPECTION SHALL BE PAID FOR BY THE OWNER; ALL RE-TESTING AND/OR RE- INSPECTION SHALL BE PAID FOR BY THE CONTRACTOR.
21. THE CONTRACTOR SHALL MAINTAIN A NEATLY MARKED SET OF FULL-SIZE AS-BUILT RECORD DRAWINGS SHOWING THE FINAL LOCATION AND LAYOUT OF ALL STRUCTURES AND OTHER FACILITIES. AS-BUILT RECORD DRAWINGS SHALL REFLECT CHANGE ORDERS, ACCOMMODATIONS, AND ADJUSTMENTS TO ALL IMPROVEMENTS CONSTRUCTED. WHERE NECESSARY, SUPPLEMENTAL DRAWINGS SHALL BE PREPARED AND SUBMITTED BY THE CONTRACTOR. PRIOR TO ACCEPTANCE OF THE PROJECT, THE CONTRACTOR SHALL DELIVER TO THE ENGINEER, ONE SET OF NEATLY MARKED AS-BUILT RECORD DRAWINGS SHOWING THE INFORMATION REQUIRED ABOVE. AS-BUILT RECORD DRAWINGS SHALL BE REVIEWED AND THE COMPLETE AS-BUILT RECORD DRAWING SET SHALL BE CURRENT WITH ALL CHANGES AND DEVIATIONS REDLINED AS A PRECONDITION TO THE FINAL PROGRESS PAYMENT APPROVAL AND/OR FINAL ACCEPTANCE.
22. WHERE THE PLANS OR SPECIFICATIONS DESCRIBE PORTIONS OF THE WORK IN GENERAL TERMS BUT NOT IN COMPLETE DETAIL, IT IS UNDERSTOOD THAT ONLY THE BEST GENERAL PRACTICE IS TO PREVAIL AND THAT ONLY MATERIALS AND WORKMANSHIP OF THE FIRST QUALITY ARE TO BE USED.
23. THE CONTRACTOR SHALL BE SKILLED AND REGULARLY ENGAGED IN THE GENERAL CLASS AND TYPE OF WORK CALLED FOR IN THE PROJECT PLANS AND SPECIFICATIONS. THEREFORE, THE OWNER IS RELYING UPON THE EXPERIENCE AND EXPERTISE OF THE CONTRACTOR, IT SHALL BE EXPECTED THAT PRICES PROVIDED WITHIN THE CONTRACT DOCUMENTS SHALL INCLUDE ALL LABOR AND MATERIALS NECESSARY AND PROPER FOR THE WORK CONTEMPLATED AND THAT THE WORK BE COMPLETED IN ACCORDANCE WITH THEIR TRUE INTENT AND PURPOSE. THE CONTRACTOR SHALL BE COMPETENT, KNOWLEDGEABLE AND HAVE SPECIAL SKILLS IN THE NATURE, EXTENT AND INHERENT CONDITIONS OF THE WORK TO BE PERFORMED. CONTRACTOR SHALL ALSO ACKNOWLEDGE THAT THERE ARE CERTAIN PECULIAR AND INHERENT CONDITIONS EXISTENT IN THE CONSTRUCTION OF THE PARTICULAR FACILITIES, WHICH MAY CREATE, DURING THE CONSTRUCTION PROGRAM, UNUSUAL OR UNSAFE CONDITIONS HAZARDOUS TO PERSONS, PROPERTY AND THE ENVIRONMENT. CONTRACTOR SHALL BE AWARE OF SUCH PECULIAR RISKS AND HAVE THE SKILL AND EXPERIENCE TO FORESEE AND TO ADOPT PROTECTIVE MEASURES TO ADEQUATELY AND SAFELY PERFORM THE CONSTRUCTION WORK WITH RESPECT TO SUCH HAZARDS.
24. THE CONTRACTOR SHALL PROVIDE ALL SHORING, BRACING, SLOPING OR OTHER PROVISIONS NECESSARY TO PROTECT WORKMEN FOR ALL AREAS TO BE EXCAVATED TO A DEPTH OF 4 FEET OR MORE. FOR EXCAVATIONS 4 FEET OR MORE IN DEPTH, THE CONTRACTOR SHALL COMPLY WITH INDUSTRIAL COMMISSION OF UTAH SAFETY ORDERS ALONG WITH ANY LOCAL CODES OR ORDINANCES.
25. ALL EXISTING GATES AND FENCES TO REMAIN UNLESS OTHERWISE NOTED ON PLANS. PROTECT ALL GATES AND FENCES FROM DAMAGE.
26. PRIOR TO STARTING EXCAVATION, A DIGGING PERMIT MUST BE REQUESTED THROUGH THE CAMPUS DESIGN AND CONSTRUCTION PROJECT MANAGER 5 WORKING DAYS PRIOR TO START. THE DIGGING PERMIT WILL ALSO SERVE AS NOTIFICATION FOR THE REQUEST TO LOCATE EXISTING UTILITIES. UTILITY SHUTDOWNS, ROAD AND SIDEWALK CLOSURES REQUIRE A 72 HOUR MINIMUM NOTICE PRIOR THE THE SHUTDOWN TO THE CAMPUS DESIGN AND CONSTRUCTION PROJECT MANAGER.
27. THE CONTRACTOR SHALL CLEAR AND GRUB PRIOR TO EXCAVATION REMOVING ALL PLANT LIFE, GRASS, ROOT SYSTEMS, AND ALL SURFACE DEBRIS AS NEEDED TO PROVIDE A CLEAN SUB-BASE FOR THE WORK.
28. NO ON SITE BURNING WILL BE PERMITTED.
29. LANDSCAPING FEATURES AND PLANT GROWTH DESIGNATED TO REMAIN AS FINAL LANDSCAPING ARE TO BE PROTECTED. ALL TREES REMOVED AS PART OF THE CONSTRUCTION MUST BE REPLACED ON A 2 FOR 1 BASIS UNLESS NOTED OTHERWISE. CONTACT LANDSCAPE AND MAINTENANCE DEPARTMENT AT 801-581-5358 FOR DETERMINATION OF TREE TYPE, SIZE, AND LOCATION REQUIRED. ONLY TREES IDENTIFIED FOR REMOVAL ON THE DRAWINGS ARE TO BE REMOVED.
30. CONTRACTOR SHALL POT HOLE ALL UTILITIES TO DETERMINE IF CONFLICTS EXIST PRIOR TO BEGINNING ANY EXCAVATION. NOTIFY THE DFCM, UNIVERSITY OF UTAH, AND THE ENGINEER OF ANY CONFLICTS. CONTRACTOR SHALL VERIFY LOCATION AND INVERTS OF EXISTING UTILITIES TO WHICH NEW UTILITIES WILL BE CONNECTED.
31. CONTRACTOR SHALL PROVIDE AND MAINTAIN AT ALL TIMES AMPLE MEANS AND DEVICES WITH WHICH TO REMOVE PROMPTLY AND TO PROPERLY DISPOSE OF ALL WATER ENTERING THE TRENCH EXCAVATION.
32. THE CONTRACTOR SHALL NOTIFY UNIVERSITY OF UTAH SURVEYOR, IN WRITING AT LEAST 48 HOURS PRIOR TO BACKFILLING OF ANY PIPE.
33. CONTRACTOR SHALL SUBMIT A SWPPP FOR APPROVAL TO UNIVERSITY OF UTAH CAMPUS DESIGN AND CONSTRUCTION. SEE SHEET CE-115.
34. THE CONTRACTOR SHALL EXERCISE DUE CAUTION AND SHALL CAREFULLY PRESERVE BENCH MARKS, CONTROL POINTS, REFERENCE POINTS AND ALL SURVEY STAKES, AND SHALL BEAR ALL EXPENSES FOR REPLACEMENT AND/OR ERRORS CAUSED BY THEIR UNNECESSARY LOSS OR DISTURBANCE.
35. IF EXISTING IMPROVEMENTS NEED TO BE DISTURBED AND/OR REMOVED FOR THE PROPER PLACEMENT OF IMPROVEMENTS TO BE CONSTRUCTED BY THESE PLANS, THE CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING EXISTING IMPROVEMENTS FROM DAMAGE. COST OF REPLACING OR REPAIRING EXISTING IMPROVEMENTS SHALL BE INCLUDED IN THE PRICE BID FOR ITEMS REQUIRING REMOVAL AND/OR REPLACEMENT OF EXISTING IMPROVEMENTS. REPLACEMENT WILL BE AT NO COST TO THE OWNER.
36. WHENEVER EXISTING FACILITIES ARE REMOVED, DAMAGED, BROKEN, OR CUT IN THE INSTALLATION OF THE WORK COVERED BY THESE PLANS OR SPECIFICATIONS, SAID FACILITIES SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE, WITH MATERIALS EQUAL TO OR BETTER THAN THE MATERIALS USED IN THE ORIGINAL EXISTING FACILITIES. THE FINISHED PRODUCT SHALL BE SUBJECT TO THE APPROVAL OF THE OWNER AND THE ENGINEER. LIGHTING CONDUIT THAT IS BROKEN SHALL BE REPAIRED OR REPLACED AND NEW WIRE SHALL BE PULLED THE ENTIRE DISTANCE BETWEEN LIGHTS. CONCRETE SIDEWALK AND PAVEMENT SHALL BE REPLACED TO THE NEAREST EXISTING JOINT. LIGHTING TO BE OPERATIONAL BY THE END OF EACH DAY.

UTILITY NOTES

1. UNLESS OTHERWISE NOTED, ALL DRY UTILITIES ARE ASSUMED TO BE 3' BELOW EXISTING GRADES TO TOP OF CONDUIT. ALL WATER LINES ARE ASSUMED TO BE 4' BELOW EXISTING GRADE TO TOP OF PIPE. ALL STORM AND SANITARY LINES ARE BASED ON SURVEYED INVERT DATA. CONTRACTOR TO POTHOLE ALL UTILITIES CROSSINGS, VERIFY ELEVATION INFORMATION AND CONTACT ENGINEER IF ELEVATIONS ARE DIFFERENT FROM THOSE SHOWN IN THESE PLANS.
2. CONTRACTOR IS TO COORDINATE LOCATION OF NEW "DRY UTILITIES" WITH THE APPROPRIATE UTILITY COMPANY, INCLUDING BUT NOT LIMITED TO: TELEPHONE SERVICE, GAS SERVICE, CABLE, POWER, INTERNET.
3. EXISTING UTILITIES HAVE BEEN SHOWN ON THE PLANS USING A SITE SURVEY.
4. CARE SHOULD BE TAKEN IN ALL EXCAVATIONS DUE TO POSSIBLE EXISTENCE OF UNRECORDED UTILITY LINES. EXCAVATION REQUIRED WITHIN PROXIMITY OF EXISTING UTILITY LINES SHALL BE DONE BY HAND. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITY LINES OR STRUCTURES INCURRED DURING CONSTRUCTION OPERATIONS AT HIS EXPENSE.
5. ALL VALVES AND MANHOLES COVERS SHALL BE RAISED OR LOWERED TO MEET FINISHED GRADE.
6. ENSURE POSITIVE DRAINAGE FROM ANY EXISTING OR PROPOSED UTILITY STRUCTURES.
7. CONTRACTOR SHALL REMOVE AND DISPOSE OF ALL EXISTING STRUCTURES, DEBRIS, WASTE AND OTHER UNSUITABLE FILL MATERIAL FOUND WITHIN THE LIMITS OF EXCAVATION.
8. EXISTING UTILITIES HAVE BEEN SHOWN ON THE PLANS USING A SITE SURVEY. UTILITIES HAVE BEEN LOCATED WITH A TOPOGRAPHIC SURVEY LEVEL OF ACCURACY, LITTLE SUBSURFACE EXPLORATION HAS BEEN COMPLETED. CONTRACTOR IS RESPONSIBLE FOR OBTAINING BLUE STAKES BY CONTACTING LENARD BARNEY @ 801-718-0804, IT WILL BE THE CONTRACTOR'S SOLE RESPONSIBILITY TO DIRECTLY CONTACT ANY OTHER UTILITY COMPANIES THAT ARE NOT MEMBERS OF BLUE STAKES. IT SHALL BE THE CONTRACTOR'S SOLE RESPONSIBILITY TO PROTECT ALL EXISTING UTILITIES SO THAT NO DAMAGE RESULTS TO THEM DURING THE PERFORMANCE OF THIS CONTRACT. ANY REPAIRS NECESSARY TO DAMAGED UTILITIES SHALL BE PAID FOR BY THE CONTRACTOR. THE CONTRACTOR SHALL BE REQUIRED TO COOPERATE WITH OTHER CONTRACTORS AND UTILITY COMPANIES INSTALLING NEW STRUCTURES, UTILITIES AND SERVICE TO THE PROJECT
9. CARE SHOULD BE TAKEN IN ALL EXCAVATIONS DUE TO POSSIBLE EXISTENCE OF UNRECORDED UTILITY LINES. EXCAVATION REQUIRED WITHIN PROXIMITY OF EXISTING UTILITY LINES SHALL BE DONE BY HAND. CONTRACTOR SHALL REPAIR ANY DAMAGE TO EXISTING UTILITY LINES OR STRUCTURES INCURRED DURING CONSTRUCTION OPERATIONS AT HIS EXPENSE. THE CONTRACTOR SHALL BEAR ALL EXPENSES FOR THE REPLACEMENT OF THE DAMAGED UTILITIES WHOSE LOCATION HAS BEEN IDENTIFIED BY THE UNIVERSITY OR BLUESTAKING.
10. ALL BOLTED FITTINGS MUST BE GREASED AND WRAPPED.
11. IF AN EMERGENCY SHUT-DOWN OF A UTILITY IS REQUIRED CALL UNIVERSITY OF UTAH PLANT OPERATIONS DISPATCH AT (801) 581-7221

ABBREVIATIONS :

APWA	AMERICAN PUBLIC WORKS ASSOCIATION	FH	FIRE HYDRANT	PP	POWER POLE
AC	ASPHALTIC CONCRETE	FL	FLANGED JOINT	PRC	POINT OF REVERSE CURVE
&	AND	FT	FEET	PRV	PRESSURE REDUCING VALVE
APPR.	APPROXIMATELY	HP	HIGH POINT	PSI	POUNDS PER SQUARE INCH
ARV	AIR RELEASE VALVE	HORIZ	HORIZONTAL	PT	POINT OF TANGENT
@	AT	HT	HIGH TEMPERATURE	PVC	POLYVINYL CHLORIDE
BDRY	BOUNDARY	HTW	HIGH TEMPERATURE WATER	PUE	PUBLIC UTILITY EASEMENT
BG	FINISH GRADE AT BUILDING	HV	HIGH VOLTAGE	PVI	POINT OF VERTICAL TANGENT
BVC	BEGIN VERTICAL CURVE	HYD	HYDRANT	PVT	POINT OF VERTICAL INTERSECTION
BRG	BEARING	ID	INSIDE DIAMETER	R	RADIUS
BW	BOTTOM OF WALL	IE	INVERT ELEVATION	RCP	REINFORCED CONCRETE PIPE
CAV	COMBINATION AIR VALVE	IRR	IRRIGATION	REF	REFERENCE
CB	CATCH BASIN	L	LENGTH	ROW	RIGHT-OF-WAY
CL OR ℄	CENTERLINE	LF	LINEAR FEET	SS	SANITARY SEWER
CMP	CORRUGATED METAL PIPE	LP	LOW POINT	SD	STORM DRAIN
COB	CLEANOUT BOX	MAX	MAXIMUM	SW	SIDEWALK
CONC	CONCRETE	MH	MANHOLE	SCH	SCHEDULE
DET	DETAIL	MIN	MINIMUM	SF	SQUARE FEET
DIA	DIAMETER	MJ	MECHANICAL JOINT	STA	STATION
DIP	DUCTILE IRON PIPE	N	NORTH	STD	STANDARD
DIST	DISTRICT	NIC	NOT IN CONTRACT	TA	TOP OF ASPHALT
DWG	DRAWING	NTS	NOT TO SCALE	TBC	TOP BACK OF CURB
EA	EACH	OAE	OR APPROVED EQUAL	TC	TOP OF CURB
EG	EXISTING GRADE	OC	ON CENTER	TEMP	TEMPORARY
EP	EDGE OF PAVEMENT	OH	OVERHEAD	TG	TOP OF GRATE
ELEV	ELEVATION	P	POWER	TW	TOP OF WALL
ESMT	EASEMENT	PC	POINT OF CURVATURE	TYP	TYPICAL
EXIST.	EXISTING	PI	POINT OF INTERSECTION	VAR	VARIES
FF	FINISH FLOOR	PL	PROPERTY LINE	W	WATER
FG	FINISH GRADE	POC	POINT ON CURVE	W/	WITH

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No.	Description	Date
-	RELEASE 2	00 MAR 2011
-	RELEASE 1	00 JAN 2011

KEY PLAN

Drawing Title:

GENERAL NOTES

Project No.: 004345.00 Checked by: Checker

C-001

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GENERAL NOTES:

EXISTING UTILITY INFORMATION SHOWN IS FOR INFORMATIONAL PURPOSES ONLY. IT IS DERIVED FROM RECORD DRAWINGS AND MAY NOT BE LOCATED CORRECTLY AND IS NOT ALL INCLUSIVE. CONTRACTOR SHALL FIELD LOCATE ALL UTILITIES BEFORE BEGINNING DEMOLITION/CONSTRUCTION AND NOTIFY ENGINEER WHEN UNEXPECTED UTILITIES ARE DISCOVERED.

THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR LOCATING AND PROTECTING FROM DAMAGE ALL EXISTING UTILITIES AND IMPROVEMENTS WHETHER OR NOT SHOWN ON THESE PLANS. THE FACILITIES AND IMPROVEMENTS ARE BELIEVED TO BE CORRECTLY SHOWN BUT THE CONTRACTOR IS REQUIRED TO SATISFY HIMSELF AS TO THE COMPLETENESS AND ACCURACY OF THE LOCATIONS. ANY CONTRACTOR PERFORMING WORK ON THIS PROJECT SHALL FAMILIARIZE THEMSELVES WITH THE SITE AND SHALL BE HELD SOLELY RESPONSIBLE FOR ANY DAMAGE TO EXISTING FACILITIES RESULTING DIRECTLY, OR INDIRECTLY, FROM THEIR OPERATIONS, WHETHER OR NOT SAID FACILITIES ARE SHOWN ON THESE PLANS.

SCOPE OF WORK:

1. APPROXIMATE LIMITS-OF-DISTRUBANCE.
2. SAWCUT EXISTING ASPHALT.
3. REMOVE & PROPERLY DISPOSE OF EXISTING ASPHALT.
4. PRESERVE & PROTECT EXISTING A
5. REMOVE & PROPERLY DISPOSE OF SAWCUT AT CONTROL JOINT NEAREST DEMOLITION BOUNDARY SHOWN.
6. CLEAR & GRUB. PRESERVE & PRO APING BEYOND AREA NECESSARY TO BE DISTURBED FOR IMPROVEMENT.
7. THIS AREA PREVIOUSLY DEMOLISHED FOR THE HPER TUNNEL CONSTRUCTION. SEE GEOTECHNICAL NOTE THIS SHEET FOR ADDITIONAL INFORMATION. SEE HATCHED AREA
8. REMOVE & PROPERLY DISPOSE OF EXISTING TREE (49 TREES REMOVED)
9. REMOVE & PROPERLY DISPOSE OF EXISTING SEWER PIPE.
10. REMOVE & PROPERLY DISPOSE OF EXISTING CONCRETE SEWER MANHOLE
11. REMOVE & PROPERLY DISPOSE OF EXISTING BUS STOP STRUCTURE AND CONCRETE.
12. COORDINATE CONNECTION OF NEW MANHOLE TO EXISTING SANITARY SEWER PIPE. SEWER TO REMAIN IN SERVICE DURING CONSTRUCTION. SEE PLAN AND PROFILE SHEET C-105 AND C-106
13. CAP REMAINING SEWER PIPE AND PLUG AT MANHOLE
14. REMOVE & PROPERLY DISPOSE OF EXISTING STORM DRAIN PIPE.
15. REMOVE & PROPERLY DISPOSE OF EXISTING CONCRETE CATCH BASINS
16. CUT, CAP WITH CONCRETE PLUG, AND REMOVE EXISTING ABANDONED HIGH TEMPERATURE WATER PIPE AS NEEDED TO AVOID CONFLICTS. CONTACT UNIVERSITY OF UTAH PLANT OPERATIONS PRIOR TO PROCEEDING WITH ANY WORK ON HIGH TEMPERATURE WATER PIPES.

TO BE REVISED

DEMOLITION LEGEND:

- G — EXISTING GAS SERVICE
- 6"GG — EXISTING QUESTAR HIGH PRESSURE GAS SERVICE
- T — EXISTING TELEPHONE SERVICE
- CTV — EXISTING CABLE TV SERVICE
- P — EXISTING POWER SERVICE
- SS — EXISTING SANITARY SEWER PIPE
- SD — EXISTING STORM DRAIN PIPE
- W — EXISTING WATER PIPE
- CLEAR AND GRUB
- PREVIOUSLY CLEARED AND GRUBED DURING HPER TUNNEL CONSTRUCTION
- EXISTING ASPHALT PAVEMENT (TO BE DEMOLISHED AND REMOVED)
- EXISTING CONCRETE PAVEMENT (TO BE DEMOLISHED AND REMOVED)
- DEMO PIPE
- SAWCUT LINE
- LIMITS OF DISTURBANCE

SCALE
HORIZONTAL: 1" = 20'
0 5' 10' 20' 30'

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KEY PLAN

Drawing Title:

DEMOLITION PLAN OVERALL

Project No.: 004345.00 Checked by: Checker

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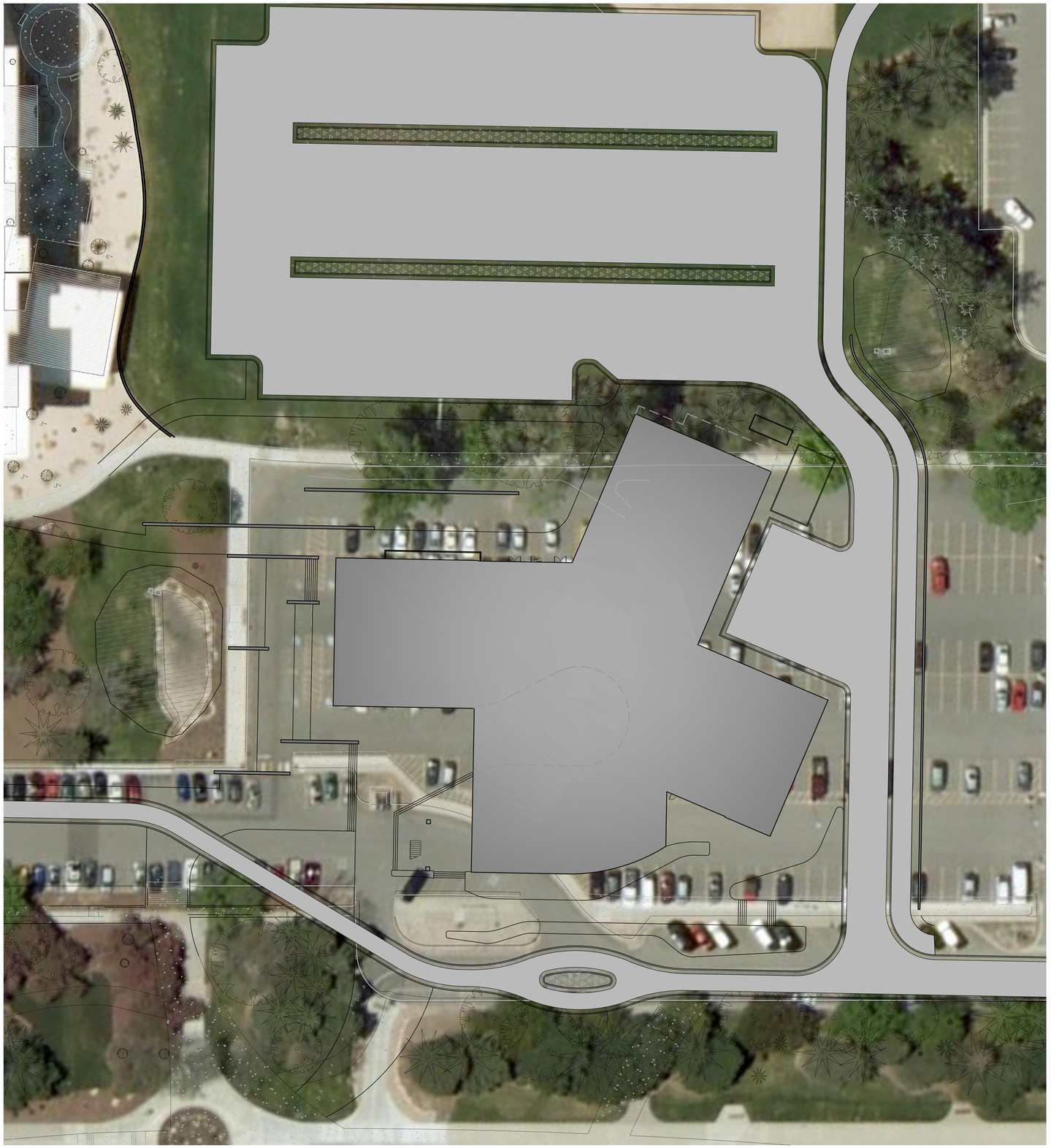

SITE GENERAL NOTES:

SEE LANDSCAPE PLANS FOR CONCRETE, FINISH AND ADDITIONAL INFORMATION. (BID SET 2)

SEE LANDSCAPE PLANS FOR CONCRETE CONTROL JOINT LOCATIONS. (BID SET 2)

SEE ELECTRICAL PLANS FOR ADDITIONAL INFORMATION. (BID SET 2)

SEE LANDSCAPE PLANS FOR IRRIGATION, PLANTING AND ADDITIONAL INFORMATION. (BID SET 2)

ALL WORK TO COMPLY WITH THE UNIVERSITY OF UTAH AND DFCM STANDARDS AND SPECIFICATIONS.

ALL IMPROVEMENTS MUST COMPLY WITH ADA STANDARDS.

SEE GRADING PLANS FOR ADDITIONAL DESIGN INFORMATION.

SITE SCOPE OF WORK:

PROVIDE, INSTALL AND/OR CONSTRUCT THE FOLLOWING PER THE SPECIFICATIONS GIVEN OR REFERENCED, THE DETAILS NOTED, AND/OR AS SHOWN ON THE CONSTRUCTION DRAWINGS:

1. CONCRETE RETAINING WALL. SEE ARCHITECTURAL AND STRUCTURAL PLANS FOR DESIGN INFORMATION. BID PACKAGE 2.
2. CONTRACTOR TO PROTECT & PRESERVE EXISTING IMPROVEMENTS (TYPICAL UNLESS OTHERWISE NOTED).
3. BUILDING FOOTPRINT.
4. NOT USED
5. VEHICULAR CONCRETE PAVEMENT: ITH 10" GRANULAR BASE PER UNIVERSITY OF UTAH STANDARDS.
6. 6" THICK CONCRETE SIDEWALK W PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-C1. SEE DRAWINGS C ACCESSIBILITY PATH.
7. ASPHALT PAVEMENT: 3" THICK CONCRETE WITH 8" GRANULAR BASE PER UNIVERSITY OF UTAH STANDARDS. PER DETAIL C/C-118.
8. CONCRETE CURB AND GUTTER PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-C3 AND CIV-MISC8.
9. 0" FACE CONCRETE CURB AND GUTTER PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-C3 AND CIV-MISC8.
10. FREE STANDING CONCRETE CURB PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-C4.
11. TYPE I SIDEWALK RAMP PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-C5 WITH DETECTABLE WARNING SURFACE PER APWA PLAN NO. 238.
12. PEDESTRIAN CONCRETE PAVEMENT: 6" THICK CONCRETE WITH 6" GRANULAR BASE PER DETAIL A/C-118. AND/PER SOILS REPORT PROVIDED BY GEOTECHNICAL ENGINEER. REFER TO MOST CURRENT COPY OF SOILS REPORT TO VERIFY CONCRETE SECTION.
13. TRANSITION CONCRETE CURB AND GUTTER TO FREE STANDING CONCRETE CURB.
14. BOLLARDS SHOWN FOR REFERENCE ONLY. SEE LANDSCAPE PLANS FOR EXACT LOCATION AND TYPE.
15. LANDSCAPE FEATURE. SEE LANDSCAPE PLANS FOR DESIGN INFORMATION.
16. SEAT WALL. SEE ARCHITECTURAL AND STRUCTURAL PLANS FOR DESIGN INFORMATION.
17. OPEN DRIVEWAY APPROACH PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-C6.
18. DIP DRIVEWAY APPROACH PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-C7.
19. ASPHALT PAVEMENT TIE IN: 3" THICK CONCRETE WITH 6" GRANULAR BASE PER SOILS REPORT PROVIDED BY GEOTECHNICAL ENGINEER. REFER TO MOST CURRENT COPY OF SOILS REPORT TO VERIFY ASPHALT SECTION. INSTALL PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-MISC7.

TO BE REVISED

SIGNAGE AND STRIPPING GENERAL NOTES:

ALL DIMENSIONS ARE TO THE FACE OF CURB, UNLESS OTHERWISE NOTED.

SEE ARCHITECTURAL PLANS FOR ADDITIONAL INFORMATION.

ALL SIGNS AND PAVEMENT MARKINGS SHALL CONFORM TO THE LATEST EDITION OF THE M.U.T.C.D. (MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES).

ALL STRIPING TO BE 3M TAPE OR 90 MIL PREFORMED THERMO PLASTIC.

SIGNAGE AND STRIPPING SCOPE OF WORK:

PROVIDE, INSTALL AND/OR CONSTRUCT THE FOLLOWING PER THE SPECIFICATIONS GIVEN OR REFERENCED, THE DETAILS NOTED, AND/OR AS SHOWN ON THE CONSTRUCTION DRAWINGS:

1. 4" WIDE SOLID WHITE PAVEMENT M
2. 4" WIDE SOLID DOUBLE YELLOW P.
3. 12" WIDE SOLID WHITE STOP BAR
4. 12" WIDE SOLID WHITE CROSSWALK LESS OTHERWISE NOTED).
5. "STOP" SIGN PER M.U.T.C.D. STANDARD PLAN R1-1.
6. "SPEED LIMIT" SIGN PER M.U.T.C.D. STANDARD PLAN R2-1 WITH 15 MPH SPEED.
7. "PEDESTRIAN CROSSING" SIGN PER M.U.T.C.D. STANDARD PLAN W-11-2 AND W16-7P.
8. "SIDEWALK ENDS" SIGN PER DETAIL L/C-9.01.
9. TRAFFIC SIGNAL (BY OTHERS).
10. LIMITS OF CONSTRUCTION.
11. "HANDICAP PARKING" SIGN NO. R7-8 PER 2009 M.U.T.C.D. SECTION 2B.46.
12. "HANDICAP PARKING" SIGN NO. R7-8 WITH "VAN ACCESSIBLE" SIGN R7-8P BELOW, PER 2009 M.U.T.C.D. SECTION 2B.46.

TO BE REVISED

HATCH LEGEND:

- PROPOSED CONCRETE PAVEMENT (PLAZA) PER A/C-116
- PROPOSED CONCRETE PAVEMENT (SIDEWALKS) PER A/C-116
- PROPOSED CONCRETE PAVEMENT (VEHICULAR) PER B/C-116
- PROPOSED ASPHALT PAVEMENT PER C/C-116
- PROPOSED CONCRETE WALL (SEE LANDSCAPE PLANS FOR MORE INFORMATION)
- PROPOSED MULCH PER D/C-116
- PROPOSED TURF PER A/C-116
- FUTURE SIDEWALK

SCALE
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5' 0' 10' 20' 30'

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No.	Description	Date
-	RELEASE 2	00 MAR 2011
-	RELEASE 1	00 JAN 2011

KEY PLAN

Drawing Title:

SITE PLAN
OVERALL

Project No.: 004345.00 Checked by: Checker

C-200

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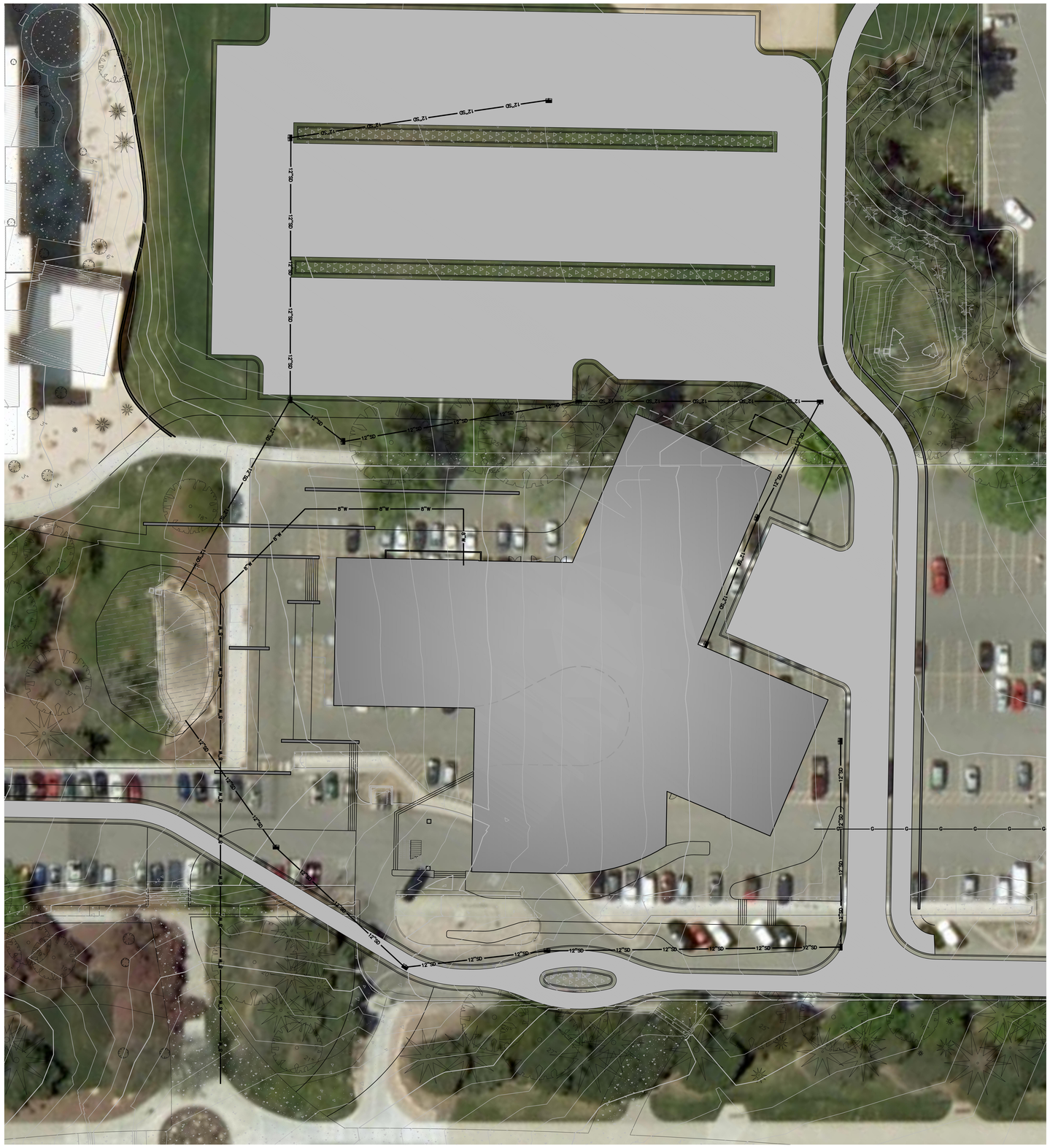

GRADING: GEOTECHNICAL NOTES/REQUIREMENTS:

1) ALL IMPORTED MATERIAL TO BE APPROVED IN WRITING BY GEOTECHNICAL ENGINEER.

2) ALL COMPACTION FOR INTERIOR AND EXTERIOR BACKFILL ADJACENT TO BUILDINGS TO BE VERIFIED IN WRITING BY GEOTECHNICAL ENGINEER.

3) A LETTER FROM THE GEOTECHNICAL ENGINEER THAT THE FOUNDATION EXCAVATION AND THE SUBGRADE WERE PREPARED IN ACCORDANCE WITH THE GEOTECHNICAL REPORT FOR THIS PROJECT AND THAT THE SUBGRADE FOR FOUNDATION AND SLAB SUPPORT IS READY FOR PLACEMENT OF CONCRETE IS REQUIRED PRIOR TO FOOTING AND FLATWORK PLACEMENT.

GRADING GENERAL NOTES:

SITE GRADING SHALL BE PERFORMED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS AND THE RECOMMENDATIONS SET FORTH IN THE GEOTECHNICAL REPORT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVING AND REPLACING ALL SOFT, YIELDING OR UNSUITABLE MATERIALS AND REPLACING THEM WITH SUITABLE MATERIALS AS SPECIFIED IN THE GEOTECHNICAL REPORT. ALL EXCAVATED OR FILLED AREAS SHALL BE COMPACTED TO 95% OF MODIFIED PROCTOR MAXIMUM DENSITY PER ASTM TEST D-1557 EXCEPT UNDER BUILDING FOUNDATIONS WHERE IT SHALL BE 95% MIN. OF MAXIMUM DENSITY. MOISTURE CONTENT AT TIME OF PLACEMENT SHALL NOT EXCEED 2% ABOVE NOR 3% BELOW OPTIMUM. CONTRACTOR SHALL SUBMIT A COMPACTION REPORT PREPARED BY A QUALIFIED REGISTERED GEOTECHNICAL THAT ALL FILLED AREAS AND SUBGRADE AREAS WITHIN THE BUILDING TO BE PAVED HAVE BEEN COMPACTED IN ACCORDANCE WITH THES IONS AND THE RECOMMENDATIONS SET FORTH IN THE GEOTECHNICAL REPORT.

TO BE REVISED

CONTRACTOR SHALL BECOME FAMILIAR IDITIONS.

THE CONTRACTOR IS TO USE BEST MAN OR PROVIDING EROSION CONTROL AND DUST SUPPRESSION FOR CONSTRUCTION CIFIC INFORMATION SHOWN ON DRAWINGS C-115 SHALL BE USED IN COMBINATION WITH OTHER ACCEPTED LOCAL PRACTICES.

EXISTING UNDERGROUND UTILITIES AND IMPROVEMENTS ARE SHOWN IN THEIR APPROXIMATE LOCATIONS BASED UPON RECORD INFORMATION AVAILABLE AT THE TIME OF PREPARATION OF PLANS. LOCATIONS MAY NOT HAVE BEEN VERIFIED IN THE FIELD AND NO GUARANTEE IS MADE AS TO ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE EXISTENCE AND LOCATION OF THOSE UTILITIES SHOWN ON THESE PLANS OR INDICATED IN THE FIELD BY LOCATING SERVICES. ANY ADDITIONAL COSTS INCURRED AS A RESULT OF CONTRACTOR'S FAILURE TO VERIFY LOCATIONS OF EXISTING UTILITIES PRIOR TO BEGINNING OF CONSTRUCTION IN THEIR VICINITY SHALL BE BORNE BY THE CONTRACTOR AND ASSUMED INCLUDED IN THE CONTRACT.

LOCATIONS OF ALL UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR IS TO VERIFY CONNECTION POINTS WITH EXISTING UTILITIES. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED TO EXISTING UTILITIES AND UTILITY STRUCTURES THAT ARE TO REMAIN.

ALL SURFACE IMPROVEMENTS DISTURBED BY CONSTRUCTION SHALL BE RESTORED OR REPLACED, INCLUDING TREES, DECORATIVE SHRUBS, SOD, FENCES, WALLS AND STRUCTURES, WHETHER OR NOT THEY ARE SPECIFICALLY SHOWN ON THE CONTRACT DOCUMENTS.

GRADING SCOPE OF WORK:

SEE SHEETS C-301 THRU C-304 FOR PROPOSED GRADING SCOPE OF WORK, SPOT ELEVATIONS AND GRADE SLOPES

DRAINAGE GENERAL NOTES:

EXISTING UNDERGROUND UTILITIES AND IMPROVEMENTS ARE SHOWN IN THEIR APPROXIMATE LOCATIONS BASED UPON RECORD INFORMATION AVAILABLE AT THE TIME OF PREPARATION OF PLANS. LOCATIONS MAY NOT HAVE BEEN VERIFIED IN THE FIELD AND NO GUARANTEE IS MADE AS TO ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE EXISTENCE AND LOCATION OF THOSE UTILITIES SHOWN ON THESE PLANS OR INDICATED IN THE FIELD BY LOCATING SERVICES. ANY ADDITIONAL COSTS INCURRED AS A RESULT OF CONTRACTOR'S FAILURE TO VERIFY LOCATIONS OF EXISTING UTILITIES PRIOR TO BEGINNING OF CONSTRUCTION IN THEIR VICINITY SHALL BE BORNE BY THE CONTRACTOR AND ASSUMED INCLUDED IN THE CONTRACT.

LOCATIONS OF ALL UNDERGROUND UTILI OXIMATE. CONTRACTOR IS TO VERIFY CONNECTION POINTS WITH EXISTING UTIL RESPONSIBLE FOR ANY DAMAGE CAUSED TO EXISTING UTILITIES AND UTI ARE TO REMAIN.

TO BE REVISED

ALL SURFACE IMPROVEMENTS DISTURBE HALL BE RESTORED OR REPLACED, INCLUDING TREES, DECORATIVE SHRUBS, AND STRUCTURES, WHETHER OR NOT THEY ARE SPECIFICALLY SHOWN ON THE S.

CONTRACTOR IS TO COORDINATE ALL UTILITIES WITH MECHANICAL AND ELECTRICAL DRAWINGS.

DRAINAGE SCOPE OF WORK:

SEE SHEETS C-310 THRU C-3XX FOR PROPOSED UTILITY SCOPE OF WORK, PLAN AND PROFILES

UTILITY LEGEND:

- LIMITS OF DISTURBANCE
- G — PROPOSED GAS LINE
- 6"G — PROPOSED QUESTAR HIGH PRESSURE GAS LINE (BY OTHERS)
- HTW — PROPOSED HIGH TEMPERATURE WATER
- 8"CW — PROPOSED CHILLED WATER PIPE
- SS — PROPOSED SANITARY SEWER PIPE
- SD — PROPOSED STORM DRAIN PIPE
- 4"FD — PROPOSED FOUNDATION DRAIN
- 6"RD — PROPOSED ROOF DRAIN
- PROPOSED DRAINAGE CLEANOUT
- W — PROPOSED WATER PIPE
- S — PROPOSED 4' SEWER MANHOLE
- SS — PROPOSED 5' SEWER MANHOLE
- PROPOSED FIRE HYDRANT
- PROPOSED WATER VALVE
- PROPOSED LANDSCAPE CATCH BASIN
- D — PROPOSED STORM DRAIN CLEAN OUT
- PROPOSED CURB OPENING CATCH BASIN

SCALE
HORIZONTAL: 1" = 20'
0 5' 10' 20' 30'

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No.	Description	Date
-	RELEASE 2	00 MAR 2011
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KEY PLAN

Drawing Title:

GRADING AND DRAINAGE PLAN OVERALL

Project No.: 004345.00 Checked by: Checker

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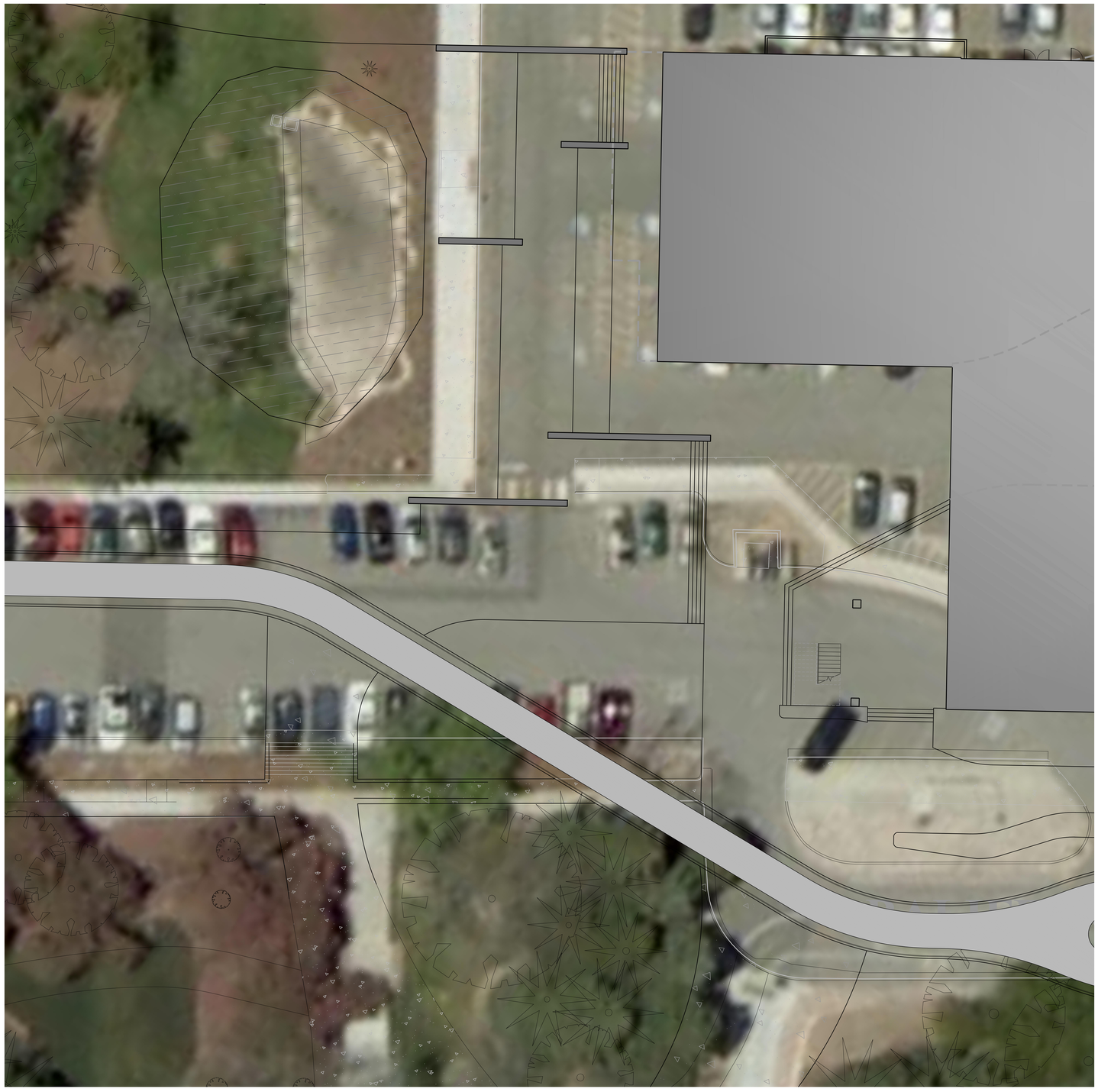

GENERAL NOTES:

SEE SHEET C-001 AND C-300 FOR GRADING GENERAL NOTES.

SCOPE OF WORK:

PROVIDE, INSTALL AND/OR CONSTRUCT THE FOLLOWING PER THE SPECIFICATIONS GIVEN OR REFERENCED, THE DETAILS NOTED, AND THE CONSTRUCTION DRAWINGS:

1. GRADE SITE TO ELEVATIONS SHOWN
2. EGRESS AND ACCESSIBILITY PATH CONSTRUCTED PER ADA ACCESSIBILITY GUIDELINES (SEE SHEET C-116).
3. REFER TO SITE CROSS SECTIONS FOR ROUGH GRADING.
4. SEE STORM DRAIN PLAN FOR CURB AND GUTTER SIZES AND TYPES.
5. SEE DRAINAGE PLAN AND STORM DRAIN PLAN AND PROFILE DRAWINGS FOR ADDITIONAL DESIGN INFORMATION.

TO BE REVISED

ABBREVIATIONS:

BG	FINISH GRADE AT BUILDING
BS	BOTTOM OF STAIRS/STEP
BW	BOTTOM OF WALL
EG	EXISTING GRADE
EP	EDGE OF PAVEMENT
FG	FINISHED GRADE
TBC	TOP BACK OF CURB
TG	TOP OF GRATE
TS	TOP OF STAIRS/STEP
TW	TOP OF WALL

NOTE: MAY CONTAIN ABBREVIATIONS THAT ARE NOT USED IN THIS PLAN SET.

SCALE
HORIZONTAL: 1" = 10'
0 2.5' 5' 10' 15'

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-	RELEASE 2	00 MAR 2011
-	RELEASE 1	00 JAN 2011

KEY PLAN

Drawing Title:

GRADING PLAN AREA SW

Project No.: 004345.00 Checked by: Checker

C-301

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GENERAL NOTES:

SEE SHEET C-001 AND C-300 FOR GRADING GENERAL NOTES.

SCOPE OF WORK:

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1. GRADE SITE TO ELEVATIONS SHOWN
2. EGRESS AND ACCESSIBILITY PATH CONSTRUCTED PER ADA ACCESSIBILITY GUIDELINES (SEE SHEET C-116).
3. REFER TO SITE CROSS SECTIONS ROUGH GRADING.
4. SEE STORM DRAIN PLAN FOR CURB AND GUTTER SIZES AND TYPES.
5. SEE DRAINAGE PLAN AND STORM DRAIN PLAN AND PROFILE DRAWINGS FOR ADDITIONAL DESIGN INFORMATION.

