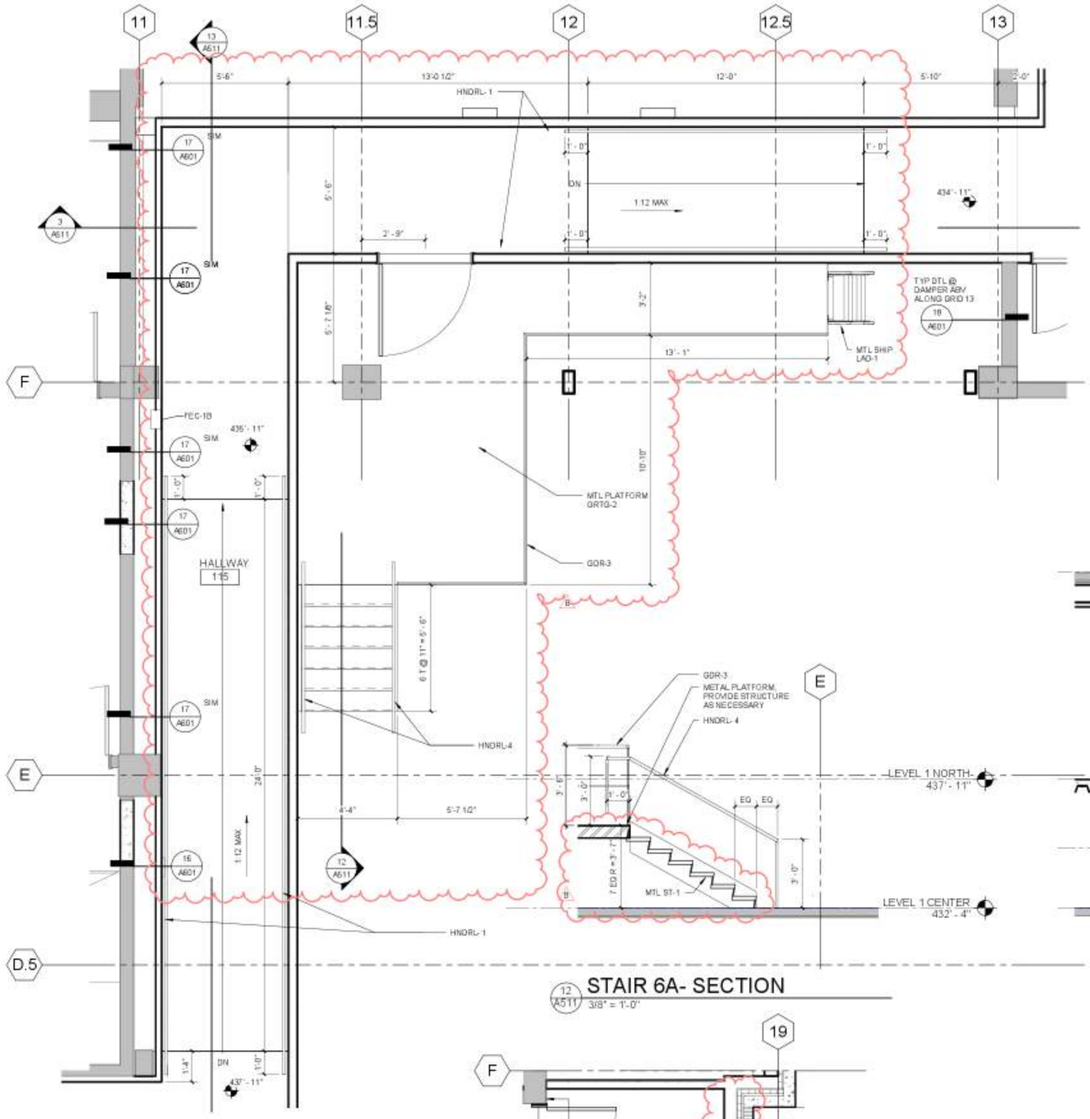
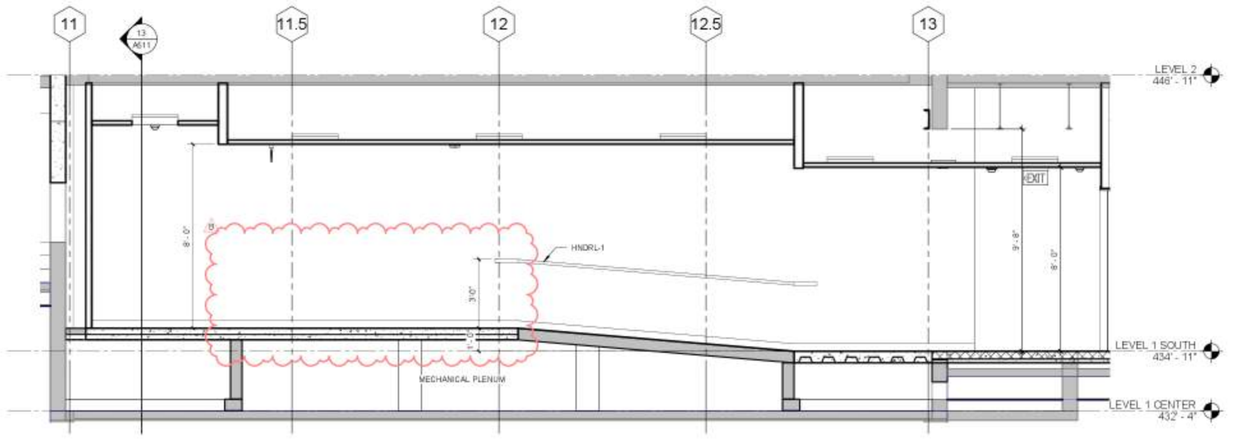
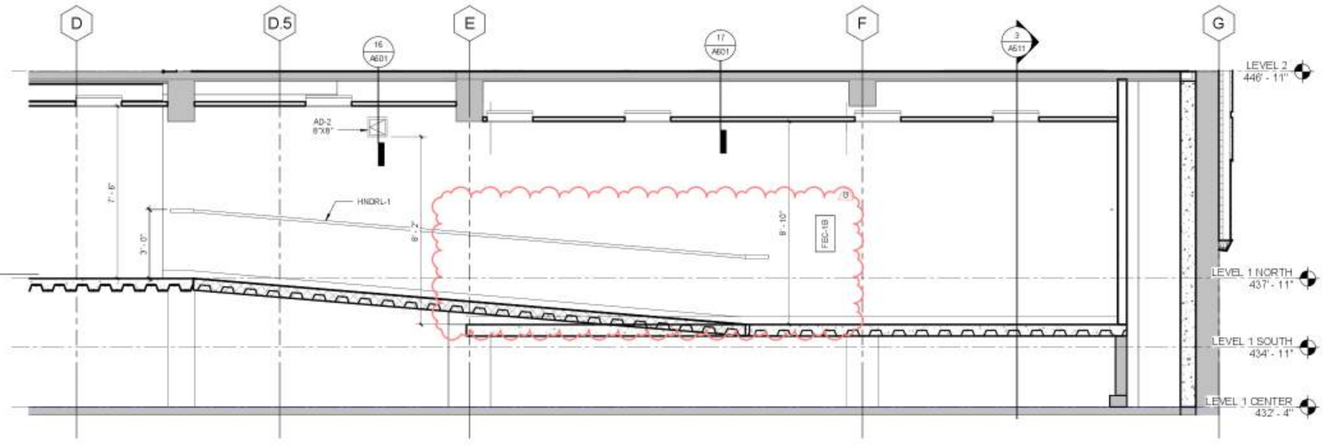