TO BE REVISED

ABBREVIATIONS:

BG	FINISH GRADE AT BUILDING
BS	BOTTOM OF STAIRS/STEP
BW	BOTTOM OF WALL
EG	EXISTING GRADE
EP	EDGE OF PAVEMENT
FG	FINISHED GRADE
TBC	TOP BACK OF CURB
TG	TOP OF GRATE
TS	TOP OF STAIRS/STEP
TW	TOP OF WALL

NOTE: MAY CONTAIN ABBREVIATIONS THAT ARE NOT USED IN THIS PLAN SET.

SCALE
HORIZONTAL: 1" = 10'
0 2.5' 5' 10' 15'

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No.	Description	Date
-	RELEASE 2	00 MAR 2011
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Drawing Title:

KEY PLAN

GRADING PLAN AREA SE

Project No.: 004345.00 Checked by: Checker

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GENERAL NOTES:

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SCOPE OF WORK:

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1. GRADE SITE TO ELEVATIONS SHOWN
2. EGRESS AND ACCESSIBILITY PATH CONSTRUCTED PER ADA ACCESSIBILITY GUIDELINES (SEE SHEET C-116).
3. REFER TO SITE CROSS SECTIONS ROUGH GRADING.
4. SEE STORM DRAIN PLAN FOR CURB AND GUTTER SIZES AND TYPES.
5. SEE DRAINAGE PLAN AND STORM DRAIN PLAN AND PROFILE DRAWINGS FOR ADDITIONAL DESIGN INFORMATION.

TO BE REVISED

ABBREVIATIONS:

BG	FINISH GRADE AT BUILDING
BS	BOTTOM OF STAIRS/STEP
BW	BOTTOM OF WALL
EG	EXISTING GRADE
EP	EDGE OF PAVEMENT
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TBC	TOP BACK OF CURB
TG	TOP OF GRATE
TS	TOP OF STAIRS/STEP
TW	TOP OF WALL

NOTE: MAY CONTAIN ABBREVIATIONS THAT ARE NOT USED IN THIS PLAN SET.

SCALE
HORIZONTAL: 1" = 10'
0 5' 5' 10' 10'

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No.	Description	Date
-	RELEASE 2	00 MAR 2011
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Drawing Title:

KEY PLAN

GRADING PLAN AREA NE

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GENERAL NOTES:

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SCOPE OF WORK:

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1. GRADE SITE TO ELEVATIONS SHOWN
2. EGRESS AND ACCESSIBILITY PATH CONSTRUCTED PER ADA ACCESSIBILITY GUIDELINES (SEE SHEET C-116).
3. REFER TO SITE CROSS SECTIONS FOR ROUGH GRADING.
4. SEE STORM DRAIN PLAN FOR CURB AND GUTTER SIZES AND TYPES.
5. SEE DRAINAGE PLAN AND STORM DRAIN PLAN AND PROFILE DRAWINGS FOR ADDITIONAL DESIGN INFORMATION.

TO BE REVISED

ABBREVIATIONS:

BG	FINISH GRADE AT BUILDING
BS	BOTTOM OF STAIRS/STEP
BW	BOTTOM OF WALL
EG	EXISTING GRADE
EP	EDGE OF PAVEMENT
FG	FINISHED GRADE
TBC	TOP BACK OF CURB
TG	TOP OF GRATE
TS	TOP OF STAIRS/STEP
TW	TOP OF WALL

NOTE: MAY CONTAIN ABBREVIATIONS THAT ARE NOT USED IN THIS PLAN SET.

SCALE
HORIZONTAL: 1" = 10'
0 2.5' 5' 10' 20'

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No.	Description	Date
-	RELEASE 2	00 MAR 2011
-	RELEASE 1	00 JAN 2011

KEY PLAN

Drawing Title:

GRADING
PLAN
AREA NW

Project No.: 004345.00 Checked by: Checker

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GENERAL NOTES:

SEE SHEET C-001 AND C-300 FOR DRAINAGE GENERAL NOTES.

SCOPE OF WORK:

PROVIDE, INSTALL AND/OR CONSTRUCT THE FOLLOWING PER THE SPECIFICATIONS GIVEN OR REFERENCED, THE DETAILS NOTED, AND/OR AS SHOWN ON THE CONSTRUCTION DRAWINGS:

1. 12"ø ADS N-12 STORM DRAIN LINE OR APPROVED EQUAL. TRENCHING PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-MISC2. LENGTH AND SLOPE PER PLAN OR PLAN AND PROFILE.
2. 15"ø ADS N-12 STORM DRAIN LINE OR APPROVED EQUAL. TRENCHING PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-MISC2. LENGTH AND SLOPE PER PLAN OR PLAN AND PROFILE.
3. LANDSCAPE AREA CATCH BASIN PER UNIVERSITY OF UTAH DETAIL CIV-SD16.
4. CATCH BASIN PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-SD12 AND CIV-SD14.
5. STORM DRAIN MANHOLE NO. 2 PE STANDARD DETAIL CIV-SD2 WITH 30" FRAME & COVER PER UNIVERSITY TAIL CIV-SD5.
6. CONNECT TO EXISTING COMBINATIO X PER UNIVERSITY OF UTAH STANDARDS AND SPECIFICATIONS.
7. CONNECT ROOF DRAIN LINE TO DO TECTURAL AND MECHANICAL PLANS FOR DESIGN INFORMATION.
8. CONNECT FOUNDATION DRAIN TO CATCH BASIN.
9. SEE PLAN AND PROFILE DRAWINGS FOR ADDITIONAL STORM DRAIN DESIGN INFORMATION.
10. ROOF DRAIN TO DISCHARGE INTO LANDSCAPING.
11. INSTALL ACO TRENCH DRAIN PER DETAIL F/C-118.
12. INSTALL FOUNDATION DRAIN PER DETAIL G/C-118.
13. BASEMENT LEVEL FOUNDATION DRAIN TO RECEIVE MAIN LEVEL FOUNDATION DRAIN BEFORE DISCHARGING TO STORMDRAIN.
14. ELEVATOR PIT FOUNDATION DRAIN REQUIRES LIFT TO DISCHARGE TO BASEMENT FOUNDATION DRAIN.
15. ELEVATOR PIT FOUNDATION DRAIN TO RECEIVE MAIN LEVEL FOUNDATION DRAIN BEFORE DISCHARGING TO STORMDRAIN.
16. DRAINAGE CLEANOUT PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-SS2.

TO BE REVISED

UTILITY LEGEND:

- LIMITS OF DISTURBANCE
- G — PROPOSED GAS LINE
- 6"G — PROPOSED QUESTAR HIGH PRESSURE GAS LINE (BY OTHERS)
- HTW — PROPOSED HIGH TEMPERATURE WATER
- 8"CW — PROPOSED CHILLED WATER PIPE
- SS — PROPOSED SANITARY SEWER PIPE
- SD — PROPOSED STORM DRAIN PIPE
- 4"FD — PROPOSED FOUNDATION DRAIN
- 6"RD — PROPOSED ROOF DRAIN
- PROPOSED DRAINAGE CLEANOUT
- W — PROPOSED WATER PIPE
- PROPOSED 4' SEWER MANHOLE
- PROPOSED 5' SEWER MANHOLE
- PROPOSED FIRE HYDRANT
- PROPOSED WATER VALVE
- PROPOSED LANDSCAPE CATCH BASIN
- PROPOSED STORM DRAIN CLEAN OUT
- PROPOSED CURB OPENING CATCH BASIN

HATCH LEGEND:

- PROPOSED CONCRETE PAVEMENT (PLAZA) PER A/C-116
- PROPOSED CONCRETE PAVEMENT (SIDEWALKS) PER A/C-116
- PROPOSED CONCRETE PAVEMENT (VEHICULAR) PER B/C-116
- PROPOSED ASPHALT PAVEMENT PER C/C-116
- PROPOSED CONCRETE WALL (SEE LANDSCAPE PLANS FOR MORE INFORMATION)
- PROPOSED MULCH PER D/C-116
- PROPOSED TURF PER A/C-116
- FUTURE SIDEWALK

SCALE
HORIZONTAL: 1" = 20'
5' 5' 10' 20' 30'

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No.	Description	Date
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KEY PLAN

Drawing Title:

DRAINAGE PLAN AND PROFILE

Project No.: 004345.00 Checked by: Checker

C-310

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GENERAL NOTES:

SEE SHEET C-001 AND C-300 FOR DRAINAGE GENERAL NOTES.

SCOPE OF WORK:

PROVIDE, INSTALL AND/OR CONSTRUCT THE FOLLOWING PER THE SPECIFICATIONS GIVEN OR REFERENCED, THE DETAILS NOTED, AND/OR AS SHOWN ON THE CONSTRUCTION DRAWINGS:

1. 12"ø ADS N-12 STORM DRAIN LINE OR APPROVED EQUAL. TRENCHING PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-MISC2. LENGTH AND SLOPE PER PLAN OR PLAN AND PROFILE.
2. 15"ø ADS N-12 STORM DRAIN LINE OR APPROVED EQUAL. TRENCHING PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-MISC2. LENGTH AND SLOPE PER PLAN OR PLAN AND PROFILE.
3. LANDSCAPE AREA CATCH BASIN PER UNIVERSITY OF UTAH DETAIL CIV-SD16.
4. CATCH BASIN PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-SD12 AND CIV-SD14.
5. STORM DRAIN MANHOLE NO. 2 PE STANDARD DETAIL CIV-SD2 WITH 30" FRAME & COVER PER UNIVERSITY TAIL CIV-SD5.
6. CONNECT TO EXISTING COMBINATIO X PER UNIVERSITY OF UTAH STANDARDS AND SPECIFICATIONS.
7. CONNECT ROOF DRAIN LINE TO DO TECTURAL AND MECHANICAL PLANS FOR DESIGN INFORMATION.
8. CONNECT FOUNDATION DRAIN TO CATCH BASIN.
9. SEE PLAN AND PROFILE DRAWINGS FOR ADDITIONAL STORM DRAIN DESIGN INFORMATION.
10. ROOF DRAIN TO DISCHARGE INTO LANDSCAPING.
11. INSTALL ACO TRENCH DRAIN PER DETAIL F/C-118.
12. INSTALL FOUNDATION DRAIN PER DETAIL G/C-118.
13. BASEMENT LEVEL FOUNDATION DRAIN TO RECEIVE MAIN LEVEL FOUNDATION DRAIN BEFORE DISCHARGING TO STORMDRAIN.
14. ELEVATOR PIT FOUNDATION DRAIN REQUIRES LIFT TO DISCHARGE TO BASEMENT FOUNDATION DRAIN.
15. ELEVATOR PIT FOUNDATION DRAIN TO RECEIVE MAIN LEVEL FOUNDATION DRAIN BEFORE DISCHARGING TO STORMDRAIN.
16. DRAINAGE CLEANOUT PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-SS2.

TO BE REVISED

UTILITY LEGEND:

- LIMITS OF DISTURBANCE
- G — PROPOSED GAS LINE
- 6"G — PROPOSED QUESTAR HIGH PRESSURE GAS LINE (BY OTHERS)
- HTW — PROPOSED HIGH TEMPERATURE WATER
- 8"CW — PROPOSED CHILLED WATER PIPE
- SS — PROPOSED SANITARY SEWER PIPE
- SD — PROPOSED STORM DRAIN PIPE
- FD — PROPOSED FOUNDATION DRAIN
- 6"RD — PROPOSED ROOF DRAIN
- PROPOSED DRAINAGE CLEANOUT
- W — PROPOSED WATER PIPE
- S — PROPOSED 4' SEWER MANHOLE
- SS — PROPOSED 5' SEWER MANHOLE
- PROPOSED FIRE HYDRANT
- PROPOSED WATER VALVE
- PROPOSED LANDSCAPE CATCH BASIN
- D — PROPOSED STORM DRAIN CLEAN OUT
- PROPOSED CURB OPENING CATCH BASIN

HATCH LEGEND:

- PROPOSED CONCRETE PAVEMENT (PLAZA) PER A/C-116
- PROPOSED CONCRETE PAVEMENT (SIDEWALKS) PER A/C-116
- PROPOSED CONCRETE PAVEMENT (VEHICULAR) PER B/C-116
- PROPOSED ASPHALT PAVEMENT PER C/C-116
- PROPOSED CONCRETE WALL (SEE LANDSCAPE PLANS FOR MORE INFORMATION)
- PROPOSED MULCH PER D/C-116
- PROPOSED TURF PER A/C-116
- FUTURE SIDEWALK

SCALE
HORIZONTAL: 1" = 20'
0 5' 10' 20' 30'

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No.	Description	Date
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KEY PLAN

Drawing Title:

DRAINAGE PLAN AND PROFILE

Project No.: 004345.00 Checked by: Checker

C-311

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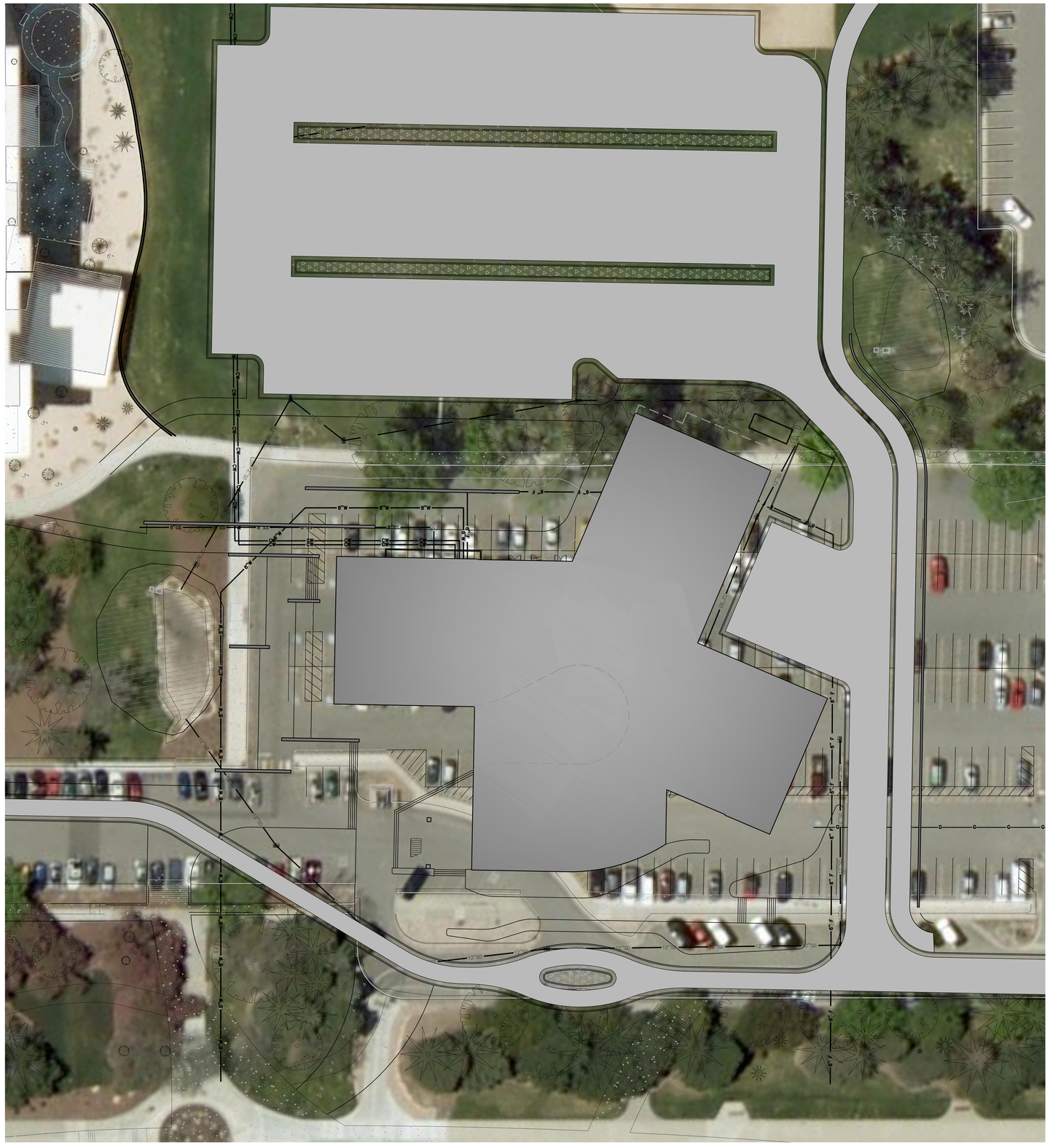

UTILITY GENERAL NOTES:

CONTRACTOR IS TO COORDINATE ALL UTILITIES WITH MECHANICAL AND ELECTRICAL DRAWINGS.

ALL NEW SANITARY SEWER CONSTRUCTION TO BE DONE IN ACCORDANCE WITH LOCAL GOVERNING AGENCIES AND SALT LAKE CITY SEWER STANDARDS & SPECIFICATIONS.

ALL NEW WATER CONSTRUCTION TO BE DONE IN ACCORDANCE WITH LOCAL GOVERNING AGENCIES AND SALT LAKE CITY STANDARDS & SPECIFICATIONS.

CONTRACTOR IS TO COORDINATE LOCATIONS OF NEW TELEPHONE SERVICES TO BUILDINGS WITH CENTURY LINK. A PVC CONDUIT, PLYWOOD BACKBOARD AND GROUND WIRE ARE REQUIRED FOR SERVICE THROUGH PROPERTY. COORDINATE SIZES AND LOCATIONS WITH CENTURY LINK.

CONTRACTOR IS TO SUBMIT SITE PLAN TO QUESTAR GAS FOR DESIGN OF GAS LINE SERVICE TO BUILDINGS. CONTRACTOR TO COORDINATE WITH QUESTAR GAS FOR CONTRACTOR LIMITS OF WORK VERSUS QUESTAR GAS LIMITS.

EXISTING UNDERGROUND UTILITIES AND IMPROVEMENTS ARE SHOWN IN THEIR APPROXIMATE LOCATIONS BASED UPON RECORD INFORMATION AVAILABLE AT THE TIME OF PREPARATION OF PLANS. LOCATIONS MAY NOT HAVE BEEN VERIFIED IN THE FIELD AND NO GUARANTEE IS MADE AS TO ACCURACY OR COMPLETENESS OF THE INFORMATION SHOWN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DETERMINE THE EXISTENCE AND LOCATION OF THOSE UTILITIES SHOWN ON THESE PLANS OR INDICATED IN THE FIELD BY LOCATING SERVICES. ANY ADDITIONAL COSTS INCURRED AS A RESULT OF CONTRACTOR'S FAILURE TO VERIFY LOCATIONS OF EXISTING UTILITIES PRIOR TO BEGINNING OF CONSTRUCTION IN THEIR VICINITY SHALL BE BORNE BY THE CONTRACTOR AND ASSUMED INCLUDED IN THE CONTRACT.

LOCATION OF ALL UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE. CONTRACTOR IS TO VERIFY CONNECTION POINTS WITH EXISTING UTILITIES. CONTRACTOR IS RESPONSIBLE FOR ANY DAMAGE CAUSED TO EXISTING UTILITIES AND UTILITY STRUCTURES THAT ARE TO REMAIN.

ALL SURFACE IMPROVEMENTS DISTURBED BY CONSTRUCTION SHALL BE RESTORED OR REPLACED, INCLUDING TREES, DECORATIVE SHRUBS, SOD, FENCES, WALLS AND STRUCTURES, WHETHER OR NOT THEY ARE SPECIFICALLY SHOWN ON THE CONTRACT DOCUMENTS.

DEFLECT WATER LINE TO AVOID CONFLICT WITH STORM DRAIN LINE PER SOUTH JORDAN CITY STANDARDS AND SPECIFICATIONS (MAINTAIN MINIMUM 18" CLEARANCE). DEFLECT IRRIGATION LINE TO AVOID CONFLICT WITH WATER LINE OR STORM DRAIN LINE PER SOUTH JORDAN CITY STANDARDS AND SPECIFICATIONS (MAINTAIN MINIMUM 18" CLEARANCE).

SEE ELECTRICAL PLANS FOR DRY UTILITY LOCATION, INSTALLATION AND DESIGN INFORMATION.

IRRIGATION SYSTEM TO BE MAINTAINED BY THE OWNER OR ITS DESIGNATED AGENT.

UTILITY SCOPE OF WORK:

PROVIDE, INSTALL AND/OR CONSTRUCT [illegible] HE SPECIFICATIONS GIVEN OR REFERENCED, THE DETAILS NOTED, AND [illegible] CONSTRUCTION DRAWINGS:

TO BE REVISED

1. 4"ø SANITARY SEWER MANHOLE PI[illegible] STANDARD DETAIL CIV-SS1.
2. 5"ø SANITARY SEWER MANHOLE PI[illegible] STANDARD DETAIL CIV-SS1.
3. CONNECT TO EXISTING SEWER MAI[illegible] MANHOLE.
4. CONNECT 8"ø PVC C-900 WATER SERVICE LINE TO EXISTING 8"ø WATER MAIN WITH 8" TEE AND THRUST BLOCKING PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-W3.
5. CONNECT 3"ø PVC C-900 WATER SERVICE LINE TO EXISTING 8"ø WATER MAIN WITH 8" X 8" X 3" TEE OR REDUCER AND THRUST BLOCKING PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-W3.
6. 70 L.F. OF 8"ø C-900 PVC WATER MAIN. INSTALLATION AND TRENCHING PER APWA SECTION 3 SPECIFICATIONS.
7. 90 L.F. OF 6"ø C-900 PVC WATER LATERAL. INSTALLATION AND TRENCHING PER APWA SECTION 3 SPECIFICATIONS.
8. 120 L.F. OF 3"ø C-900 PVC WATER LATERAL. INSTALLATION AND TRENCHING PER APWA SECTION 3 SPECIFICATIONS.
9. 8"ø GATE VALVE WITH THRUST BLOCKING AND LOCKING VALVE COVER PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-W2.
10. 6"ø GATE VALVE WITH THRUST BLOCKING AND LOCKING VALVE COVER PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-W2.
11. 3"ø GATE VALVE WITH THRUST BLOCKING AND VALVE COVER PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-W2.
12. 6"ø TEE AND 45° BEND WITH THRUST BLOCKING PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-W3.
13. 3"ø 22.5° BEND AND 11.25 BEND WITH THRUST BLOCKING PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-W3.
14. INSTALL FIRE HYDRANT PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-W1 WITH THRUST RESTRAINTS PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-W3 AND CIV-W4.
15. SEE DRAINAGE PLAN AND PLAN AND PROFILE SHEETS C300, C310 AND C311 FOR STORM DRAIN DESIGN INFORMATION.
16. SEE SHEETS C-113 FOR ADDITIONAL CHILLED WATER PLAN AND PROFILE DESIGN INFORMATION.
17. SEE MECHANICAL PLANS FOR CONTINUATION.

SCALE

HORIZONTAL: 1" = 20'

0 5' 10' 20' 30'

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No.	Description	Date
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KEY PLAN

Drawing Title:

UTILITY PLAN OVERALL

Project No.: 004345.00 Checked by: Checker

C-400

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UTILITY GENERAL NOTES:

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UTILITY SCOPE OF WORK:

PROVIDE, INSTALL AND/OR CONSTRUCT THE FOLLOWING PER THE SPECIFICATIONS GIVEN OR REFERENCED, THE DETAILS NOTED, AND/OR AS SHOWN ON THE CONSTRUCTION DRAWINGS:

1. 15"ø SDR-35 PVC SANITARY SEW AND TRENCHING PER APWA STANDARD PLAN AND SPECIFICATIONS 381 A PROFILE DRAWINGS FOR SEWER LINE DESIGN INFORMATION.
2. 6"ø SDR-35 PVC SANITARY SEWE STANDARD PLAN AND SPECIFICATIONS 431. SEE PLAN OR PLAN AND PI DESIGN INFORMATION.
3. 4'ø SANITARY SEWER MANHOLE PI STANDARD DETAIL CIV-SS1.
4. 5'ø SANITARY SEWER MANHOLE PER UNIVERSITY OF UTAH STANDARD DETAIL CIV-SS1.
5. CONNECT TO EXISTING SEWER MAIN WITH CAST IN PLACE MANHOLE.
6. SHEETS C-400 FOR ADDITIONAL SANITARY SEWER PLAN AND PROFILE DESIGN INFORMATION.
7. SEE DRAINAGE PLAN AND PLAN AND PROFILE SHEETS C-110, C-111 AND C-112 FOR STORM DRAIN DESIGN INFORMATION.
8. SEE SHEETS C-113 FOR ADDITIONAL CHILLED WATER PLAN AND PROFILE DESIGN INFORMATION.
9. SEE MECHANICAL PLANS FOR CONTINUATION.

TO BE REVISED

UTILITY LEGEND:

	LIMITS OF DISTURBANCE
G	PROPOSED GAS LINE
6"G	PROPOSED QUESTAR HIGH PRESSURE GAS LINE (BY OTHERS)
HTW	PROPOSED HIGH TEMPERATURE WATER
8"CW	PROPOSED CHILLED WATER PIPE
SS	PROPOSED SANITARY SEWER PIPE
SD	PROPOSED STORM DRAIN PIPE
4"FD 4"FD	PROPOSED FOUNDATION DRAIN
6"RD	PROPOSED ROOF DRAIN
	PROPOSED DRAINAGE CLEANOUT
W	PROPOSED WATER PIPE
S	PROPOSED 4' SEWER MANHOLE
SS	PROPOSED 5' SEWER MANHOLE
	PROPOSED FIRE HYDRANT
	PROPOSED WATER VALVE
	PROPOSED LANDSCAPE CATCH BASIN
D	PROPOSED STORM DRAIN CLEAN OUT
	PROPOSED CURB OPENING CATCH BASIN

SCALE

HORIZONTAL: 1" = 20'

0 5' 10' 20' 30'

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-	RELEASE 2	00 MAR 2011
-	RELEASE 1	00 JAN 2011

KEY PLAN

Drawing Title:

SANITARY SEWER PLAN AND PROFILE

Project No.: 004345.00 Checked by: Checker

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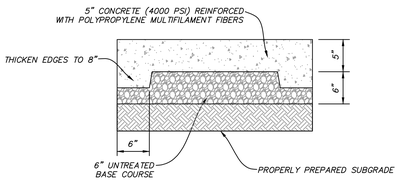
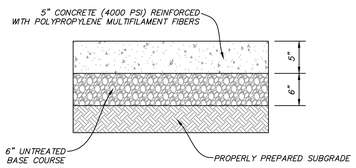


NOTE:
EXPANSION AND CONTRACTION JOINTS ARE TO BE PLACED PER APWA STANDARD PLAN NO. 231 FOR LONGITUDINAL WALKWAYS, AND ON A 10' GRID SPACING (CONTRACTION JOINTS) AND 50' GRID SPACING (EXPANSION JOINTS) IN PLAZA AREAS.

A — PEDESTRIAN CONCRETE PAVEMENT SECTION

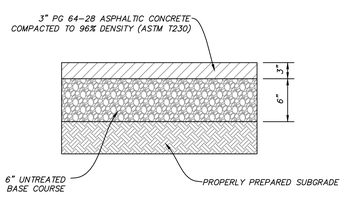
SCALE: N.T.S.



NOTE:
EXPANSION AND CONTRACTION JOINTS ARE TO BE PLACED ON A 10' GRID SPACING (CONTRACTION JOINTS) AND 50' GRID SPACING (EXPANSION JOINTS).

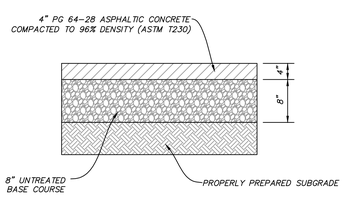
B — VEHICULAR CONCRETE PAVEMENT SECTION

SCALE: N.T.S.



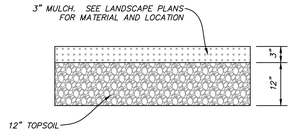
C — ASPHALT PAVEMENT SECTION-LIGHT DUTY

SCALE: N.T.S.



D — ASPHALT PAVEMENT SECTION-HEAVY DUTY

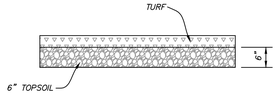
SCALE: N.T.S.



NOTE: FOR ROUGH GRADING INFORMATION ONLY. FINISH GRADING IS NOT IN CONTRACT.

E — LANDSCAPE MULCH SECTION

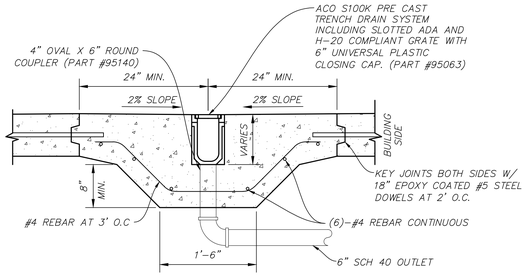
SCALE: N.T.S.



NOTE: FOR ROUGH GRADING INFORMATION ONLY. FINISH GRADING IS NOT IN CONTRACT.

G — LANDSCAPE TURF SECTION

SCALE: N.T.S.

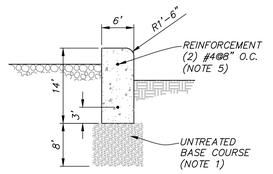


GENERAL NOTE:

TRENCH DRAIN SYSTEM TO BE 24.5 LINEAR FEET PER PLAN. CORE BOTTOM OF LAST SECTION AT EACH DRAIN AND PROVIDE A 4" OVAL X 6" ROUND COUPLER. CONNECT A 6" A-2000 PIPING WITH ELBOW (SDTD-01) OR WYE (SDTD-02, SDTD-03) TO CONNECT TO 6" STORM DRAIN LINE. INSTALL A CATCH BASIN AT END OF SDTD-04 TO CONNECT TRENCH DRAIN, 6" A-2000 PIPE AND 12" PIPE. USE EPOXY TO SEAL BOTTOM OF TRENCH DRAIN AND PIPING PER MANUFACTURER'S RECOMMENDATIONS. CONTACT ACO DRAIN FOR ADDITIONAL INFORMATION AT 1-800-543-4764

H — PRE-SLOPED TRENCH DRAIN DETAIL

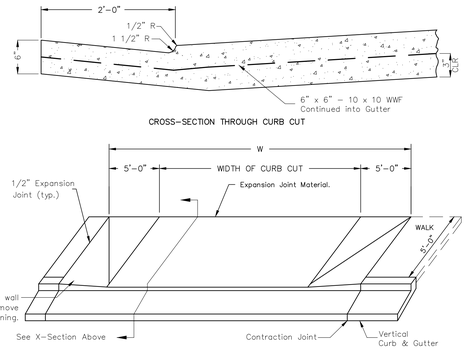
SCALE: 1"=1'



1. UNTREATED BASE COURSE: Provide material specified in APWA Section 32 11 23.
   A. Do not use gravel as a substitute for untreated base course without ENGINEER's permission.
   B. Place material per APWA Section 32 05 10.
   C. Compact per APWA Section 31 23 26 to a modified proctor density of 95 percent or greater. Maximu. lift thickness before compaction is 8 inches when using riding compaction equipment or 6 inches when using hand held compaction equipment.
2. CONCRETE: Class 4000 per APWA Section 03 30 04.
   A. If necessary, provide concrete that achieves design strength in less than 7 days. Use caution; howeve as concrete crazing (spider cracks) may develop if air temperature exceeds 90 degrees F.
   B. Place concrete per APWA Section 03 30 10.
   C. Provide 1/2 inch radius on concrete edges exposed to public view.
   D. Cure concrete per APWA Section 03 39 00 with type ID Class A or B (clear 'with fugitive dye) membrane forming compound unless specified otherwise.
3. EXPANSION JOINT: Make expansion joints vertical., full depth, 1/2 inch wide with type F1 joint filler materia. per APWA Section 32 13 73.
   A. Set top of filler flush with surface of concrete.
   B. Expansion joints are required at the start or end of a street intersection curb return.
   C. Expansion joints are not required in curb tangents or slip form work.
4. CONTRACTION JOINT: Make contraction joints vertical.
   A. 1/8 inch wide and 2 inches deep or 1/4 slab thickness if slab is greater than 8 inches thick.
   B. If necessary, match location of contraction joints in adjacent concrete flatwork.
5. REINFORCEMENT: ASTM A 615, grade 60, galvanized or epoxy coated deformed steel. See APWA Section 03 20 00 requirements.
6. FINISH: Broomed.

I — APWA CURB DETAIL P

SCALE: N.T.S. PLAN #: 209

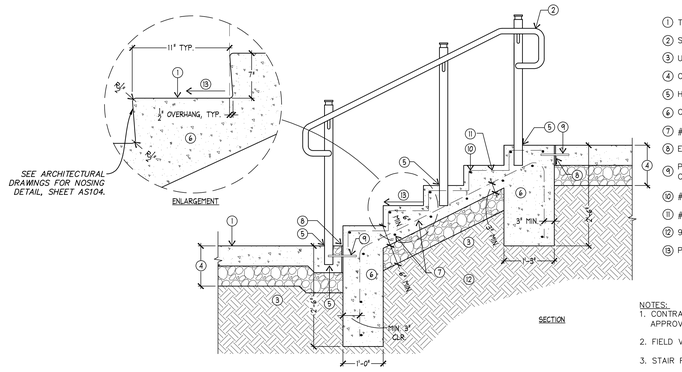


NOTES:

1. Back of curb cut extends to back of walk or back of bicycle path. If no walk is present, extend back of curb cut to 5' 0" behind flowline.

L — CURB CUT DETAIL

SCALE: N.T.S.



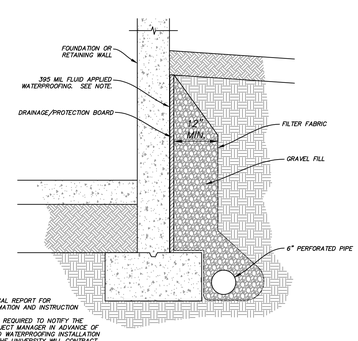
1. TOP OF FINISH GRADE
2. STAIR HANDRAIL
3. UNTREATED BASE COURSE
4. CONCRETE PAVING
5. HANDRAIL ANCHOR
6. CAST IN PLACE CONCRETE STAIRS
7. #4 REBAR @ 12" O.C.
8. EXPANSION JOINT
9. PROVIDE SMOOTH STEEL DOWEL PIN-JOINT BETWEEN SEPERATE CONCRETE POURS @ 10" O.C. SPACING
10. #4 REBAR AT NOSE, TYP., 2" CLEAR
11. #4 REBAR @12" O.C., TYP., 1-1/5" CLEAR
12. 95% COMPACTED SUBGRADE
13. PROVIDE 2.0% SLOPE ALONG STAIR TREAD

NOTES:

1. CONTRACTOR TO SUBMIT SHOP DRAWINGS OF HANDRAIL FOR APPROVAL BY OWNER'S REPRESENTATIVE AS A DEFERRED SUBMITTAL.
2. FIELD VERIFY ALL DIMENSIONS.
3. STAIR RISER HEIGHT IS 7" MAX.
4. STAIR TREAD DEPTH TO BE 11" MINIMUM.
5. TOP OF GRIPPING SURFACES OF HANDRAILS SHALL BE 36" VERTICALLY ABOVE WALKING SURFACES AND STAIR NOSING PER 2010 ADA GUIDELINES
6. TOP AND BOTTOM LANDINGS OF STAIRS SHALL NOT EXCEED A 2% SLOPE FOR 4' BEYOND THE TOP AND BOTTOM RISERS.

M — STAIR CONSTRUCTION DETAIL

SCALE: N.T.S.

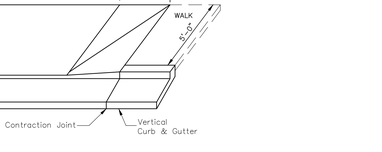


NOTES:

1. SEE GEOTECHNICAL REPORT FOR FURTHER INFORMATION AND INSTRUCTION
2. CONTRACTOR IS REQUIRED TO NOTIFY THE UNIVERSITY PROJECT MANAGER IN ADVANCE OF THE ANTICIPATED WATERPROOFING INSTALLATION START DATE. THE UNIVERSITY WILL CONTRACT SEPARATELY FOR TESTING AND INSTALLATION OBSERVATION.
3. CONTRACTOR TO CONSTRUCT FOUNDATION/CHIMNEY DRAIN PER RECOMMENDATIONS IN THE GEOTECHNICAL STUDY DATED FEB. 7, 2012 FOR THE PROPOSED GUINNEY SCHOOL OF LAW CONDUCTED BY PSL INC.

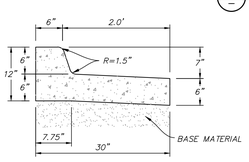
N — FOUNDATION/CHIMNEY DRAIN

SCALE: N.T.S.



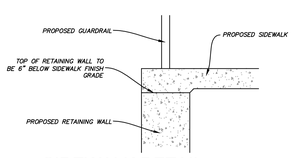
O — ELECTRICAL MANHOLE COLLAR

SCALE: N.T.S.



J — 30" REVERSE PAN CURB AND GUTTER DETAIL

VAR SCALE: N.T.S.



K — SIDEWALK DETAIL

SCALE: N.T.S.

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KEY PLAN

Drawing Title:

DETAILS

Project No.: 004345.00 Checked by: Checker

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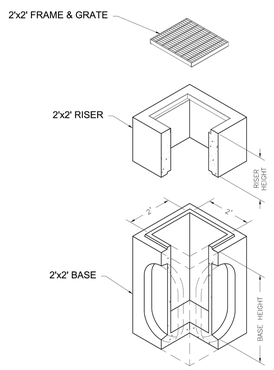

HEIGHT	WEIGHTS BASE	WEIGHTS RISER
6"		375 #
1'		899 #
2'	1,374 #	1,798 #
3'	2,596 #	2,697 #
4'	3,998 #	3,596 #

NOTES:
1. Vault design complies with ASTM C-857 and AASHTO HS-20 loading for less than 2' of earth cover and an AASHTO HS-20 loading.
2. Lifting insert type and location may change without notice.

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2' x 2' Basin
FILE NAME: 210DIC2X2CB6WL
ISSUE DATE: 3/2010
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2' x 2' Catch Basin Bases and Risers 6" Wall
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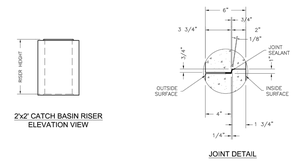

BASE HEIGHT	KNOCKOUT DIMENSIONS DIA.	A	B
2'	20"	20"	0"
3'	20"	23"	7"
4'	20"	30"	10"

KNOCKOUTS ARE 4" DEEP

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2' x 2' Catch Basin Bases and Risers 6" Wall
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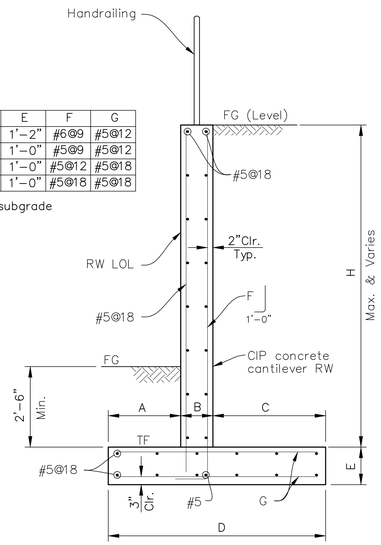
B — LANDSCAPE CATCH BASIN
SCALE: N.T.S.

H	A	B	C	D	E	F	G
10'-0"	2'-3"	1'-0"	3'-6"	6'-9"	1'-2"	#6@9	#5@12
8'-0"	2'-3"	1'-0"	2'-6"	5'-9"	1'-0"	#5@9	#5@12
6'-0"	1'-9"	10"	2'-2"	4'-9"	1'-0"	#5@12	#5@18
4'-0"	1'-3"	10"	1'-8"	3'-9"	1'-0"	#5@18	#5@18

NOTE: See Geotechnical Report for subgrade and drainage requirements.



A — RETAINING WALL
SCALE: N.T.S.

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KEY PLAN

Drawing Title:

DETAILS

Project No.: 004345.00 Checked by: Checker

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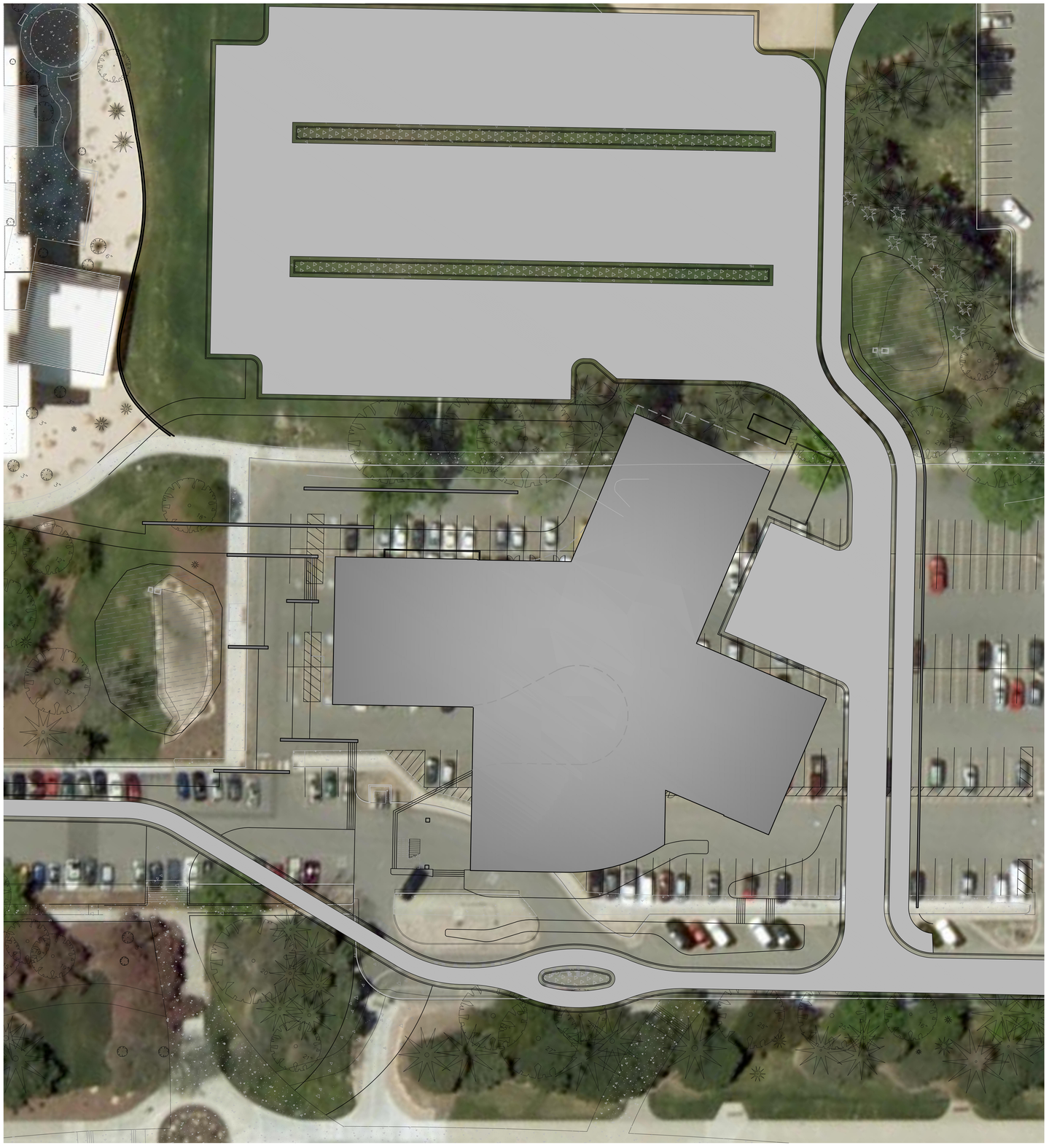

GENERAL NOTES:

THE CONTRACTOR TO USE BEST MANAGEMENT PRACTICES FOR PROVIDING EROSION CONTROL FOR CONSTRUCTION OF THIS PROJECT. SPECIFIC DETAILS SHOWN ON C-9.06 SHALL BE USED IN COMBINATION WITH OTHER ACCEPTED LOCAL PRACTICES.

ALL MATERIAL AND WORKMANSHIP SHALL CONFORM TO THE LOCAL AGENCY'S EROSION CONTROL STANDARDS AND SPECIFICATIONS AND ALL WORK SHALL BE SUBJECT TO INSPECTION BY THE AGENCY HAVING JURISDICTION. ALSO INSPECTORS WILL HAVE THE RIGHT TO CHANGE THE FACILITIES AS NEEDED.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR FIELD VERIFYING THE LOCATION OF ALL EXISTING UTILITIES. IF CONFLICTS OCCUR, THE CONTRACTOR SHALL NOTIFY THE ENGINEER PRIOR TO CONSTRUCTION TO DETERMINE IF ANY FIELD ADJUSTMENTS SHOULD BE MADE.

THE CONTRACTOR SHALL PROVIDE ADEQUATE DUST CONTROL.

WHEN GRADING OPERATIONS ARE COMPLETED AND THE DISTURBED GROUND IS LEFT "OPEN" FOR 30 DAYS OR MORE, THE AREA SHALL BE FURROWED PARALLEL TO THE CONTOURS.

THE CONTRACTOR SHALL MODIFY EROSION CONTROL MEASURES TO ACCOMMODATE PROJECT PLANNING.

ALL BEST MANAGEMENT PRACTICES (BMP'S) SHOWN ON THIS PLAN MUST BE MAINTAINED AT ALL TIMES UNTIL A CERTIFICATE OF OCCUPA[illegible] IS ISSUED BY SALT LAKE CITY.

ALL ACCESS TO PROPERTY WILL BE FR[illegible] WAYS.

TO BE REVISED

MAINTENANCE:

THE OWNER'S RESPONSIBILITY SHALL IN[illegible] CHECKS ON ALL EROSION CONTROL MEASURES TO DETERMINE IF REPAIR OR [illegible] NECESSARY. CHECKS SHALL BE MADE BASED ON CONDITIONS THAT MAY ARISE IN THE FIELD OR ADDITIONAL CONTROL AS DEEMED NECESSARY.

SEDIMENT DEPOSITS SHOULD BE REMOVED AFTER EACH RAINFALL. THEY MUST BE REMOVED WHEN THE LEVEL OF DEPOSITION REACHES APPROXIMATELY ONE-HALF THE HEIGHT OF BARRIER.

NECESSARY REPAIRS TO BARRIERS OR REPLACEMENT OF FILTER SOCK SHALL BE ACCOMPLISHED PROMPTLY.

CLOSE ATTENTION SHALL BE PAID TO THE REPAIR OF DAMAGED FILTER SOCK, END RUNS, AND UNDERCUTTING BENEATH FILTER SOCK.

FILTER SOCK BARRIERS SHALL BE INSPECTED IMMEDIATELY AFTER EACH RAINFALL AND AT LEAST DAILY DURING PROLONGED RAINFALL.

SCOPE OF WORK:

PROVIDE, INSTALL AND/OR CONSTRUCT THE FOLLOWING PER THE SPECIFICATIONS GIVEN OR REFERENCED, THE DETAILS NOTED, AND/OR AS SHOWN ON THE CONSTRUCTION DRAWINGS:

1. STABILIZED CONSTRUCTION ENTRANCE PER DETAIL C/ C-115
2. INLET PROTECTION AROUND EXISTING OR NEW STORM DRAIN CATCH BASINS OR INLETS PER DETAIL B/ C-115.
3. SILT FENCE PER DETAIL A/ C-115.

SCALE
HORIZONTAL: 1" = 20'
0 5 10 20 30

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KEY PLAN

Drawing Title:

EROSION CONTROL PLAN

Project No.: 004345.00 Checked by: Checker

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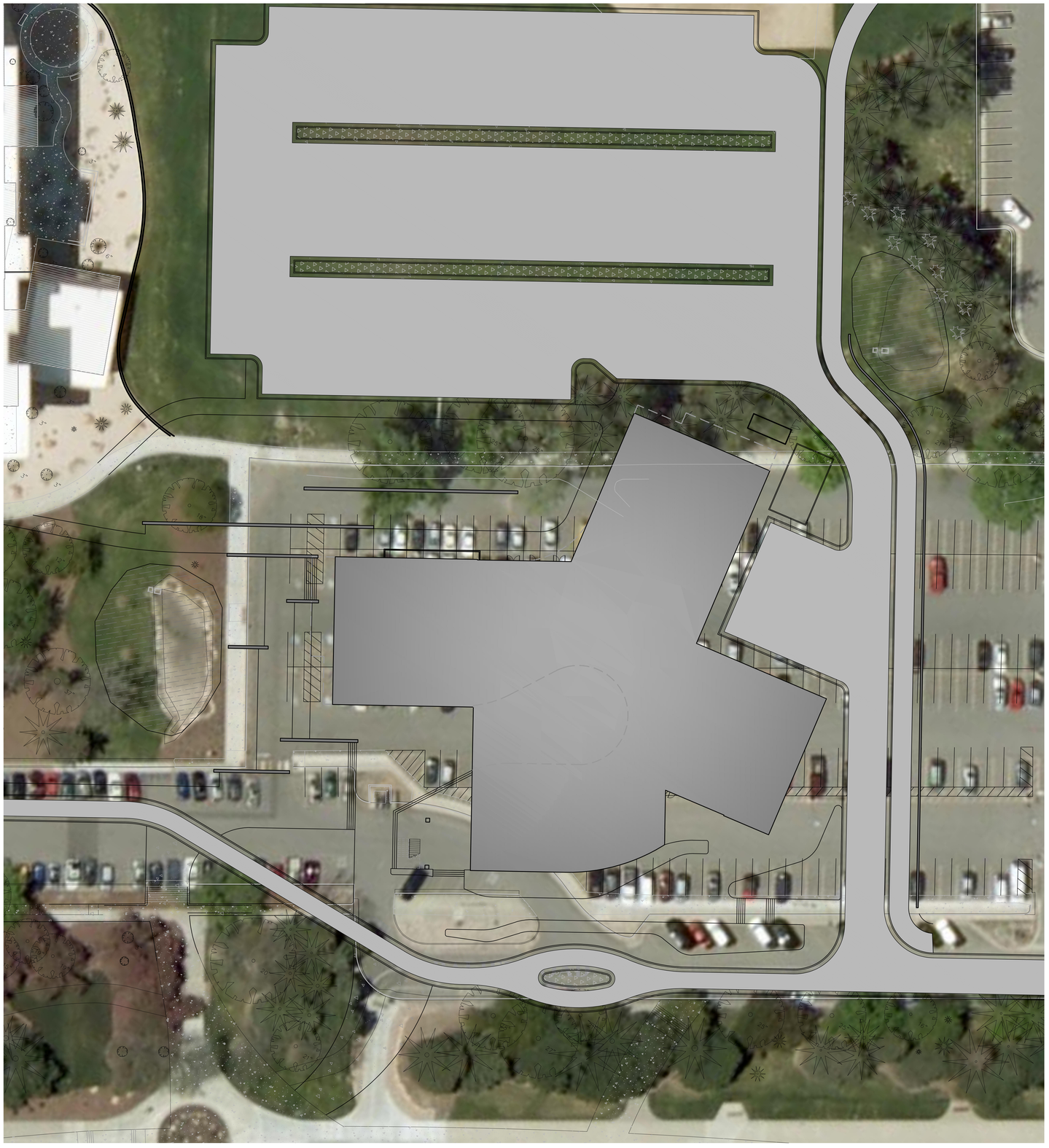

GENERAL NOTES:

SEE PRECISE GRADING PLANS FOR NOTES AND ADDITIONAL INFORMATION.

SCOPE OF WORK:

PROVIDE, INSTALL AND/OR CONSTRUCT THE FOLLOWING PER THE SPECIFICATIONS GIVEN OR REFERENCED, THE DETAILS NOTED, AND/OR AS SHOWN ON THE CONSTRUCTION DRAWINGS:

1. EGRESS AND ACCESSIBILITY PATH TO COMPLY AND BE CONSTRUCTED PER ADA ACCESSIBILITY GUIDELINES (HATCHED PATH).

ADA PARKING CALCULATION:

THERE ARE A TOTAL OF XXX PARKING ARE ADA ACCESSIBLE STALLS.)
TABLE 1106.1 REQUIRES A MINIMUM LE: 2% X XXX = XXX (XX MINIMUM
REQUIRED/XX IS TO BE PROVIDE

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SCALE
HORIZONTAL: 1" = 20'
0' 5' 10' 20' 30'

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ADA ACCESSIBILITY PLAN

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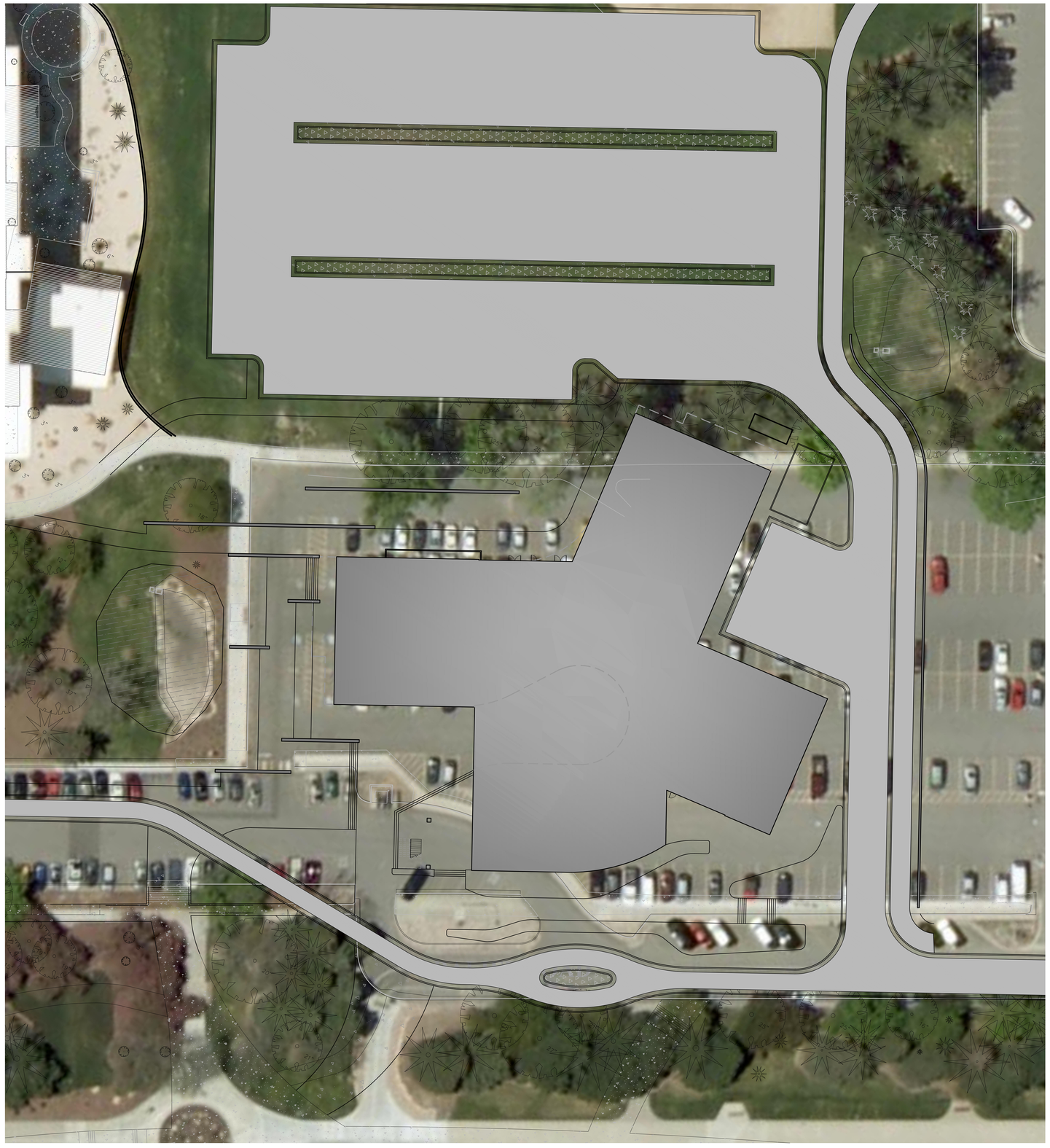
GENERAL NOTES:
SEE GRADING PLAN FOR NOTES AND ADDITIONAL INFORMATION.

LEGEND:

- FIRE ACCESSIBILITY PATH
- PROPOSED FIRE HYDRANT
- EXISTING FIRE HYDRANT



SCALE
HORIZONTAL: 1" = 20'
0 5' 10' 20' 30'

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FIRE ACCESSIBILITY PLAN

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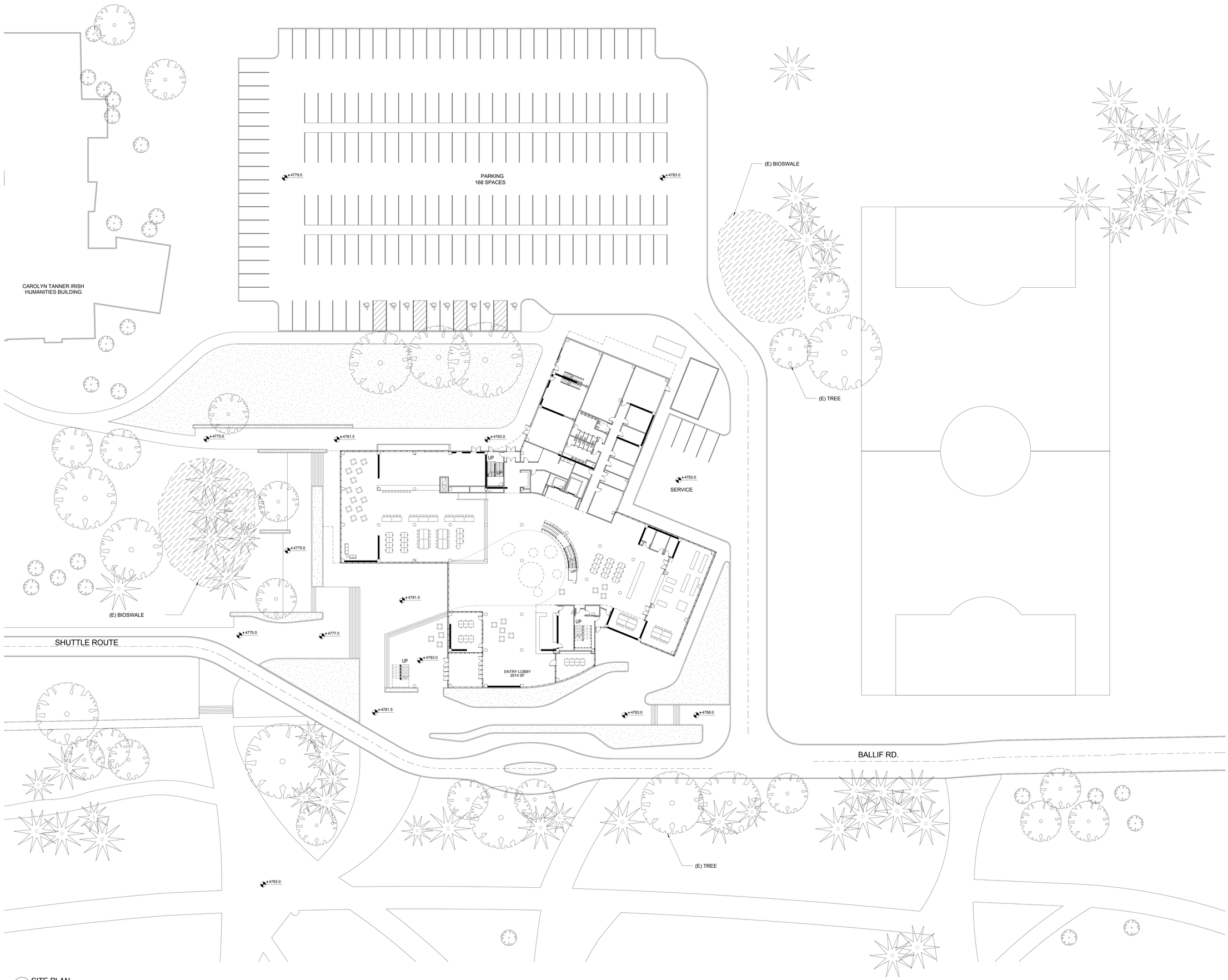

1 SITE PLAN
1" = 20'-0"

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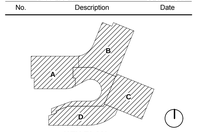

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Drawing Title:

SITE PLAN

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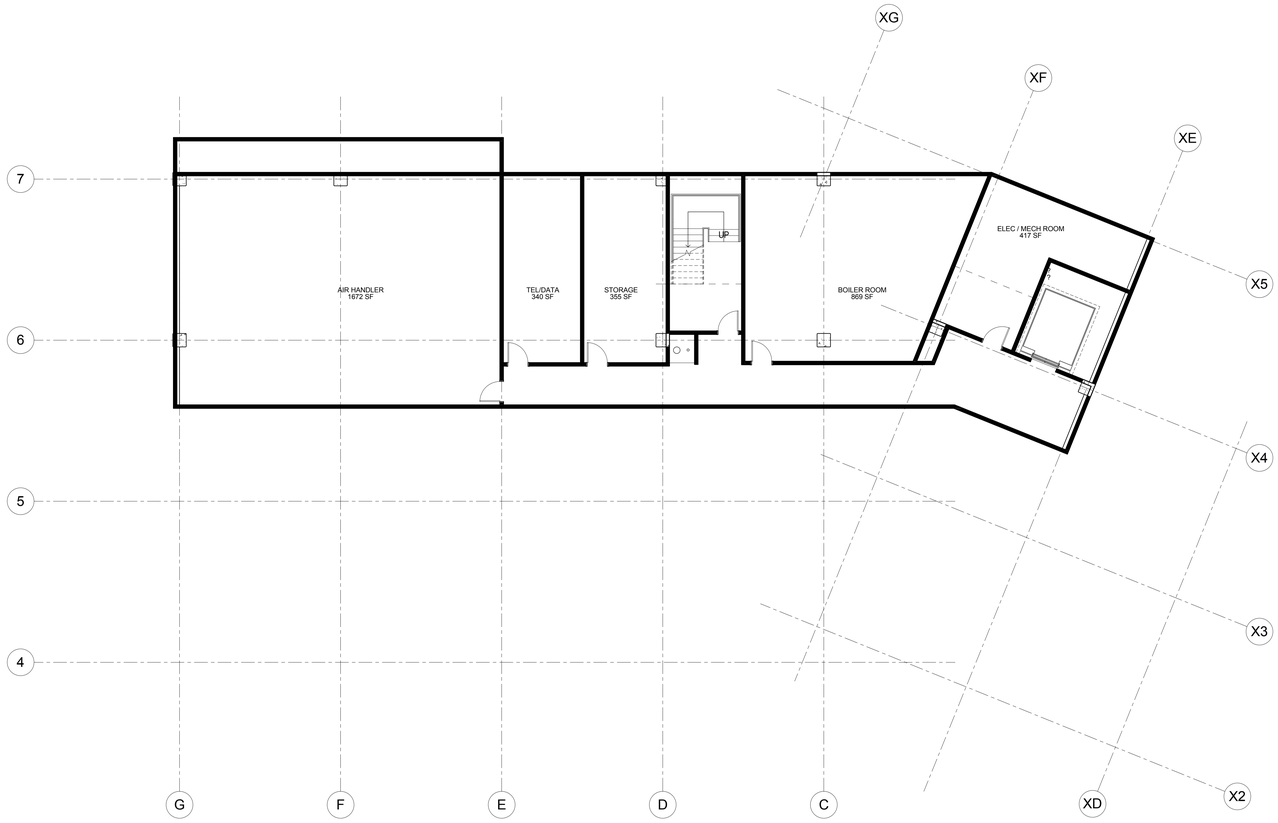

1 BASEMENT FLOOR PLAN
1/8" = 1'-0"

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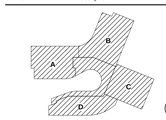

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BASEMENT FLOOR PLAN

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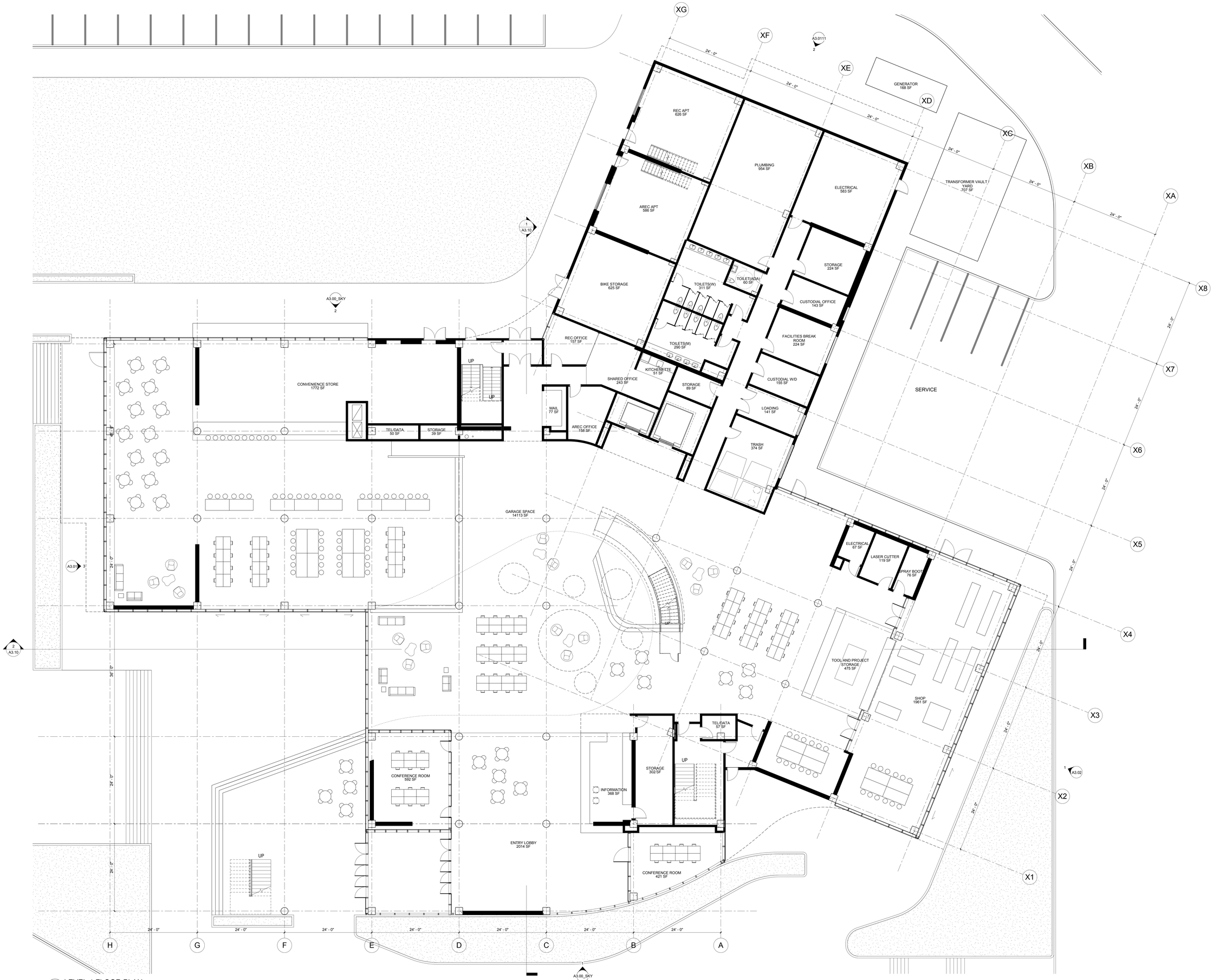

1 LEVEL 1 FLOOR PLAN
1/8" = 1'-0"

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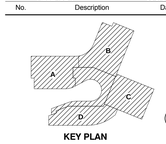

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LEVEL 01 FLOOR PLAN

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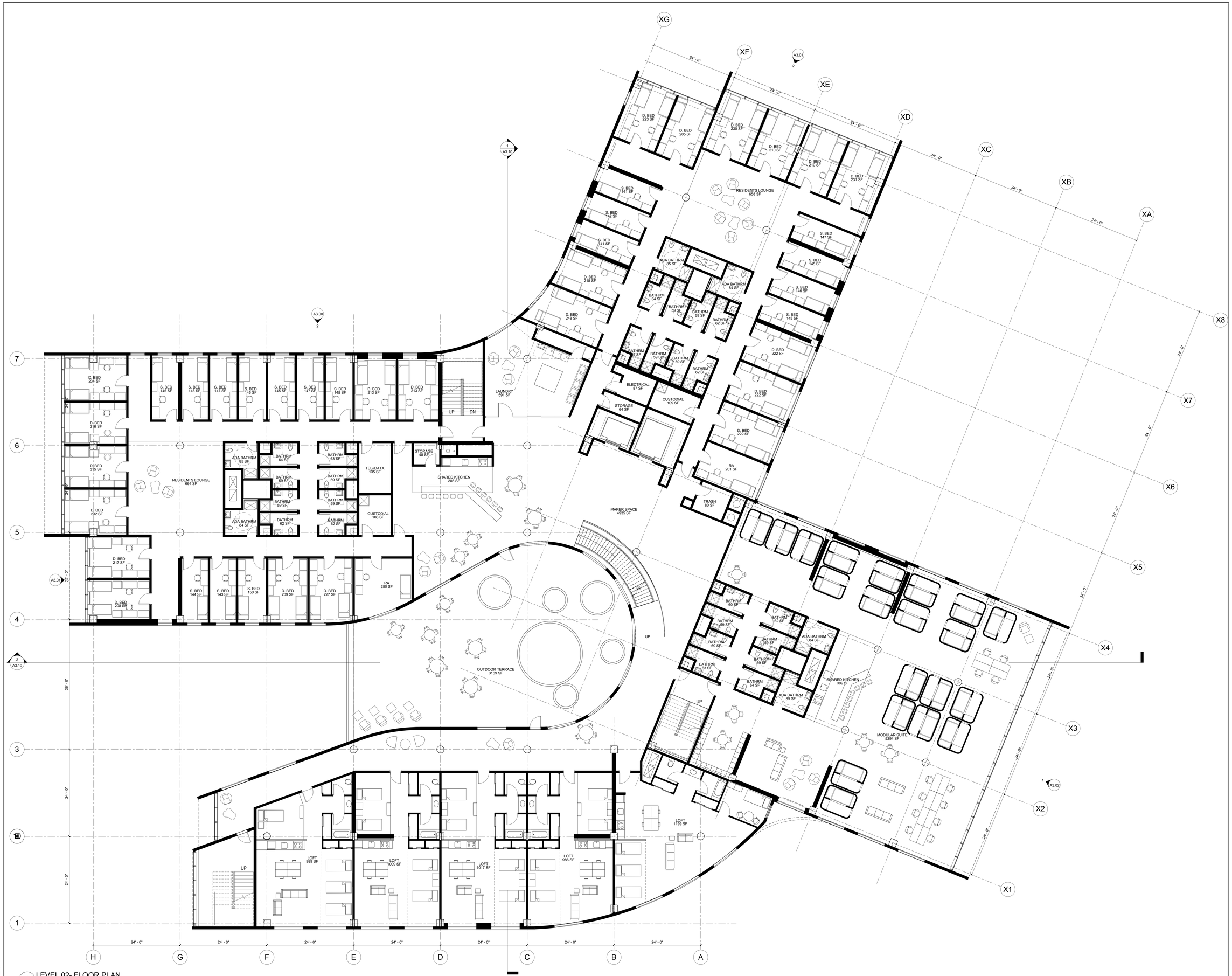

1 LEVEL 02- FLOOR PLAN
1/8" = 1'-0"

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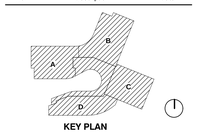

KEY PLAN

Drawing Title:

LEVEL 02 FLOOR PLAN

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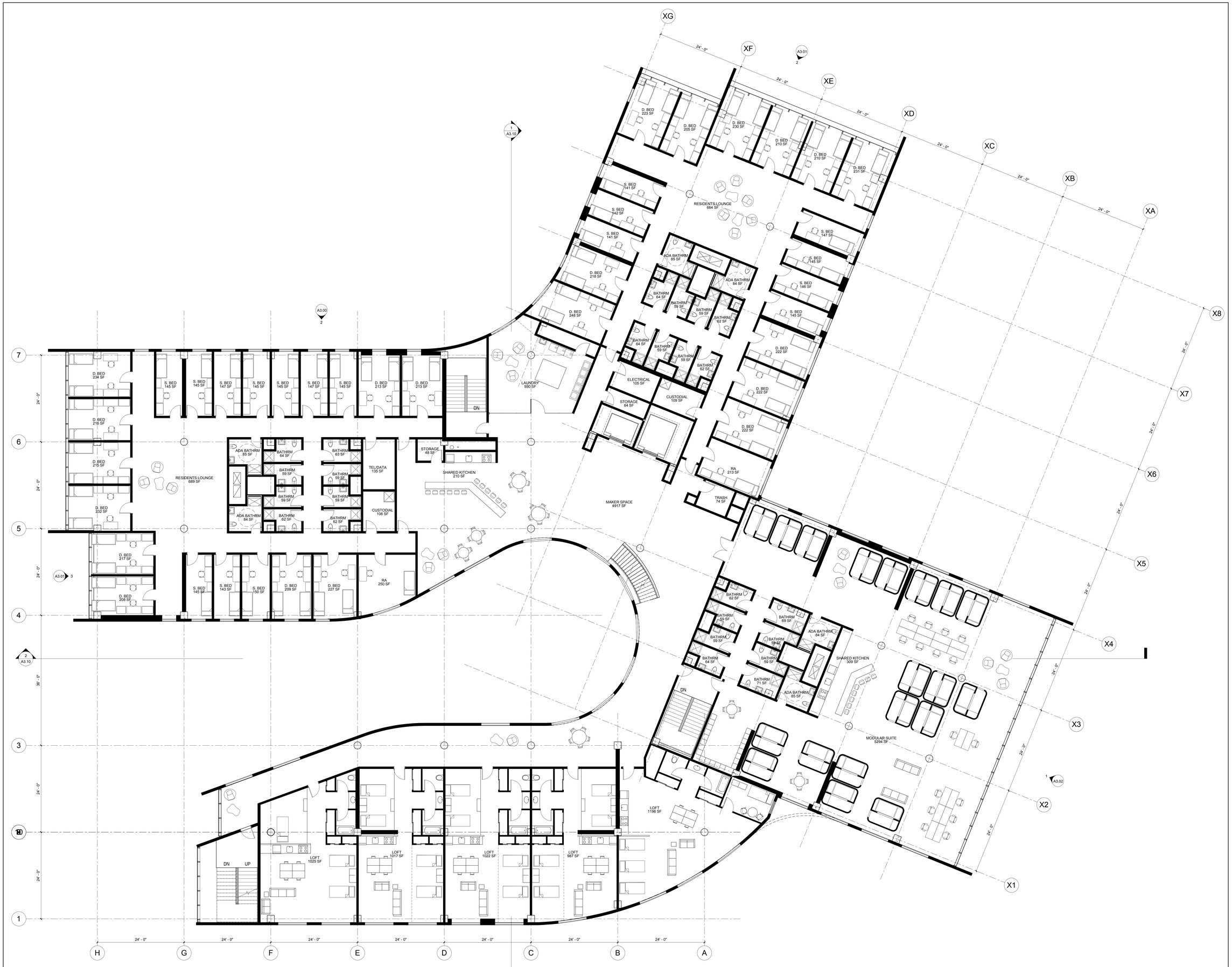

1 TYPLICAL FLOOR PLAN
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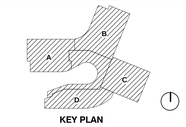

KEY PLAN

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TYPICAL FLOOR PLAN

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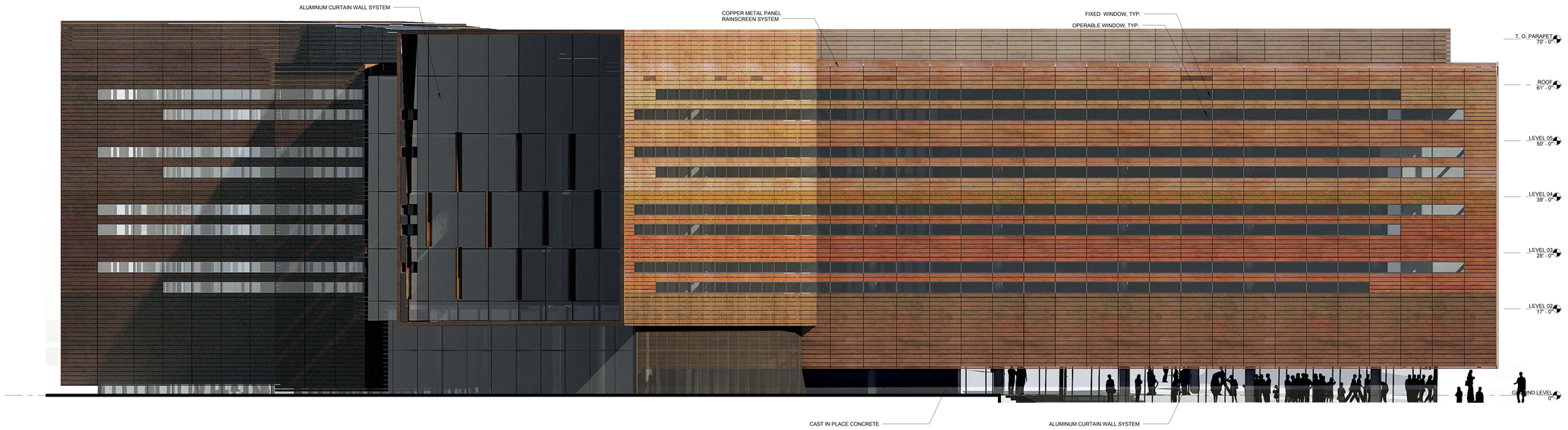
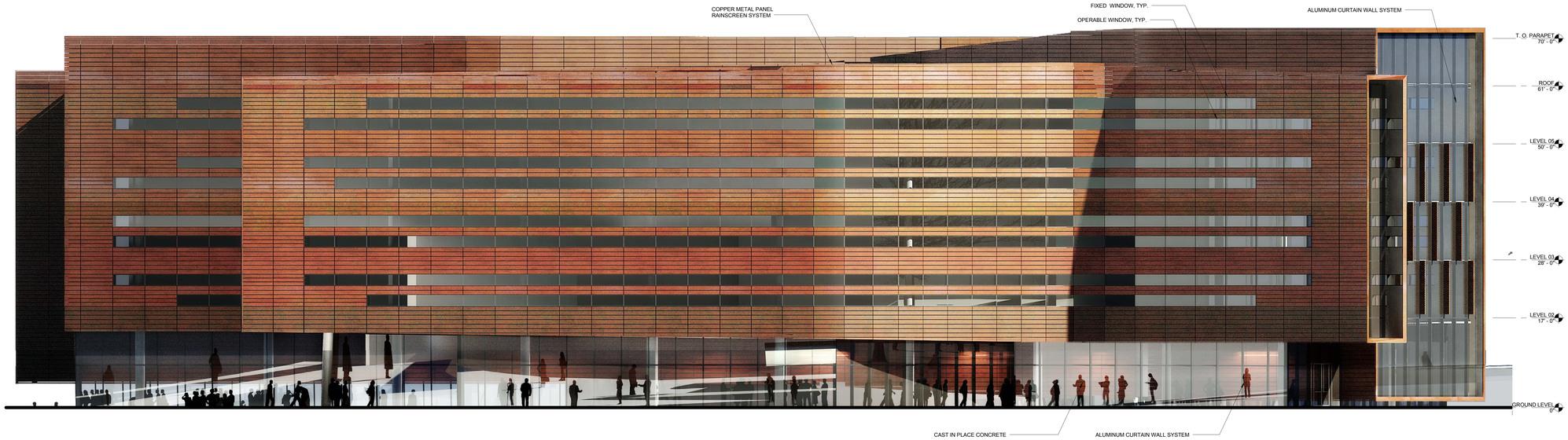


2 BUILDING ELEVATION -NORTH
1/8" = 1'-0"



1 BUILDING ELEVATION - SOUTH
1/8" = 1'-0"

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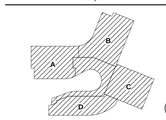

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BUILDING ELEVATION

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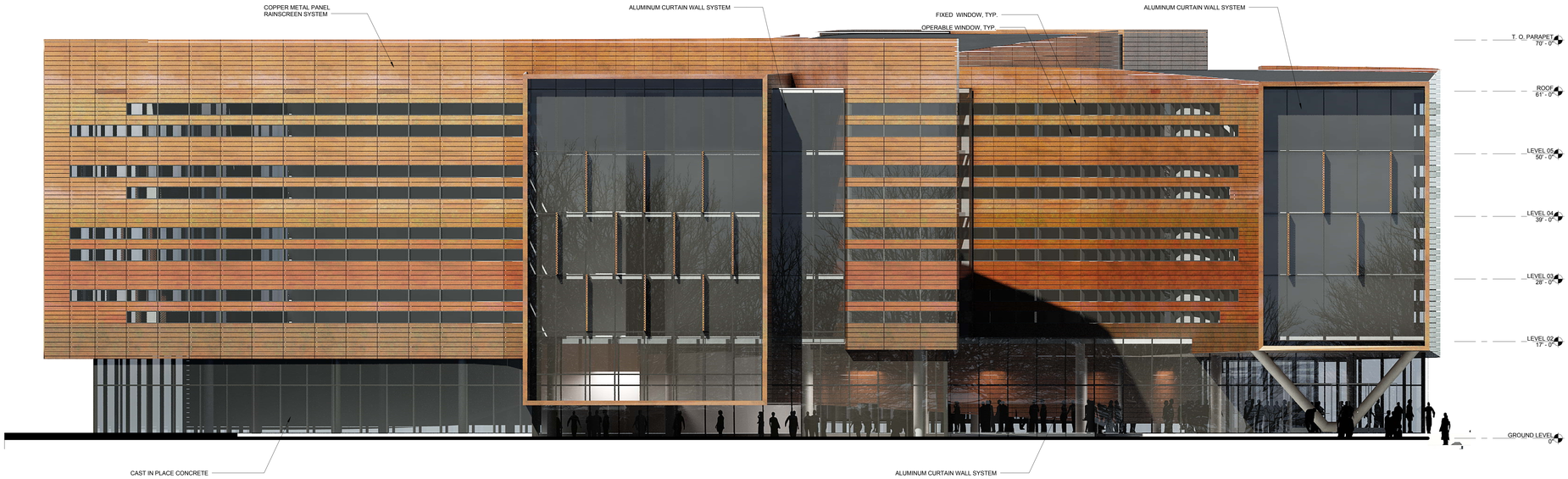

3 BUILDING ELEVATION - WEST
1/8" = 1'-0"

2 BUILDING ELEVATION - NORTH EAST
1/8" = 1'-0"

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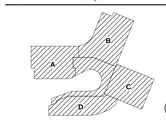

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BUILDING ELEVATION

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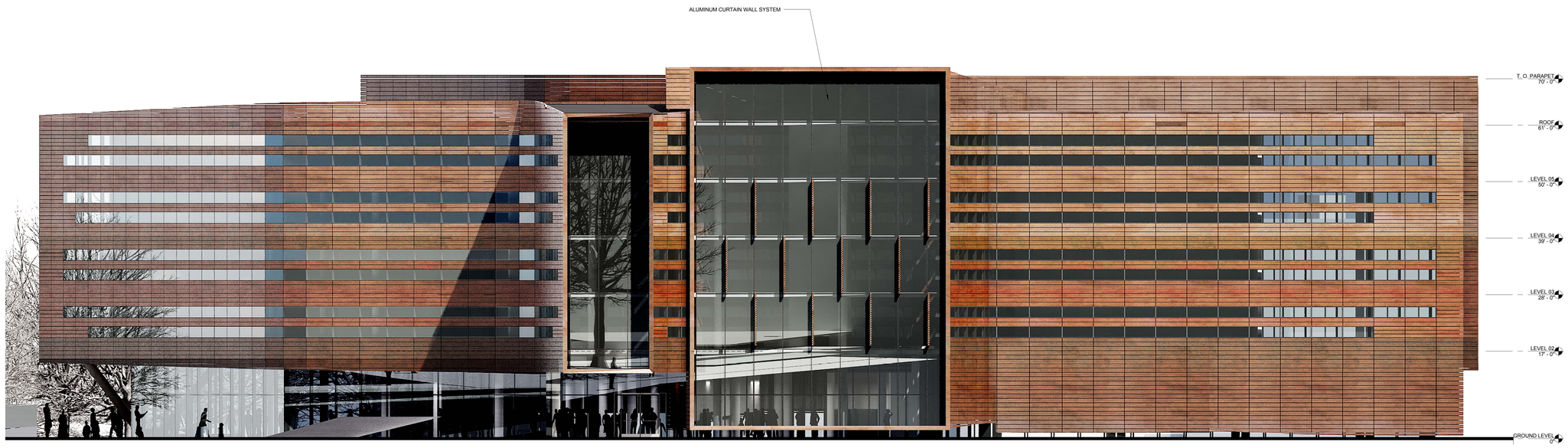

1 BUILDING ELEVATION -SOUTH EAST
1/8" = 1'-0"

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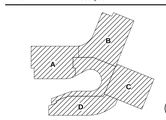

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Drawing Title:

BUILDING ELEVATION

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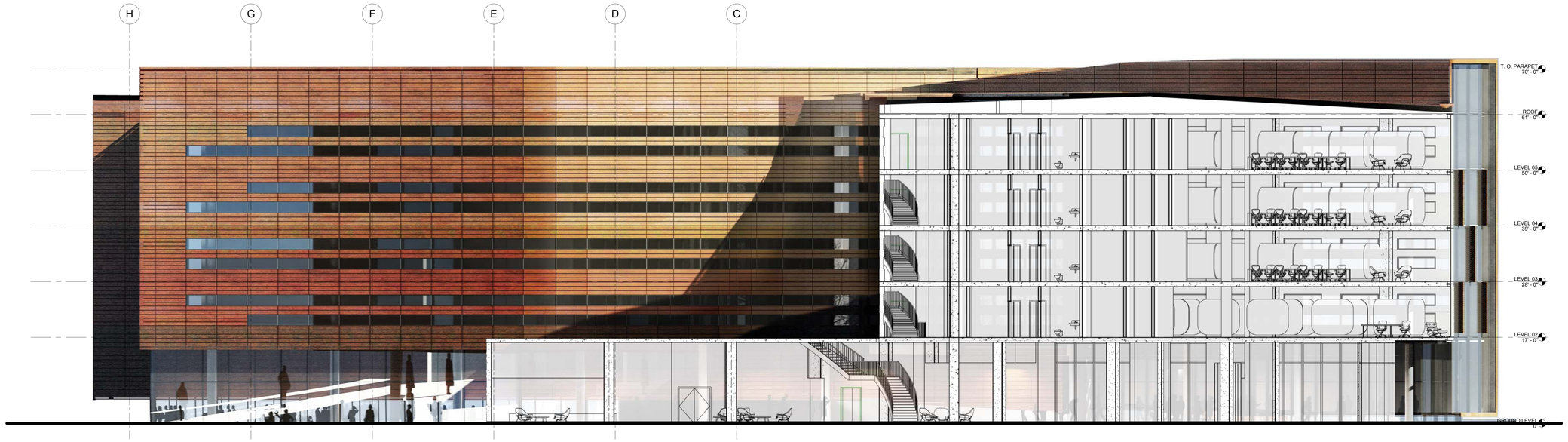
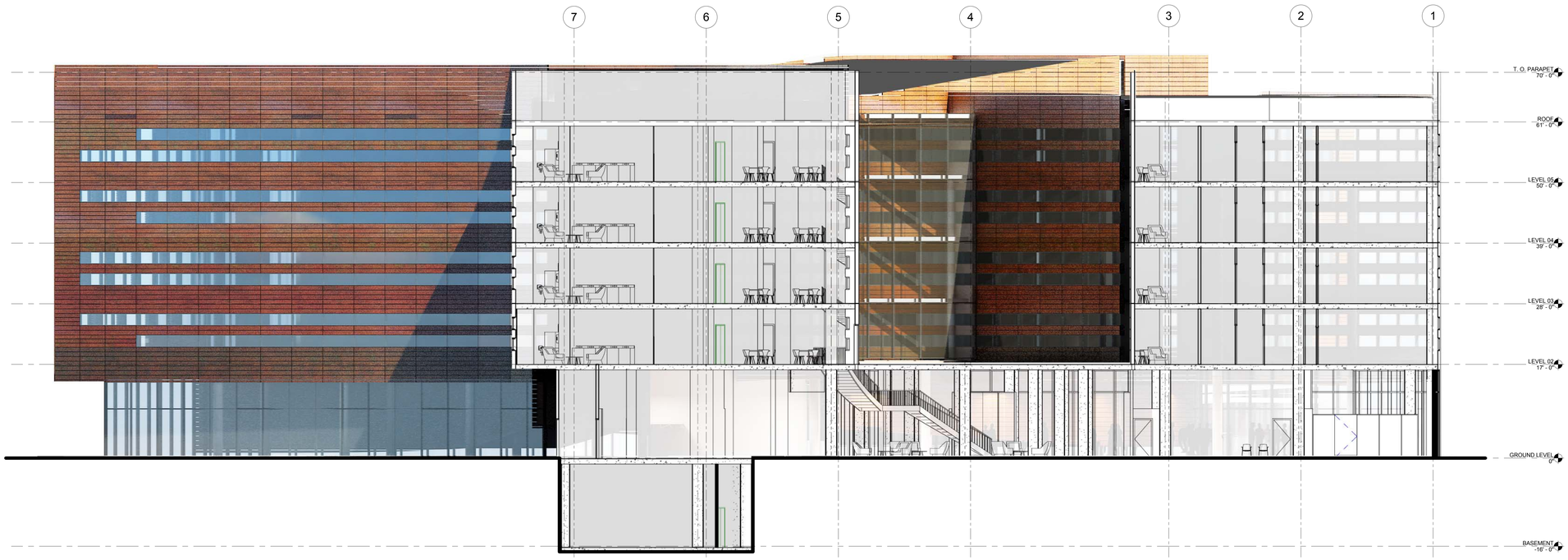


2 BUILDING SECTION - EAST WEST LOOKING
1/8" = 1'-0"



1 BUILDING SECTION - NORTH SOUTH LOOKING
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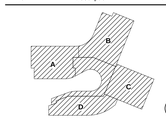

KEY PLAN

Drawing Title:

BUILDING SECTIONS

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FLOOR PLATE SCHEDULE	
Level	Area
BASEMENT	5113 SF
GROUND LEVEL	31278 SF
LEVEL 02	31354 SF
LEVEL 03 ,04 AND 05	31354 SF

TOTAL :161,807 SF

ROOM SCHEDULE			
Name	Count	Area	Level
COMMUNITY DIRECTOR APARTMENTS			
AREC APT	1	620 SF	GROUND LEVEL
REC APT	1	656 SF	GROUND LEVEL
		1276 SF	
GARAGE COMMUNITY SPACE			
AREC OFFICE	1	171 SF	GROUND LEVEL
BIKE STORAGE	1	653 SF	GROUND LEVEL
CONFERENCE ROOM	2	1021 SF	GROUND LEVEL
CONVENIENCE STORE	1	1811 SF	GROUND LEVEL
ELECTRICAL	1	79 SF	GROUND LEVEL
ENTRY LOBBY	1	2026 SF	GROUND LEVEL
GARAGE SPACE	1	14228 SF	GROUND LEVEL
INFORMATION	1	389 SF	GROUND LEVEL
KITCHENETTE	1	59 SF	GROUND LEVEL
LASER CUTTER	1	133 SF	GROUND LEVEL
MAIL	1	84 SF	GROUND LEVEL
REC OFFICE	1	165 SF	GROUND LEVEL
SHARED OFFICE	1	255 SF	GROUND LEVEL
SHOP	1	1975 SF	GROUND LEVEL
SPRAY BOOTH	1	89 SF	GROUND LEVEL
TOOL AND PROJECT STORAGE	1	475 SF	GROUND LEVEL
		23612 SF	
OUTDOOR SPACE			
OUTDOOR TERRACE	1	3169 SF	LEVEL 02
		3169 SF	
STUDENT RESIDENTIAL SPACE			
ADA BATHRM	6	506 SF	LEVEL 02
ADA BATHRM	6	506 SF	LEVEL 03
ADA BATHRM	6	506 SF	LEVEL 04
ADA BATHRM	6	506 SF	LEVEL 05
BATHRM	24	1462 SF	LEVEL 02
BATHRM	24	1479 SF	LEVEL 03
BATHRM	24	1464 SF	LEVEL 04
BATHRM	24	1464 SF	LEVEL 05
D. BED	21	4623 SF	LEVEL 02
D. BED	21	4623 SF	LEVEL 03
D. BED	21	4623 SF	LEVEL 04
D. BED	21	4623 SF	LEVEL 05
LAUNDRY	1	591 SF	LEVEL 02
LAUNDRY	1	590 SF	LEVEL 03
LAUNDRY	1	590 SF	LEVEL 04
LAUNDRY	1	590 SF	LEVEL 05
LOFT	5	5200 SF	LEVEL 02
LOFT	5	5249 SF	LEVEL 03
LOFT	5	5334 SF	LEVEL 04
LOFT	5	5334 SF	LEVEL 05
MAKER SPACE	1	4935 SF	LEVEL 02
MAKER SPACE	1	4917 SF	LEVEL 03
MAKER SPACE	1	4843 SF	LEVEL 04
MAKER SPACE	1	4843 SF	LEVEL 05
MODULAR SUITE	1	5294 SF	LEVEL 02
MODULAR SUITE	1	5294 SF	LEVEL 03
MODULAR SUITE	1	5294 SF	LEVEL 04
MODULAR SUITE	1	5294 SF	LEVEL 05
RA	2	451 SF	LEVEL 02
RA	2	463 SF	LEVEL 03
RA	2	463 SF	LEVEL 04
RA	2	463 SF	LEVEL 05
RESIDENTS LOUNGE	2	1322 SF	LEVEL 02
RESIDENTS LOUNGE	2	1353 SF	LEVEL 03
RESIDENTS LOUNGE	2	1374 SF	LEVEL 04
RESIDENTS LOUNGE	2	1374 SF	LEVEL 05
S. BED	17	2461 SF	LEVEL 02
S. BED	17	2462 SF	LEVEL 03
S. BED	17	2461 SF	LEVEL 05
SHARED KITCHEN	2	511 SF	LEVEL 02
SHARED KITCHEN	2	519 SF	LEVEL 03
SHARED KITCHEN	2	436 SF	LEVEL 04
SHARED KITCHEN	2	518 SF	LEVEL 05
STORAGE	1	48 SF	LEVEL 02
STORAGE	1	48 SF	LEVEL 03
STORAGE	1	48 SF	LEVEL 04
STORAGE	1	48 SF	LEVEL 05
WT	17	2461 SF	LEVEL 04
		109856 SF	
SUPPORT SPACE			
AIR HANDLER	1	1672 SF	BASEMENT
BOILER ROOM	1	869 SF	BASEMENT
CUSTODIAL	2	217 SF	LEVEL 02
CUSTODIAL	2	217 SF	LEVEL 03
CUSTODIAL	2	236 SF	LEVEL 04
CUSTODIAL	2	236 SF	LEVEL 05
CUSTODIAL OFFICE	1	160 SF	GROUND LEVEL
CUSTODIAL W/D	1	169 SF	GROUND LEVEL
ELEC / MECH ROOM	1	417 SF	BASEMENT
ELECTRICAL	1	613 SF	GROUND LEVEL
ELECTRICAL	1	87 SF	LEVEL 02
ELECTRICAL	1	105 SF	LEVEL 03
ELECTRICAL	1	111 SF	LEVEL 04
ELECTRICAL	1	111 SF	LEVEL 05
FACILITIES BREAK ROOM	1	243 SF	GROUND LEVEL
GENERATOR	1	168 SF	GROUND LEVEL
LOADING	1	154 SF	GROUND LEVEL
PLUMBING	1	987 SF	GROUND LEVEL
STORAGE	1	355 SF	BASEMENT
STORAGE	4	720 SF	GROUND LEVEL
STORAGE	1	64 SF	LEVEL 02
STORAGE	1	64 SF	LEVEL 03
TEL//DATA	1	135 SF	LEVEL 02
TEL/DATA	1	340 SF	BASEMENT
TEL/DATA	2	123 SF	GROUND LEVEL
TEL/DATA	1	135 SF	LEVEL 03
TEL/DATA	1	135 SF	LEVEL 04
TEL/DATA	1	135 SF	LEVEL 05
TOILET(ADA)	1	67 SF	GROUND LEVEL
TOILETS(M)	1	315 SF	GROUND LEVEL
TOILETS(W)	1	332 SF	GROUND LEVEL
TRANSFORMER VAULT / YARD	1	735 SF	GROUND LEVEL
TRASH	1	395 SF	GROUND LEVEL
TRASH	1	80 SF	LEVEL 02
TRASH	1	74 SF	LEVEL 03
TRASH	1	88 SF	LEVEL 04
TRASH	1	88 SF	LEVEL 05
		11149 SF	

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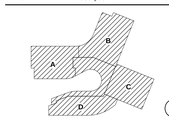

KEY PLAN

Drawing Title:

ROOM AND FLOOR PLATE SCHEDULE

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GENERAL STRUCTURAL NOTES

GENERAL

1. The structural notes are intended to complement the project specifications. Specific notes and details in the drawings shall govern over the structural notes and typical details.
2. Typical details and sections shall apply where specific details are not shown.
3. The contractor shall verify all site conditions and dimensions. If actual conditions differ from those shown in the contract drawings, the contractor shall immediately notify the architect/engineer before proceeding with the fabrication or construction of any affected elements.
4. Drawings shall not be scaled for the purpose of preparing shop drawings or for construction. Where dimensions on the design drawings are not provided or inferred, the contractor may scale drawings only to estimate member lengths for the purpose of bidding.
5. Changes to these contract drawings may be made only by an authorized representative of Dunn Associates, Inc. Dunn Associates, Inc. shall not be held responsible or liable for any claims arising directly or indirectly from changes made without written authorization by an authorized representative of Dunn Associates, Inc.
6. Omissions or conflicts between the contract drawings and/or specifications shall be brought to the attention of the architect/engineer before proceeding with any work involved. In case of conflict, follow the most stringent requirement as directed by the architect/engineer at no additional cost to the owner.
7. The contractor shall submit a written request to the architect/engineer before proceeding with any changes, substitutions, or modifications. Any work done by the contractor before receiving written approval will be at the contractor's risk.
8. The contractor shall coordinate with all trades any items that are to be integrated into the structural system such as openings, penetrations, mechanical and electrical equipment, etc. Sizes and locations of mechanical and other equipment that differs from those shown on the contract drawings shall be reported to the architect/engineer. Contractor shall take measures as required to insure that construction loads shall not exceed design loads for the structure.
9. The contractor shall be responsible for means, methods, techniques, sequences, and procedures in order to comply with the contract drawings and specifications. The contractor shall provide adequate shoring and bracing as required for the chosen method of erection. Shoring and bracing shall remain in place until final connections for the permanent members are completed. The building shall not be considered stable until all connections are completed. Walls shall not be considered self-supporting and shall be braced until the floor/roof system is completed.
10. Site observations by a field representative of Dunn Associates, Inc. shall not be construed as approval of construction, the procedures, nor special inspection.
12. All work shall be done in accordance with OSHA requirements. Potential conflicts between these documents and OSHA requirements shall be brought to the attention of the structural engineer before proceeding with the work.
13. Shop Drawings and submittals:
    - 13.1. Review of shop drawings and submittals by Dunn Associates, Inc. is for general compliance only and is not intended for approval. The shop drawing review shall not relieve the contractor from the responsibility of completing the project according to the contract documents.
    - 13.2. Submittals for the following items shall be submitted to the Project Architect/Engineer for review prior to fabrication and/or installation:
        - 13.2.1. Concrete Mix Design
        - 13.2.2. Concrete Reinforcing
        - 13.2.3. Anchorage and Embeds
        - 13.2.4. Structural Steel
        - 13.2.5. Steel Decking
        - 13.2.6. Deferred Design Items
    - 13.3. Detailing and shop drawing production for structural elements will require information (including dimensions) contained in the architectural, structural and/or other consultants' drawings. The structural drawings shall be used in conjunction with the architectural and other consultant's drawings. See the Architectural Drawings for dimensions, doors, windows, non-bearing interior and exterior walls, elevations, slopes, stairs, curbs, drains, recesses, depressions, railings, waterproofing, finishes, chamfers, kerfs, etc.
    - 13.4. Shop drawings made from reproductions of the structural drawings will be rejected unless the contractor signs a release agreement prior to the shop drawings being reviewed. The contractor may also obtain electronic files of the plan sheets after signing a release agreement. Electronic files of the detail sheets and schedule sheets will not be made available.
    - 13.5. The Contractor may choose to submit shop drawings and submittals for review electronically. The Contractor may do this provided a minimum of one hard copy set is submitted for review. The submittal will be stamped as received by Dunn Associates, Inc. when the hard copy is received by our office. Hard copies of small submittals need not be submitted if the Contractor receives the approval for this exception by the Engineer of Record.