12 A511 STAIR 6A- SECTION
3/8" = 1'-0"



3 A511 RAMP 1A - SECTION
3/8" = 1'-0"



13 A511 RAMP 1B - SECTION
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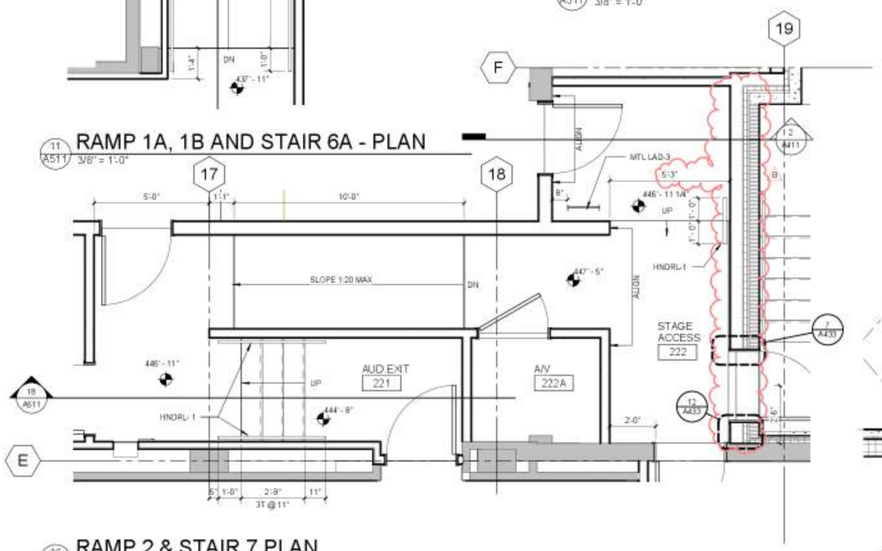
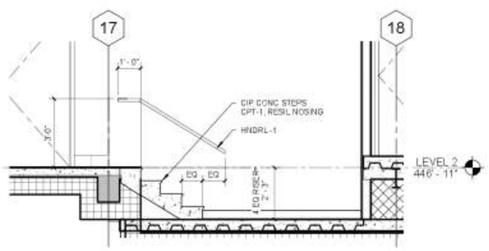