BASIS OF DESIGN

1. Governing Building Code------International Building Code 2012
2. Risk Category------II
3. Floor Live Loads
    - 3.1. Uniformly Distributed Loads
        - 3.1.1. "Garage" Level------80 psf + 20 psf (removable partitions)
        - 3.1.2. Residential Levels------80 psf + 20 psf (removable partitions)
        - 3.1.3. Storage Rooms------125 psf Non-reducible
        - 3.1.4. Service Rooms------125 psf Non-reducible
    - 3.2. Concentrated Loads, all areas------2000 lbs
4. Roof Live Load (Not concurrent with Roof Snow Load)------ 20 psf
5. Roof Snow Load
    - 5.1. Ground Snow Load------ Pg = 47.1 psf
    - 5.2. Flat Roof Snow Load------ Pf = 33 psf + 5 psf (rain on snow)
    - 5.3. Snow Exposure Factor------ Ce = 1.0
    - 5.4. Thermal Factor------ Ct = 1.0
    - 5.5. Snow Load Importance Factor------ Is = 1.1
6. Wind Load
    - 6.1. Ultimate Wind Design Speed ------ 120 mph
    - 6.2. Wind Exposure------ C
    - 6.3. Internal Pressure Coefficient------ ± 0.18
7. Seismic Design Criteria
    - 7.1. Mapped Spectral Response Accelerations
        - 7.1.1. Short Period Acceleration------ SS = 1.22
        - 7.1.2. 1-Second Acceleration------ S1 = 0.45
    - 7.2. Spectral Response Coefficients
        - 7.2.1. Short Period Acceleration------ SDS = 0.823
        - 7.2.2. 1-Second Acceleration------ SD1 = 0.465
    - 7.2. Site Class (Soil Profile)------ D
    - 7.3. Seismic Importance Factor------ 1.25
    - 7.4. Seismic Design Category------ D
    - 7.5. Effective Structural Seismic Weight------ W
    - 7.6. Lateral Force Resisting System------ Special Reinforced Concrete Shear Walls
        - 7.6.1. Response Modification Coefficient------ R = 5.0
        - 7.6.2. System Overstrength Factor------ Ωo = 2.5
        - 7.6.3. Deflection Amplification Factor------ CD = 5.0
        - 7.6.4. Design Base Shear------ V = Cs*W = 0.206W (ULT), 0.144W (ASD)
    - 7.7. Analysis Procedure------Modal Response Spectrum Analysis
8. Serviceability Criteria
    - 8.1. Interstory Seismic/Wind Drift------Δa < 0.02h ('h' is story height) - See table for calculated magnitudes
    - 8.2. Deflection Limits------Total------Live/Snow/Wind
        - Floor------L/240------L/360
        - Roof------L/240------L/360
        - Perimeter------___------L/600(3/8" max)
        - Wall------___------L/240

BUILDING MAXIMUM STORY DRIFTS

Level	Floor to floor height (feet)	Elastic Story Drift		Inelastic Story Drift	
		Story Drift (inch)	Drift Ratio	Story Drift (inch)	Drift Ratio
Roof	15'-0"	X.X"	.00XX	X.X"	.00XX
4th	15'-0"	X.X"	.00XX	X.X"	.00XX
3rd	15'-0"	X.X"	.00XX	X.X"	.00XX
2nd	15'-0"	X.X"	.00XX	X.X"	.00XX

EXTERIOR FACADE FRAMING AND CLADDING

1. All systems (including façade, cladding, components, elements and/or their attachments to the structure) intended for use to enclose the building shall comply with the following criteria for interstory drift as required by ASCE 7 as interpreted or defined herein and as modified or supplemented herein. See Basis of Design section of the General Structural notes for vertical and horizontal (story) drift limits.
    - 1.1. Systems shall be detailed to accommodate vertical building movement (live load deflection) in conjunction with interstory drift. Interstory drifts should be considered equal in both orthogonal building directions unless noted otherwise.
    - 1.2. Systems shall be designed and detailed for elastic (probable) interstory drift such that all systems shall remain intact, undamaged and all sealant joints integral to or placed between systems shall remain intact, uncompromised, without failures or breaches. Joints, jointing and/or jointery shall be designed such that sealant materials flex, compress and/or shear within limits recommended by the sealant manufacturers so as to remain an effective barrier for water and air infiltration.
    - 1.3. Systems shall be designed and detailed for inelastic (credible) interstory drift such that no failure or distress occurs to systems except joint sealant is allowed to fail. Under no circumstances shall elements and/or components come in contract with adjacent systems, elements and/or components.
    - 1.4. Systems with glazing are intended to keep all members and glazing intact and connected to the building. Glazing shall not break or become dislodged from its restraints. Gaskets may fail and may dislodge but shall not let glass escape its restraint.
    - 1.5. Systems shall not apply moments to the slab edges and shall not induce lateral loads into beams unless kicker bracing is supplied. Attachments shall not induce torsional loads into beams and columns, nor loads into braces that are part of the Main Seismic Force Resisting System.
    - 1.6. Allowance shall be made for sealant to occupy some finite space when compressed beyond its working limit (suggest ±15% of its static joint width).
2. All system connections shall comply with requirements of ASCE 7 , Chapter 13.
3. All systems shall be coordinated to interface with all adjoining systems such that consistency is maintained throughout the exterior closure regarding the mode (sliding or racking) in which the system performs to meet interstory drift and other design criteria.
4. Systems and details shall be consistent with the architectural intent for joint sizes and system details to the largest extent possible, or where required, modified only after prior approval.

FOUNDATION

1. Soils Report by:------Applied Geotech (AGEC)
2. Report Number & Date:------No. 1140032 on March 20, 2014
3. Soil Bearing Pressure:------5500 psf, on Rammed Aggregate Piers
4. Frost Protection:------30 inches minimum
5. Lateral Soil Pressure Fluid Equivalent Density (Clay soil type):
    - 5.1. Active------50 pcf (retaining walls)
    - 5.2. At Rest------65 pcf (rigid foundation walls)
    - 5.3. Passive------250 pcf
6. Coefficient of Friction------0.35/0.45 (Clay/Structural fill)

EARTHWORK

1. Consult the project specifications and soils report for earthwork requirements. In absence of information, refer to the following notes.
2. Clearing: The entire building area shall be scraped to remove the top 4" of soil including all vegetation and debris.
3. Contractor shall provide temporary shoring for excavations as required.
4. Contractor shall provide measures necessary to prevent damage to or settlement of new or existing construction and utilities on or adjacent to project site.
5. Contractor shall provide dewatering as required to protect the site from flooding.
6. Proof rolling: The natural undisturbed soil below all footings shall be proof rolled prior to placing concrete. Remove all soft spots and replace with compacted structural fill.
7. Compacted structural fill: All fill material shall be a well-graded granular material with a maximum size less than 4" and with not more than 10% passing a #200 sieve. Fill beneath footings shall be compacted to 95% of the maximum laboratory density as determined by ASTM D 1557. All fill shall be tested. Compacted structural fill shall be placed in lifts not exceeding 8" in uncompacted thickness.
8. Floor slabs shall be underlain by a granular layer at least 4" thick. The granular layer shall have a maximum size less than 1" with not more than 5% passing a #200 sieve and shall be compacted to at least 90% of the maximum laboratory density as determined by ASTM D 1557.
9. The soils engineer shall review all excavations and fill placement prior to placing concrete.

CONCRETE

1. Concrete shall be supplied in accordance with ACI 318 and the following requirements:

Concrete Use	Comp. Strength f'c (psi)	Exposure Classes	Cement Type a	Max. W/CM Ratio	Max. Flyash	Air Content b,c	Aggregate Size, Max.	Slump Limit d
Footings	3000	F0, S0, P0, C0	I, II	0.50	25%	1.5%	1 1/2"	5"
Foundation Walls	3000	F1, S0, P0, C1	I, II	0.50	25%	5%	3/4"	4"
Shear Walls	6000	F0, S0, P0, C0	I, II	0.45	25%	1.5%	3/4"	4"
Other Walls	4000	F0, S0, P0, C0	I, II	0.45	25%	1.5%	3/4"	4"
Columns	4000	F0, S0, P0, C0	I, II	0.45	25%	1.5%	3/4"	4"
Interior Slabs on Grade	3500	F0, S0, P0, C0	I, II	0.45	25%	1.5%	3/4"	5"
Suspended Slabs	5000	F0, S0, P0, C0	I, II	0.45	25%	1.5%	3/4"	4"
Joists and Beams	4000	F0, S0, P0, C0	I, II	0.40	25%	1.5%	3/4"	4"
Site Concrete (reinforced)	5000	F2, S0, P0, C2	I, II	0.40	25%	6%	3/4"	4"
Site Concrete e (unreinforced)	4500	F2, S0, P0, C0	I, II	0.45	25%	6%	3/4"	4"

Table Footnotes:

- a. Cement to comply with ASTM C150. Use Type V cement where required by soils report.
- b. Air content ± 1.5%, measured at point of final placement. Air-entraining admixtures shall comply with ASTM C260 (when used). Calcium chloride shall not be added to the concrete mix. Unreinforced concrete slabs on grade may have calcium chloride not exceeding one percent.
- c. Air entrainment shall be adjusted for the use of admixtures and fly ash.
- d. Slump limit ± 1" applies to non-plasticized concrete. Test shall be conducted prior to adding plasticizer if used.
- e. See civil drawings for site concrete requirements. In the absence of information, use values listed.

1. Materials unless noted otherwise:
    - 1.1. Normal Weight aggregates------ASTM C33
    - 1.2. Light Weight aggregates------ASTM C330
    - 1.3. Fly Ash, Class F Pozzolan------ASTM C618
    - 1.4. Silica Fume (2% to suspended parking slabs)------ASTM C1240
    - 1.5. Reinforcing Steel
        - 1.5.1. General------ASTM A615 Grade 60
        - 1.5.2. Columns, Beams, Shearwalls------ASTM A706-60ksi. ASTM A615 is permitted if mill certifications are submitted showing that actual yield strength does not exceed the specified strength by more than 18000 psi and the ratio of tensile to yield strength is greater than 1.25.
        - 1.5.3. Subject to the above requirements, ASTM A615 Grade 75 steel may be used at the contractor's option, except in special moment frames, special concrete shear walls, shear stirrups or torsional reinforcement.
    - 1.6. Deformed Bar Anchors (DBA) ------ASTM A496
    - 1.7. Headed Stud Anchors (HSA) ------ASTM A108
    - 1.8. Anchor Bolts: See steel and/or wood section(s) of general notes.
    - 1.9. No aluminum conduit or product containing aluminum or any other material injurious to concrete shall be embedded in concrete.
2. Reinforce composite slabs over metal deck with the following welded wire reinforcement (minimum), based on the thickness of concrete above upper deck flutes. Welded wire reinforcement shall be placed 1" to 1 1/2" below the top of the slab:
    - 2.1. Slab (above upper deck flute) 3 1/4" or thinner 6" x 6" - W1.4/W1.4
3. Welded wire reinforcement may be substituted with macro synthetic fibers "coarse fibers" (per ASTM Subcommittee C09.42), made from virgin polyolefin, with equivalent diameter between 0.016" and 0.05", having minimum aspect ratio (length/equivalent diameter) of 50, at a minimum rate of 4 lb / cubic yard. Fibers above finished slab shall not be burned off. Do not use fibers in architecturally finished or colored concrete.
4. The contractor shall be responsible for the design, detailing, care, placement and removal of all formwork and shores.
    - 4.1. Supporting forms and shoring shall not be removed until structural members have acquired sufficient strength to safely support their own weight and any construction load to which they may be subjected. In no case, however, shall forms and shoring be removed in less than 24 hours after concrete placement.
    - 4.2. Suspended slabs shall be re-supported after form removal until concrete reaches its 28-day specified compressive strength.
5. Reinforcement shall have the following concrete cover:------ Clear Cover
    - 5.1. Cast-in-place Concrete
        - 5.1.1. Cast against and permanently exposed to earth------3"
        - 5.1.2. Formed concrete exposed to earth or weather:
            - #6 thru #18 bars------2"
            - #5 and smaller bars------1 1/2"
        - 5.1.3. Concrete not exposed to weather or in contact with ground:
            - Slabs, Walls, Joists; #11 bars and smaller ------3/4"
            - Beams, Columns: Primary Reinforcement, Ties,------1 1/2"
            - Stirrups, Spirals
6. Construction Joints and Control Joints:
    - 6.1. Provide a beveled 2" x 4" x continuous or intermittent keyway in all horizontal and vertical construction joints including between top of footing and foundation walls. In addition, all joints shall be intentionally roughened to a full amplitude of approximately 1/4".
    - 6.2. Control joints shall be installed in slabs on grade so the length to width ratio of the slab is no more than 1.25:1. Control joints shall be completed within 12 hours of concrete placement. Control joints may be installed by either:
        - 6.2.1. Saw cut with depth of 1/4 the thickness of the slab
        - 6.2.2. Tooled joints with depth of 1/4 the thickness of the slab
    - 6.3. Install construction or control joints in slabs on grade at a spacing not to exceed 30 times the slab thickness in any direction, unless noted otherwise. Construction joints shall not exceed a distance of 125'-0" on center in any direction.
7. Construction
    - 7.1. Use chairs or other support devices recommended by the CRSI to support bar and tie reinforcement bars and WWR prior to placing concrete. WWR shall be continuously supported at 36" on center maximum. Reinforcing steel for slabs on grade shall be adequately supported on precast concrete units. Lifting the reinforcing off the grade during placement of concrete is not permitted.
    - 7.2. Contractor shall coordinate placement of all openings, curbs, dowels, sleeves, conduits, bolts, inserts and other embedded items prior to concrete placement.
    - 7.3. All embeds and dowels shall be securely tied to formwork or to adjacent reinforcing prior to the placement of concrete.
    - 7.4. No pipes, ducts, sleeves, etc. shall be placed in structural concrete unless specifically detailed or approved by the structural engineer. Penetrations through walls when approved shall be built into the wall prior to concrete placement. Penetrations will not be allowed in footings or grade beams unless detailed. Piping shall be routed around these elements and footings stepped to avoid piping.
    - 7.5. Reinforcing bars shall not be welded unless specifically shown on drawings. In such cases, use only AWS standards. Do not substitute reinforcing bars for DBAs or HSAs.
    - 7.6. Top of concrete columns shall be flush (±1/4") with bottom of supported cast-in-place members.
8. Detailing:
    - 8.1. Lap splice lengths shall be detailed to comply with the "Reinforcing Bar Lap Splice Schedule" contained within the contract drawings.
        - 8.1.1. Do not splice stirrups and ties. Do not splice vertical bars in retaining walls unless specifically shown.
        - 8.1.2. At shearwall boundary elements lap lengths shall be increased by 25%.
        - 8.1.3. Splices may be made with mechanical splices capable of 125% tension capacity of the bar being spliced. Mechanical splices shall be the positive connecting type coupler and shall meet all ACI requirements. Use "Cadweld", "Lenton" Standard Couplers, "Bar-Lock" or equal with internal protector. If mechanical splices are used, splices or couplers on adjacent bars shall be staggered a minimum of 24" apart along the longitudinal axis of the reinforcing bars.
    - 8.2. At joints provide reinforcing dowels to match the member reinforcing, unless noted otherwise.
    - 8.3. At all discontinuous control or construction slab on grade joints, provide (2) #4 x 48".
    - 8.4. Provide corner bars at intersecting wall corners using the same bar size and spacing as the horizontal wall reinforcing.
    - 8.5. All vertical reinforcing shall be doweled to footings, or to the structure below with the same size and spacing as the vertical reinforcing for the element above. Dowels extending into footings shall terminate with a 90° standard hook and shall extend to within 4" of the bottom of the footing. Footing dowels (#8 bars and smaller) with hooks need not extend more than 20" into footings.
    - 8.6. In concrete shearwalls, the horizontal wall reinforcing shall terminate at ends of walls and openings into the far end of the jamb column with a standard hook . Horizontal wall reinforcing shall be continuous through construction and control joints.
    - 8.7. See details for reinforcing around miscellaneous openings. All recesses that interrupt reinforcing shall be reinforced the same as an opening.
    - 8.8. Reference ACI 315 for additional detailing requirements.
9. Contractor required to submit concrete mix design for review by the engineer prior to any placement of concrete.
10. Contractor shall refer to and follow the recommendations in ACI 305R for hot weather concreting and ACI 306R for cold weather concreting.
11. Contractor is not to backfill against retaining walls unless walls have achieved design strength or have been shored. Contractor is not to backfill against basement walls without placement of the main floor diaphragm unless the walls have been shored or approval of the EOR has been granted, or it has been noted otherwise on the design drawings.
12. Construction activity or storage of materials shall not take place on newly placed concrete for a minimum of 7 days after concrete placement.

POST-INSTALLED ANCHORS

1. Post-installed anchors shall only be used where specifically detailed or called for on the design drawings. If circumstances arise during construction where the Contractor desires to substitute a post-installed anchor in place of a cast-in-place anchor, the Contractor shall submit a formal written request for each circumstance to the Architect and Engineer for review.
2. Follow all ICC Evaluation Report and manufacturers' requirements and recommendations for post-installed anchor installation. Where conflicts may exist, the most stringent requirement applies.
3. Post-installed anchors that are exposed to exterior conditions, or interior spaces where moisture can accumulate, shall be either galvanized or stainless steel anchors.
4. All holes in hollow, brick, or stone masonry shall be performed in the "rotary-only" mode with the hammer function off.
5. For installation of adhesive anchors horizontally or vertically inclined, installers must have AMI/CRSI Adhesive Anchor Installer Certification.
6. Mechanical (Expansion) anchors
    - 6.1. Mechanical anchors in concrete shall be
        - 6.1.1. Kwik Bolt TZ by Hilti (ESR-1917)
        - 6.1.2. Kwik HUS-EZ by Hilti (ESR-3027)
        - 6.1.3. Strong-Bolt by Simpson (ESR-1771)
        - 6.1.4. Strong-Bolt 2 by Simpson (ESR-3037)
        - 6.1.5. Titen HD by Simpson (ESR-2713)
        - 6.1.6. Torq-cut by Simpson (ESR-2705)
        - 6.1.7. Trubolt+ by ITW Redhead (ESR-2427)
        - 6.1.8. Wedge-Bolt+ by Powers (ESR-2526)
        - 6.1.9. Power-Stud+ SD2 by Powers (ESR-2502)
        - 6.1.10. Power-Stud+ SD3, SD4 and SD6 Stainless by Powers (ESR-3471)
        - 6.1.11. Snake+ by Powers (ESR-2272)
7. The Contractor may submit, for review and approval, the manufacturer's ICC evaluation report of alternate anchor systems. The alternate method shall provide minimum capacities equal to or greater than those in the above noted anchors. The alternate method shall be approved by the engineer of record prior to the substitution.

STRUCTURAL STEEL

1. Codes and Standards: Fabrication and installation shall comply with the latest edition of the following:
    - 1.1. American Institute of Steel Construction (AISC), "Specification for the Design, Fabrication and Erection of Structural Steel for Buildings," with "Commentary".
    - 1.2. AISC "Code of Standard Practice" excluding sections 3.4, 4.4 and 4.4.1.
    - 1.3. AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts"
    - 1.4. AISC "Seismic Provisions for Structural Steel Buildings."
    - 1.5. American Welding Society (AWS), Structural Welding Codes D1.1, D1.3, D1.4, and D1.8, except as modified by the "Steel Construction Manual".
2. Material:
    - 2.1. Wide Flange Sections------ASTM A992 (50 ksi)
    - 2.2. Plate
        - 2.2.1. Typical------ASTM A36
        - 2.2.2. Braced/Moment Frames------ASTM A572 Grade 50
    - 2.3. Notch-toughness requirements apply for Group 3, 4, and 5 shapes with flange thickness greater than 1 1/2" and plate 2" and thicker which are a part of the Seismic Load Resisting System (SLRS). Minimum Charpy V-Notch requirements are 20 ft-lbs at 70°F.
    - 2.4. Notch-toughness requirements apply for demand critical welds. Minimum Charpy V-Notch requirements are 20 ft-lbs at 0°F and 40 ft-lbs at 70°F
    - 2.5. Pipe------ASTM A53 Grade B Type E/S
    - 2.6. Hollow Structural Shapes
        - 2.6.1. Rectangular------ASTM A500 Grade B (46 ksi)
        - 2.6.2. Round------ASTM A500 Grade B (42 ksi)
    - 2.7. Other Structural Shapes (M, C, etc)------ASTM A36
    - 2.8. Bolted Connections------ASTM A325
    - 2.9. Anchor Bolts
        - 2.9.1. All Columns unless noted otherwise: ASTM F1554 Grade 105 with ASTM A563 heavy hex nuts with Grade A hardened washers.
        - 2.9.2. Braced Frame/Moment Frame Columns unless noted otherwise: ASTM F1554 Grade 105 (equiv to A193 Grade B7) with ASTM A563 heavy hex nuts with ASTM F436 minimum 5/16" thick washers.
    - 2.10. Weld Filler Metal
        - 2.10.1. Shielded Metal Arc Welding------AWS A5.1, low-hydrogen only. Low-hydrogen restrictions do not apply when welding sheet steels in accordance with AWS D1.3, including attaching these steels to structural members.
        - 2.10.2. Gas-Metal & Metal-Cored Arc Welding----AWS A5.18
        - 2.10.3. Flux-Cored Arc Welding------AWS A5.20. E7XT-4 or E7XT-11 electrodes are not permitted.
        - 2.10.4. Intermixing of welds made from self-shielded welding electrodes with welds made by other processes is not allowed in seismic critical welds, unless tested in accordance with AWS D1.8, annex B. The Field Erection Contractor is responsible for verifying that intermixing of self-shielded weld metal with weld metal of other processes will not occur, or alternatively, the welding procedure is qualified by testing.
    - 2.11. Deformed Bar Anchors (DBA)------ASTM A496
    - 2.12. Headed Stud Anchors (HSA)------ASTM A108
    - 2.13. Non-Shrink Grout------ASTM C1107 Grade B
        - Non-shrink grout shall be prepackaged, non-metallic and non-gaseous.
        - Furnish certified independent test data to Structural Engineer.
        - Fluid Consistency (flow cone) = 20 to 30 seconds
        - Compressive Strength in 28 days = 7,500 psi
    - 2.14. Refer to architectural drawings for structural steel fireproofing requirements .
3. Structural Detailing
    - 3.1. Welds may be performed in the shop or the field. Designations of field welds on the Contract Documents are shown where it is anticipated field welds may be required, and are shown only for the purpose of assisting the Contractor in the bidding process. The Contractor shall coordinate the welding sequence between sub-contractors, and any costs associated with variations in the welding sequence are outside the scope of the Design Engineer, and are the responsibility of the Contractor. Field welding is to be minimized where possible. Contractor is to verify that the sequencing of welds meets all safety regulations, and the requirements of the Construction Documents and their referenced codes.
    - 3.2. Provide full depth web stiffener plates at each side of all beams at all bearing points. Stiffener plates shall be the thickness called out below unless noted otherwise. Stiffeners shall be welded on both sides of the plate-to-flange and plate-to-web interfaces. Do not weld into the web-to-flange fillet region of the member.
        - FLANGE WIDTH------STIFFENER THICKNESS & WELD SIZE
        - Less than 8 1/4"------1/4" & 3/16"
        - 8 1/4" to 12 1/4"------3/8" & 1/4"
        - 12 1/4" to 16 1/2"------1/2" & 5/16"
        - 16 1/2" to 20 3/4"------5/8" & 3/8"
    - 3.3. Bolting and Fasteners
        - 3.3.1. Ordinary steel-to-steel connections, simple span framing, and beam/girder-to-bearing plates are the standard connection used throughout the design drawings, unless noted otherwise:
            - 3.3.1.1. Use A325N bolts or tension-controlled bolts.
            - 3.3.1.2. Tighten these fasteners to a "snug tight" condition.
            - 3.3.1.3. Where a steel-to-steel connection is not shown, provide a framed connection per AISC for one half the total uniform load capacity of the beam for the span and steel specified.
        - 3.3.2. Pretensioned connections are shown on the structural design drawings. They join steel-to-steel connections, unless noted otherwise:
            - 3.3.2.1. Use A325N or A325X bolts or tension-controlled bolts.
            - 3.3.2.2. Pretension these fasteners as required by AISC "Specification for Structural Joints Using ASTM A325 or a A490 bolts."
        - 3.3.3. Slip Critical connections (SC) are shown on the structural design drawings. They join steel-to-steel connections in Seismic Load-Resisting Systems (SLRS).
        - 3.3.4. Fasteners and washers shall not be reused. Scrap dirty, rusted, or water-contaminated bolt assemblies.
    - 3.4. Weld Access Holes and Temporary Attachments
        - 3.4.1. Fabricate beam copes and weld access holes using the geometry described in AISC 360 Section J1.6.
        - 3.4.2. Runoff tabs are to be removed unless noted otherwise.
    - 3.5. Backup Bars: Remove backup bars from all beam bottom flange connections in demand critical welds, unless noted otherwise. Backgouge the root and weld to sound metal. Reweld the gouged area and add a 5/16" reinforcing fillet weld.
    - 3.6. Protected Zones: No connections, other than those on the design drawings, shall be made within the protected zone of the SLRS as identified in AISC 341.
        - 3.6.1. Locate headed studs, welds, miscellaneous metal, etc outside of the protected zone.
        - 3.6.2. Paint the protected zones with bright paint before and after fire coating operations to identify them.
    - 3.7. All welds not noted on drawings shall be minimum 1/4" fillet welds.
    - 3.8. All structural steel members shall be considered as an unrestrained fire-resistance-rated assembly.
4. Welding of Reinforcing Steel or Bolts
    - 4.1. Reinforcing Bars: Do not weld rebar except as specifically detailed in the drawings. In such cases, use only AWS standards. Do not substitute reinforcing bars for deformed bar anchors, structural bolts, or headed stud anchors.
    - 4.2. Do not weld anchor bolts, including "tack" welds.
    - 4.3. Headed Stud Anchor welding and Deformed Bar Anchor welding shall conform to the manufacturer's specifications.

METAL DECKING

1. Steel deck shall comply with the latest requirements of the Steel Deck Institute.
2. Steel deck material shall comply with the manufacturer's ICC Report and have a minimum yield strength of 33ksi.
3. All deck shall be 3-span continuous minimum. In areas where 3-span conditions are not possible, the contractor shall provide heavier gauge deck as required to provide the equivalent loading of the specified deck under a 3-span condition.
4. Steel roof deck shall not be used to support loads from plumbing, fire sprinklers, HVAC ducts, light fixtures, architectural elements, or equipment of any kind, unless specifically noted.
5. Conduits are permitted in deck slabs subject to local code requirements and fire rating considerations. When conduit is installed in the slab, it shall be limited to conduits of 1" diameter or less, or less than 1/3 the concrete cover over flutes, and no crossovers occur, and conduit is spaced at least 18" apart with a 3/4" minimum cover.
6. All members supporting deck shall be dry before welding.
7. Crimp seams before button punching or welding interlocking seams.
8. Where deck is to receive sprayed-on fire proofing, painted deck shall be coated with special paint that will allow the sprayed-on fire proofing to adhere to the painted deck.
9. All welds performed on roof deck or galvanized deck are to be painted.
10. Steel deck shall be galvanized (G60) when used above or below mechanical equipment rooms.
11. Steel floor deck shall be phosphatized/painted, composite, with interlocking side seams with the following minimum properties (LW = Light weight concrete, NW = Normal weight concrete):
    - Type/Ga------S(in3/ft)------I (in4/ft------Concrete (Total)------Allowable shear value------Notes
    - W2/20------0.361------0.423------3 1/4"(5 1/4") LW------XXX plf for X'-X" span------Typ. Floor
    - W2/18------0.510------0.555------3 1/4"(5 1/4") LW------XXX plf for X'-X" span------Typ. Floor
    - W3/20------0.534------0.896------3 1/4"(6 1/4") LW------XXX plf for X'-X" span------Typ. Floor
    - W3/18------0.767------1.203------3 1/4"(6 1/4") LW------XXX plf for X'-X" span------Typ. Floor
    - 11.1. Weld deck to supporting framing members with 3/4" diameter puddle welds at the following spacing (Closer spacings may be used to develop minimum shear requirements):
        - 11.1.1. 12" on center to supports perpendicular to deck corrugations (4 welds per 36" wide sheet).
        - 11.1.2. 12" on center to all supports parallel to deck corrugations.
    - 11.2. Attach interlocking seams with 3/16" diameter button punch at 18" on center or 1 1/2" top seam weld at 36" on center between adjacent pieces of deck.
    - 11.3. Provide a 2" minimum bearing at all supports.
    - 11.4. Butt all end splices.
12. Steel roof deck shall be painted with interlocking side seams with the following minimum properties:
    - Type/Ga------S(in3/ft)------I (in4/ft)------Allowable shear value------Notes
    - 1 1/2" B/20------0.235------0.216------XXX plf for X'-X" span------Typ. Roof
    - 1 1/2" B/18------0.322------0.302------XXX plf for X'-X" span------Typ. Roof
    - 12.1. Weld steel roof deck to supporting framing members with 3/4" diameter puddle welds at the following spacings (Closer spacings may be used to develop minimum shear requirements):
        - 12.1.1. 6" on center to all supports perpendicular to deck corrugations (7 welds per 36" sheet).
        - 12.1.2. 6" on center to all supports parallel to deck corrugations.
        - 12.1.3. Interlocking side seams between adjacent pieces of decking may be attached with "Verco Sidelap Connections" by Verco Manufacturing (VSC) or "ASC DeltaGrip side seam connection" by ASC Steel Deck at 12" on center minimum.
    - 12.2. At the Contractor's option, Hilti X-EDN19/X-EDNK 22 powder-actuated fasteners may be used in lieu of puddle welds. Follow fastener manufacturer's recommendations for installation. Fasteners shall be installed at the following spacings (Closer spacings may be used to develop minimum shear requirements):
        - 12.2.1. 6" on center to all supports perpendicular to deck corrugations (7 fasteners per 36" sheet).
        - 12.2.2. 6" on center to all supports parallel to deck corrugations.
        - 12.2.3. Interlocking side seams between adjacent pieces of decking may be attached with "Verco Sidelap Connections" by Verco Manufacturing (VSC) or "ASC DeltaGrip side seam connection" by ASC Steel Deck at 4" on center. Closer spacing may be used to develop minimum shear requirements.
    - 12.3. The Contractor may submit, for review and approval, the manufacturer's ICC report of an alternate method of deck attachment. The alternate method shall provide minimum deck diaphragm shear values equal to or greater than those noted above. The alternate method shall be approved by the engineer of record prior to the substitution.
    - 12.4. Provide a minimum deck bearing of 2". Lap splices shall be centered over the support. To ensure proper lap placement, 4" of lap is recommended, however, it may be reduced to 2" minimum. Deck laps less than the minimum will need to be replaced with deck that meets the minimum lap.

COLD FORMED STEEL

1. Cold Formed Steel Framing
    - 1.1. The design of cold formed steel and low alloy steel structural members shall be in accordance with AISI-NASPEC, North American Specification for the Design of Cold-Formed Steel Structural Members.
    - 1.2. The design, installation and construction of cold formed steel for structural and non-structural framing shall be in accordance with AISI-CFSD, Standard for Cold-Formed Steel Framing - General Provisions.
    - 1.3. All steel framing members shall comply with ASTM A1003.
    - 1.4. Follow all manufacturers' guidelines and recommendations for all products.
    - 1.5. Unless noted otherwise, all welded connections shall be done according to AWS standards.
    - 1.6. All interior non-bearing steel stud walls that extend above the ceiling but do not attach to the structure above shall be braced with diagonal metal-stud braces (45°). The kl/r ratio of the brace shall not exceed 200 and shall not be spaced further apart than 10'-0" on center. Connect diagonal braces to the top of the steel stud walls and to the top flange of the steel beams with (2) #10 tek screws minimum. Where a concrete deck occurs above, use two powder-driven fasteners per diagonal brace. Other approved methods may be used.
    - 1.7. Anchor bolts: See steel section of general notes.
2. Connection Hardware
    - 2.1. Exterior framing shall be attached to primary structure to provide vertical and lateral drift as indicated in these drawings. The "DriftTrack DTSL" by the Steel Network or equivalent is suitable to meet this requirement. Inside and outside corner joints shall be detailed to accommodate the lateral drift indicated. See architectural drawings for joint location and details.
    - 2.2. All connection hardware (examples: "StiffClip", "VertiClip", "DriftClip", "BridgeClip", etc) shown shall be supplied by:
        - The Steel Network, Inc.
        - 3221 Wellington Court
        - Raleigh, NC 27615
        - Phone: (888) 474-4876
        - www.steelnetwork.com
    - 2.3. Install all hardware per the manufacturer's guidelines and recommendations.
    - 2.4. The contractor may submit an alternate connection method for approval by Dunn Associates, Inc. and the Architect.
3. Prefabricated Wall Systems: Submit complete shop drawings and calculations of all elements and connections for review. Shop Drawings shall bear the stamp of a Professional Engineer licensed in the same state as the project location.

MAY 20, 2014
SCHEMATIC DESIGN

NOTE:
THESE STRUCTURAL DRAWINGS ARE BASED ON ARCHITECTURAL DRAWINGS DATED 06.25.2013

DIMENSIONS AND ELEVATIONS, AS THEY RELATE TO THE BUILDING IN GENERAL, i.e. GRID TO GRID DIMENSIONS OR DECK BEARING ELEVATIONS, ARE SUPPLIED BY THE ARCHITECT. THEY ARE PROVIDED ON THE STRUCTURAL PLANS AND DETAILS FOR THE CONVENIENCE OF THE CONTRACTOR. VERIFY DIMENSIONS AND ELEVATIONS WITH ARCHITECTURAL DRAWINGS.

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Telephone

No.	Description	Date
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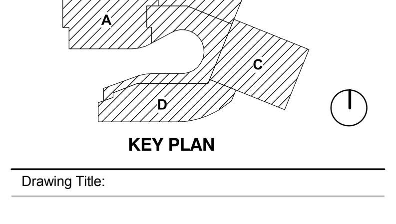
-	SCHEMATIC DESIGN	20 MAY 2014



KEY PLAN

Drawing Title:

GENERAL STRUCTURAL NOTES

Project No.: Checked by: Checker

S101

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GENERAL STRUCTURAL NOTES

SPECIAL INSPECTION & STRUCTURAL OBSERVATION REQUIREMENTS

1. Special Inspections and Testing:
   - 1.1. Special inspection and testing as required per the construction documents and per Chapter 17 of the IBC shall be provided for this project unless waived by the Building Official.
   - 1.2. An independent agency/agencies shall be employed by the Owner, shall perform the special inspection and testing services required.
   - 1.3. Structural observations are required per the construction documents, and per the IBC, and shall be required for this project unless waived by the Building Official. The Engineer of Record or his representative shall perform structural site observations as required.
   - 1.4. Structural observations are required per the construction documents, and per the IBC, and shall be required for this project unless waived by the Building Official. A registered design professional employed by the Owner shall perform the structural observations as required.
   - 1.5. The special inspection and testing requirements of this section of the General Structural Notes and the special inspection tables serve as the Engineer of Record's statement of special inspections and structural observations required by Chapter 17 of the IBC.
2. Contractor Responsibilities
   - 2.1. Each Sub-Contractor responsible for the construction of a main wind or seismic force resisting system, a designated seismic system, or a wind or seismic resisting element or component shall submit a written statement of responsibility to the Building Official and Owner prior to commencing with the work involved. It shall contain acknowledgement of awareness of the special inspection and testing requirements.
   - 2.2. The Contractor shall coordinate and cooperate with all the required inspections, testing and/or structural observations required for the project. The Contractor shall not proceed with subsequent work until required inspections, testing and/or structural observations have been provided.
   - 2.3. The Contractor shall correct all work found to be deficient, and re-test at no additional cost to the Owner.
   - 2.4. The Contractor shall notify the Engineer of Record at least (7) days prior to any required structural observations.
3. Special Inspector Responsibilities
   - 3.1. Each Special Inspector shall be a qualified person who shall demonstrate competence, to the satisfaction of the Building Official, for the inspection of the particular type of construction or operation requiring special inspection.
   - 3.2. Special Inspectors shall keep records of their inspections. They shall submit inspection reports to the Building Official and the Architect/Engineer.
   - 3.3. Inspection reports shall indicate whether the work inspected was or was not completed in accordance with the construction documents and the referenced building codes.
   - 3.4. Non-conforming work and/or discrepancies shall be brought to the Contractor's immediate attention for correction.
   - 3.5. The Special Inspector shall notify the Architect/Engineer of any non-conforming work or discrepancies that the Contractor cannot readily correct.
   - 3.6. Any uncorrected non-conforming work or discrepancies shall be brought to the attention of the Architect/Engineer and the Building Official prior to completion of that phase of the work.
4. Quality Control Submittals for Structural Steel
   - 4.1. Furnish Level III non-destructive testing (NDT) personnel certifications.
   - 4.2. Furnish welder qualification records to verify project welders are tested and qualified in accordance with AWS D1.1 before welding structural or miscellaneous steels. D1.3 before welding sheet steels (10 ga and thinner), and D1.4 before welding reinforcing steel. Submit documentation to the approved inspection agency for review before welding.
   - 4.3. The fabricator/erector shall maintain a system by which the welder who has welded a joint or member can be identified. Stamps, if used shall be the low stress type.
   - 4.4. Furnish welding procedures that comply with AWS D1.1, D1.3, D1.4, D1.8, as required by the project. Welding procedures shall be made available to welders and inspectors.
     - 4.4.1. Furnish weld filler metal product data sheets identifying optimum welding parameters and storage conditions with each welding procedure submittal.
   - 4.5. Provide mill/material test reports (MTR) or certificates of conformance (CoFC) that verify compliance of furnished materials to the requirements of the approved contract documents. MTRs or CoFCs are required for structural shapes, plate, metal deck, fasteners, headed studs, DBAs, weld filler metal, and bolt assemblies used as primary, load-bearing members. Maintain the heat number traceability of structural shapes and plate used as primary, load bearing members.
5. Structural Steel Non-Destructive Testing (NDT)
   - 5.1. NDT personnel will:
     - 5.1.1. Qualify in accordance with the recommended practices of the American Society of Nondestructive Testing, SNT-TC-1A, latest edition.
     - 5.1.2. Pass eye examinations meeting: (1) ASTM requirements at least once a year, and (2) AWS D1.1 every three years.
     - 5.1.3. Be certified in accordance with the AWS QC-1, latest edition.
     - 5.1.4. Level III must be qualified by ASNT testing in the applicable method under review.
   - 5.2. Only Level III and Level III technicians, qualified by testing in the applicable method, are permitted to interpret nondestructive testing results.
   - 5.3. Only Senior Certified or Certified Welding Inspectors (SCWI, CWI) are permitted to evaluate welds. Certified Associate Welding Inspectors may evaluate welds when under the direct supervision of a SCWI and/or CWI.
   - 5.4. Approved Inspection Agency will certify the following:
     - 5.4.1. Level III inspector has reviewed the NDT procedures
     - 5.4.2. Project ultrasonic testing technicians, testing demand critical welds, are trained and qualified in accordance with AWS D1.8, Annex E
     - 5.4.3. That the Inspection Agencies' ultrasonic testing procedures are qualified by weld mockups similar to AWS D1.1, Annex S
6. Special Inspections
   - 6.1. Fabricators (1704.2.5): All offsite fabrication of structural members (structural steel, precast concrete, wood glulams, etc.) shall be special inspected as required by the IBC, except work performed by fabricators registered and approved to perform work without special inspection. Approved fabricators shall submit a certificate of compliance to the Building Official at the completion of fabrication.
   - 6.2. Structural Steel (1705.2.1): Special inspection and non-destructive testing (NDT) are required during the fabrication and erection of any load-bearing members and assemblies. Special inspection, except NDT, may be waived when the work is performed in a fabricating shop, or by an erector approved by the Building Official to perform work without Special Inspection. NDT of welds completed in an approved fabricator's shop may be performed by the fabricator when approved by the Building Official. When the fabricator performs the NDT, the fabricator shall submit the NDT reports for review by the Special Inspector. Special inspection and NDT shall be provided per the special inspection tables for structural steel in the construction documents.
     - 6.2.1. Perform all welding and welding special inspection activities in accordance with AWS D1.1, D1.3, D1.4, and D1.8, and AISC 360 Chapter N as appropriate for the material form and welding methods employed. Approved methods and acceptance criteria are established in these codes.
     - 6.2.2. Perform all bolting and bolting inspection in accordance with AISC 360 Specification for Structural Steel Buildings Using A325 and A490 Bolts and AISC 360 Chapter N.
     - 6.2.3. Non-Destructive Testing (NDT) of welds is required as follows:
       - 6.2.3.1. Ultrasonic testing (UT), magnetic particle testing (MT), penetrant testing (PT), and radiographic testing (RT), where required, shall be performed in accordance with AWS D1.1/D1.1M. Acceptance criteria shall be in accordance with AWS D1.1/D1.1M for statically loaded structures, unless otherwise designated on the design drawings or project specifications.
       - 6.2.3.2. All NDT shall be documented. NDT reports shall be distributed to the fabricator/erector, the Building Official, the Contractor, and the Architect.
       - 6.2.3.3. Amount of NDT is permitted to be reduced according to AISC 360 Chapter N and AISC 341 Chapter J if appropriate criteria are met, and if approved by the building official and the engineer of record.
       - 6.2.3.4. Additional requirements for structures in Seismic Design Categories A & B:
         - 6.2.3.4.1. Ultrasonic test all complete joint penetration groove welds for structures in Risk Categories III and IV for materials 5/16" thick or greater. Ultrasonic test 10% of all complete joint penetration groove welds for structures in Risk Category II for materials 5/16" thick or greater. Complete joint penetration groove welds need not be tested for structures in Risk Category.
         - 6.2.3.4.2. Magnetic particle test or penetrant test all thermally cut surfaces of access holes for flange or web thicknesses exceeding 2". Any crack shall be deemed unacceptable.
       - 6.2.3.5. Additional requirements for structures in Seismic Design Categories C thru F:
         - 6.2.3.5.1. Ultrasonic test all complete joint penetration groove welds for structures in Risk Categories III and IV for materials 5/16" thick or greater. Ultrasonic test all complete joint penetration groove welds that are part of the seismic force resisting system for all Risk Categories. Ultrasonic test 10% of all complete joint penetration groove welds for structures in Risk Category II for materials 5/16" thick or greater that are not designated part of the seismic force resisting system. Complete joint penetration groove welds need not be tested for structures in Risk Category I for items not part of the seismic force resisting system. Magnetic particle test 25% of all beam to column complete joint penetration groove welds that are part of the seismic force resisting system.
         - 6.2.3.5.2. Magnetic particle test or penetrant test all thermally cut surfaces of access holes for flange or web thicknesses exceeding 2". Magnetic particle test or penetrant test all thermally cut surfaces of beam copes access holes for flange or web thicknesses exceeding 1 1/2" for members of the seismic force resisting system in Seismic Design Categories C thru F. Any crack shall be deemed unacceptable.
     - 6.2.4. Special inspections and Testing for Non-Shrink Grout shall be required as follows:
       - 6.2.4.1. Periodic special inspection verifying the use of required mix design.
       - 6.2.4.2. Samples of non-shrink grout shall be tested for compressive strength at least daily, with additional tests required for each additional 10 bags mixed per day.
   - 6.3. Steel Construction Other than Structural Steel shall be special inspected according to table 1705.2.2 in the construction documents.
   - 6.4. Concrete (1705.3): Concrete construction shall be special inspected according to Table 1705.3 in the construction documents. In the absence of sufficient data or documentation showing conformance to quality standards for concrete materials, testing shall be required to determine material properties under the direction of the building official according to Chapter 3 of ACI 318.
   - 6.5. Soils (1705.6): Existing site soil conditions, fill placement and procedure and load-bearing requirements shall be special inspected to verify compliance with the approved soils report and Table 1705.6 in the construction documents. Where total depth of controlled fill is 12" or less, the specialt inspector shall verify that the in-place dry density of the compacted fill is not less than the 90% of the maximum dry density at optimum moisture content according to ASTM D 1557.
   - 6.6. Rammed Aggregate Piers: Special inspection shall be performed during installation to verify compliance with the ICC Evaluation Report and section 1705 of the IBC.
   - 6.7. Post-Installed Anchors: Special inspections shall be performed according to the requirements of the ICC evaluation report, per table 1705.3 of the IBC.
     - 6.7.1. Testing shall be done according to the more stringent requirements of the ICC evaluation report and the values listed below.
       - 6.7.1.1. Adhesive Anchors in Concrete or Solid Grouted Masonry: 50% of anchors in non-redundant elements (e.g. column, brace connections, boundary steel, hold-downs) and 10% of anchors in redundant elements shall be tension tested at the following loads in kips:

Bar Size	Concrete	Masonry
#3	xxx	xxx
#4	xxx	xxx
#5	xxx	xxx
#6	xxx	xxx
#7	xxx	xxx
#8	xxx	xxx
#9	xxx	xxx
#10	xxx	xxx
#11	xxx	xxx
#14	xxx	xxx
#18	xxx	xxx

       - 6.7.1.2. Mechanical anchors shall be tension tested to twice the allowable tension load listed in the ICC evaluation report.
   - 6.8. See architectural drawings for additional required inspections pertaining to sprayed fire-resistant materials (1705.13), mastic and intumescent fire-resistant coatings (1705.14), EIFS (1705.15), fire resistant penetrations and joints (1705.16), or smoke control systems (1705.17).
7. Section 1705.11: Special Inspections for Seismic Resistance
   - 7.1. Structural Steel (1705.11.1): See the special inspections Tables for structural steel in the construction documents.
   - 7.2. Designated Seismic Systems (1705.11.4): The Special Inspector shall examine designated seismic systems requiring seismic qualifications in accordance with Section 1705.12.3, and verify that label, anchorage or mounting conforms to the certificate of compliance.
     - 7.2.1. Designated Seismic Systems include all architectural, mechanical, and electrical components included in chapter 13 of ASCE 7 including components that are required to function for life safety purposes after and earthquake, including fire protection sprinkler systems, components that contain hazardous materials, and components in a Risk Category IV that are needed for continued operation of the facility, or if its failure could impair continued operation of the facility.
     - 7.2.2. Components that are exempt from special inspection are listed in Section 13.1.4 of ASCE 7.
     - 7.2.3. Refer to the architectural, mechanical, electrical drawings for all designated seismic systems required for their individual disciplines.
   - 7.3. Architectural Components (1705.11.5): Provide periodic special inspection of architectural components. See specific discipline drawings.
   - 7.4. Mechanical and Electrical Components (1705.11.6): Special inspection for mechanical and electrical components shall be provided per Section 1705.11.6 and the specific discipline drawings.
8. Section 1705.12: Structural Testing and Qualification for Seismic Resistance
   - 8.1. Concrete Reinforcement (1705.12.1): Where reinforcement complying with ASTM A 615 is used to resist earthquake-induced flexural and axial forces in special moment frames, special structural walls and coupling beams connecting special structural walls in structures assigned to Seismic Design Category B, C, D, E or F, the reinforcement shall comply with section 21.1.5.2 of ACI 318. Certified mill test reports shall be provided for each shipment of such reinforcement. Where ASTM A 615 reinforcing steel is to be welded, chemical tests shall be performed to determine weldability in accordance with Section 3.5.2 of ACI 318.
   - 8.2. See manufacturer's seismic certification of compliance for non-structural components, per 1705.12.3.
9. Special Inspections for Wind Resistance (1705.10):
   - 9.1. Wind Resisting Components (1705.10.3): Periodic special inspection is required for roof and wall cladding.
10. Structural Observations/Site Observations (1704.5):
    - 10.1. Site observations are part of the Dunn Associates, Inc. contract with the Architect/Owner. The stages of construction listed below will serve as suggested stages of construction to be observed. The Contractor shall notify (in writing) the Engineer of Record at least 7 days prior to the following stages of construction so that the Engineer may have the opportunity to review the work.
      - 10.1.1. Initial placing of any concrete, including but not limited to: footings, shear walls, slabs on grade or suspended concrete slabs
      - 10.1.2. Initial finish work
    - 10.2. Site observation reports will be provided to the Architect. Distribution to the Contractor, Owner, and/or Building Official will be through the Architect.
11. Seismic/Wind Main Force Resisting Systems That Require Special Inspections
    - 11.1. Concrete Shear Walls
    - 11.2. Concrete Diaphragms (suspended)

ABBREVIATIONS

AB	Anchor Bolt	JST	Joist
ABV	Above		
ALT	Alternate	K	Kip(s) = 1000 Pounds
ARCH	Architect	KLF	Kips Per Lineal Foot
		KSF	Kips Per Square Foot
BLDG	Building		
BLK	Blocking	LB	Pounds (#)
BLW	Below	LOC	Location
BM	Beam		
BOTT	Bottom	MAX	Maximum
BRDG	Bridging	MECH	Mechanical
BRG	Bearing	MEZZ	Mezzanine
BTW	Between	MFR	Manufacturer
		MIN	Minimum
CJ	Control Joint	MISC	Miscellaneous
CL	Center Line	MTL	Metal
COL	Column		
CONC	Concrete	NTS	Not To Scale
CONN	Connection		
CONT	Continuous	oc	On Center
COORD	Coordinate	OPNG	Opening
CTR	Center	OPP	Opposite
DBA	Deformed Bar Anchor	PCF	Pounds per Cubic Foot
DBL	Double	PEN	Penetrate or Penetration
DET	Detail	PERP	Perpendicular
DIA	Diameter	PJP	Partial Joint Penetration
DIM	Dimension	PL	Plate
DWG	Drawing	PLF	Pounds per Lineal Foot
		PREFAB	Prefabricated
(E)	Existing	PSF	Pounds per Square Foot
EA	Each	PSI	Pounds per Square Inch
EF	Each Face		
EL	Elevation	REINF	Reinforce
ELEC	Electrical	REQD	Required
ENGR	Engineer	RTU	Roof Top Unit
EQ	Equal		
EQUIP	Equipment	SCHED	Schedule
EQ SP	Equally Spaced	SFRS	Seismic Force Resisting System
EW	Each Way	SHTG	Sheathing
EJ	Expansion Joint	SIM	Similar
EXT	Exterior	SOG	Slab on Grade
		STD	Standard
FLR	Floor	STIFF	Stiffener
FND	Foundation	STL	Steel
FTG	Footing	STRUCT	Structural
		SW	Shear Wall
ga	Gage		
GALV	Galvanized	T&B	Top and Bottom
GSN	General Structural Notes	TEMP	Temperature
		THRU	Through
HD	Hold-down	T/	Top of
HORIZ	Horizontal	TYP	Typical
HSA	Headed Stud Anchor		
HSS	Hollow Structural Section	UNO	Unless Noted Otherwise
ICBO	International Conference of Building Officials	VERT	Vertical
IBC	International Building Code	W/	With
ICC	International Code Council	WWR	Welded Wire Reinforcement
INT	Interior	WP	Working Point

DEFERRED SUBMITTALS

1. Items requiring deferred submittals that are listed below are to be designed and fabricated by the manufacturer according to specifications given in the construction documents.
   - 1.1. Steel Stairs (by steel stair manufacturer): Stair suppliers to provide any additional required support steel beyond that of the main building framing system shown on the design drawings. Steel stair shall be designed to accommodate lateral building drift between adjacent floors, both perpendicular and parallel for the drifts listed in the Maximum Story Drift Table.
   - 1.2. Exterior Façade Framing and Connections (by supplier) showing compliance with drift requirements
   - 1.3. Seismic Bracing for mechanical, electrical and plumbing components per ASCE 7, Chapter 13
2. These deferred submittals shall first be submitted to the project architect and/or engineer for review and coordination. Upon completion of the architect/engineer review, the architect/engineer will submit the deferred submittals to the Building Official for review and approval. The submittal to the Building Official shall include a letter stating that the architect/engineer review has been performed and that the plans and calculations for the deferred submittal items are found to be in general conformance with the design drawings with no exceptions.
3. The final submittal shall be signed and sealed by a Professional Engineer licensed in the state in which construction will occur and shall be available at the jobsite throughout construction.
4. Construction related to deferred submittals shall not commence until the Building Official has approved the submittal.