16 A511 RAMP 2 & STAIR 7 PLAN
3/8" = 1'-0"



18 A511 STAIR 7 SECTION
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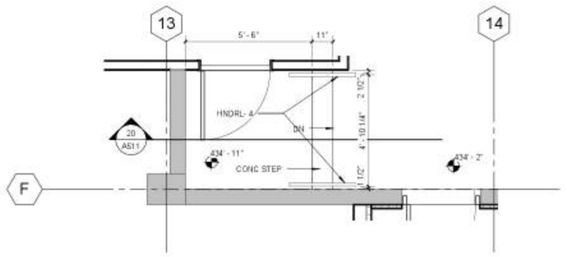
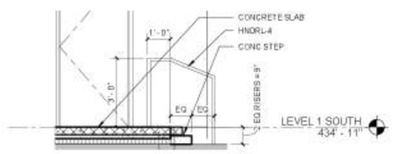


19 A511 STAIR 6B - PLAN
3/8" = 1'-0"



20 A511 STAIR 6B- SECTION
3/8" = 1'-0"

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SAM ASIAN ART MUSEUM

Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect /
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Construction Documents

Submittal

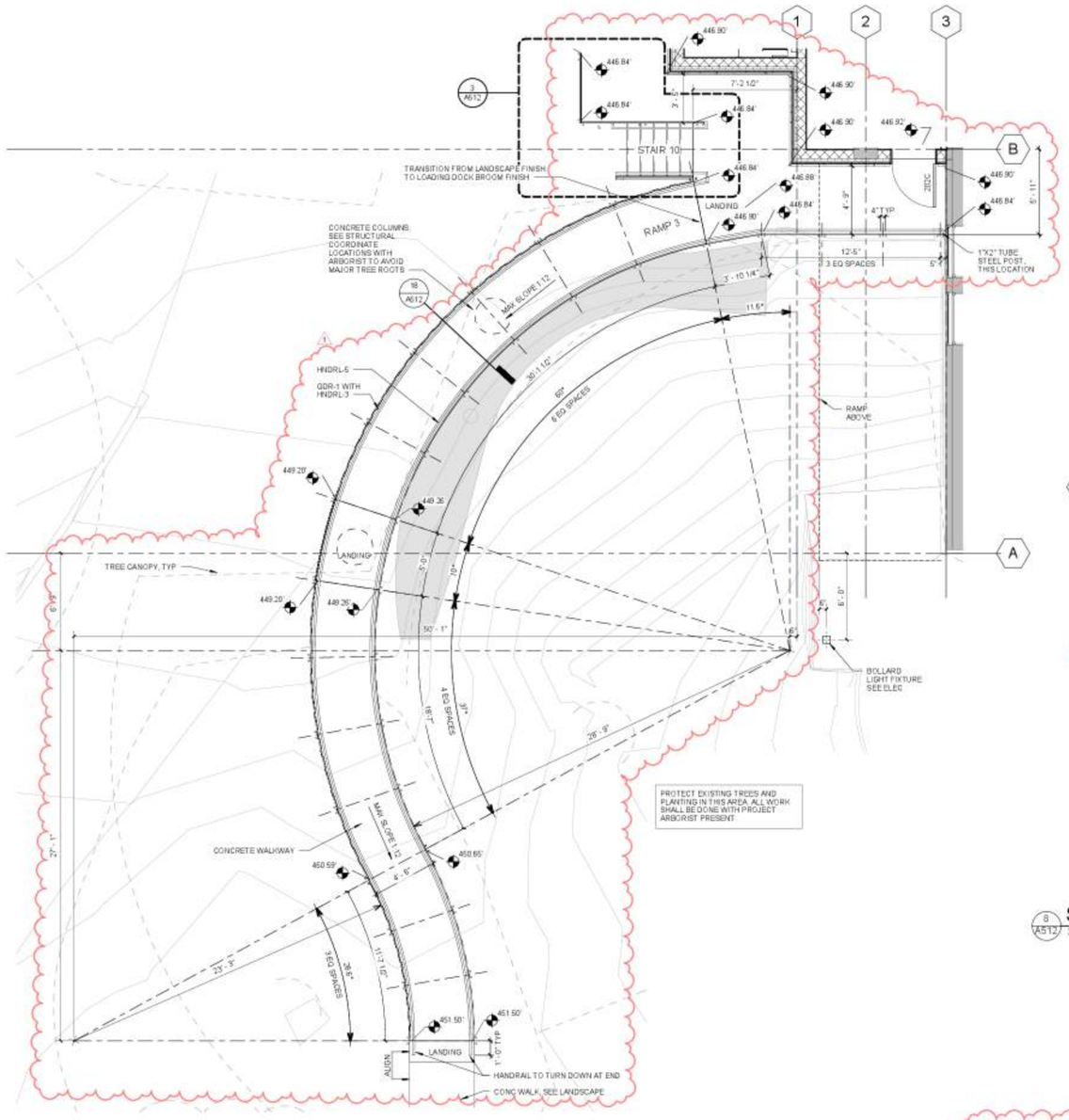
Revisions

No	Date	Description
B	9/1/17	PERMIT CORRECTIONS 1

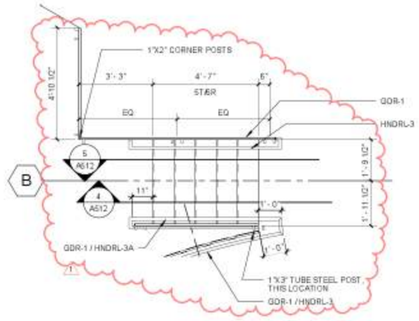
Drawn	Author