MAY 20, 2014
SCHEMATIC DESIGN

NOTE:
THESE STRUCTURAL DRAWINGS ARE BASED ON ARCHITECTURAL DRAWINGS DATED:

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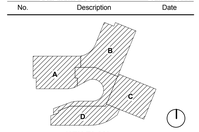

KEY PLAN

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GENERAL STRUCTURAL NOTES

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TABLE 1705.3: REQUIRED VERIFICATION AND INSPECTION OF CONCRETE CONSTRUCTION

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD [a]	IBC REFERENCE
1. Inspection of reinforcing steel	-	X	ACI 318: 3.5, 7.1-7.7	1910.4
2. Inspection of reinforcing steel welding in accordance with Table 1705.2.2, Item 2b	-	-	AWS D1.4 ACI 318: 3.5.2	-
3. Inspection of anchors cast in concrete where allowable loads have been increased or where strength design is used.	-	X	ACI 318; 8.1.3, 21.1.8	1908.5 1909.1
4. Inspection of anchors post-installed in hardened concrete members. [b]	-	X	ACI 318: 3.8.6, 8.1.3, 21.1.8	1909.1
5. Verifying use of required design mix.	-	X	ACI 318: Ch 4, 5.2-5.4	1904.2, 1910.2 1910.3
6. At the time fresh concrete is sampled to fabricate specimens for strength tests, perform slump and air content tests, and determine the temperature of the concrete.	X	-	ASTM C 172 ASTM C 31 ACI 318: 5.6, 5.8	1910.10
7. Inspection of concrete and shotcrete placement for proper application techniques.	X	-	ACI 318: 5.9, 5.10	1910.6, 1910.7 1910.8
8. Inspection for maintenance of specified curing temperature and techniques.	-	X	ACI 318: 5.11-5.13	1910.9
11. Verification of in-situ concrete strength, prior to removal of shores and forms from beams and structural slabs.	-	X	ACI 318: 6.2	-
12. Inspect formwork for shape, location and dimensions of the concrete member being formed.	-	X	ACI 318: 6.1.1	-

For SI: 1 inch = 25.4 mm.
a. Where applicable, see also Section 1705.11. Special inspection for seismic resistance.
b. Specific requirements for special inspection shall be included in the research report for anchor issued by an approved source in accordance with ACI 355.2 or other qualification procedures. Where specific requirements are not provided, special inspection requirements shall be specified by the registered design professional and shall be approved by the building official prior to commencement of the work.

TABLE 1705.2.2: REQUIRED VERIFICATION AND INSPECTION OF STEEL CONSTRUCTION OTHER THAN STRUCTURAL STEEL

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD [a]	IBC REFERENCE
1. Material verification of cold-formed steel deck:				
a. Identification markings to conform to ASTM standards specified in the approved construction documents.	-	X	Applicable ASTM material standards	
b. Manufacturer's certified test reports.	-	X		
2. Inspection of welding:				
a. Cold-formed steel deck:				
1) Floor and roof deck welds.	-	X	AWS D1.3	
b. Reinforcing steel:				
1) Verification of weldability of reinforcing steel other than ASTM A 706.	-	X	AWS D1.4 ACI 318: Section 3.5.2	-
2) Reinforcing steel resisting flexural and axial forces in intermediate and special moment frames, and boundary elements of special structural walls of concrete and shear reinforcement.	X	-		
3) Shear reinforcement.	X	-		
4) Other reinforcing steel.	-	X		

For SI: 1 inch = 25.4 mm.
a. Where application, see also Section 1705.11. Special inspection for seismic resistance.

REQUIRED VERIFICATION AND INSPECTION OF STRUCTURAL STEEL CONSTRUCTION PRIOR TO BOLTING OR WELDING

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD
1. Required Special Inspections prior to bolting or welding			
a. Verify welding procedure specifications are available	X	-	AISC 360-10 Table N5.4-1
b. Verify manufacture's certifications for welding consumables is available	X	-	AISC 360-10 Table N5.4-1
c. Verify material type/grade	-	X	AISC 360-10 Table N5.4-1 and AISC 341-10 Table J6-1
d. Verify fabricator or erector has a system by which a welder who welded a joint or member can be identified	-	X	AISC 360-10 Table N5.4-1 and AISC 341-10 Table J6-1
e. Verify the following for the fit-up of groove welds (including joint geometry)			AISC 360-10 Table N5.4-1 and AISC 341-10 Table J6-1
1. Joint preparation	-	X	
2. Dimensions (alignment, root opening, root face, bevel)	-	X	
3. Cleanliness (condition of steel surfaces)	-	X	
4. Tacking (tack weld quality and location)	-	X	
5. Backing type and fit (if applicable)	-	X	
f. Verify the configuration and finish of access holes	-	X	AISC 360-10 Table N5.4-1 and AISC 341-10 Table J6-1
g. Verify the following for the fit-up of fillet welds			AISC 360-10 Table N5.4-1 and AISC 341-10 Table J6-1
1) Dimensions (alignment, gaps at root)	-	X	
2) Cleanliness (condition of steel surfaces)	-	X	
3) Tacking (tack weld quality and location)	-	X	
h. Verify manufacturer's certifications available for fasteners	X	-	AISC 360-10 Table N5.6-1
i. Verify fasteners are marked in accordance with ASTM requirements	-	X	AISC 360-10 Table N5.6-1
j. Verify proper fasteners are selected for the joint detail (grade, type)	-	X	AISC 360-10 Table N5.6-1 and AISC 341-10 Table J7-1
k. Verify proper procedure selected for joint detail	-	X	AISC 360-10 Table N5.6-1 and AISC 341-10 Table J7-1
l. Observe and document pre-installation verification testing by installation personnel for fastening assemblies and methods used.	-	X	AISC 360-10 Table N5.6-1 and AISC 341-10 Table J7-1
m. Verify proper storage is provided for bolts, nuts, washers and other fastener components.	-	X	AISC 360-10 Table N5.6-1 and AISC 341-10 Table J7-1
2. Additional required Special Inspections prior to bolting or welding in Seismic Design Categories C thru F			
a. Verify connecting elements, including the appropriate faying surface condition and hole preparation, if specified, meet the applicable requirements	-	X	AISC 341-10 Table J7-1
b. Observe and document Reduced Beam Section requirements if applicable (Contour, finish and dimensional tolerances)	X	-	AISC 341-10 Table J8-1

TABLE 1705.6: REQUIRED VERIFICATION AND INSPECTION OF SOILS

VERIFICATION AND INSPECTION TASK	CONTINUOUS DURING TASK LISTED	PERIODIC DURING TASK LISTED
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity.	-	X
2. Verify excavations are extended to proper depth and have reached proper material.	-	X
3. Perform classification and testing of compacted fill materials.	-	X
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill.	X	-
5. Prior to placement of compacted fill, observe subgrade and verify that site has been prepared properly.	-	X

REQUIRED VERIFICATION AND INSPECTION OF STRUCTURAL STEEL CONSTRUCTION DURING BOLTING OR WELDING

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD
1. Required Special Inspections during bolting or welding [1, 2]			
a. Verify use of qualified welders	-	X	AISC 360-10 Table N5.4-2 and AISC 341-10 Table J6-2
b. Verify the control and handling of consumables			AISC 360-10 Table N5.4-2 and AISC 341-10 Table J6-2
1) Packing	-	X	
2) Exposure Control	-	X	
c. Verify no welding occurs over cracked tack welds	-	X	AISC 360-10 Table N5.4-2 and AISC 341-10 Table J6-2
d. Verify environmental conditions			AISC 360-10 Table N5.4-2 and AISC 341-10 Table J6-2
1) Wind speed within limits	-	X	
2) Precipitation and temperature	-	X	
e. Verify weld specification procedures are followed			AISC 360-10 Table N5.4-2 and AISC 341-10 Table J6-2
1) Settings on weld equipment	-	X	
2) Travel speed	-	X	
3) Selecting weld materials	-	X	
4) Shielding gas type/flow rate	-	X	
5) Preheat applied	-	X	
6) Interpass temperature maintained (min/max)	-	X	
7) Proper position (F, V, H, OH)	-	X	
f. Verify welding techniques			AISC 360-10 Table N5.4-2 and AISC 341-10 Table J6-2
1) Interpass and final cleaning	-	X	
2) Each pass within profile limitations	-	X	
3) Each pass meets quality requirements	-	X	
g. Verify fastener assemblies, of suitable condition, are placed in all holes and washers are positioned as required	-	X	AISC 360-10 Table N5.6-2 and AISC 341-10 Table J7-2
h. Verify joints are brought to the snug-tight condition prior to the pretensioning operation	-	X	AISC 360-10 Table N5.6-2 and AISC 341-10 Table J7-2
i. Verify fastener components not turned by the wrench are prevented from rotating	-	X	AISC 360-10 Table N5.6-2 and AISC 341-10 Table J7-2
j. Verify fasteners are pretensioned in accordance with RCSC Specification progressing from the most rigid point toward the free edges	-	X	AISC 360-10 Table N5.6-2 and AISC 341-10 Table J7-2
2. Additional required Special Inspections during bolting or welding in Seismic Design Categories C thru F			
a. Verify intermix of filler metals avoided unless approved	-	X	AISC 341-10 Table J7-2

1. (Note: Special inspection is not required during bolting of snug tight connections)
2. (Note: Special inspection is not required during bolting for pretensioned joints or slip-critical joints when installer is using the turn-of-nut method with matchmarking techniques, the direct tension indicator method, or twist-off-type tension control bolt method)

REQUIRED VERIFICATION AND INSPECTION OF STRUCTURAL STEEL CONSTRUCTION AFTER BOLTING OR WELDING

VERIFICATION AND INSPECTION	CONTINUOUS	PERIODIC	REFERENCED STANDARD
1. Required Special Inspections after bolting or welding			
a. Verify welds are cleaned	-	X	AISC 360-10 Table N5.4-3 and AISC 341-10 Table J6-3
b. Verify size, length and location of welds	X	-	AISC 360-10 Table N5.4-3 and AISC 341-10 Table J6-3
c. Verify welds meet visual acceptance criteria			AISC 360-10 Table N5.4-3 and AISC 341-10 Table J6-3
1) Crack prohibition	X	-	
2) Weld/base metal fusion	X	-	
3) Crater cross section	X	-	
4) Weld profiles	X	-	
5) Undercut	X	-	
6) Porosity	X	-	
d. Inspect arc strikes for cracks	X	-	AISC 360-10 Table N5.4-3
e. Visually inspect the web k-area for cracks within 3" of web doubler plates and stiffeners	X	-	AISC 360-10 Table N5.4-3
f. Verify backing bars removed (if required) and weld tabs removed	X	-	AISC 360-10 Table N5.4-3 and AISC 341-10 Table J6-3
g. Observe repair activities	X	-	AISC 360-10 Table N5.4-3 and AISC 341-10 Table J6-3
h. Document acceptance or rejection of welded joint or member and bolted connections	X	-	AISC 360-10 Table N5.6-3
i. Verify structural steel framing is in compliance with details shown on the Construction Documents, including bracing, stiffeners, member locations, and proper application of joint details at each connection	X	-	AISC 360-10 Chapter N
2. Additional required Special Inspections after bolting or welding in Seismic Design Categories C thru F			
a. Verify placement of reinforcing or contouring fillet welds (if required)	X	-	AISC 341-10 Table J6-3
b. Verify placement of backing fillet welds (if required)	X	-	AISC 341-10 Table J6-3
c. Inspect and document protected zones have no holes and unapproved attachments	X	-	AISC 341-10 Table J8-1

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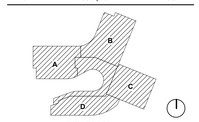

KEY PLAN

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FLOOR FRAMING PLAN NOTES:

1. VERIFY WALL FLOOR OPENINGS FOR MECHANICAL SHAFTS, STAIRS, ETC. WITH ARCHITECTURAL DRAWINGS.
2. SEE SHEETS (S401) AND (S402) FOR FRAME ELEVATIONS AND DETAILS.
3. SEE ARCHITECTURAL PLANS FOR ALL COLUMN LOCATIONS (DIMENSIONS).
4. PLACE ONE TEMPERATURE TENDON AT 4'-8" FROM BEAM FACE ON WALL AND 4'-9"oc (MAX) BETWEEN, ALL AT MID-DEPTH OF SLAB.

MARKS & SYMBOLS LEGEND

- SECTION MARK / SHEET NUMBER
- EXTENT OF REINF OR PT
- CONTINUATION OF CONDITION SPECIFIED
- ADDITIONAL CONC REINF OF (2) #6 BARS x 6'-0", CTR ON CORNERS, NO SPLICES
- DEPRESSED SLAB, SEE ARCH PLANS FOR EXACT LOCATION AND EL
- CONC WALL, SEE SCHED ON (S301)
- BRG WALL BLW
- CC-x — CONC COL, SEE SCHED ON (S301)
- TM-x — TOP BAR MAT, SEE SCHED ON (S301)
- SR-x — STUD RAIL SHEAR REINF, SEE SCHED ON (S301)

FOOTING AND FOUNDATION PLAN NOTES:

1. COORDINATE LOCATION OF DEPRESSED SLABS, SLOPED SLABS, AND FLOOR DRAINS WITH ARCHITECTURAL AND MECHANICAL DRAWINGS.
2. SEE ARCHITECTURAL DRAWINGS AND CIVIL DRAWINGS FOR EXTERIOR CONCRETE WORK AT DOORS, SIDEWALKS, ETC.
3. CENTER ALL SPOT FOOTINGS UNDER COLUMNS AS SHOWN ON PLAN, TYPICAL UNO.
4. SEE ARCHITECTURAL DRAWINGS FOR DIMENSIONS TO ALL STEEL COLUMNS.
5. SEE FOOTING AND FOUNDATION DETAILS ON SHEET (S501) FOR BURIED PIPES RUNNING PARALLEL AND PERPENDICULAR TO FOOTINGS.
6. SEE FOOTING AND FOUNDATION DETAILS ON SHEET (S501) FOR TYPICAL CONSTRUCTION AND CONTROL JOINTS IN FLOOR SLABS.
7. SEE FOOTING AND FOUNDATION DETAILS ON SHEET (S501) FOR LOCATIONS WHERE CONTROL JOINTS ARE DISCONTINUOUS.
8. SEE FOOTING AND FOUNDATION DETAILS ON SHEET (S501) FOR REINFORCING AROUND MISCELLANEOUS OPENINGS IN CONCRETE WALLS.
9. SEE FOOTING AND FOUNDATION DETAILS ON SHEET (S501) FOR FILL BENEATH FOOTINGS.
10. SEE SHEETS (S401) AND (S402) FOR FRAME ELEVATIONS AND DETAILS.

MARKS AND SYMBOL LEGEND

- SECTION MARK / SHEET NUMBER
- FRAME EL MARK FRAME EL ON (S401)
- FTG | EL — FTG DESIGNATION; TOP EL, SEE DET ON (S501) FOR REQD FROST DEPTH
- DEPRESSED FND WALL, POUR SLAB OVER, SEE FTG AND FND DETS ON (S501)
- S — S — FTG STEP, SEE FTG AND FND DETS ON (S501)
- FLR OFFSET, SEE FTG AND FND DETS ON (S501)
- DEPRESSED SLAB, SEE ARCH PLANS FOR EXACT LOCATION AND EL
- CONC WALL, SEE SCHED ON (S301)
- CW-X — CONC WALL, SEE SCHED ON (S301)
- CP-x — CONC PIER, SEE SCHED ON (S301)
- FC-x — CONT FTG, SEE SCHED ON (S301)
- FS-x — SPOT FTG, SEE SCHED ON (S301)
- FR-x — RECTANGULAR FTG, SEE SCHED ON (S301)
- FTS-x — THICKENED SLAB FTG, SEE SCHED ON (S301)
- CJ — CONTROL JOINT, SEE FTG AND FND DETS ON (S501)
- FD — FLR DRAIN, SEE ARCH FOR EXACT LOCATION

NORTH

1 / S201 GROUND LEVEL - FOOTING, FOUNDATION AND FLOOR FRAMING PLAN
SCALE: 1/8" = 1'-0"

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FOOTING AND FOUNDATION PLAN

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FLOOR FRAMING PLAN NOTES:

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3. SEE ARCHITECTURAL PLANS FOR ALL COLUMN LOCATIONS (DIMENSIONS).
4. PLACE ONE TEMPERATURE TENDON AT 4'-6" FROM BEAM FACE OR WALL AND 4'-6"oc (MAX) BETWEEN, ALL AT MID-DEPTH OF SLAB.

MARKS & SYMBOLS LEGEND

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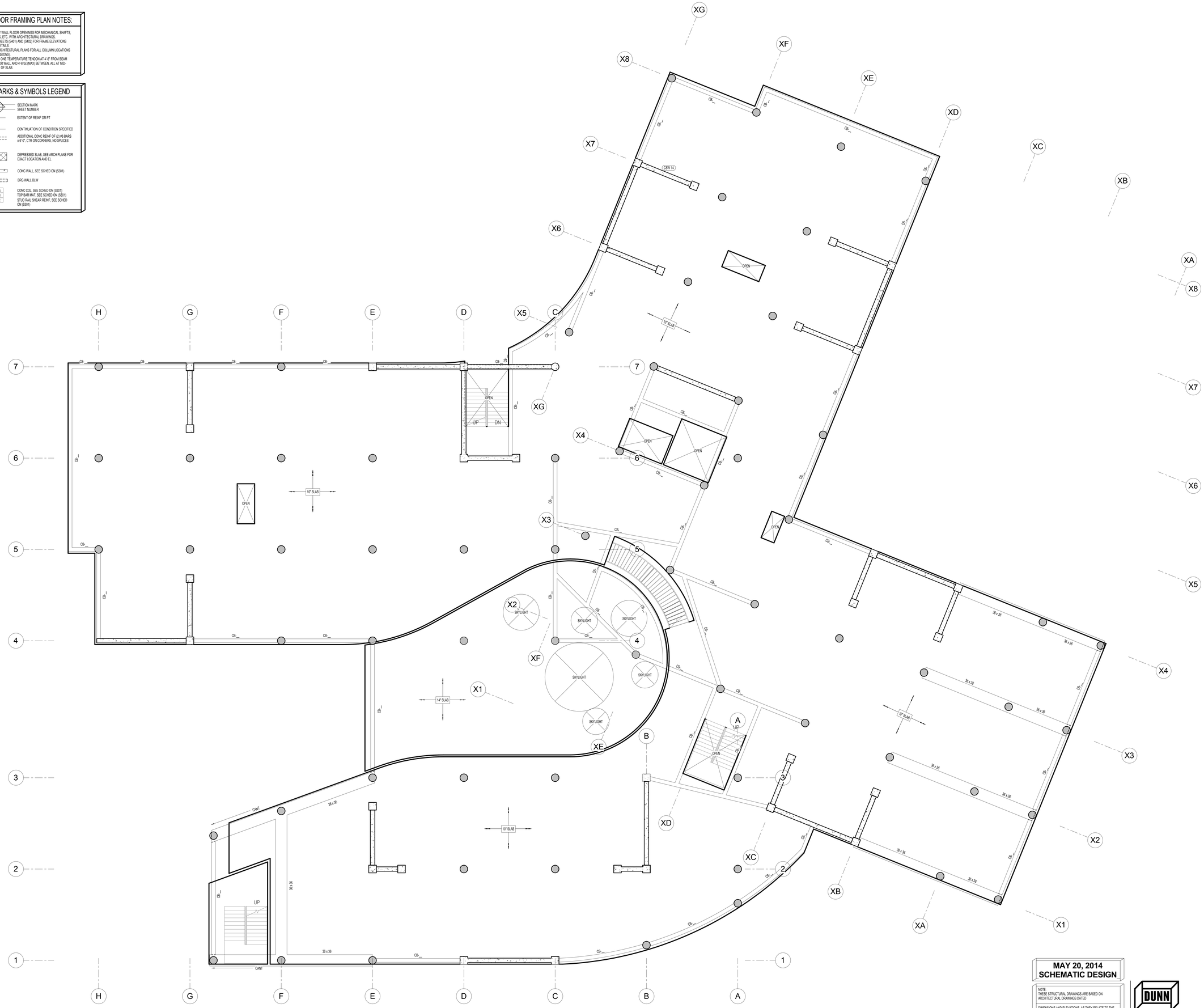

NORTH

1 / S202 LEVEL 02 - FLOOR FRAMING PLAN
SCALE: 1/8" = 1'-0"

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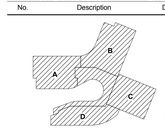

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LEVEL 02 FRAMING PLAN

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FLOOR FRAMING PLAN NOTES:

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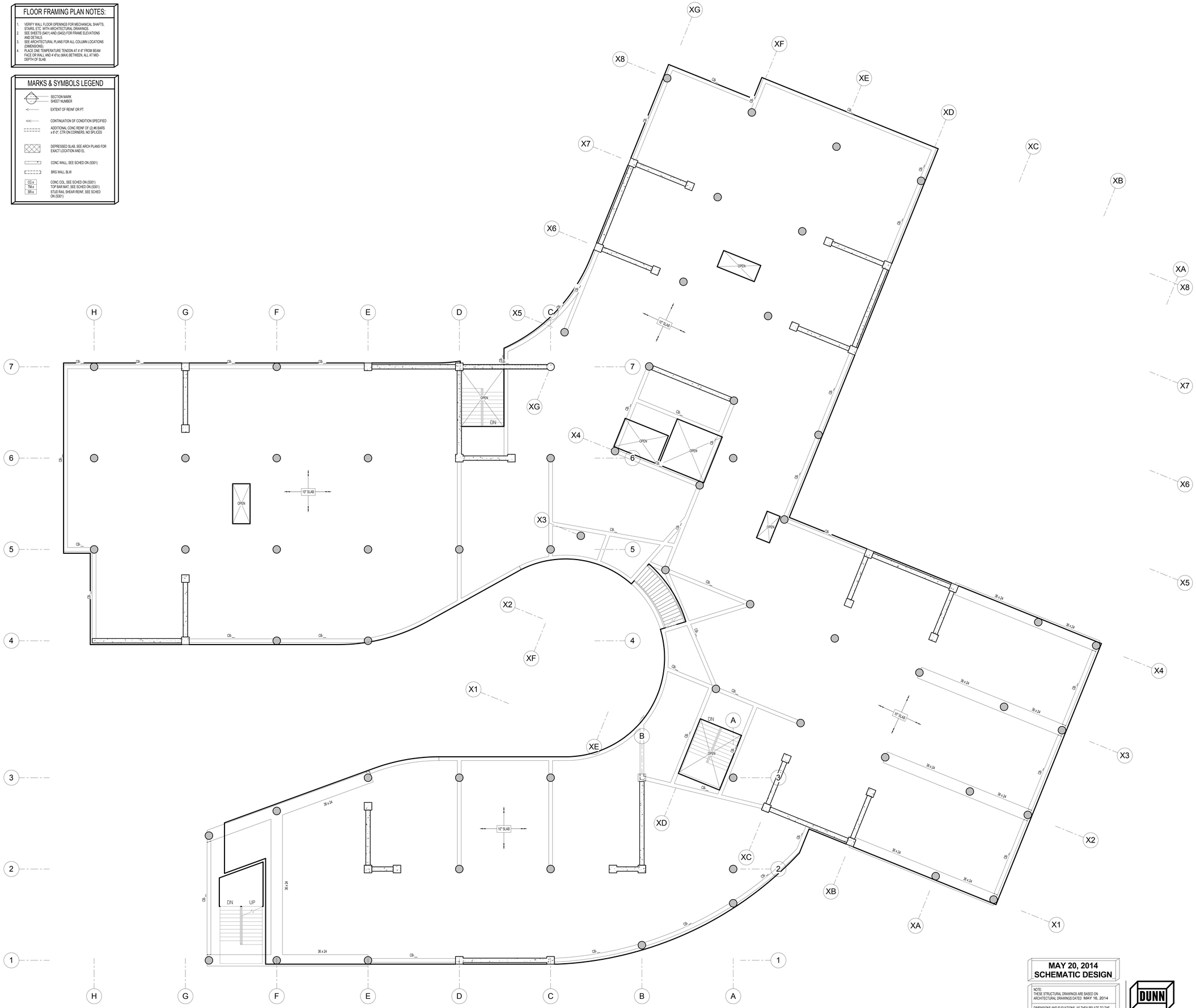

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1 / S203 LEVEL 03 - FLOOR FRAMING PLAN
SCALE: 1/8" = 1'-0"

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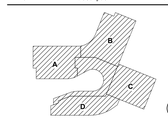

KEY PLAN

Drawing Title:

LEVEL 03 FRAMING PLAN

Project No.: Checked by: Checker

S203

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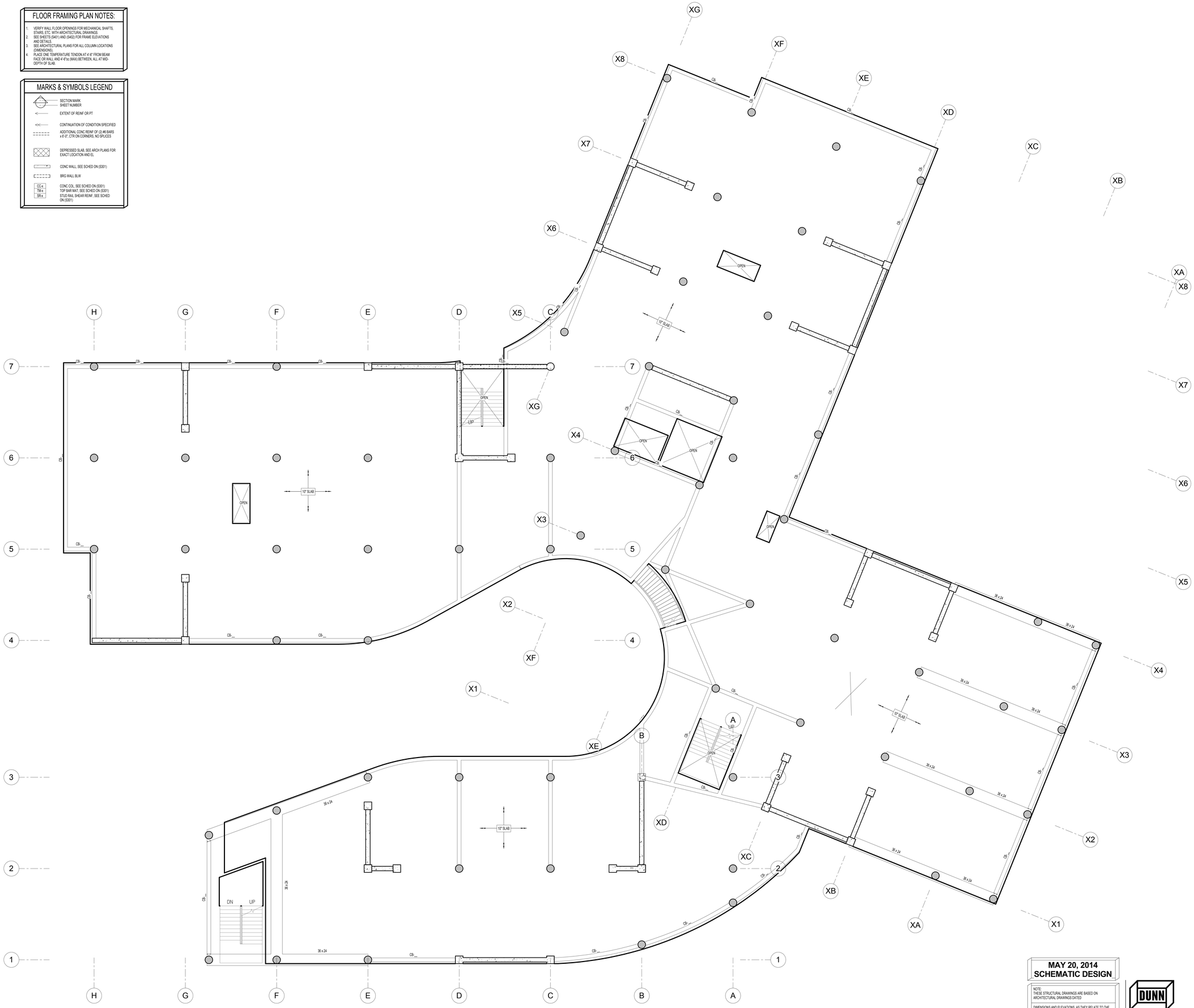
FLOOR FRAMING PLAN NOTES:

1. VERIFY WALL FLOOR OPENINGS FOR MECHANICAL SHAFTS, STAIRS, ETC. WITH ARCHITECTURAL DRAWINGS.
2. SEE SHEETS (S401) AND (S402) FOR FRAME ELEVATIONS AND DETAILS.
3. SEE ARCHITECTURAL PLANS FOR ALL COLUMN LOCATIONS (DIMENSIONS).
4. PLACE ONE TEMPERATURE TENDON AT 4'-6" FROM BEAM FACE OR WALL AND 4'-6"o.c.(MAX) BETWEEN. ALL AT MID-DEPTH OF SLAB.

MARKS & SYMBOLS LEGEND

- SECTION MARK / SHEET NUMBER
- EXTENT OF REINF OR PT
- CONTINUATION OF CONDITION SPECIFIED
- ADDITIONAL CONC REINF OF (2) #6 BARS x 6'-0", CTR ON CORNERS, NO SPLICES
- DEPRESSED SLAB. SEE ARCH PLANS FOR EXACT LOCATION AND EL
- CONC WALL, SEE SCHED ON (S301)
- BRG WALL BLW
- CC-4 — CONC COL, SEE SCHED ON (S301)
- TM-4 — TOP BAR MAT, SEE SCHED ON (S301)
- SR-4 — STUD RAIL SHEAR REINF, SEE SCHED ON (S301)



1 LEVEL 04 - FLOOR FRAMING PLAN
S204 SCALE: 1/8" = 1'-0"

NORTH

MAY 20, 2014
SCHEMATIC DESIGN

NOTE:
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1 -	Revision 1	Date 1
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KEY PLAN

Drawing Title:

LEVEL 04 FRAMING PLAN

Project No.: Checked by: Checker

S204

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- CONC WALL, SEE SCHED ON (S301)
- BRG WALL BLW
- CC-x / TM-x / SR-x — CONC COL, SEE SCHED ON (S301); TOP BAR MAT, SEE SCHED ON (S301); STUD RAIL SHEAR REINF, SEE SCHED ON (S301)

NORTH

1 / S205 LEVEL 05 - FLOOR FRAMING PLAN
SCALE: 1/8" = 1'-0"

MAY 20, 2014
SCHEMATIC DESIGN

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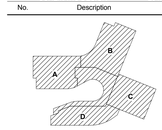

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Drawing Title:

LEVEL 05 FRAMING PLAN

Project No.: Checked by: Checker

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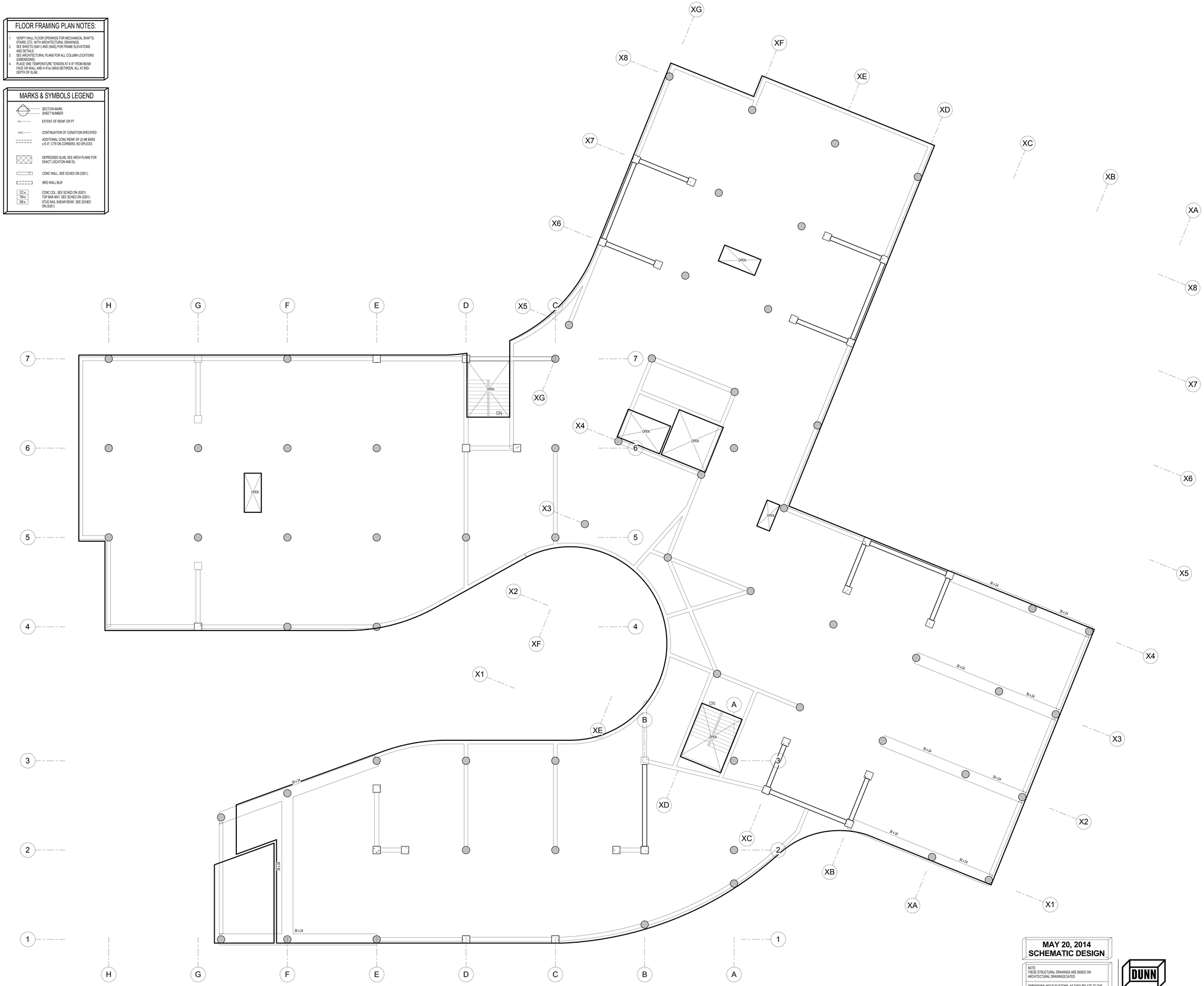

NORTH

1 ROOF FRAMING PLAN
S207 SCALE: 1/8" = 1'-0"

MAY 20, 2014
SCHEMATIC DESIGN

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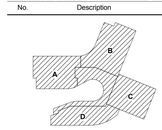

KEY PLAN

Drawing Title:

ROOF FRAMING PLAN

Project No.: Checked by: Checker

S207

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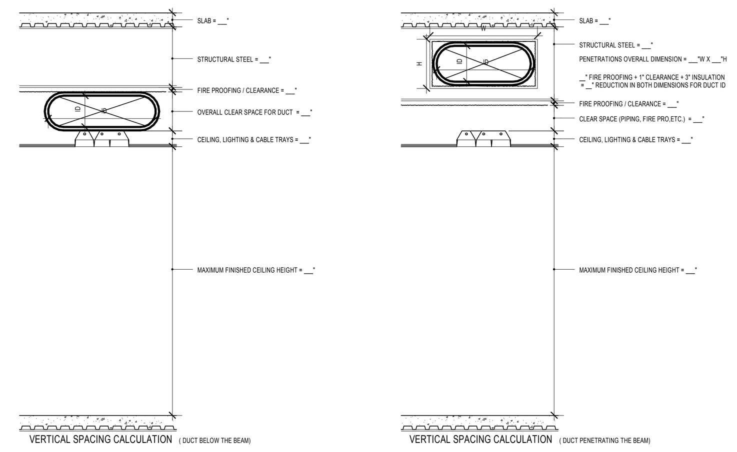
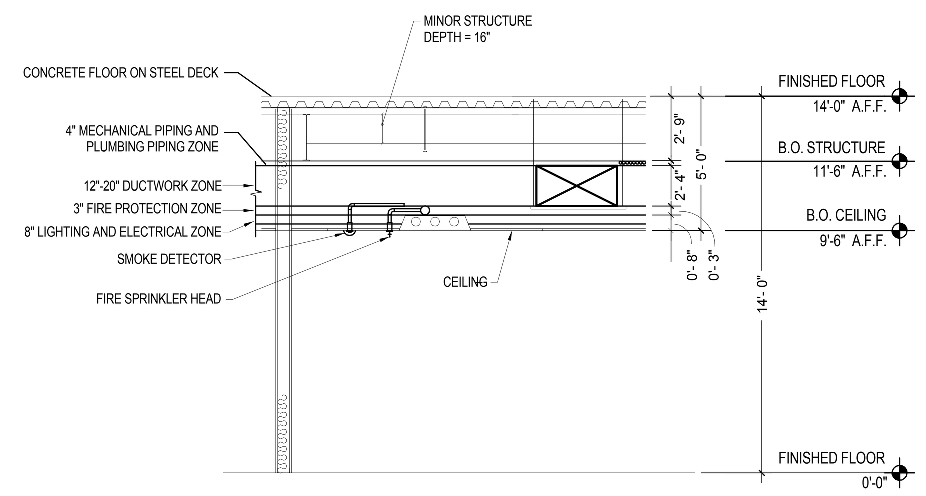


1 SPACE CALCULATION - BEAM PENETRATION
SCALE: 1/4" = 1'-0"

UNDER MAJOR STRUCTURE
55"
30" STRUCTURE
4" PIPING
12" DUCTS/EQUIP
3" FIRE/CONDUIT-SHARED
6" LIGHTS
} MUST BE SHARED SPACE AT BEAMS
55"

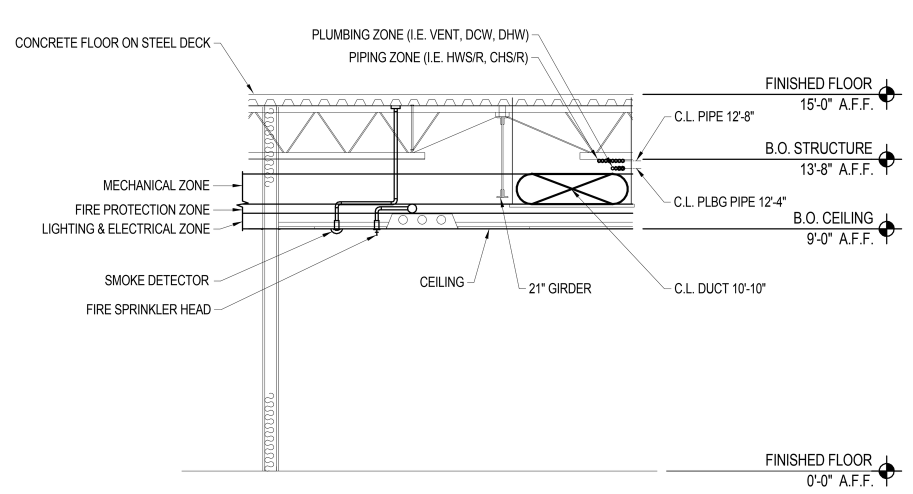
UNDER MINOR STRUCTURE
60"
22" STRUCTURE
4" PIPING
16" DUCTS/EQUIP
6" FIRE/CONDUIT
6" LIGHTS
54"

AT ROOF
54"- 64"
24" STRUCTURE
0" PIPING/CONDUIT IN JOINT SPACES
18" DUCTS/EQUIP
4" FIRE
6" ELEC/LIGHTS
52"



NOTE: EXTREMELY LIMITED SPACE IS AVAILABLE FOR TRADES TO INSTALL THEIR WORK. CAREFUL COORDINATION IS REQUIRED TO ASSURE THAT CROSS-OVER LINES ACTUALLY FIT IN ZONES ALLOTTED. ON OCCASION "FIRE PROTECTION ZONE" AND/OR "ELECTRICAL ZONE" MAY NEED TO TRANSITION UP INTO "STRUCTURAL ZONE" BETWEEN BEAMS AND GIRDERS. GENERAL CONTRACTOR SHALL COORDINATE WORK AND SCHEDULE OF EACH TRADE TO PREVENT UTILITY LINE CONFLICTS.

2 VERTICAL SPACE ALLOCATION - BEAM
SCALE: 1/8" = 1'-0"



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3 VERTICAL SPACE ALLOCATION - OPEN WEB
SCALE: 1/8" = 1'-0"

DRAWING INDEX

#	SHEET NAME
M001	MECHANICAL LEGEND, SYMBOLS & ABBREVIATIONS
MH100	BASEMENT MECHANICAL HVAC FLOOR PLAN
MH101	GROUND LEVEL MECHANICAL HVAC OVERALL PLAN
MH102-A	LEVEL 2 MECHANICAL HVAC FAN COIL OPTION
MH201	AIR HANDLER SCHEMATICS
MH202	CHILLED WATER SCHEMATICS
MH203	MECHANICAL SCHEMATICS
MH204	MECHANICAL SCHEMATICS
MH601	MECHANICAL SCHEDULES
MH602	MECHANIAL SCHEDULES
MP101	GROUND LEVEL RADIANT ZONES
MP101-A	GROUND LEVEL MECH. PIPING FAN COIL OPTION
MP102	LEVEL 2 RADIANT ZONES
MP102-A	LEVEL 2 MECHANICAL PIPING FAIN COIL OPTION
MP201	EAST RADIANT SCHEMATIC
MP202	SOUTH RADIANT SCHEMATIC
MP203	WEST RADIANT SCHEMATIC
MP204	NORTH RADIANT SCHEMATIC
MP205	INTERIOR RADINAT SCHEMATIC
PL401	ENLARGED PLUMBING PLANS
PL601	PLUMBING SCHEDULES

ABBREVIATIONS

Ø	ROUND OR DIAMETER	LWT	LEAVING WATER TEMPERATURE
AD	ACCESS DOOR	MAX	MAXIMUM
AF	AIRFOIL	MBH	THOUSAND BRITISH THERMAL UNITS/HOUR
AFF	ABOVE FINISHED FLOOR	MECH	MECHANICAL
ALT	ALTERNATE	MIN	MINIMUM
BI	BACKWARD INCLINED	NC	NOISE CRITERIA OR NORMALLY CLOSED
BOD	BOTTOM OF DUCT	NIC	NOT IN CONTRACT
BOP	BOTTOM OF PIPE	NO	NUMBER
BTU/H	BRITISH THERMAL UNITS PER HOUR	NOM	NOMINAL
CAP	CAPACITY	NTS	NOT TO SCALE
CFM	CUBIC FEET PER MINUTE	OA	OUTSIDE AIR
CV	CONSTANT VOLUME	OBD	OPPOSED BLADE DAMPER
DB	DRY BULB	OD	OVERFLOW DRAIN
DN	DOWN	OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
DIA	DIAMETER	OFOI	OWNER FURNISHED, OWNER INSTALLED
DCW	DOMESTIC COLD WATER	PD	PRESSURE DROP
DHW	DOMESTIC HOT WATER	POC	POINT OF CONNECTION
DHWC	DOMESTIC HOT WATER CIRC.	PRV	PRESSURE REDUCING VALVE
DSN	DOWN SPOUT NOZZLE	PSI	POUNDS PER SQUARE INCH
DW	DISHWASHER	PSIG	POUNDS PER SQUARE INCH GAUGE
(E)	EXISTING	RA	RETURN AIR
EA	EXHAUST AIR	RAD	RADIUS
EAT	ENTERING AIR TEMPERATURE	RD	ROOF DRAIN
EFF	EFFICIENCY	RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
ELEV	ELEVATION	SA	SUPPLY AIR OR SHOCK ARRESTOR
ENCL	ENCLOSURE	SEN	SENSIBLE
ESP	EXTERNAL STATIC PRESSURE	SIM	SIMILAR
ET	EXPANSION TANK	SL	SEA LEVEL
EWC	ELECTRIC WATER COOLER	SP	STATIC PRESSURE
EWT	ENTERING WATER TEMPERATURE	SF	SQUARE FEET
FCO	FLOOR CLEANOUT	SS	SERVICE SINK OR STAINLESS STEEL
FD	FLOOR DRAIN	TOD	TOP OF DUCT
FO	FLAT OVAL	TSP	TOTAL STATIC PRESSURE
FPM	FEET PER MINUTE	TYP.	TYPICAL
FS	FLOOR SINK	U	URINAL
FT	FEET	V	VENT
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
LBS	POUNDS	W	SANITARY WASTE

MECHANICAL LEGEND

NOTE: ALL ITEMS MAY NOT APPEAR ON DRAWINGS

GATE VALVE		CHILLED WATER SUPPLY	CHS
OS & Y PATTERN GATE VALVE		CHILLED WATER RETURN	CHR
BALL VALVE		CONDENSER WATER SUPPLY	CS
BUTTERFLY VALVE		CONDENSER WATER RETURN	CR
MOTORIZED VALVE OPERATOR	M	GROUND LOOP SUPPLY	GLS
GAS COCK		GROUND LOOP RETURN	GLR
PLUG VALVE		HEATING WATER SUPPLY	HWS
CHECK VALVE (SWING OR LIFT AS REQ'D)		HEATING WATER RETURN	HWR
SOLENOID VALVE		RADIANT FLOOR SUPPLY	RFS
AUTOMATIC CONTROL VALVE (2-WAY)		RADIANT FLOOR RETURN	RFR
AUTOMATIC CONTROL VALVE (3-WAY)		SNOW MELT SUPPLY	SMS
PRESSURE REDUCING VALVE		SNOW MELT RETURN	SMR
P & T RELIEF VALVE		STEAM	S
AIR VENT (AUTOMATIC)		STEAM CONDENSATE RETURN	SCR
CURB COCK		WATER TREATMENT	WT
THERMAL EXPANSION VALVE		FUEL OIL SUPPLY	FOS
STRAINER		FUEL OIL RETURN	FOR
CALIBRATED BALANCE VALVE		REFRIGERANT LIQUID	RL
VENTURI FLOW METER		REFRIGERANT SUCTION	RS
REDUCER		HOT GAS	HG
PET COCK OR GAUGE COCK		HOT GAS BYPASS	HGBP
PRESSURE GAUGE W/GAUGE COCK		VACUUM	VAC
THERMOMETER		MEDICAL AIR	MA
TEMPERATURE & PRESSURE TEST PLUG		OXYGEN	O2
IN-LINE PUMP		NITROUS OXIDE	N2O
FLOW SWITCH	F	NITROGEN	N
AQUASTAT	A	HYDROGEN	H
TEMPERATURE SENSING WELL	T	HELIUM	HE
HOSE BIBB OR SILLCOCK		CARBON DIOXIDE	CO2
YARD HYDRANT	H	ARGON	AR
FLOOR DRAIN		DUCT SIZE (IN), FIRST FIGURE IS SIDE SHOWN	18/12
FLOOR SINK		BURIED OR UNDERFLOOR DUCT	
MANHOLE		FLEXIBLE DUCT (HELICAL)	
WALL CLEANOUT		SPIN-IN FITTING W/ MVD	
FLOOR OR GRADE CLEANOUT		FLEXIBLE DUCT CONNECTION	
GRADE CLEANOUT W/ CONCRETE PAD		SUPPLY SLOT DIFFUSER	
VENT THROUGH ROOF		SUPPLY DIFFUSER	
POST TYPE FDC CONNECTION		RETURN GRILLE	
WALL TYPE FDC CONNECTION		RADIAL SUPPLY DIFFUSERS	
FIRE HOSE CABINET		RETURN AIR DUCT SECTION	
FIRE DEPT. HORN & LIGHT		RETURN AIR DUCT UP	
EXPANSION JOINT		RETURN AIR DUCT DOWN	
FLEXIBLE PIPE CONNECTION		SUPPLY AIR DUCT SECTION	
REDUCED PRESSURE BACKFLOW PREVENTER	RPBP	SUPPLY AIR DUCT UP	
DIRECTION OF FLOW		SUPPLY AIR DUCT DOWN	
ELBOW DOWN		EXHAUST AIR DUCT SECTION	
ELBOW UP		EXHAUST AIR DUCT UP	
PIPE CAP		EXHAUST AIR DUCT DOWN	
TEE DOWN		ACCESS PANEL	
UNION		MANUAL VOLUME DAMPER	
DOMESTIC COLD WATER		GRAVITY BACKDRAFT DAMPER	G
DOMESTIC HOT WATER		MOTORIZED DAMPER	M
DOMESTIC HOT WATER CIRC.		AIR FLOW STATION	F
TEMPERED WATER	T	FIRE DAMPER	F
SANITARY (PLBG) VENT		SMOKE DAMPER	S
SANITARY WASTE ABOVE GRADE		COMBINATION FIRE/SMOKE DAMPER	FS
SANITARY WASTE BELOW GRADE		DUCT TRANSITION	
GREASE WASTE ABOVE GRADE	GW	ELBOW W/ TURNING VANES	
GREASE WASTE BELOW GRADE	GW	TEE W/ 45° ENTRY	
DRAIN	D	WYE W/ 45° ENTRY	
ROOF DRAIN	RD	THERMOSTAT OR TEMP SENSOR	T
OVERFLOW DRAIN	OD	HUMIDISTAT OR HUMIDITY SENSOR	H
STORM DRAIN ABOVE GRADE	SD	CARBON MONOXIDE SENSOR	C
STORM DRAIN BELOW GRADE	SD	CARBON DIOXIDE SENSOR	C
FIRE SERVICE	F	NITROGEN DIOXIDE SENSOR	N
NATURAL GAS	G	POINT OF REMOVAL FROM EXISTING	
PROPANE	P	POINT OF CONNECTION TO EXISTING	
COMPRESSED AIR	CA	DETAIL TAG	DETAIL NO. / DRAWING NO.
INDUSTRIAL WATER (NON-POTABLE)	IW		
DEIONIZED WATER	DI	KEYED NOTE	NOTE NO.
DEIONIZED WATER RETURN	DIR		
HEAT TRACING		SECTION CUT LINE	SECTION NO. / DRAWING NO.