Checked	Checker
LMN Proj No	16028.01
Date	6/23/17

Sheet Title: Enlarged Plans & Sections - Misc Stairs & Ramps

Sheet Number: **A511**



1 A512 ELEVATED WALKWAY & STAIR 10 - ENLARGED PLAN
1/4" = 1'-0"



3 A512 STAIR 10 - ENLARGED PLAN
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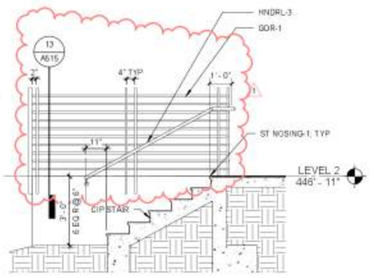

4 A512 STAIR 10 SECTION 1
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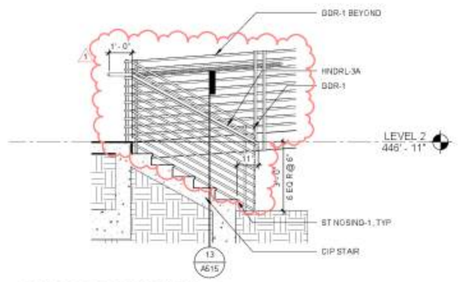

5 A512 STAIR 10 SECTION 2
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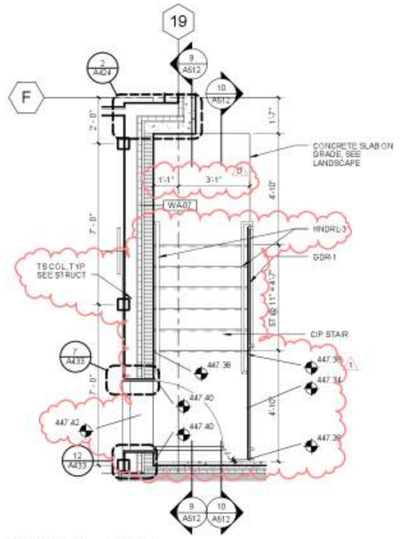
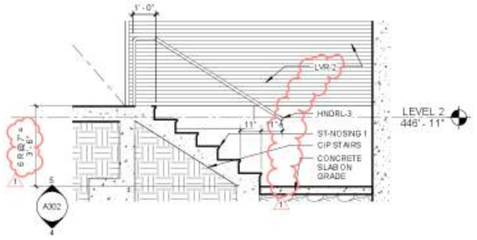
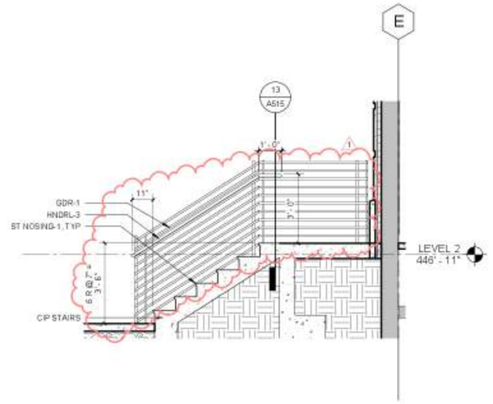