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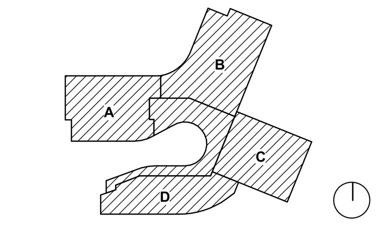
No.	Description	Date
-	RELEASE 2	00 MAR 2011
-	RELEASE 1	00 JAN 2011



KEY PLAN

Drawing Title:

MECHANICAL LEGEND, SYMBOLS & ABBREVIATIONS

Project No.: 2014-017.00 Checked by: JMB

M001

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1 BASEMENT MECH. HVAC FLOOR PLAN

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

12' 0' 8' 16' 24' 32'

KEYED NOTES

GENERAL NOTES

A. MECHANICAL GENERAL NOTES
B.
C.

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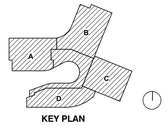

KEY PLAN

Drawing Title:

BASEMENT MECHANICAL HVAC FLOOR PLAN

Project No.: 2014-017.00 Checked by: JMB

MH100

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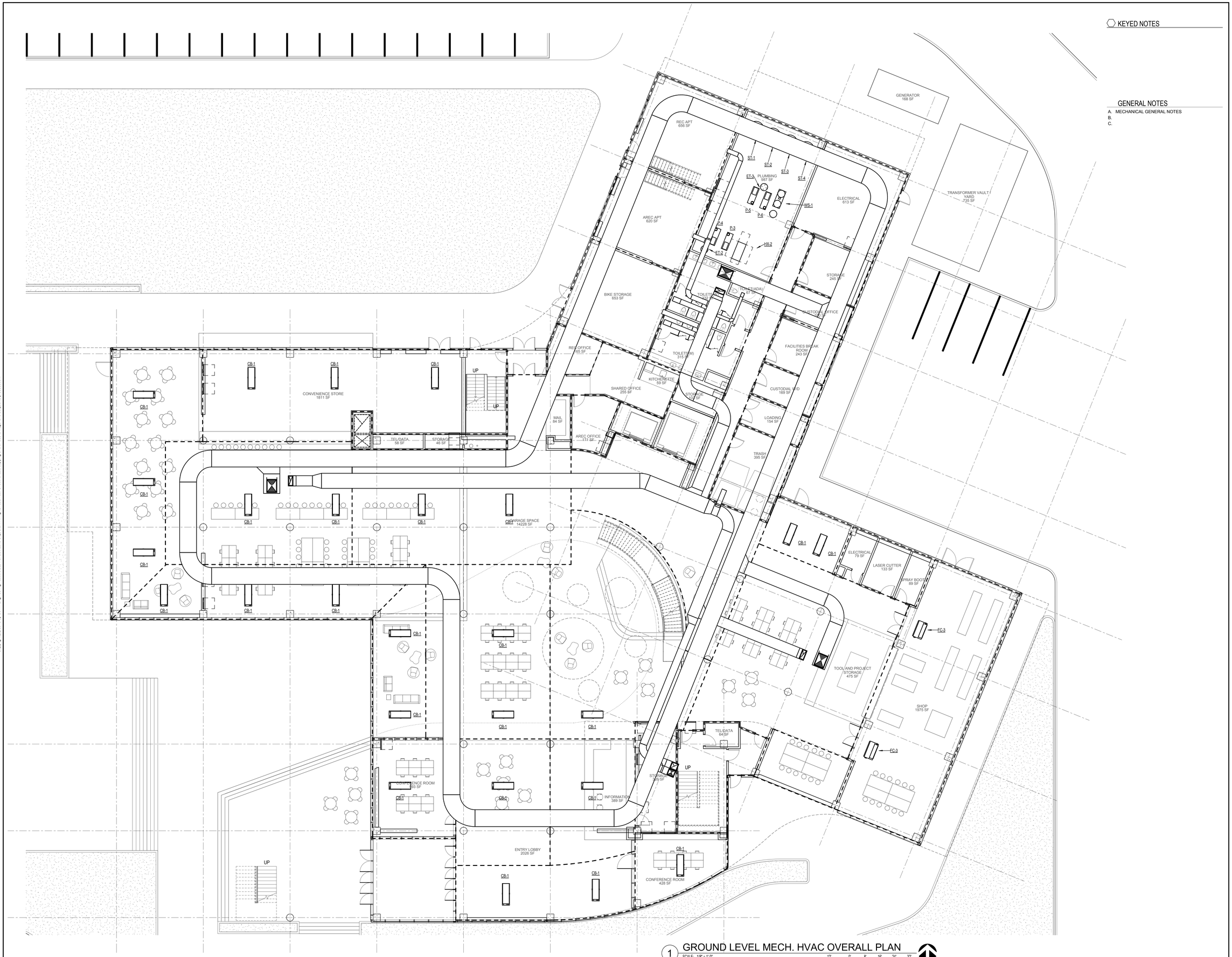

1 GROUND LEVEL MECH. HVAC OVERALL PLAN

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

12' 0' 8' 16' 24' 32'

KEYED NOTES

GENERAL NOTES

A. MECHANICAL GENERAL NOTES
B.
C.

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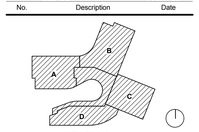

KEY PLAN

Drawing Title:

GROUND LEVEL MECHANICAL HVAC OVERALL PLAN

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1 LEVEL 2 MECH. HVAC RADIANT OPTION

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

12' 0' 8' 16' 24' 32'

KEYED NOTES

GENERAL NOTES

A. MECHANICAL GENERAL NOTES
B.
C.

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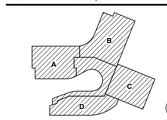

KEY PLAN

Drawing Title:

LEVEL 2 HVAC RADIANT OPTION

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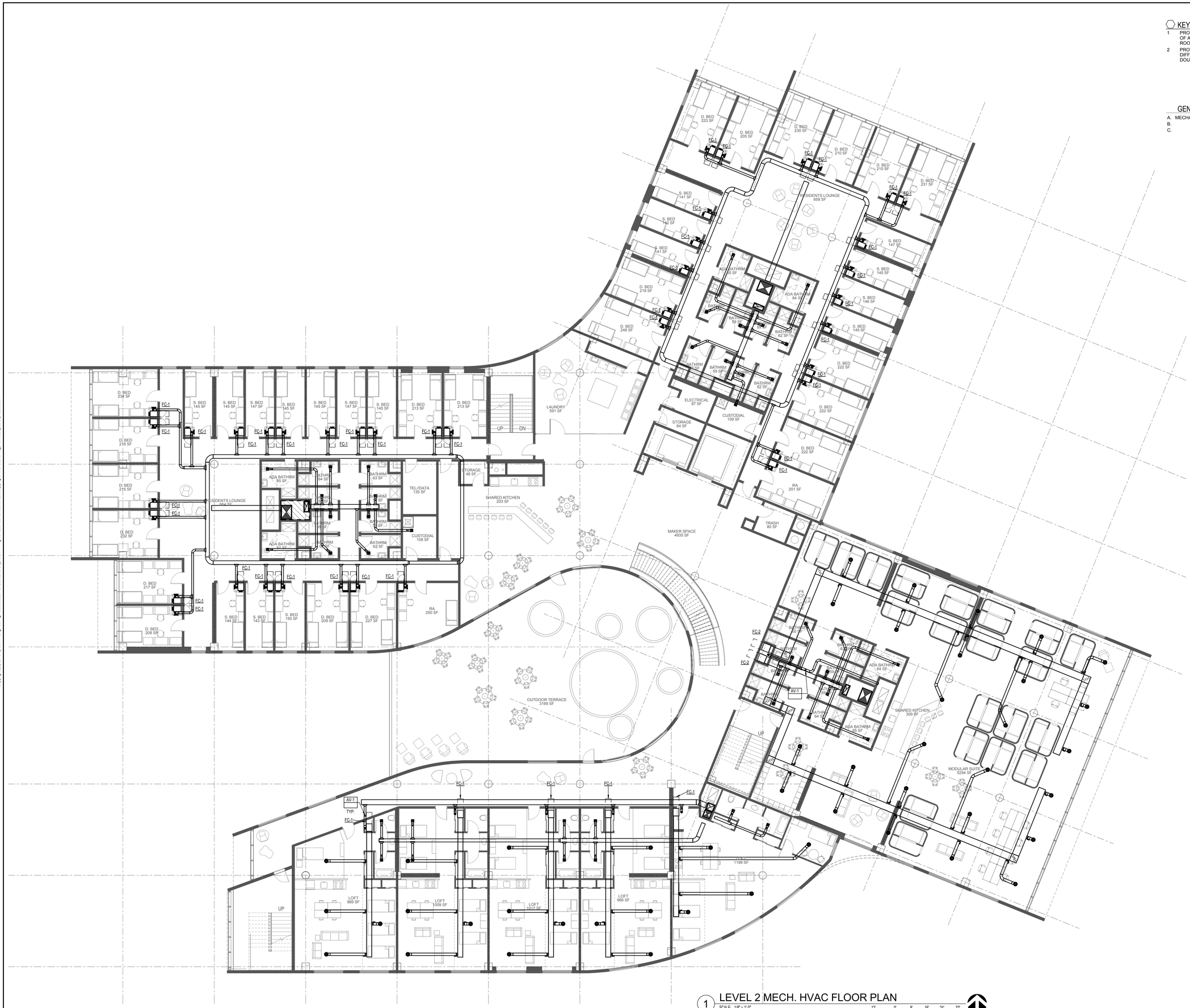

1 LEVEL 2 MECH. HVAC FLOOR PLAN

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

12' 0' 8' 16' 24' 32'

KEYED NOTES

1. PROVIDE A 6" X 10" SUPPLY DIFFUSER. TYPICAL OF ALL SINGLE AND DOUBLE OCCUPANCY ROOMS.
2. PROVIDE A 4" X 12" PERFORATED RETURN DIFFUSER. TYPICAL OF ALL SINGLE AND DOUBLE OCCUPANCY ROOMS.

GENERAL NOTES

A. MECHANICAL GENERAL NOTES
B.
C.

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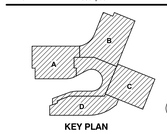

KEY PLAN

Drawing Title:

LEVEL 2 MECHANICAL HVAC FAN COIL OPTION

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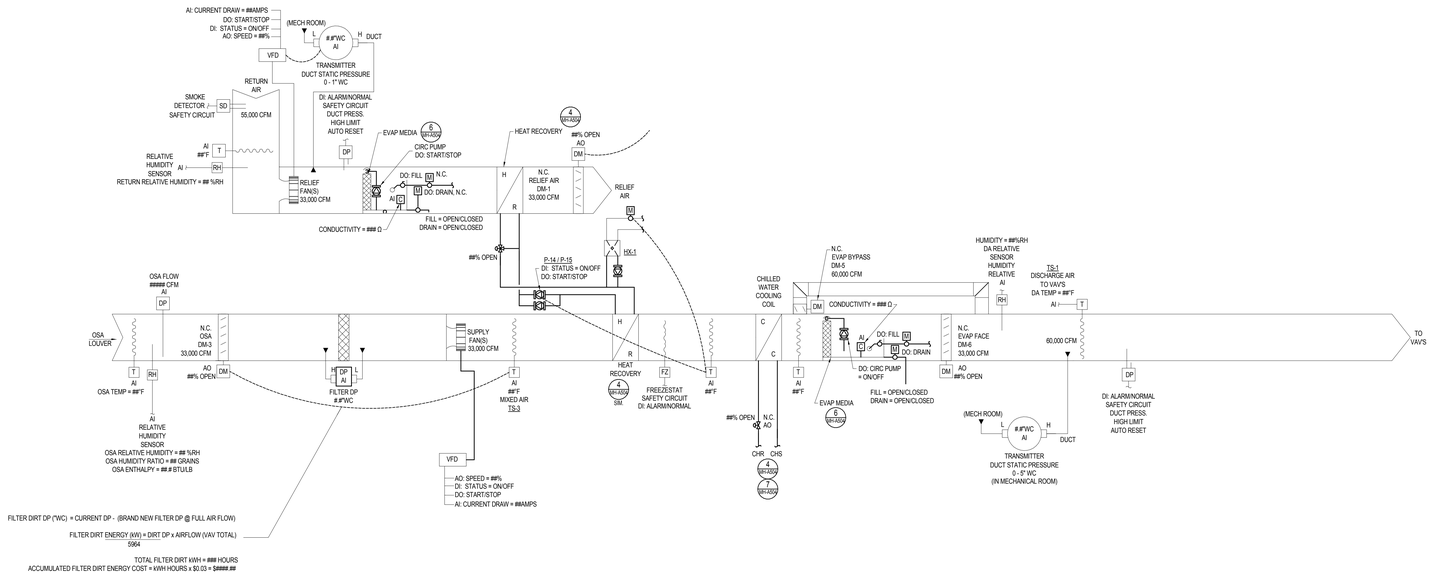

GRAPHICS LEGEND

SAMPLE FORMAT FOR GRAPHIC DISPLAY — SWP-1: SOLAR WATER PUMP #1; PUMP COMMAND = ON/OFF; PUMP STATUS = ON/OFF; PUMP FAN = ALARM/NORMAL

ON/OFF OR ALARM /NORMAL MEANS SHOW ONE OR THE OTHER

SAMPLE FORMAT FOR GRAPHIC DISPLAY — SOLAR TANK TEMPERATURE = ##F; SOLAR TANK TEMPERATURE SETPOINT= ##F

SYMBOL MEANS ACTUAL DIGIT FORMAT THAT IS EXPECTED WITH UNITS SHOWN

SAMPLE FORMAT FOR GRAPHIC DISPLAY — ROOM XXX CO2 CONTENT = ### PPM

XXX MEANS FILL IN ACTUAL ROOM NUMBER ON GRAPHIC

TERMS:
ADJUSTABLE MEANS INITIALLY SET "SET-POINT" TO VALUE SHOWN. TEST AND BALANCE CONTRACTOR TO ADJUST AS NECESSARY AND SHOW ON AS-BUILT DRAWINGS.

1 AIR HANDLING SYSTEM DDC CONTROL DIAGRAM

NO SCALE

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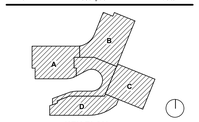

KEY PLAN

Drawing Title:

AIR HANDLER SCHEMATICS

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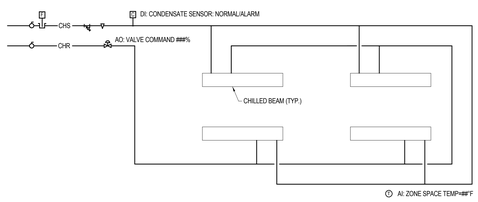
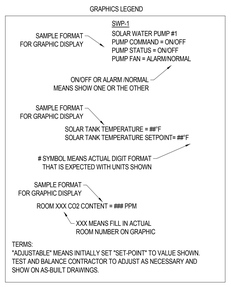
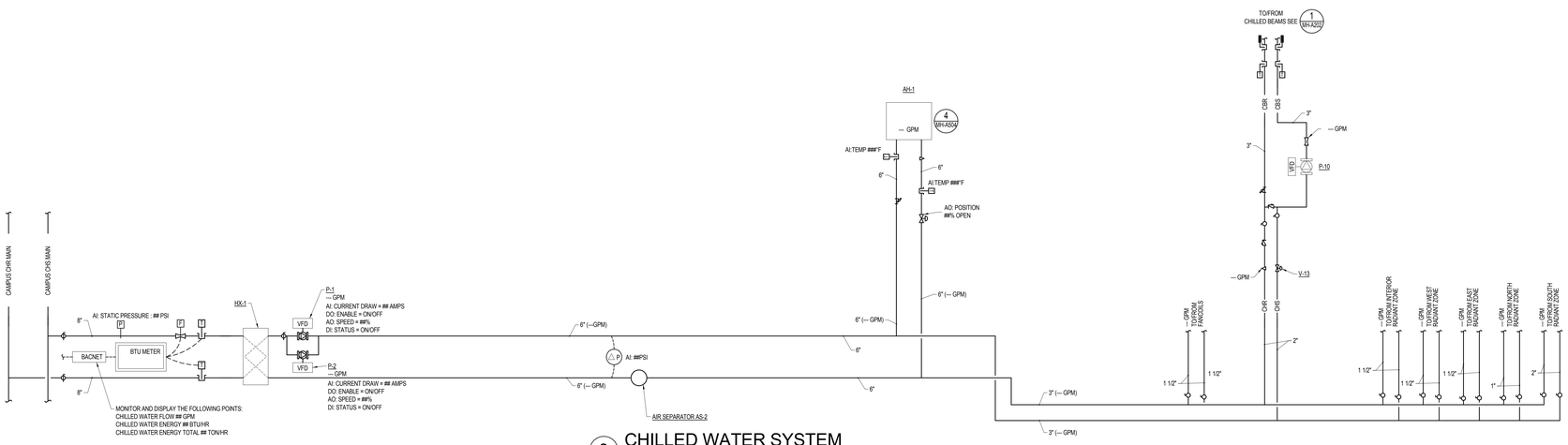


2 TYPICAL CHILLED BEAM ZONE SCHEMATIC

SCALE: NONE





3 CHILLED WATER SYSTEM

SCALE: NONE

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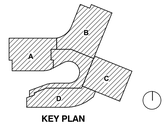

KEY PLAN

Drawing Title:

CHILLED WATER SCHEMATICS

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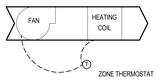
NO GRAPHIC SCREEN



UNIT HEATERS SEQUENCE
A. A WALL MOUNTED LINE VOLTAGE THERMOSTAT SHALL CYCLE THE FAN TO MAINTAIN SPACE TEMPERATURE SET POINT OF 65°F.

CABINET AND UNIT HEATERS
A. SHALL BE CONTROLLED BY AN INTEGRAL FACTORY PROVIDED AND MOUNTED THERMOSTAT.

1 UNIT-HEATER/CABINET-UNIT HEATER SCHEMATIC
SCALE: NONE

TYPICAL GRAPHIC SCREEN

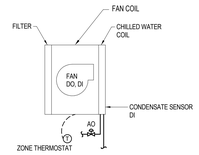
ZONE TEMPERATURE = ##°F
ZONE TEMPERATURE COOLING SETPOINT = ##°F

ALARM/NORMAL
ALARM TEMPERATURE LIMIT = ##°F

EXHAUST FANS AND TRANSFER FANS SERVING ELECTRICAL AND COMM. ROOMS SEQUENCE

A. FANS SHALL START ON AN INCREASE IN SPACE TEMPERATURE ABOVE THEIR RESPECTIVE COOLING TEMPERATURE SET POINT VIA A WALL MOUNTED LINE VOLTAGE THERMOSTAT. THE ZONE TEMPERATURE IN THESE SPACES SHALL BE MONITORED BY THE BAS AND AN ALARM SHALL BE GENERATED IF ZONE TEMPERATURE RISES ABOVE 85°F. THIS FAN(S) TO BE MONITORED BY THE BUILDING CONTROL SYSTEM.

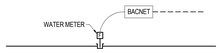
2 A/V CLOSET COOLING SCHEMATIC
SCALE: NONE



ZONE TEMPERATURE = ##°F
ZONE TEMPERATURE SETPOINT = ##°F
ALARM/NORMAL
ALARM TEMPERATURE LIMIT = ##°F
CHILLED WATER VALVE COMMAND = ###%

SEQUENCE OF OPERATION:
MODULATE CHILLED WATER VALVE TO MAINTAIN ROOM TEMPERATURE SETPOINT.
GENERATE ALARM IF SPACE TEMPERATURE EXCEEDS 85°F(ADJ.)
GENERATE ALARM IF FAN COMMAND DOES NOT MATCH STATUS.
GENERATE ALARM IF CONDENSATE LEVEL IN DRAIN PAN RISES ABOVE 1/4" AND CLOSE CHILLED WATER VALVE.

3 TELECOMM CLOSET COOLING SCHEMATIC
SCALE: NONE



MONITOR AND DISPLAY WATER FLOWRATE AND TOTALIZED FLOW.

4 WATER METER SCHEMATIC
SCALE: NONE

DOMESTIC HOT WATER SEQUENCE

A. PUMP SHALL RUN SUBJECT TO A STRAP-ON AQUASTAT AND A PROGRAMMABLE STAND ALONE OCCUPANCY TIMER. START PUMP IF OCCUPANCY TIME CLOCK IS "OCCUPIED" AND AQUASTAT PIPE TEMPERATURE IS BELOW 100°F.

5 DOMESTIC CIRCULATION PUMP DDC CONTROL DIAGRAM
NO SCALE

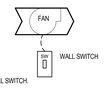
TYPICAL GRAPHIC SCREEN

FAN
STATUS = ON/OFF
COMMAND = ON/OFF

RESTROOMS EXHAUST FAN SEQUENCE

A. EXHAUST FAN IS ENABLED WHEN THE BUILDING IS IN THE OCCUPIED MODE. THIS FAN TO BE MONITORED BY THE BUILDING CONTROL SYSTEM GENERATE AND ALARM ON FAN FAILINGS.

6 RESTROOM/JANITOR'S CLOSET EXHAUST FAN SCHEMATIC
SCALE: NONE



KITCHEN EXHAUST FAN SEQUENCE

A. FAN SHALL RUN SUBJECT TO A WALL SWITCH.

7 CAFE EXHAUST FAN SCHEMATIC
SCALE: NONE

8 TRANSFER SWITCH MONITORING SCHEMATIC
SCALE: NONE

GRAPHICS LEGEND

SAMPLE FORMAT FOR GRAPHIC DISPLAY

SWP-1
SOLAR WATER PUMP #1
PUMP COMMAND = ON/OFF
PUMP STATUS = ON/OFF
PUMP FAN = ALARM/NORMAL

ON/OFF OR ALARM /NORMAL MEANS SHOW ONE OR THE OTHER

SAMPLE FORMAT FOR GRAPHIC DISPLAY

SOLAR TANK TEMPERATURE = ##°F
SOLAR TANK TEMPERATURE SETPOINT= ##°F

SYMBOL MEANS ACTUAL DIGIT FORMAT THAT IS EXPECTED WITH UNITS SHOWN

SAMPLE FORMAT FOR GRAPHIC DISPLAY

ROOM XXX CO2 CONTENT = ### PPM

XXX MEANS FILL IN ACTUAL ROOM NUMBER ON GRAPHIC

TERMS:
"ADJUSTABLE" MEANS INITIALLY SET "SET-POINT" TO VALUE SHOWN. TEST AND BALANCE CONTRACTOR TO ADJUST AS NECESSARY AND SHOW ON AS-BUILT DRAWINGS.

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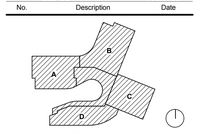

KEY PLAN

Drawing Title:

MECHANICAL SCHEMATICS

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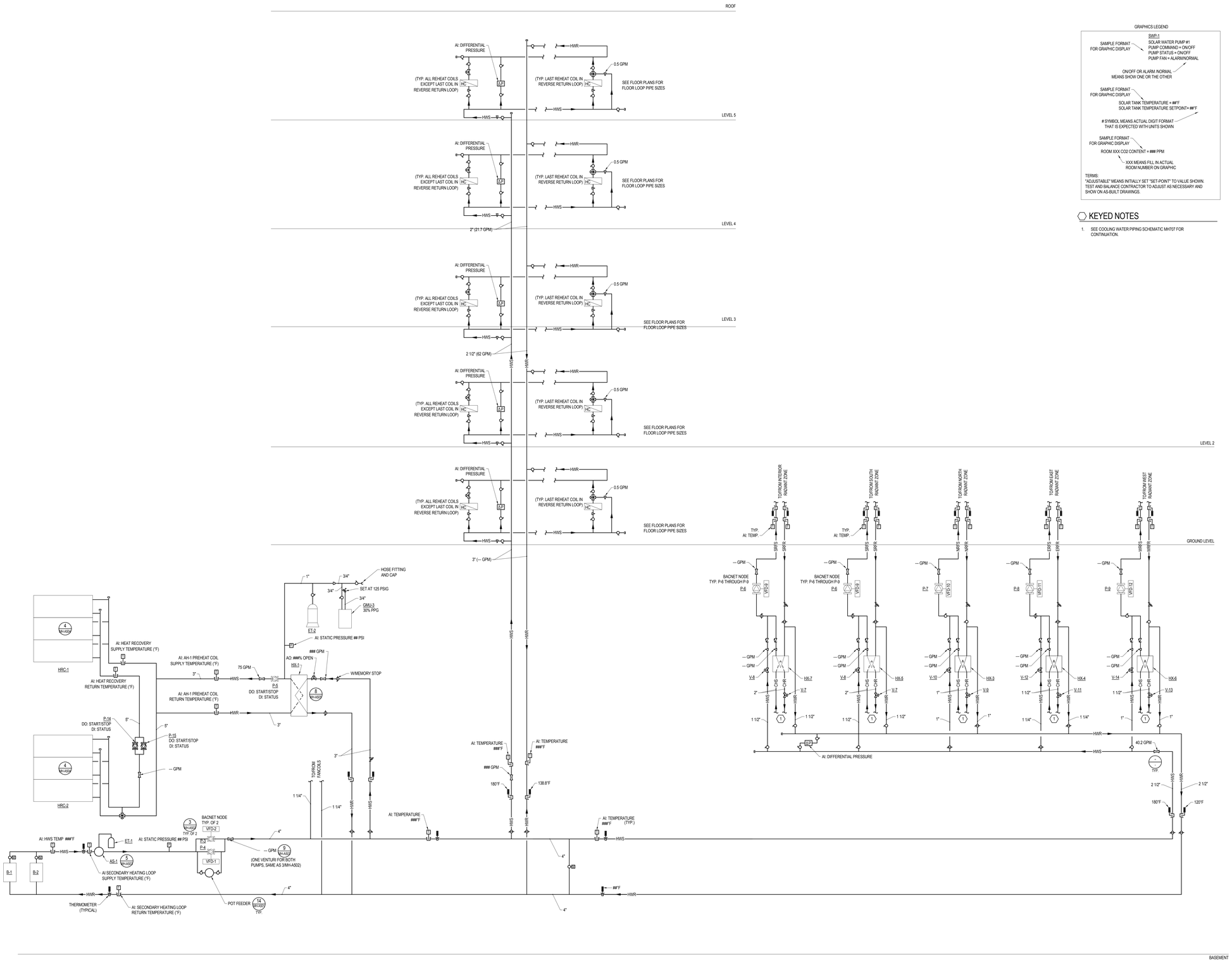

GRAPHICS LEGEND

SAMPLE FORMAT FOR GRAPHIC DISPLAY
SWP-1
SOLAR WATER PUMP #1
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SAMPLE FORMAT FOR GRAPHIC DISPLAY
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SOLAR TANK TEMPERATURE SETPOINT= ##°F

SYMBOL MEANS ACTUAL DIGIT FORMAT THAT IS EXPECTED WITH UNITS SHOWN

SAMPLE FORMAT FOR GRAPHIC DISPLAY
ROOM XXX CO2 CONTENT = ### PPM

XXX MEANS FILL IN ACTUAL ROOM NUMBER ON GRAPHIC

TERMS:
"ADJUSTABLE" MEANS INITIALLY SET "SET-POINT" TO VALUE SHOWN. TEST AND BALANCE CONTRACTOR TO ADJUST AS NECESSARY AND SHOW ON AS-BUILT DRAWINGS.

KEYED NOTES

1. SEE COOLING WATER PIPING SCHEMATIC MH707 FOR CONTINUATION.

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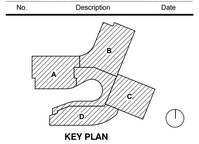

KEY PLAN

Drawing Title:

MECHANICAL SCHEMATICS

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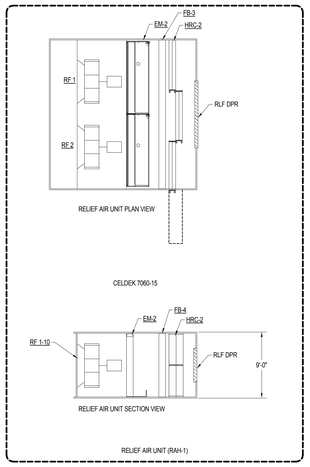
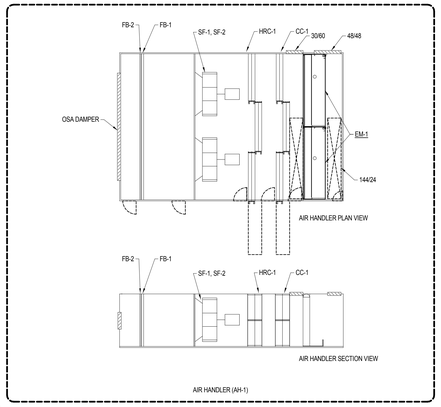


RELIEF AIR UNIT (RAH-1)



AIR HANDLER (AH-1)

AIR HANDLER (AH)

PLAN CODE	CFM	MIN. OSA (CFM)	ESP (IN WC)	MAX. OVERALL DIMENSIONS			
				LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	UNIT WEIGHT (LB)
AH-1	33,000	33,000	4.0	340	146	108	-
RAH-1	33,000	NA	1.5	216	146	120	-

1. HEIGHT INCLUDES 6" BASE RAIL AND 4" HOUSEKEEPING PAD.
2. ALL ACCESS SECTIONS ARE 18" WIDE EXCEPT 24" FAN ACCESS.
3. SOLID LINER UPSTREAM OF FANS AND DOWNSTREAM OF CHILLED WATER COIL SECTION, PERFORATED LINER ALL OTHER LOCATIONS, 2" PLENUM WALLS

FILTER BANK (FB)

PLAN CODE	TYPE	RATING[1]	MAX CLEAN PD (IN WC)	DESIGN PD (IN WC)	INDIVIDUAL FILTER DIMENSIONS			QUANTITY (EA)
					LENGTH (IN)	HEIGHT (IN)	DEPTH (IN)	
FB-1	PLEATED FILTERS	MERV 13	0.3	1.0	24	24	4	AS REQ.
FB-2	PLEATED PRE-FILTERS	30%	0.25	0.62	24	24	2	AS REQ.
FB-3	PLEATED PRE-FILTERS	MERV 7	0.25	0.62	24	24	2	AS REQ.

1. MERV RATINGS BASED ON ASHRAE 52.2

PRESSURE RELIEF DOORS (PRD)

PLAN CODE	QUANT.	SERVICE	PRESSURE SETTING (IN WC)	SIZE (IN X IN)
PRD-2	AS REQ.	RETURN	5	18 X 18

1 PROVIDE MICRO-SWITCHES TO BE TIED TO THE BMS TO ALERT IF A DOOR HAS POPPED OPEN.

EVAPORATIVE MEDIA (EM)

PLAN CODE	PERFORMANCE				MEDIA[1]		CIRCULATION PUMP 2 IN EACH AH				SUMP CONSTRUCTION
	AIR VOLUME (CFM) EACH	SATURATION EFFICIENCY (%)	MAXIMUM ACTIVE MEDIA FACE VELOCITY (FPM)	MAXIMUM PRESSURE DROP (IN WC)	THICKNESS (IN)	CONSTRUCTION	GPM	TDH FT	HP	VOLTAGE/ PHASE	
EM-1 -	33,000	89	500	0.30	12	GLASDEK w/ MI-T-EDGE	20	20	1/3	120/1	STAINLESS STEEL
EM-2 -	33,000	95	350	0.2	18	GLASDEK w/ MI-T-EDGE	30	20	1/2	120/1	STAINLESS STEEL

1. REFERENCE DETAIL A, SHEET M-503.

COIL (_C)

PLAN CODE	SERVICE	AIR SIDE						FLUID SIDE				CONFIGURATION				
		VOLUME (CFM)	MAX FACE VELOCITY (FPM)	DESIGN CONDITION	EAT (DBT / WBT)	LAT (DBT/WBT)	MAX. APD (IN WC)	FLUID	EFT (F)	LFT (F)	FLOW RATE (GPM)	MAXIMUM FPD (FT)	MIN. TUBE VELOCITY (FPS)	MIN. ROWS	FPI	NOMINAL COIL
CC-1	CHILLED	33,000	450	WET BULB	84/66	50.9/50.6	0.41 WET	FW	44.0	53.8	-/COIL	14	4.2	8	10	25 CIRCUITS/COIL, FLAT FINS, 6 COILS @ 84" X 37.5"
HRC-1	SUPPLY AIR HEAT RECOVERY	33,000	450	DRY BULB	95/63	78.7/57.7	0.36	30% PG	77.6	85	-/COIL	14	2.6	10	12	19 CIRCUITS/COIL, FLAT FINS, 6 COILS @ 84" X 32.5"
				WET BULB	-/-	-/-	0.3	-	-	-						
HRC-2	RELIEF AIR HEAT RECOVERY	33,000	300	WET BULB	65/-	81.8/-	0.13	30% PG	85	77.6	-/COIL	6	2	6	12	24 CIRCUITS/COIL, FLAT FINS, 6 COILS @ 84" X 48"

FANS 1

PLAN CODE	FAN										MOTOR			
	TYPE	CONFIGURATION	CONSTRUCTION	FLOW EACH (CFM)	TSP (IN WC)	MAX BHP	EAT (F)	WHEEL SIZE (IN)	WHEEL SPEED (RPM)	CLASS	HP	VOLTAGE/ PHASE	VOLUME CONTROL	NOTE
SF-1 SF-2	BI AF	PLENUM	ALUMINUM	16,500	6.5	-	-	-	-	I	-	-	VFD	DIRECT DRIVE 2 TOTAL
RF-1 RF-2	BI AF	PLENUM	ALUMINUM	16,500	2	-	-	-	-	I	-	-	VFD	DIRECT DRIVE 2 TOTAL

1 PROVIDE EACH FAN WALL WITH ALL FANS PRE-WIRED TOGETHER TO A SINGLE VFD FOR THAT FAN WALL BY THE MANUFACTURER.

FAN COIL UNIT SCHEDULE (FC)

PLAN CODE	CFM	ESP (IN WC)	FAN HP	VOLT/ PH	HEATING COIL						COOLING COIL							MAX DIMENSIONS				MANUFACTURER & MODEL NO	ACCESSORIES
					CAPACITY (MBH)	EAT/ LAT (°F)	EWT/ LWT (°F)	GPM	WATER PD (FT)	AIR PD (IN WC)	CAPACITY (MBH)	EAT (DB/ WB) (°F)	LAT (DB/ WB) (°F)	EWT/ LWT (°F)	GPM	WATER PD (FT)	AIR PD (IN WC)	LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	OPERATING WT (LBS)		
FC-1	350	-	1/60	115/1	33.2	-	-	1.7	2	-	8.5	-	-	-	2	12.7	-	23.5	18	88	220	ENVIROTEC VH-03	- -
FC-2	1230	-	1/5	115/1	100.2	-	-	2.5	20.2	-	26.0	-	-	-	8.7	15.2	-	29.5	24	88	280	ENVIROTEC VH-12	- -
FC-3	600	-	1/3	120/1	41.7	-	-	2.1	1	-	-	-	-	-	-	-	-	29	34	16	120	ENVIROTEC HPP-06	- -

CONDENSING BOILER SCHEDULE (B)

PLAN CODE	MBH CAPACITY			ASME PRESS RATING	OPERATING PRESSURE	% EFF	FLUE TYPE	FLUE SIZE	GPM	PD (FT)	MAX SIZE				BURNER			MANUFACTURER & MODEL NO	REMARKS
	OUTPUT @ 4400 FT	OUTPUT @ SEA LEVEL	INPUT @ SEA LEVEL								LENGTH (IN)	WIDTH (IN)	HEIGHT (IN)	OPERATING WT (LBS)	HP	VOLT/ PH	GAS PRESSURE		
B-1	2540	2760	3000	50	160	93	-	10	-	-	88	40	80	4,130	-	120/1	-	LOCHINVAR FBN3000	-
B-2	2540	2760	3000	50	160	93	-	10	-	-	88	40	80	4,130	-	120/1	-	LOCHINVAR FBN3000	-

EXPANSION TANK SCHEDULE (ET)

PLAN CODE	SYSTEM SERVED	WATER TEMP (°F)	% GLYCOL	TANK VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	PRE-CHARGE (PSI)	MAX DIMENSIONS			MANUFACTURER & MODEL NO	REMARKS
							DIA (IN)	HEIGHT (IN)	OPERATING WT (LBS)		
ET-1	CHILLED	-	-	-	-	-	-	-	-	-	-
ET-2	HEATING	-	-	-	-	-	-	-	-	-	-
ET-3	HOT WATER	-	-	-	-	-	-	-	-	-	-

AIR DEVICE SCHEDULE

PLAN CODE — GRILLE CFM

PLAN CODE	TYPE & DUTY	FACE SIZE	NECK SIZE	CEILING TYPE (2)	MAX CFM	MAX TP (IN WC)	NC LEVEL MAX	MIN THROW (FT) (T50)	4-WAY MIN THROW (T50)	2-WAY MIN THROW (T50)	MANUFACTURER & MODEL NO	REMARKS
1	LINEAR-SUPPLY	24"L	6"	MATCH CEILING	80	0.08	32	12	-	-	TEMPO L.D.	1 @ 1" SLOT
2	LINEAR-SUPPLY	24"L	8"	MATCH CEILING	160	0.09	33	13	-	-	TEMPO L.D.	2 @ 1" SLOT
3	LINEAR-SUPPLY	24"L	8"	MATCH CEILING	240	0.10	34	14	-	-	TEMPO L.D.	3 @ 1" SLOT
4	LINEAR-SUPPLY	24"L	10"	MATCH CEILING	320	0.11	35	15	-	-	TEMPO L.D.	4 @ 1" SLOT
5	LINEAR-SUPPLY	48"L	8"	MATCH CEILING	160	0.08	32	12	-	-	TEMPO L.D.	1 @ 1" SLOT
6	LINEAR-SUPPLY	48"L	10"	MATCH CEILING	320	0.09	33	13	-	-	TEMPO L.D.	2 @ 1" SLOT
7	LINEAR-SUPPLY	48"L	12" L	MATCH CEILING	480	0.10	34	14	-	-	TEMPO L.D.	3 @ 1" SLOT
8	LINEAR-SUPPLY	48"L	12"	MATCH CEILING	640	0.11	35	15	-	-	TEMPO 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	-
11	PERFORATED EXHAUST	24" X 24"	22" X 22"	MATCH CEILING	1200	0.05	17	-	-	-	TITUS PAR	-
12	PERFORATED EXHAUST	24" X 12"	22"X 10"	MATCH CEILING	600	0.06	10	-	-	-	TITUS PAR	-
13	PERFORATED EXHAUST GRILLE	8" X 8"	6" X 6"	MATCH CEILING	120	0.12	10	-	-	-	TITUS 8F	-
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	-
17	PERFORATED EXHAUST GRILLE	16" X 16"	14" x 14"	MATCH CEILING	750	0.12	17	-	-	-	TITUS 8F	-
18	PERFORATED EXHAUST GRILLE	20" X 20"	18" X 18"	MATCH CEILING	1250	0.12	19	-	-	-	TITUS 8F	-
19	PERFORATED EXHAUST GRILLE	24" X 24"	22" X 22"	MATCH CEILING	1900	0.12	21	-	-	-	TITUS 8F	-
20	PERFORATED EXHAUST GRILLE	32" X 32"	30" X 30"	SURFACE	3600	0.12	24	-	-	-	TITUS 8F	-
21	RADIAL BLADE DIFFUSER	12"	8"	SURFACE	210	0.14	29	8 (1)	-	-	AIR DIFFUSION PRODUCTS DNR	-
22	RADIAL BLADE DIFFUSER	15"	10"	SURFACE	330	0.14	29	10 (1)	-	-	AIR DIFFUSION PRODUCTS DNR	-
23	RADIAL BLADE DIFFUSER	18"	12"	SURFACE	470	0.14	30	12 (1)	-	-	AIR DIFFUSION PRODUCTS DNR	-
24	RADIAL BLADE DIFFUSER	21"	14"	SURFACE	640	0.14	30	14 (1)	-	-	AIR DIFFUSION PRODUCTS DNR	-
25	RADIAL BLADE DIFFUSER	24"	16"	SURFACE	840	0.14	30	15 (1)	-	-	AIR DIFFUSION PRODUCTS DNR	-
26	RADIAL BLADE DIFFUSER	24" X 24"	8"	GRID	210	0.14	29	8 (1)	-	-	AIR DIFFUSION PRODUCTS DNR	-
27	RADIAL BLADE DIFFUSER	24" X 24"	10"	GRID	330	0.14	29	10 (1)	-	-	AIR DIFFUSION PRODUCTS DNR	-
28	RADIAL BLADE DIFFUSER	24" X 24"	12"	GRID	470	0.14	30	12 (1)	-	-	AIR DIFFUSION PRODUCTS DNR	-
29	RADIAL BLADE DIFFUSER	24" X 24"	14"	GRID	640	0.14	30	14 (1)	-	-	AIR DIFFUSION PRODUCTS DNR	-
30	RADIAL BLADE DIFFUSER	24" X 24"	16"	GRID	840	0.14	30	15 (1)	-	-	AIR DIFFUSION PRODUCTS DNR	-
31	ADJUSTABLE LOUVERED	24" X 24"	6"	MATCH CEILING	170	0.13	25	ADJUSTABLE	11	18	TITUS TDCA	18" x 18" CORE
32	ADJUSTABLE LOUVERED	24" X 24"	8"	MATCH CEILING	310	0.13	27	ADJUSTABLE	14	24	TITUS TDCA	18" x 18" CORE
33	ADJUSTABLE LOUVERED	24" X 24"	10"	MATCH CEILING	440	0.13	28	ADJUSTABLE	17	26	TITUS TDCA	18" x 18" CORE
34	ADJUSTABLE LOUVERED	24" X 24"	12"	MATCH CEILING	600	0.14	28	ADJUSTABLE	21	33	TITUS TDCA	18" x 18" CORE
35	ADJUSTABLE LOUVERED	24" X 24"	14"	MATCH CEILING	800	0.13	29	ADJUSTABLE	24	39	TITUS TDCA	18" x 18" CORE
36	ADJUSTABLE LOUVERED	24" X 24"	16"	MATCH CEILING	950	0.11	29	ADJUSTABLE	26	41	TITUS TDCA	18" x 18" CORE
37	BAR FLOOR DIFFUSER	2 1/2"	2 1/2" x L	-	80/FT	0.10	24	-	-	-	TITUS CT-480	-
38	BAR FLOOR DIFFUSER	4"	4" x L	-	150/FT	0.10	28	-	-	-	TITUS CT-480	-
39	BAR FLOOR DIFFUSER	6"	6" x L	-	230/FT	0.09	28	-	-	-	TITUS CT-480	-
40	THERMALLY CONTROLLED DIFFUSER	24" X 24"	8"	GRID	260	0.15	35	-	-	-	THERMAFUSER	-

1 RECOMMENDED MINIMUM DISTANCE BETWEEN DIFFUSERS IN 8' CEILING.
2 VERIFY FRAME TYPE OF ALL AIR DEVICES WITH ARCHITECTURAL REFLECTED CEILING PLAN BEFORE ORDERING.

AIR VOLUME CONTROL VALVE

PLAN CODE — MAX CFM

PLAN CODE	INLET SIZE (IN)	DESIGN INLET SP (IN WC)	MAX CFM	MAX NC	MAX SP DROP (IN WC)	MIN CONTROL CFM
AV-1	6	.5	500	34	0.22	80
AV-2	8	.5	900	33	0.05	150
AV-3	10	.5	1200	34	0.05	230
AV-4	12	.5	1600	34	0.05	325
AV-5	14	.5	2800	35	0.07	450
AV-6	16	.5	3400	35	0.05	580
AV-7	24	.5	5000	35	0.05	1400

VAV COOLING ONLY

PLAN CODE — MAX CFM — FLOOR-BOX NO — MIN CFM
PLAN CODE — # - ## — THERMOSTAT

PLAN CODE	INLET SIZE (IN)	DESIGN INLET SP (IN WC)	MAX CFM	MAX NC	MAX SP DROP (IN WC)	MIN CONTROL CFM
6C	6	1.0	500	34	0.22	80
8C	8	1.0	900	33	0.05	150
10C	10	1.0	1200	34	0.05	230
12C	12	1.0	1600	34	0.05	325
14C	14	1.0	2800	35	0.07	450
16C	16	1.0	3400	35	0.05	580
24C	24	1.0	5000	35	0.05	1400

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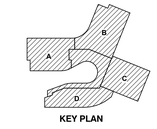

KEY PLAN

Drawing Title:

MECHANICAL SCHEDULES

Project No.: 2014-017.00 Checked by: JMB

MH601

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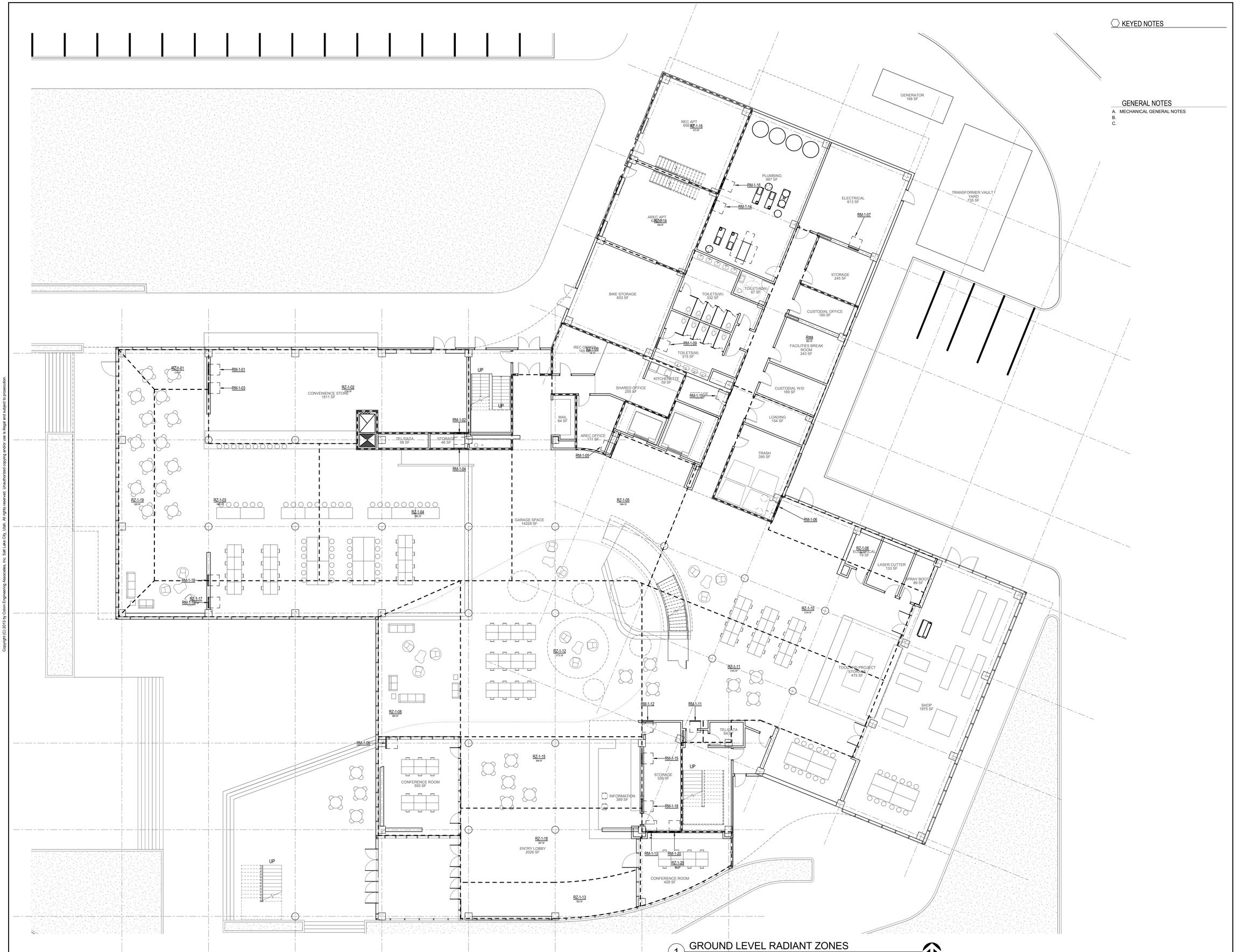

1 GROUND LEVEL RADIANT ZONES

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

12' 0' 8' 16' 24' 32'

KEYED NOTES

GENERAL NOTES

A. MECHANICAL GENERAL NOTES
B.
C.

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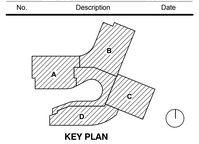

KEY PLAN

Drawing Title:

GROUND LEVEL RADIANT ZONES

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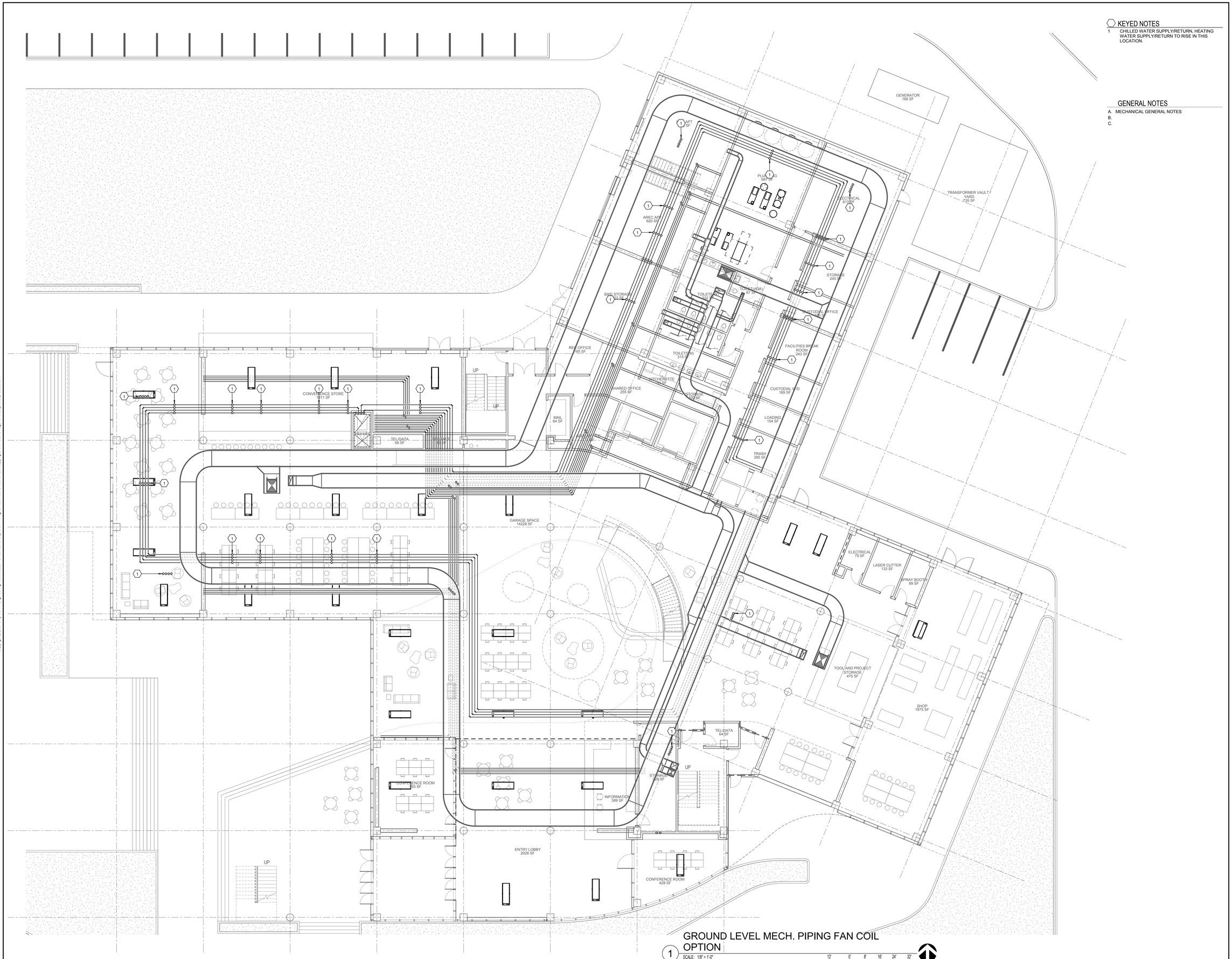

KEYED NOTES

1 CHILLED WATER SUPPLY/RETURN, HEATING WATER SUPPLY/RETURN TO RISE IN THIS LOCATION.

GENERAL NOTES

A. MECHANICAL GENERAL NOTES
B.
C.

GROUND LEVEL MECH. PIPING FAN COIL OPTION

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

12' 0' 8' 16' 24' 32'

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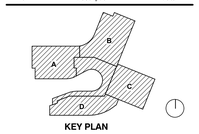

KEY PLAN

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GROUND LEVEL MECH. PIPING FAN COIL OPTION

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KEYED NOTES

GENERAL NOTES

A. MECHANICAL GENERAL NOTES
B.
C.

1 LEVEL 2 RADIANT ZONES
SCALE: 1/8" = 1'-0"

12' 0' 8' 16' 24' 32'

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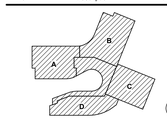

KEY PLAN

Drawing Title:

LEVEL 2 RADIANT ZONES

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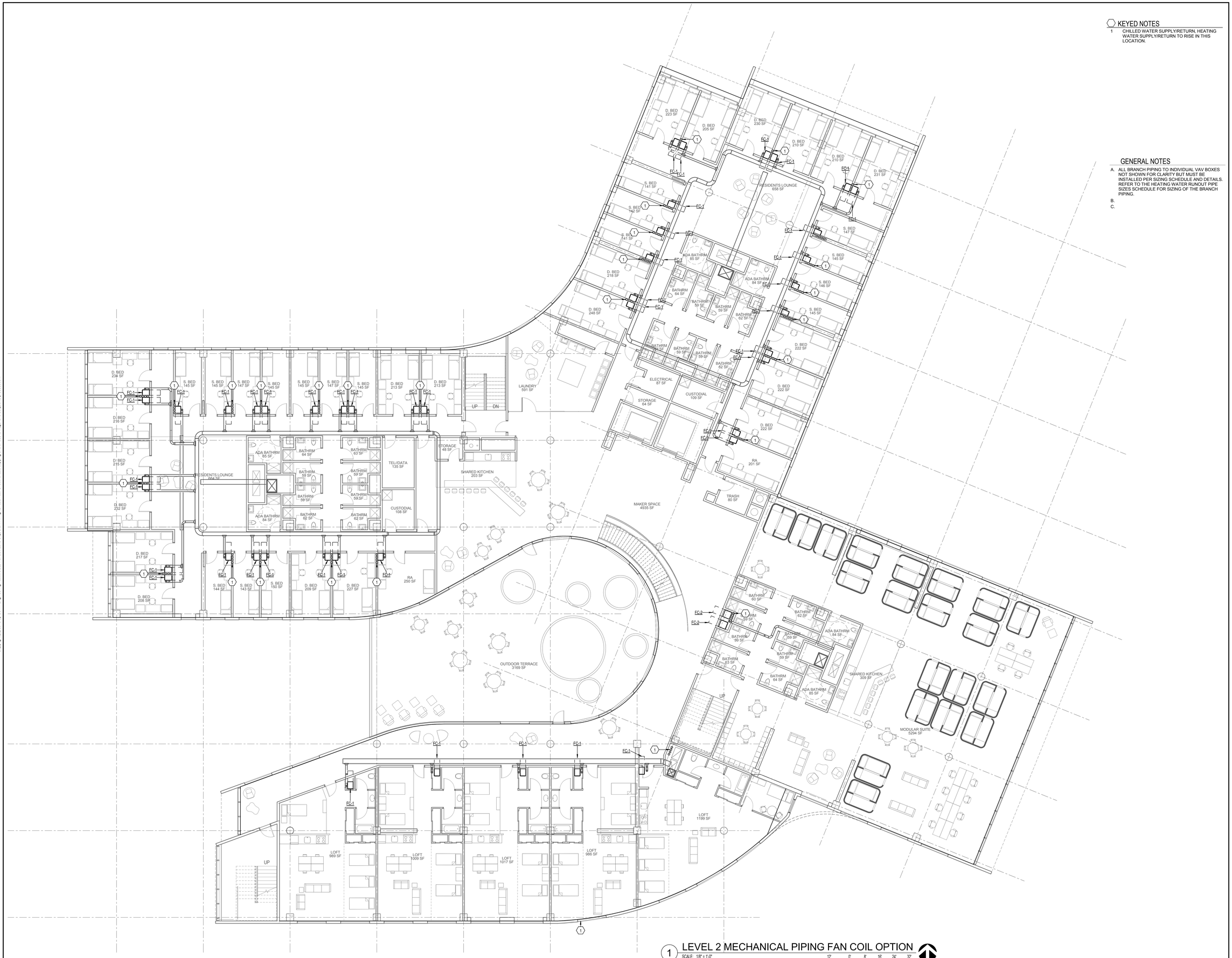

1 LEVEL 2 MECHANICAL PIPING FAN COIL OPTION
SCALE: 1/8" = 1'-0"

12 0 8 16 24 32

KEYED NOTES

1. CHILLED WATER SUPPLY/RETURN, HEATING WATER SUPPLY/RETURN TO RISE IN THIS LOCATION.

GENERAL NOTES

A. ALL BRANCH PIPING TO INDIVIDUAL VAV BOXES NOT SHOWN FOR CLARITY BUT MUST BE INSTALLED PER SIZING SCHEDULE AND DETAILS. REFER TO THE HEATING WATER RUNOUT PIPE SIZES SCHEDULE FOR SIZING OF THE BRANCH PIPING.

B.

C.

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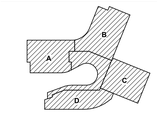

KEY PLAN

Drawing Title:

LEVEL 2 MECHANICAL PIPING FAN COIL OPTION

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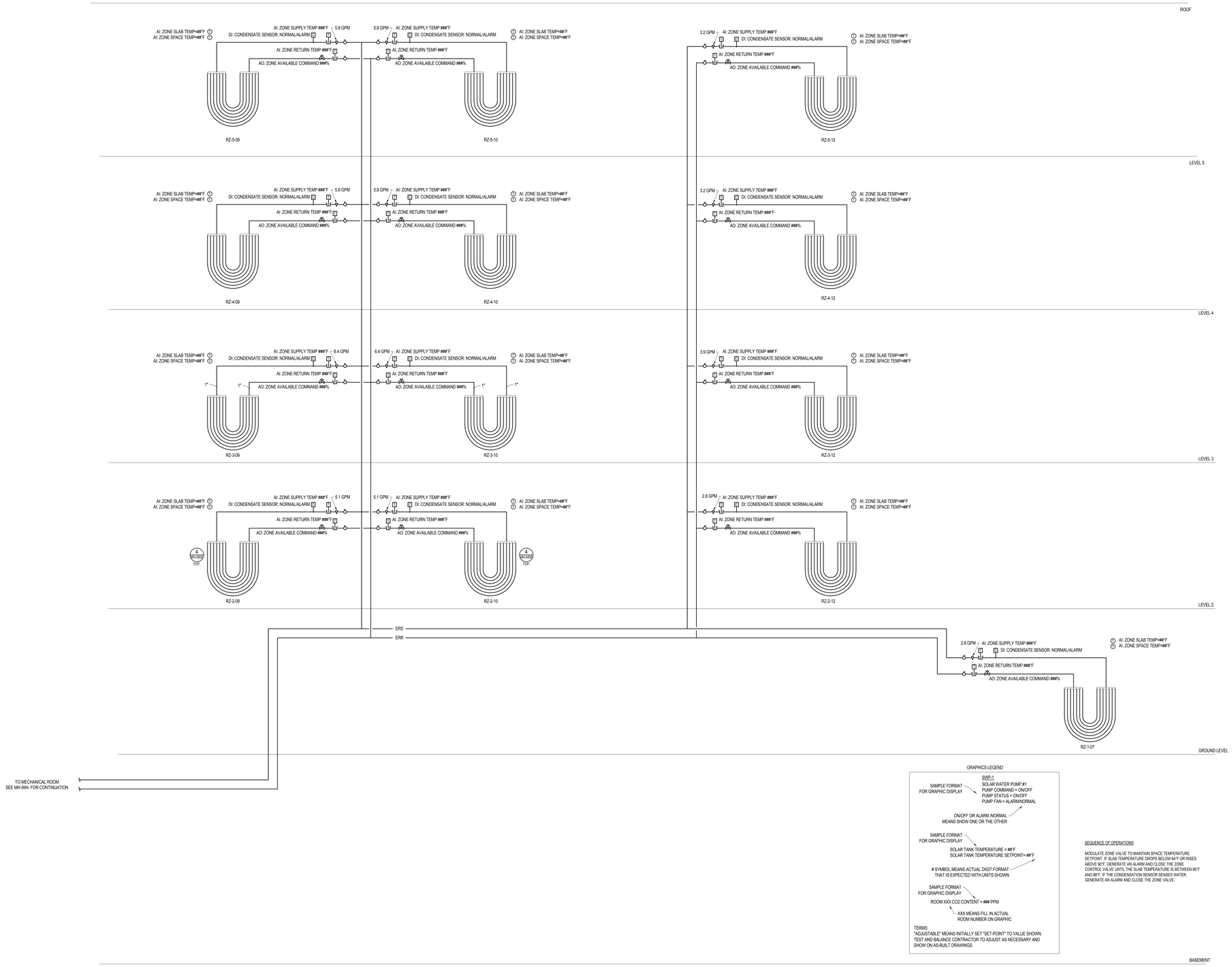

1 EAST RADIANT ZONE PIPING SCHEMATIC
SCALE: NONE

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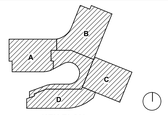

KEY PLAN

Drawing Title:

EAST RADIANT SCHEMATIC

Project No.: 2014-017.00 Checked by: JMB

MP201

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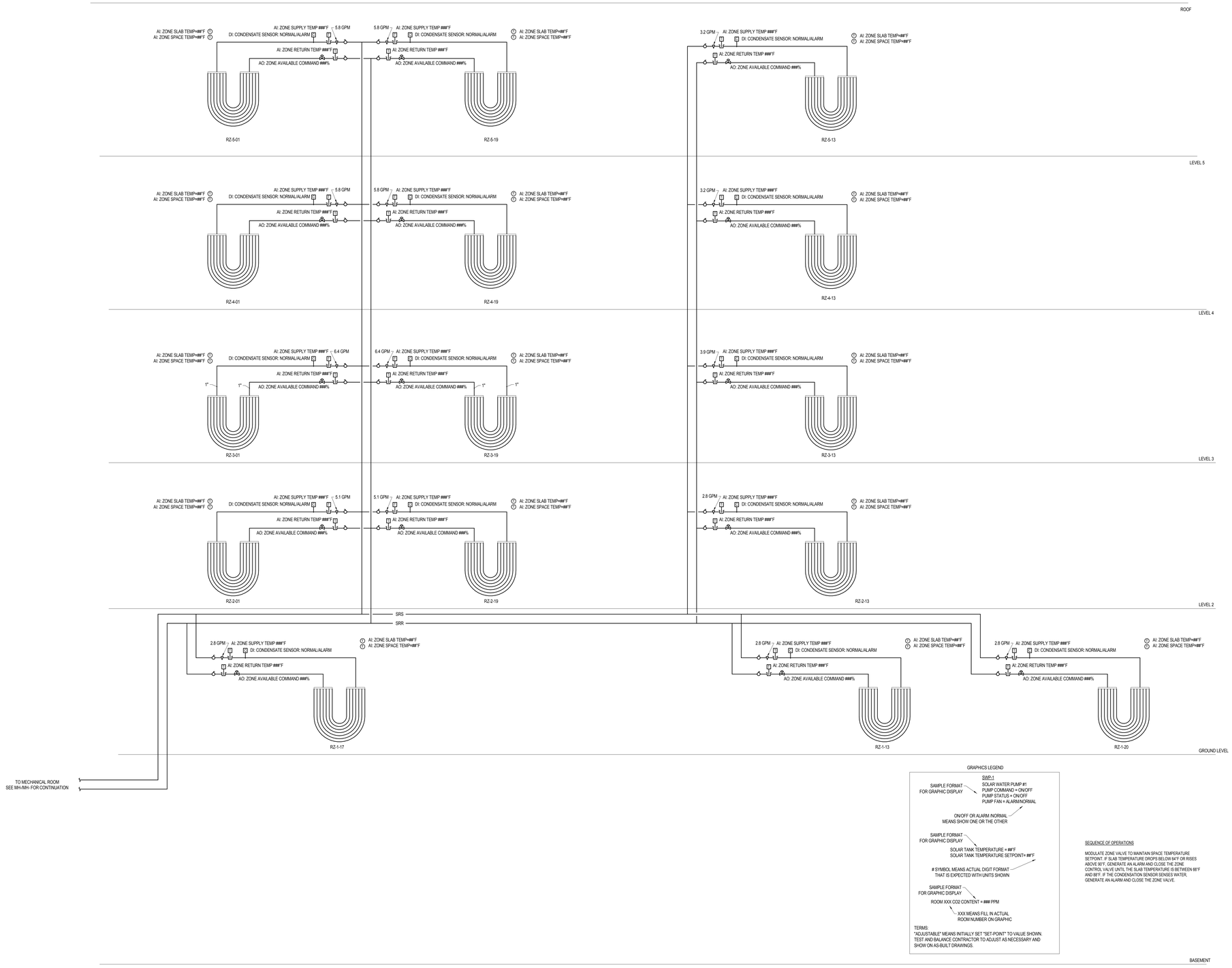

GRAPHICS LEGEND

SAMPLE FORMAT FOR GRAPHIC DISPLAY
SWP-1
SOLAR WATER PUMP #1
PUMP COMMAND = ON/OFF
PUMP STATUS = ON/OFF
PUMP FAN = ALARM/NORMAL

ON/OFF OR ALARM /NORMAL MEANS SHOW ONE OR THE OTHER

SAMPLE FORMAT FOR GRAPHIC DISPLAY
SOLAR TANK TEMPERATURE = ##F
SOLAR TANK TEMPERATURE SETPOINT= ##F

SYMBOL MEANS ACTUAL DIGIT FORMAT THAT IS EXPECTED WITH UNITS SHOWN

SAMPLE FORMAT FOR GRAPHIC DISPLAY
ROOM XXX CO2 CONTENT = ### PPM

XXX MEANS FILL IN ACTUAL ROOM NUMBER ON GRAPHIC

TERMS:
"ADJUSTABLE" MEANS INITIALLY SET "SET-POINT" TO VALUE SHOWN. TEST AND BALANCE CONTRACTOR TO ADJUST AS NECESSARY AND SHOW ON AS-BUILT DRAWINGS.

SEQUENCE OF OPERATIONS

MODULATE ZONE VALVE TO MAINTAIN SPACE TEMPERATURE SETPOINT. IF SLAB TEMPERATURE DROPS BELOW 64°F OR RISES ABOVE 90°F, GENERATE AN ALARM AND CLOSE THE ZONE CONTROL VALVE UNTIL THE SLAB TEMPERATURE IS BETWEEN 66°F AND 88°F. IF THE CONDENSATION SENSOR SENSES WATER, GENERATE AN ALARM AND CLOSE THE ZONE VALVE.

1 SOUTH RADIANT ZONE PIPING SCHEMATIC
SCALE: NONE

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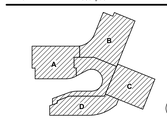

KEY PLAN

Drawing Title:

SOUTH RADIANT SCHEMATIC

Project No.: 2014-017.00 Checked by: JMB

MP202

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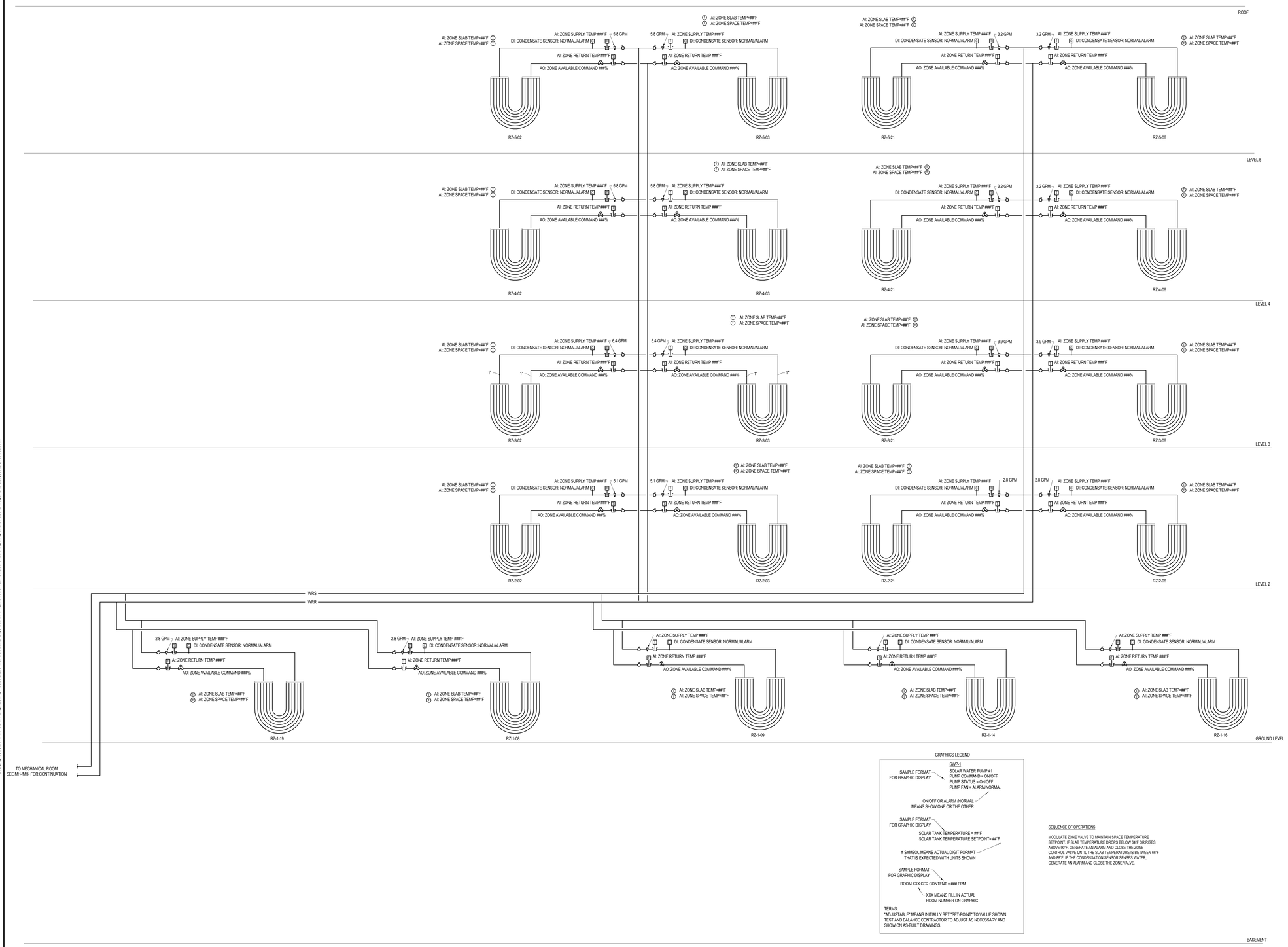

GRAPHICS LEGEND

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PUMP STATUS = ON/OFF
PUMP FAN = ALARM/NORMAL

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1 WEST RADIANT ZONE PIPING SCHEMATIC

SCALE: NONE

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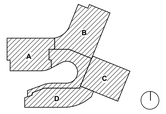

KEY PLAN

Drawing Title:

WEST RADIANT SCHEMATIC

Project No.: 2014-017.00 Checked by: JMB

MP203

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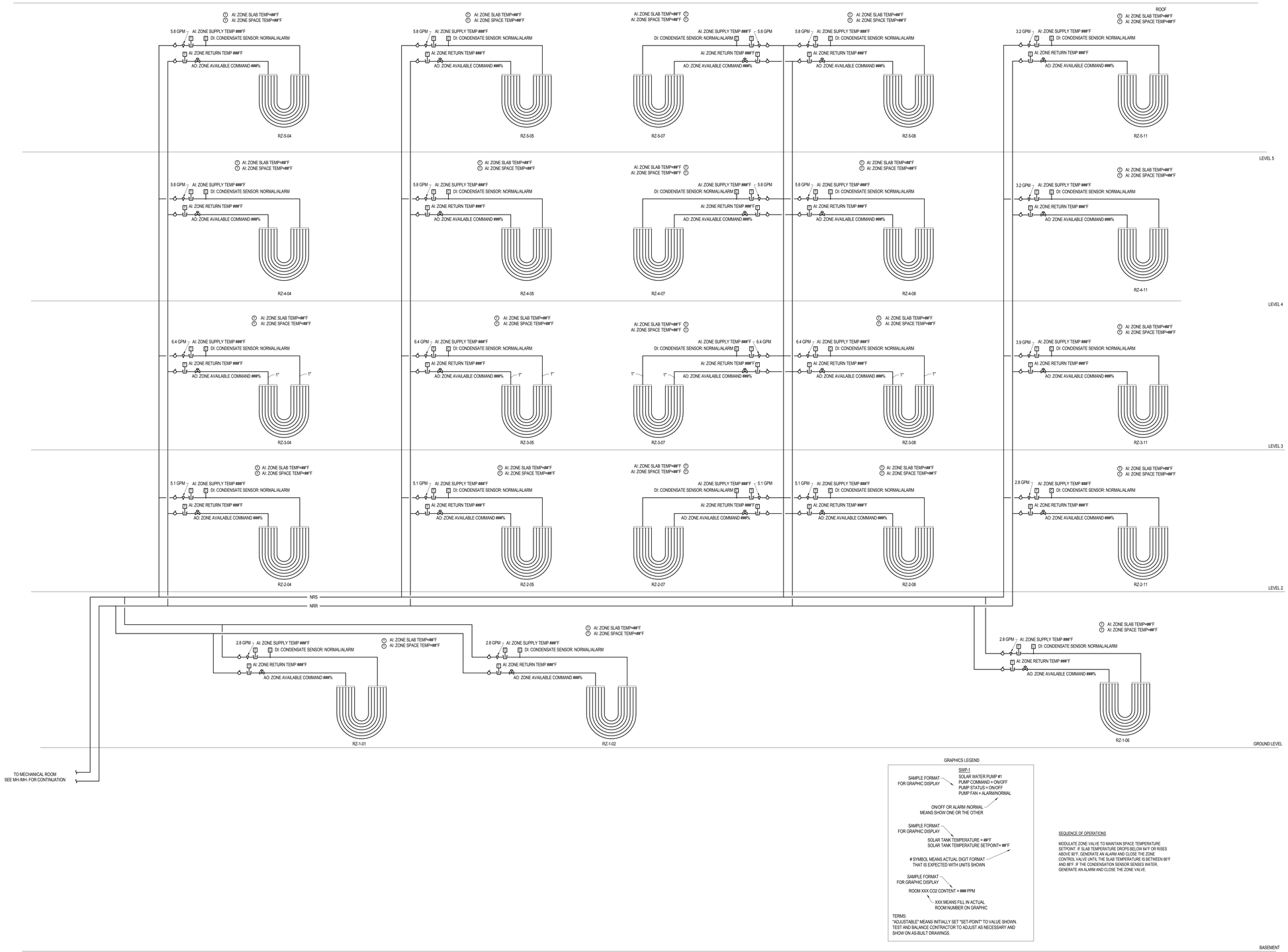

GRAPHICS LEGEND

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1 NORTH RADIANT ZONE PIPING SCHEMATIC

SCALE: NONE

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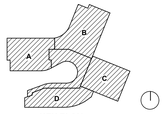

KEY PLAN

Drawing Title:

NORTH RADIANT SCHEMATIC

Project No.: 2014-017.00 Checked by: JMB

MP204

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GRAPHICS LEGEND

SYP-1
SOLAR WATER PUMP #1
PUMP COMMAND = ON/OFF
PUMP STATUS = ON/OFF
PUMP FAN = ALARM/NORMAL

SAMPLE FORMAT FOR GRAPHIC DISPLAY

ON/OFF OR ALARM/NORMAL MEANS SHOW ONE OR THE OTHER

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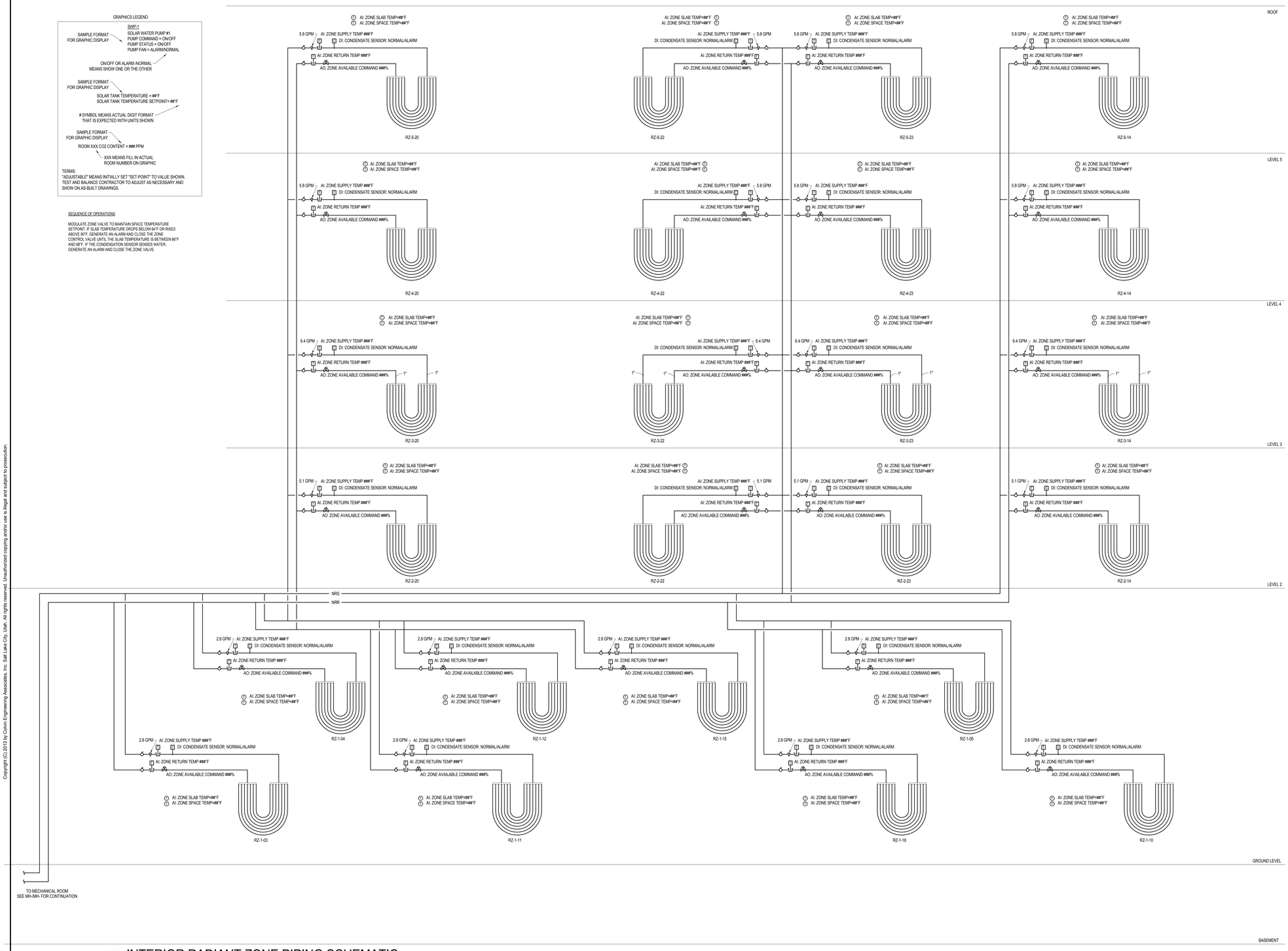

1 INTERIOR RADIANT ZONE PIPING SCHEMATIC

SCALE: NONE

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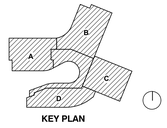

KEY PLAN

Drawing Title:

INTERIOR RADINAT SCHEMATIC

Project No.: 2014-017.00 Checked by: JMB

MP205

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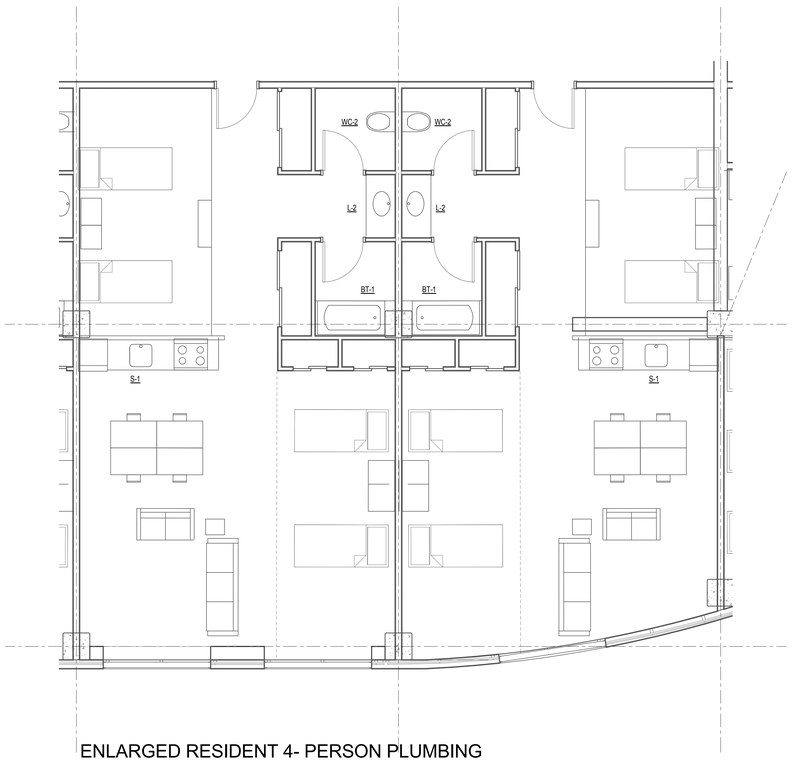
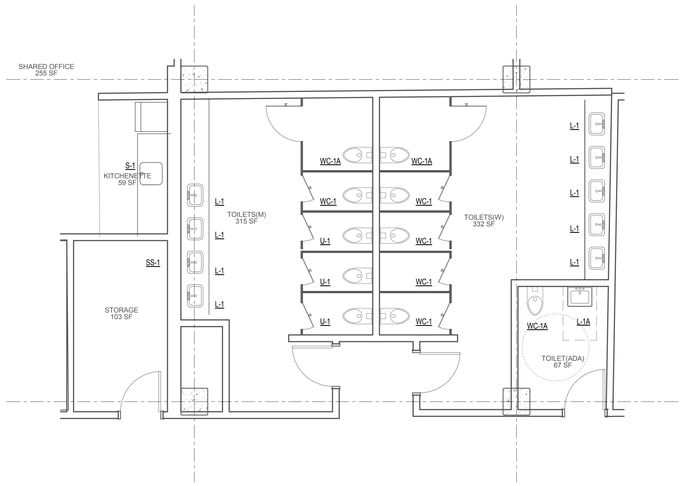
KEYED NOTES

GENERAL NOTES

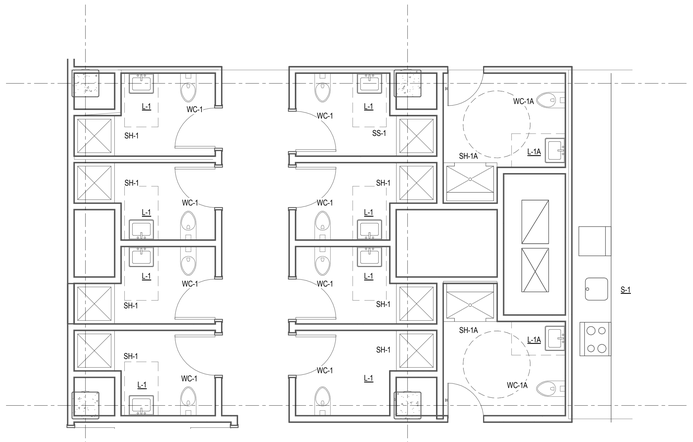
A. PLUMBING GENERAL NOTES
B.
C.



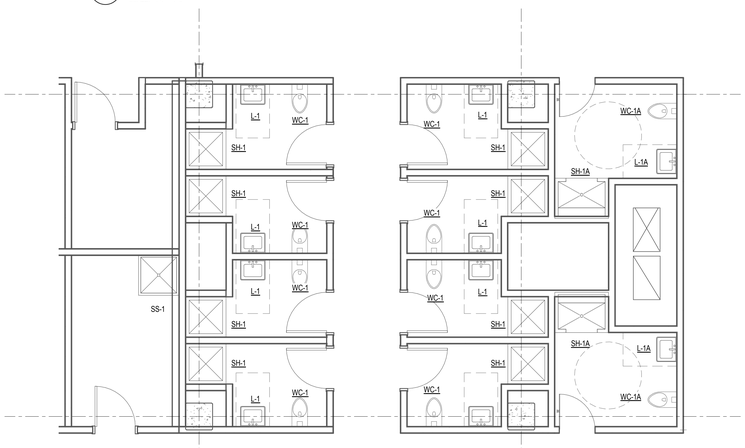
4 ENLARGED RESIDENT 4- PERSON PLUMBING PLAN
SCALE: 1/4" = 1'-0"



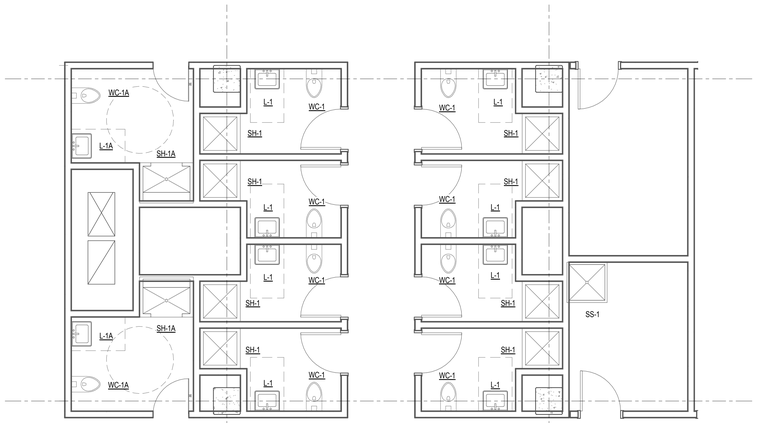
5 GROUND LEVEL RESTROOM
SCALE: 1/4" = 1'-0"



3 ENLARGED RESIDENT SOUTH COMMON RESTROOM
SCALE: 1/4" = 1'-0"



2 ENLARGED RESIDENT EAST COMMON RESTROOM
SCALE: 1/4" = 1'-0"



1 ENLARGED RESIDENT WEST COMMON RESTROOM
SCALE: 1/4" = 1'-0"

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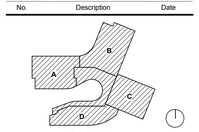

KEY PLAN

Drawing Title:

ENLARGED PLUMBING PLANS

Project No.: 2014-017.00 Checked by: JMB

PL401

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STORAGE TANK SCHEDULE (ST)

PLAN CODE	VOLUME (GALLONS)	DIMENSIONS		CONNECTION SIZES				MANUFACTURER & MODEL NO.	REMARKS
		DIAMETER (IN.)	HEIGHT (IN.)	WATER IN (IN.)	WATER OUT (IN.)	CIRCULATION IN (IN.)	CIRCULATION OUT (IN.)		
ST-1 THROUGH ST-4	1000	-	-	-	-	-	-	A.O. SMITH TJVT-1000	PROVIDE WITH GLASS LINING. INSULATION TO BE NO LESS THAN R-12.5.