8 A512 STAIR 9 - PLAN
3/8" = 1'-0"



9 A512 STAIR 9 - SECTION 1
3/8" = 1'-0"



10 A512 STAIR 9 - SECTION 2
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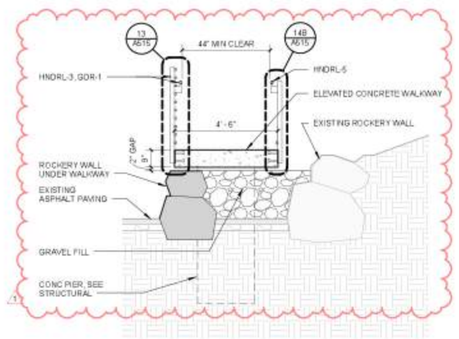

18 A512 ELEVATED WALKWAY DETAIL
3/8" = 1'-0"

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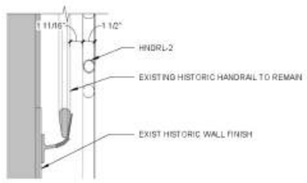
Revisions

No.	Date	Description
1	7/12/17	ADDENDUM #1
B	9/1/17	PERMIT CORRECTIONS 1

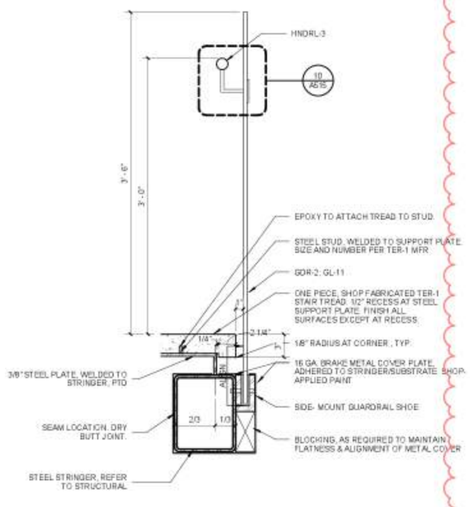
Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Enlarged Plans & Sections - Elevated Walkway & Ext Stairs