WATER SOFTENER SCHEDULE (WS)

PLAN CODE	CONTINUOUS FLOW RATE	CAPACITY (GRAINS)	CONTROL	MAX DIMENSIONS	MANUFACTURER & MODEL NO	REMARKS
WS-1	300	-	-	-	WATER SPECIALTIES -	-

PLUMBING FIXTURE SCHEDULE

PLAN CODE	DESCRIPTION	ROUGH-IN SIZE					REMARKS
		C.W.	H.W.	TEMPERED	WASTE	VENT	
BT-1	BATHSHOWER COMBO	1/2"	1/2"	-	2"	2"	INCLUDE ADA BATHTUB AND HANDHELD 1.5 GPM SHOWERHEAD MOUNTED ON ADJUSTABLE SLIDER BAR. THERMOSTATIC AND PRESSURE BALANCED MIXING VALVE. AND POP UP DRAIN. KOHLER K715 TUB WITH SYMONS 25-400-800-V TRIM OR EQUAL.
FD-1	FLOOR DRAIN	-	-	-	2"	2"	PROVIDE WITH SQUARE TOP AND TRAP PRIMER. ZURN Z415S OR EQUAL.
FD-2	FLOOR DRAIN	-	-	-	3"	2"	PROVIDE WITH SQUARE TOP AND TRAP PRIMER. ZURN Z415S OR EQUAL.
FS-1	FLOOR SINK	-	-	-	3"	2"	12/12 WITH SQUARE TOP 3/4" GRATE. ZURN 1900 OR EQUAL BY KOHLER, WADE, SMITH
GD-1	GARBAGE DISPOSAL	-	-	-	-	-	INSINKERATOR BADGER 1-1/3HP 1 PHASE/ 120V/ 60Hz 14 LBS, 11 3/8" HEIGHT OR EQUAL
H-1	HYDRANT	3/4"	-	-	-	-	FREEZE PROOF WALL BOX AND KEYED HANDLE. ZURN Z1320 OR EQUAL
HB-1	HOSE BIBB	1/2"	-	-	-	-	PROVIDE WITH KEYED HANDLE. WOODFORD MODEL 24 OR EQUAL
S-1	KITCHEN SINK (ALL APARTMENTS)	1/2"	1/2"	-	1 1/2"	1 1/2"	33" X 22" STAINLESS STEEL 2 COMPARTMENT SINK WITH REAR DRAIN OUTLET AND GARBAGE DISPOSAL GD-1. PROVIDE WITH 1.5 GPM AERATOR. KOHLER K3369 SINK WITH SYMMONS SS245 FAUCET
S-2	HOSPITALITY SINK (COMMON AREAS)	1/2"	1/2"	-	1 1/2"	1 1/2"	15" SINGLE COMPARTMENT STAINLESS STEEL ASA BAR SINK WITH BAR FAUCET. KOHLER K3349 SINK WITH SYMMONS SS245 FAUCET
S-3	KITCHEN SINK (ADA UNITS)	1/2"	1/2"	-	1 1/2"	1 1/2"	33" X 22" STAINLESS STEEL 2 COMPARTMENT SINK WITH REAR DRAIN OUTLET AND GARBAGE DISPOSAL GD-1. MAXIMUM SINK DEPTH SHALL NOT EXCEED 5 1/2". PROVIDE WITH ADA SHROUD. PTOVIDE WITH 1.5 GPM AERATOR. ELKAY ELRAD SINK WITH SYMMONSSS23PS15 OR EQUAL.
S-4	DEEP DROP-IN SINK (LAUNDRY ROOM)	1/2"	1/2"	-	1 1/2"	1 1/2"	SINGLE COMPARTMENT DEEP DROP-IN STAINLESS STEEL ADA SINK. KOHLER SINK AND SYMMONS FAUCET, OR EQUAL.
L-1	WALL MOUNTED LAVATORY	1/2"	1/2"	-	1 1/2"	1 1/2"	PROVIDE WITH THERMOSTATIC AND PRESSURE MIXING VALVE AND 1.5 GPM SENSOR FAUCET. FAUCET TO BE BATTERY OPERATED. KOHLER K2007 SINK WITH SLOAN FAUCET OR EQUAL.
SH-1	SHOWER	1/2"	1/2"	-	2"	2"	1.5 GPM SHOWER HEAD AND TRIM WITH THERMOSTATIC AND PRESSURE BALANCED MIXING VALVE. COORDINATE FINISH WITH ARCH. AND OWNER. PROVIDE FLOOR DRAIN AT BASE. SYMMONS S25 OR EQUAL.
SH-2	ADA SHOWER	1/2"	1/2"	-	2"	2"	INCLUDE ADA HANDHELD 1.5 GPM SHOWERHEAD MOUNTED ON ADJUSTABLE SLIDER BAR, THERMOSTATIV AND PRESSURE BALANCED MIXING VALVE AND SHOWER DRAIN. SYYMONS S25-300 OR EQUAL.
SS-1	SERVICE SINK	3/4"	3/4"	-	3"	3"	FLOOR MOUNTED MOP SINK AND SERVICE FAUCET WITH 48" HOSE RACK. KOHLER K6710 OR EQUAL.
EWC-1	ELECTRIC WATER COOLER - BI LEVEL	1/2"	-	-	1 1/2"	1 1/2"	ADA COMPLIANT BI-LEVEL FOUNTAIN. ELKAY EEZSTLBLC OR EQUAL.
WC-1	WATER CLOSET	3/4"	-	-	4"	2"	RESIDENTAL 1.28 HET TANK TYPE. AMERICAN STANDARD CADET 3 OR EQUAL EQUIVALENT WITH MAP TEST OF 1000, AND 2" BALL PASS.
WC-1A	ADA WATER CLOSET	3/4"	-	-	4"	2"	RESIDENTAL 1.28 HET TANK TYPE. AMERICAN STANDARD CADET 3 OR EQUAL EQUIVALENT WITH MAP TEST OF 1000, AND 2" BALL PASS.
WC-2	WATER CLOSET	1"	-	-	4"	2"	WALL MOUNTED 1.28 GPF SENSOR FLUSH VALVE, WITH MAP SCORE 1000. KOHLER K4325 OR EQUAL.
WC-2A	ADA WATER CLOSET	1"	-	-	4"	2"	WALL MOUNTED 1.28 GPF SENSOR FLUSH VALVE, WITH MAP SCORE 1000. KOHLER K4325 OR EQUAL.
U-1	URINAL	3/4"	-	-	2"	2"	PINT GPF SENSOR FLUSH VALVE

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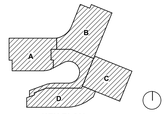

KEY PLAN

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Project No.: 2014-017.00 Checked by: JMB

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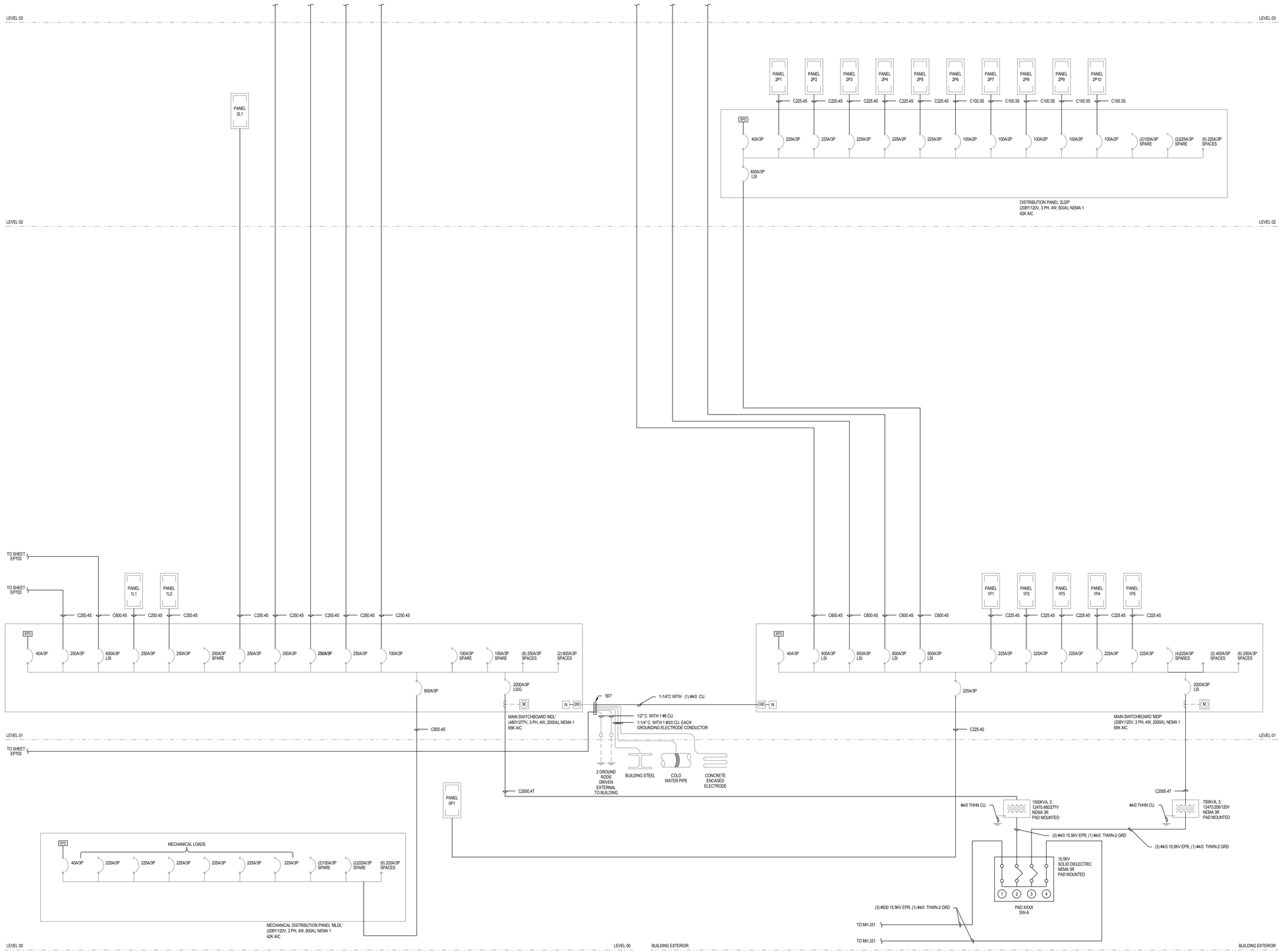

1 **ONE-LINE DIAGRAM-1**
SCALE: **12" = 1'-0"**

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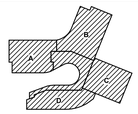

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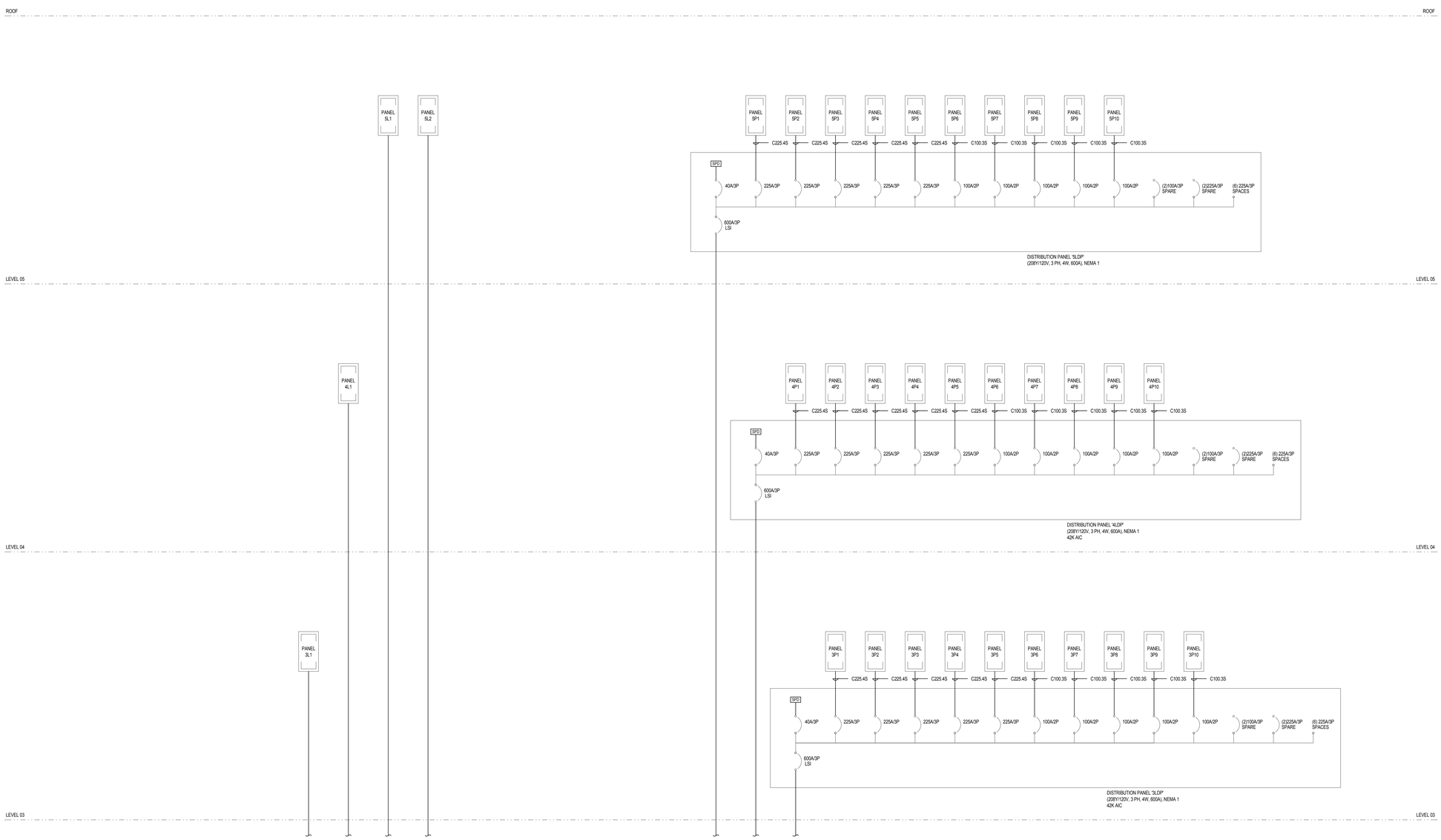

1 **ONE-LINE DIAGRAM-2**
SCALE: **12" = 1'-0"**

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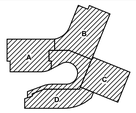

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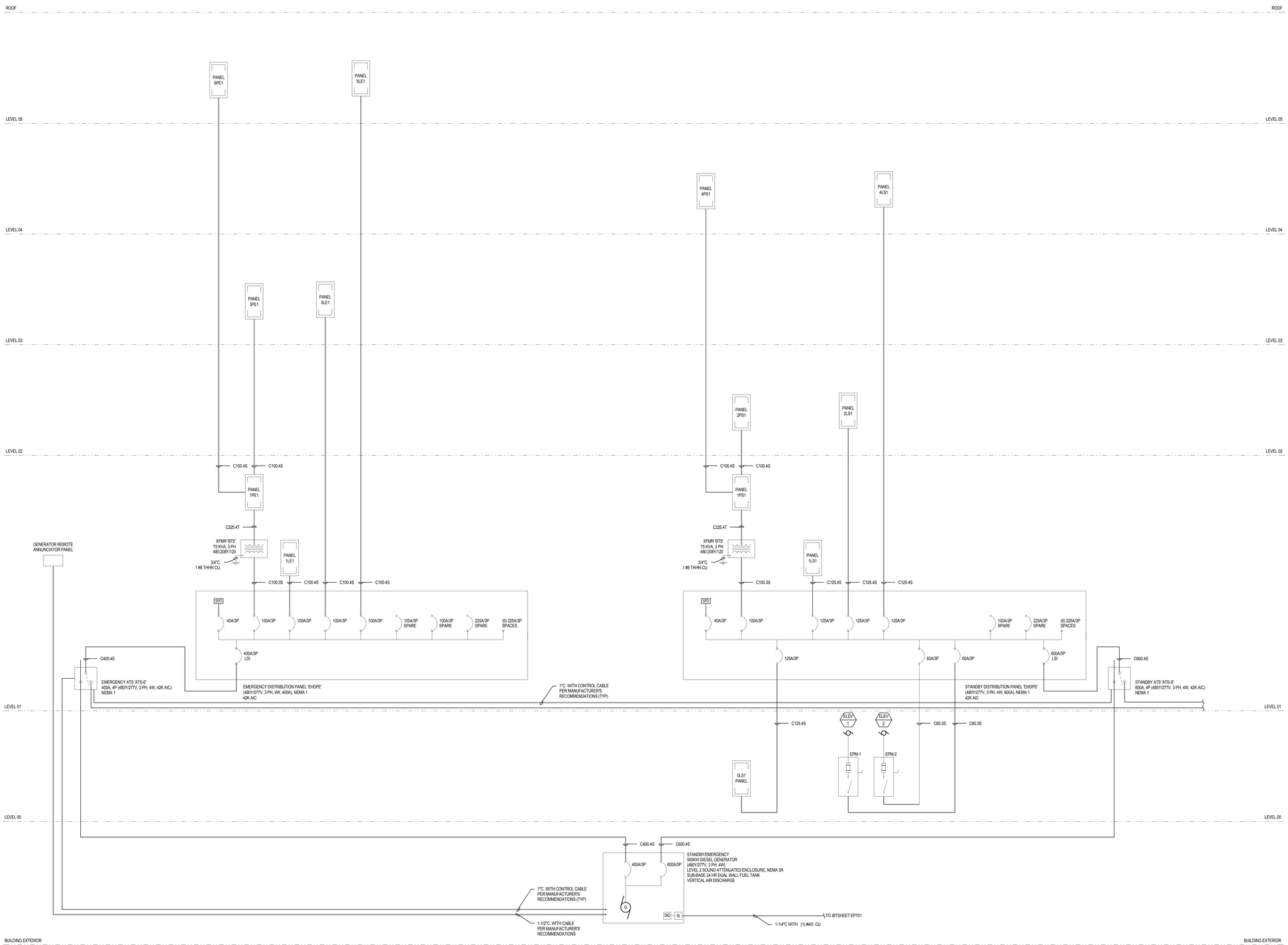

1 **ONE-LINE DIAGRAM-3**
SCALE: **12" = 1'-0"**

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Drawing Title:

ONE-LINE DIAGRAM

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1 ELECTRICAL SITE PLAN
SCALE: 1" = 20'-0"

KEYED NOTES

1. PROVIDE 5" PVC CONDUIT IN CONCRETE ENCASED DUCTBANK FROM SWITCH TO MH.331.
2. PROVIDE 4" PVC CONDUIT NE CONCRETE ENCASED DUCTBANK FROM TELECOM ROOM TO TELECOM MH.34.

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KEY PLAN

Drawing Title:

ELECTRICAL SITE PLAN

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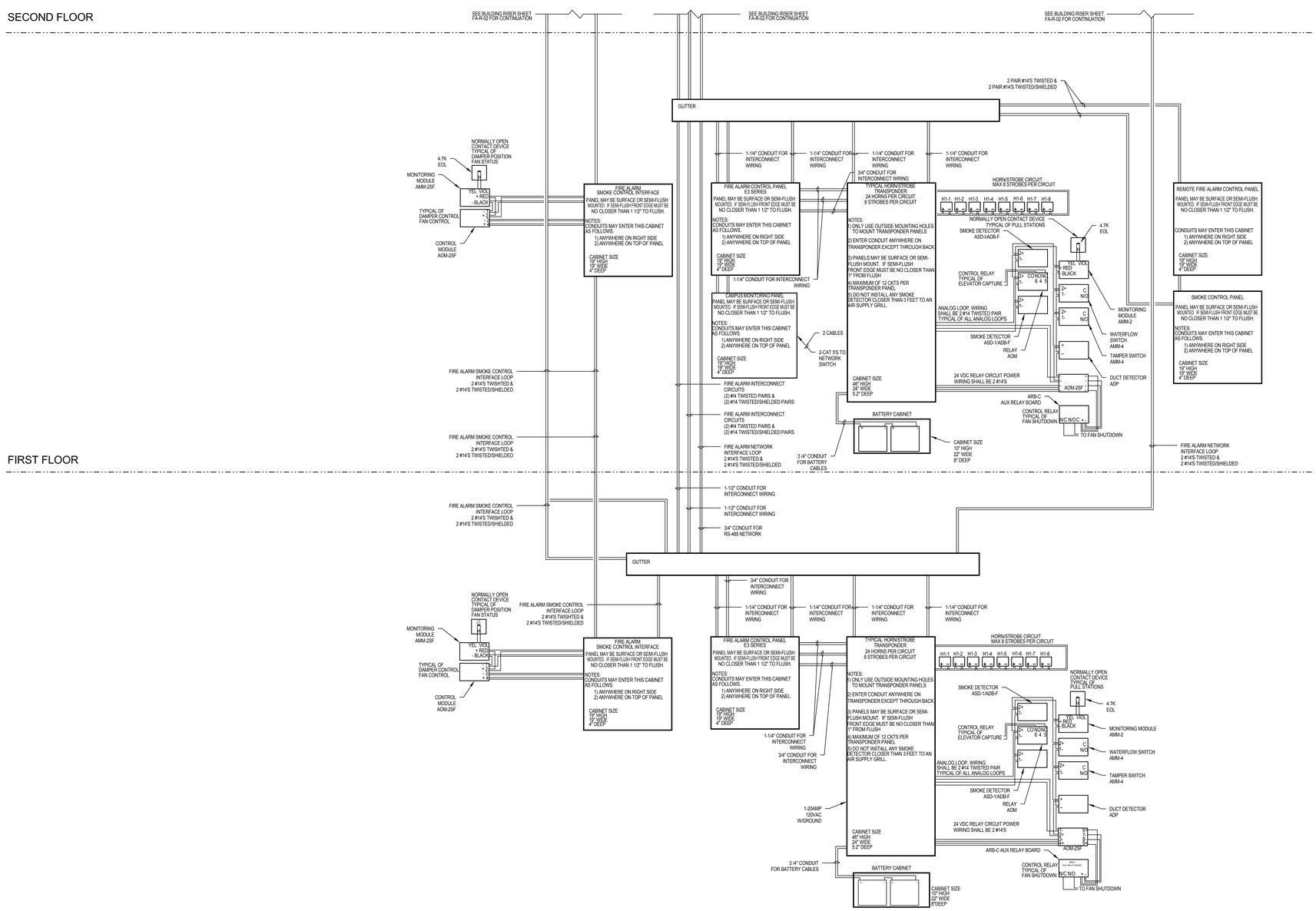

1 **FIRE ALARM RISER DIAGRAM - 1**
SCALE: 12" = 1'-0"

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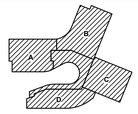

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FIRE ALARM RISER DIAGRAM - 1

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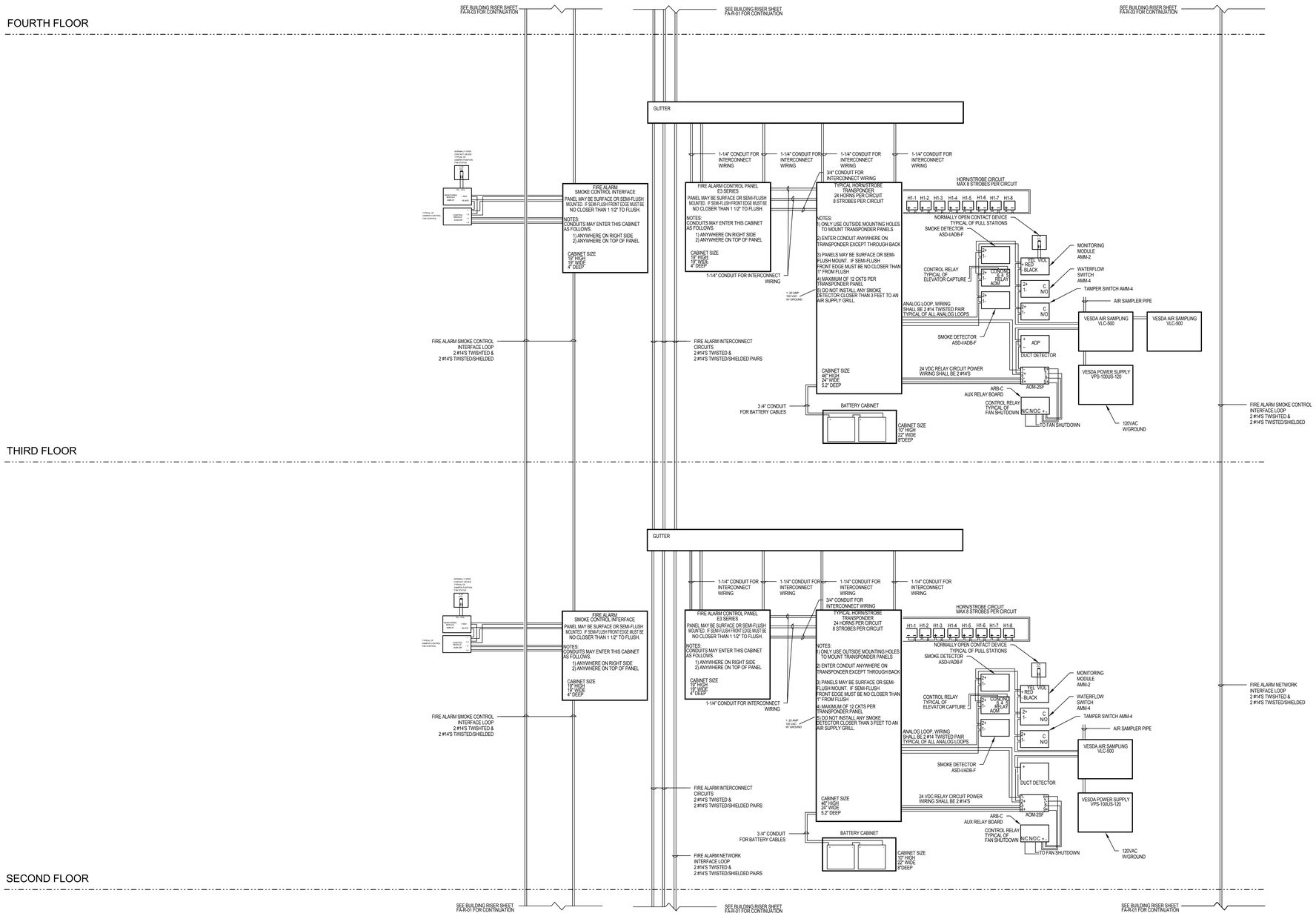

1 **FIRE ALARM RISER DIAGRAM - 2**
SCALE: **12" = 1'-0"**

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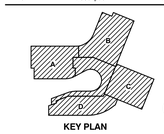

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FIRE ALARM RISER DIAGRAM - 2

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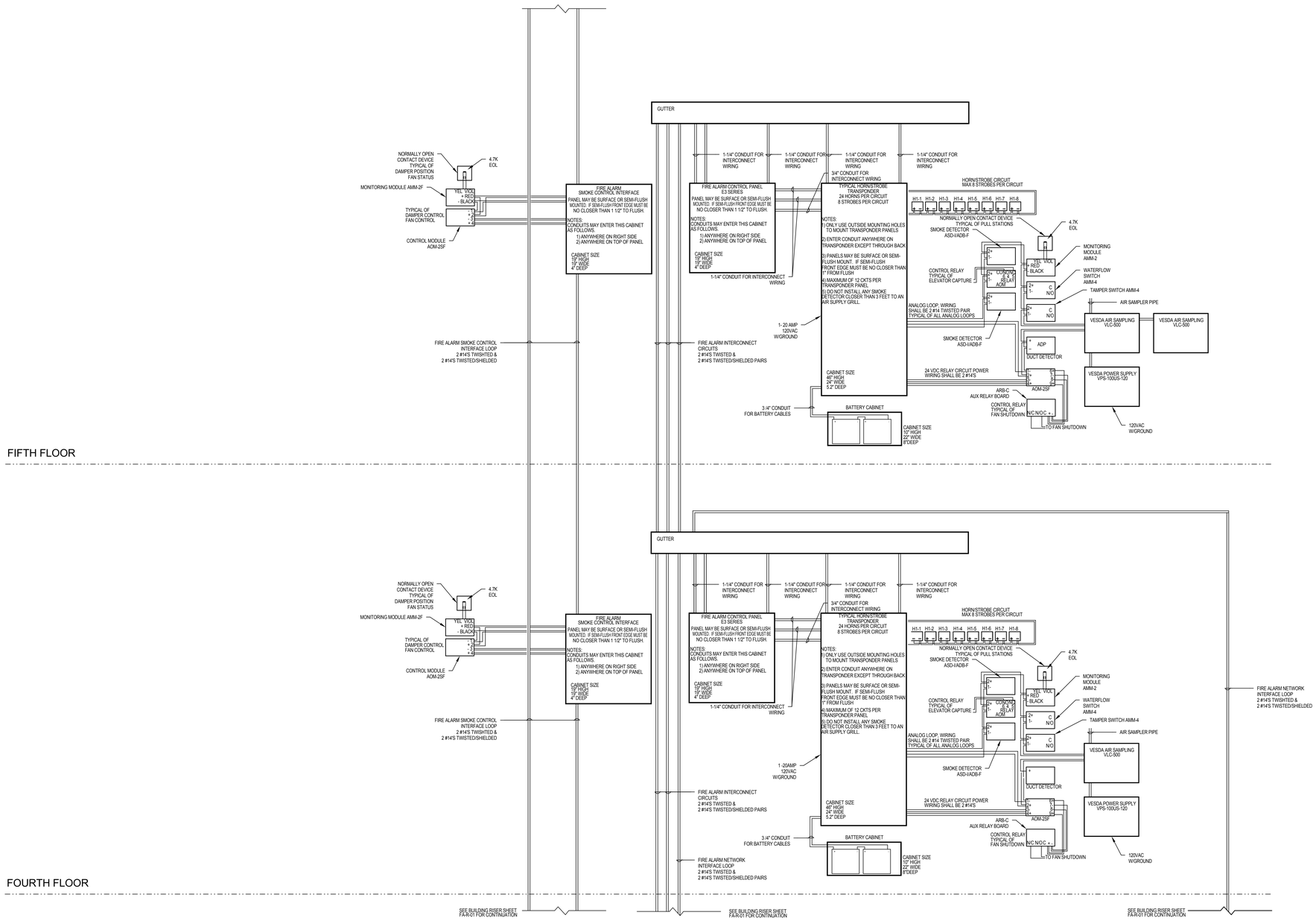

1 **FIRE ALARM RISER DIAGRAM - 3**
SCALE: **12" = 1'-0"**

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FIRE ALARM RISER DIAGRAM - 3

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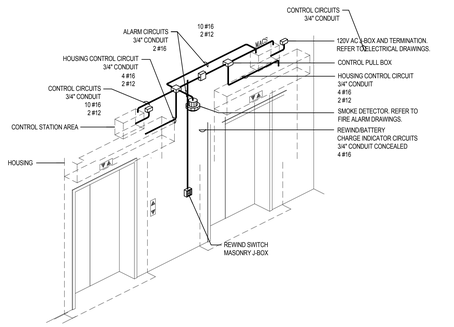


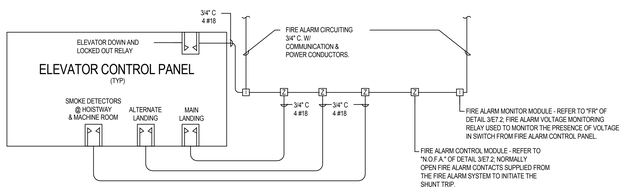
1 SMOKE GUARD ELECTRICAL ROUGH-IN
SCALE: NONE PASSENGER ELEV. - TYP ALL LEVELS

SMOKE GUARD NOTES:

THE FOLLOWING ITEMS ARE TO BE INCLUDED UNDER THE SCOPE OF WORK FOR THE ELECTRICAL CONTRACTOR:

1. SMOKE DETECTOR: CONTRACTOR SHALL PROVIDE SMOKE DETECTOR COMPLYING WITH UL268 AT LOBBY CEILING PER CODE, EQUIPPED WITH AN AUXILIARY NORMALLY OPEN CONTACT AND SUPPLIED WITH BATTERY BACKUP OR EMERGENCY POWER. SMOKE CONTAINMENT SYSTEM IS CONNECTED TO THE LOCAL DETECTOR, NOT THE GENERAL ALARM. NO VOLTAGE SHALL EXIST ACROSS THE AUXILIARY CONTACT.
2. 120V AC POWER: GROUND PROVIDED AND TERMINATED BY CONTRACTOR. EXTEND 120V CIRCUIT FROM ELECTRICAL PANEL CURRENTLY SERVING RESPECTIVE FLOOR. CONTACT ELECTRICAL ENGINEER PRIOR TO BID FOR ANY CLARIFICATIONS REQUIRED
4. ALARM CIRCUIT: PROVIDED AND INSTALLED BY CONTRACTOR FROM THE NORMALLY OPEN AUXILIARY CONTACT OF THE LOBBY SMOKE DETECTOR TO SMOKE GUARD HOUSING.
5. HOUSING CONTROL CIRCUIT: PROVIDED AND INSTALLED BY CONTRACTOR.
6. CONDUIT: PROVIDE 3/4" CONDUIT BETWEEN ALL THE ABOVE MENTIONED DEVICES AND JUNCTION BOXES.

ELECTRICAL CONTRACTOR REQUIREMENTS FOR EACH HOISTWAY DOOR PRIOR TO SMOKE GUARD SYSTEM INSTALLATION: VERIFY ALL REQUIREMENTS WITH SMOKE GUARD PRIOR TO ROUGH-IN.



2 FIRE ALARM AND ELEVATOR INTERFACE FOR ELEVATOR CAPTURE AND SHUT DOWN
SCALE: NONE

COMPLY WITH ALL NFPA REQUIREMENTS REGARDING ELEVATOR SHUT DOWN, MONITORING ETC.

FIRE ALARM INPUT/OUTPUT MATRIX

NOTE:

1. VERIFY ALL PROGRAMMING REQUIREMENTS WITH FIRE MARSHAL PRIOR TO PROGRAMMING THE FIRE ALARM SYSTEM. COMPLY WILL ALL FIRE MARSHAL REQUIREMENTS.
2. THE FIRE ALARM SYSTEM SHALL BE PROGRAMMED SO THAT WHEN A DUCT DETECTOR IS ACTIVE ON A FLOOR THE ASSOCIATED FIRE/SMOKE DAMPERS WILL CLOSE.
3. COORDINATE ALL ELEVATOR CONTROL REQUIREMENTS WITH THE ELEVATOR INSTALLER / CONTROL CONTRACTOR.

SYSTEM OUTPUT

	FACP ANNUNCIATION					NOTIFICATION								FIRE SAFETY CONTROL							AUX. SIGNALS			REPORTING			
INITIATING DEVICES	ALARM SIGNAL TO MONITORING COMPANY	SUPERVISORY SIGNAL TO MONITORING COMPANY	TROUBLE SIGNAL TO MONITORING COMPANY			BASEMENT LEVEL HORNS/STROBES	LEVEL 1 HORNS/STROBES	LEVEL 2 HORNS/STROBES	LEVEL 3 HORNS/STROBES	LEVEL 4 HORNS/STROBES	PENHOUSE LEVEL3 HORNS/STROBES	EXTERIOR HORNS	WATER FLOW HORNS/STROBE	ELEVATOR PRIMARY RECALL	ELEVATOR ALTERNATE RECALL	ELEVATOR SHUNT-TRIP	HVAC SHUTDOWN (SEE SEQ. OF OPERATION)	FIRE/SMOKE DAMPERS (SEE SEQ. OF OPERATION)	RELEASE MAGNETIC DOOR HOLDERS		SIGNAL TO DOOR ACCESS SYSTEM (ATRIUM DOORS)	SIGNAL TO DOOR ACCESS SYSTEM	SIGNAL TO DOOR ACCESS SYSTEM (OTHER DOORS)	REPORT TO PRINTER	REPORT TO MASTER FIRE ALARM PANEL		
LEVEL BASEMNT ELEV. LOBBY SMOKE DETECTORS	X					X	X	X	X	X	X			X	X		X	X	X				X	X	X		
LEVEL BASEMNT SMOKE DETECTORS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL BASEMNT HEAT DETECTORS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL BASEMNT DUCT DETECTORS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL BASEMNT WATERFLOW	X					X	X	X	X	X	X	X					X	X	X				X	X	X		
LEVEL BASEMNT TAMPER		X																						X	X		
LEVEL BASEMNT PULL STATIONS	X					X	X	X	X	X	X						X	X	X				X	X	X		
ELEVATOR PIT HEAT DETECTOR	X					X	X	X	X	X	X			X	X	X	X	X	X				X	X	X		
LEVEL BASEMNT ELEV. SHAFT HEAT DETECTOR (IF APPLICABLE)	X					X	X	X	X	X	X					X	X	X	X				X	X	X		
LEVEL 1 ELEV. LOBBY SMOKE DETECTORS	X					X	X	X	X	X	X			X	X		X	X	X				X	X	X		
LEVEL 1 SMOKE DETECTORS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 1 HEAT DETECTORS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 1 DUCT DETECTORS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 1 WATERFLOW	X					X	X	X	X	X	X	X					X	X	X				X	X	X		
LEVEL 1 TAMPER		X																						X	X		
LEVEL 1 PULL STATIONS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 1 ELEV. SHAFT HEAT DETECTOR (IF APPLICABLE.)	X					X	X	X	X	X	X					X	X	X	X				X	X	X		
LEVEL 2 ELEV. LOBBY SMOKE DETECTORS	X					X	X	X	X	X	X			X	X		X	X	X				X	X	X		
LEVEL 2 SMOKE DETECTORS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 2 HEAT DETECTORS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 2 DUCT DETECTORS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 2 WATERFLOW	X					X	X	X	X	X	X	X					X	X	X				X	X	X		
LEVEL 2 TAMPER		X																						X	X		
LEVEL 2 PULL STATIONS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 2 ELEV. SHAFT HEAT DETECTORS (IF APPLICABLE)	X					X	X	X	X	X	X					X	X	X	X				X	X	X		
LEVEL 3 ELEV. LOBBY SMOKE DETECTORS	X					X	X	X	X	X	X			X	X		X	X	X				X	X	X		
LEVEL 3 SMOKE DETECTOR	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 3 HEAT DETECTORS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 3 DUCT DETECTORS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 3 WATERFLOW	X					X	X	X	X	X	X	X					X	X	X				X	X	X		
LEVEL 3 TAMPER		X																						X	X		
LEVEL 3 PULL STATIONS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 3 ELEV. SHAFT HEAT DETECTORS (IF APPLICABLE)	X					X	X	X	X	X	X					X	X	X	X				X	X	X		
LEVEL 4 ELEV. LOBBY SMOKE DETECTORS	X					X	X	X	X	X	X			X	X		X	X	X				X	X	X		
LEVEL 4 SMOKE DETECTOR	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 4 HEAT DETECTORS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 4 DUCT DETECTORS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 4 WATERFLOW	X					X	X	X	X	X	X	X					X	X	X				X	X	X		
LEVEL 4 TAMPER		X																						X	X		
LEVEL 4 PULL STATIONS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LEVEL 4 ELEV. SHAFT HEAT DETECTORS (IF APPLICABLE)	X					X	X	X	X	X	X					X	X	X	X				X	X	X		
PENTHOUSE LEVEL ELEV. LOBBY SMOKE DETECTOR	X					X	X	X	X	X	X			X	X		X	X	X				X	X	X		
PENTHOUSE LEVEL SMOKE DETECTORS	X							X	X	X	X						X	X	X				X	X	X		
PENTHOUSE LEVEL DUCT DETECTORS	X							X	X	X	X						X	X	X				X	X	X		
PENTHOUSE LEVEL PULL STATIONS	X							X	X	X	X						X	X	X				X	X	X		
ELEVATOR ROOM HEAT DETECTOR	X					X	X	X	X	X	X					X	X	X	X				X	X	X		
ATRIUM SMOKE DETECTION SYSTEM (VESDA)	X					X	X	X	X	X	X						X	X	X		X	X	X	X	X		
ATRIUM SMOKE DETECTORS	X					X	X	X	X	X	X						X	X	X		X	X	X	X	X		
ATRIUM PULL STATIONS	X					X	X	X	X	X	X						X	X	X				X	X	X		
LOSS OF POWER ANY PANEL OR NAC			X																					X	X		
LOW BATTERY CONDITIONS			X																					X	X		
OPEN CIRCUIT CONDITIONS		X																						X	X		
GROUND FAULTS		X																						X	X		

NOTE: THE FIRE ALARM SYSTEM SUPPLIER SHALL PROVIDE A MATRIX SIMILAR TO THE ONE SHOWN ABOVE. THE FIRE ALARM SYSTEM MATRIX SHALL REPRESENT THE OPERATIONAL PARAMETERS OF THE SYSTEM. THE MATRIX SHALL MEET ALL REQUIREMENTS OF FEDERAL, STATE AND LOCAL CODES AND REQUIREMENTS.

1 FIRE ALARM DETAILS AND SCHEDULES
SCALE: 12" = 1'-0"

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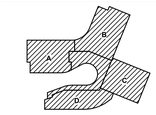

KEY PLAN

Drawing Title:

FIRE ALARM DETAILS AND SCHEDULES

Project No.: 000000.00 Checked by: JO

EY704

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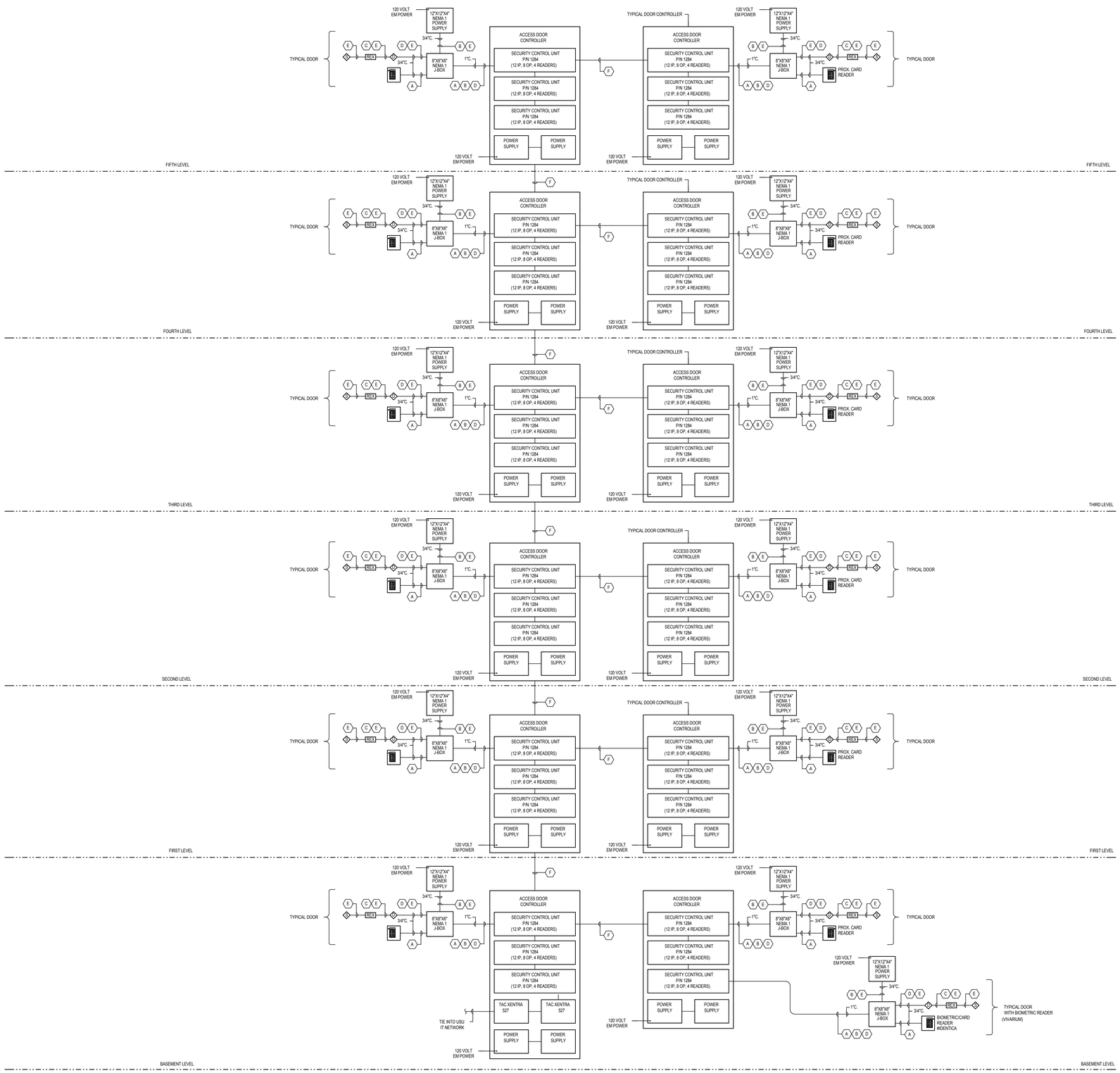

1 **CARD ACCESS SYSTEM RISER DIAGRAM**
SCALE: **12" = 1'-0"**

CARD ACCESS SYSTEM NOTES:

1. THE CONTRACTOR SHALL PROVIDE A COMPETE RACEWAY SYSTEM FOR THIS SYSTEM AS SHOWN IN THE RISER DIAGRAM. THE CONTRACTOR SHALL EXTEND A CONDUIT FROM EACH DOOR BACK TO THE DOOR CONTROLLERS WHICH WILL BE LOCATED ON THE CORRESPONDING FLOOR. COORDINATE THE CONDUIT ROUGH-IN WITH THE CARD ACCESS SYSTEM CONTRACTOR.
2. THE ACCESS DOOR CONTROLLERS SHALL BE INSTALLED INTO A 24"X24"X6" DEEP TERMINAL CABINET. UP TO 3 SECURITY CONTROL UNITS P/N 1284 CAN BE INSTALLED INTO EACH TERMINAL CABINET. EACH TERMINAL CABINET WILL HANDLE A TOTAL OF 12 DOORS. PROVIDE THE NUMBER OF ACCESS DOOR CONTROLLERS NECESSARY TO HANDLE ALL DOORS REQUIRING CARD ACCESS.
3. THE POWER SUPPLY FOR THE DOOR LATCHES SHALL BE FURNISHED BY THE DOOR HARDWARE SUPPLIER AND INSTALLED BY THE DIVISION 26 CONTRACTOR.
4. THE DOOR CONTACT SWITCH WILL BE FURNISHED BY THE DOOR HARDWARE INSTALLER AND WILL BE LOCATED IN THE HINGE OF THE DOOR IN THE MAJORITY OF THE DOORS. HOWEVER, THERE ARE A FEW DOORS THAT REQUIRE THE DOOR POSITION SWITCH TO BE LOCATED IN THE DOOR JAMB. THE CARD ACCESS SYSTEM INSTALLER SHALL MAKE ALL WIRING CONNECTIONS.
5. THE REQUEST FOR EXIST DEVICE WILL BE LOCATED IN THE DOOR HANDSET AND THE DOOR HANDSET WILL BE ELECTRIFIED BY THE POWER SUPPLY WHICH IS SHOWN ON THE RISER DIAGRAM. THE CARD ACCESS SYSTEM INSTALLER SHALL MAKE ALL WIRING CONNECTIONS TO THESE DEVICES.
6. THE 8"X8"X6" NEMA 1 JUNCTION BOX LOCATED AT EACH DOOR SHALL BE PROVIDED BY THE DIVISION 26 CONTRACTOR.
7. THE ACCESS DOOR INSTALLER SHALL COORDINATE ALL WORK WITH THE DOOR HARDWARE INSTALLER.
8. ALL CARD ACCESS SYSTEM WIRING SHALL RUN IN CONDUIT BACK TO THE DOOR CONTROLLERS ON THEIR PERSPECTIVE LEVEL. NO WIRING SHALL BE RAN IN THE CABLE TRAY.
9. SYSTEM PIN ALL U-CARD STANDARDS AND REQUIREMENTS.

ACCESS CONTROL CABLE SCHEDULE

A	1 - 22/6 AWG. TWISTED SHIELDED CABLE
B	1 - 18/2 AWG. TWISTED CABLE
C	1 - 22/2 AWG. TWISTED CABLE
D	2 - 22/2 AWG. TWISTED CABLES
E	1 - 12/2 AWG. TWISTED CABLE
F	1 - 18/2 AWG. TWISTED SHIELDED CABLE

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No.	Description	Date
-	RELEASE 2	00 MAR 2011
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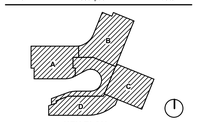

KEY PLAN

Drawing Title:

CARD ACCESS RISER DIAGRAM

Project No.: 000000.00 Checked by: JO

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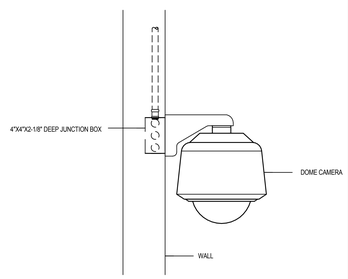
KEYED NOTES:

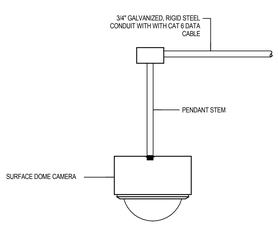
1. BASEMENT LEVEL CCTV CAMERAS. REFER TO PLANS FOR ACTAL QUANTITY AND TYP OF CAMERA.
2. LEVEL 1 CCTV CAMERAS. REFER TO PLANS FOR ACTUAL QUANTITY AND TYPE OF CAMERA.
3. LEVEL 2 CCTV CAMERAS. REFER TO PLANS FOR ACTUAL QUANTITY AND TYPE OF CAMERA.
4. LEVEL 3 CCTV CAMERAS. REFER TO PLANS FOR ACTUAL QUANTITY AND TYPE OF CAMERA.
5. LEVEL 4 CCTV CAMERAS. REFER TO PLANS FOR ACTUAL QUANTITY AND TYPE OF CAMERA.
6. EXTEND CAT 6 DATA CABLE FROM EACH CCTV CAMERA BACK TO COORESPONDING TELEPHONE ROOM ON THE LEVEL THAT THE CAMERA IS LOCATED.
7. CCTV SYSTEM EQUIPMENT AS REQUIRED.

GENERAL CCTV SYSTEM NOTES:

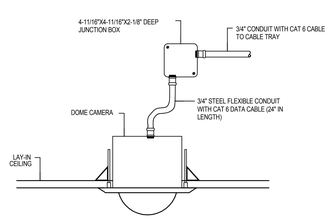
1. THE CCTV CAMERA SYSTEM SHALL UTLIZE POWER OVER ETHERNET (P.O.E.) TOPOLOGY.
2. PROVIDE A CAT 6 DATA CABLE TO EACH CCTV CAMERA FROM THE DATA RACK LOCATED IN THE TELEPHONE ROOM ON THE COORESPONDING FLOOR LEVEL.
3. A 3/4" CONDUIT SHALL EXTEND FROM EACH CAMERA TO THE NEAREST LOCATION OF THE CABLE TRAY. AT THE CABLE TRAY, THE CONDUIT SHALL BE SECURED TO THE CABLE TRAY USING A CONDUIT TO CABLE TRAY STRAP.
4. THE CABLE TRAY SHALL BE USED TO EXTEND THE CAT 6 DATA CABLES THAT ARE BEING USED FOR THE CAMERAS BACK TO THE TELEPHONE ROOM.
5. THE CAT 6 DATA CABLE SHALL RUN TO EACH CAMERA.



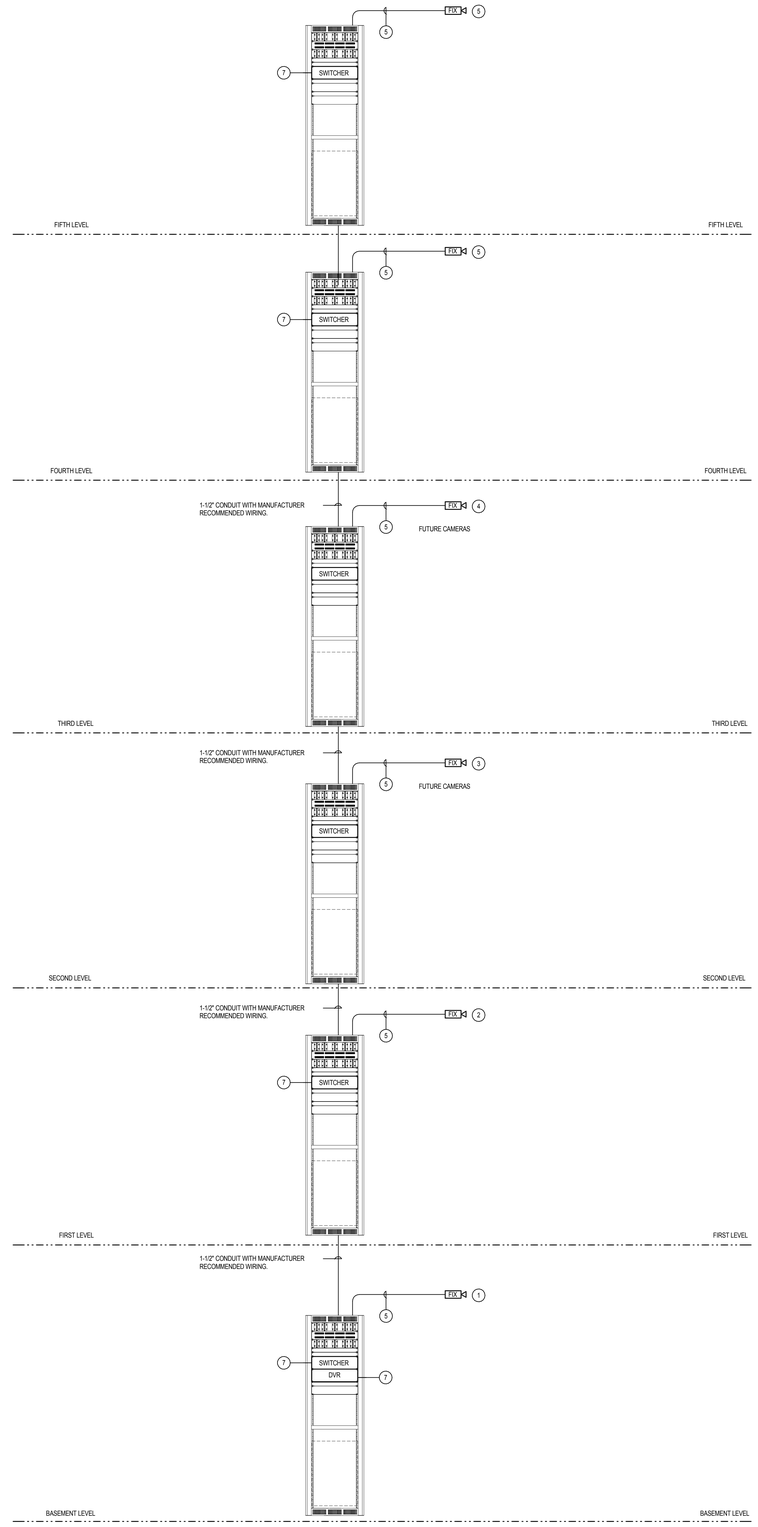
3 DOME CAMERA - WALL PENDANT MOUNT
SCALE: NONE



2 DOME CAMERA - SURFACE CEILING MOUNT
SCALE: NONE



1 DOME CAMERA - RECESS CEILING MOUNT
SCALE: NONE



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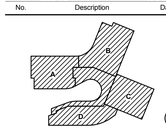

KEY PLAN

Drawing Title:

CCTV RISER DIAGRAM

Project No.: 000000.00 Checked by: JO

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