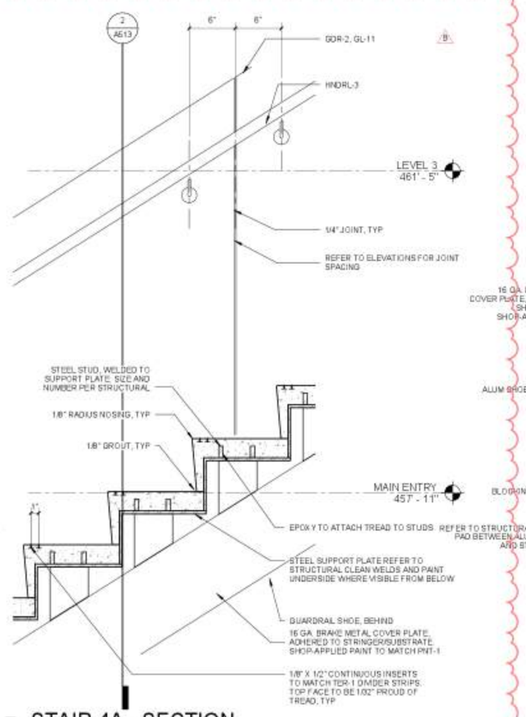
Sheet Number: A512



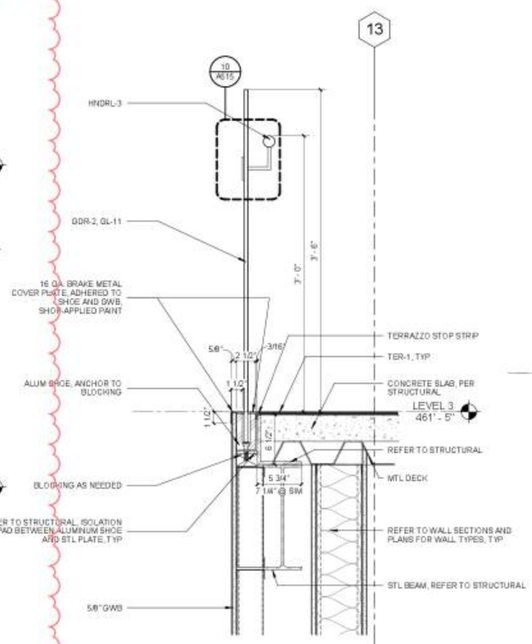
1 A513 HNDRL-2 DETAIL
1 1/2" = 1'-0"



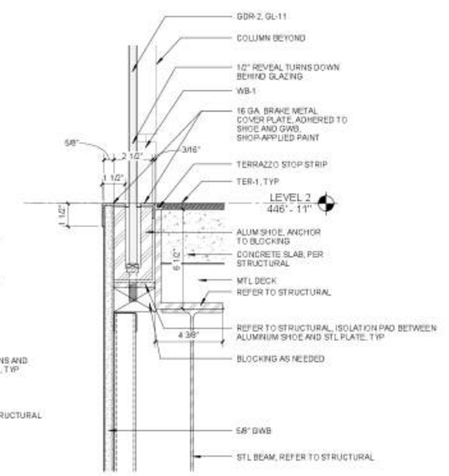
2 A513 STAIR 4A STRINGER DETAIL
1 1/2" = 1'-0"



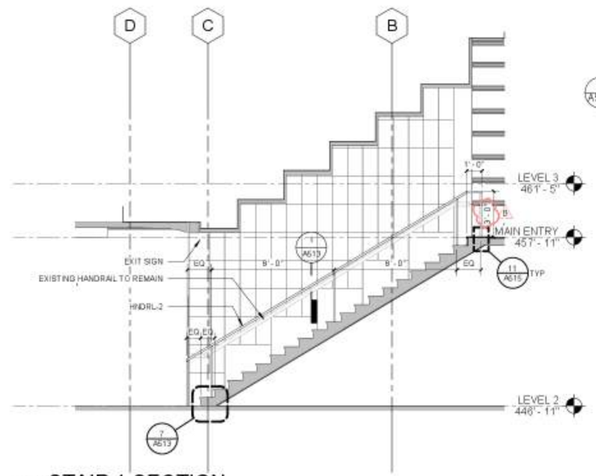
3 A513 STAIR 4A - SECTION
1 1/2" = 1'-0"



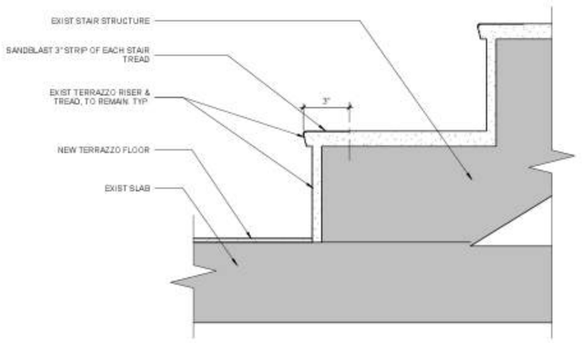
4 A513 STAIR 4A - NORTH SLAB EDGE
1 1/2" = 1'-0"



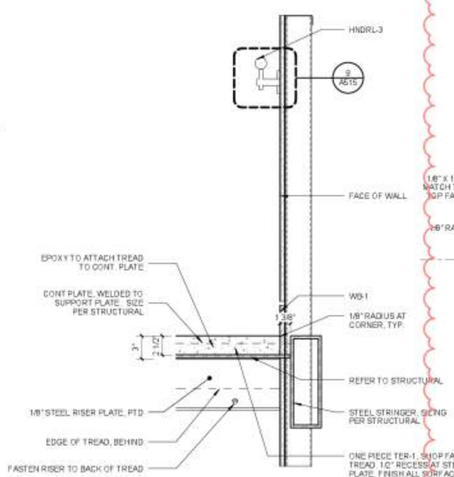
5 A513 STAIR 4B - GUARDRAIL AT LVL 2
3" = 1'-0"



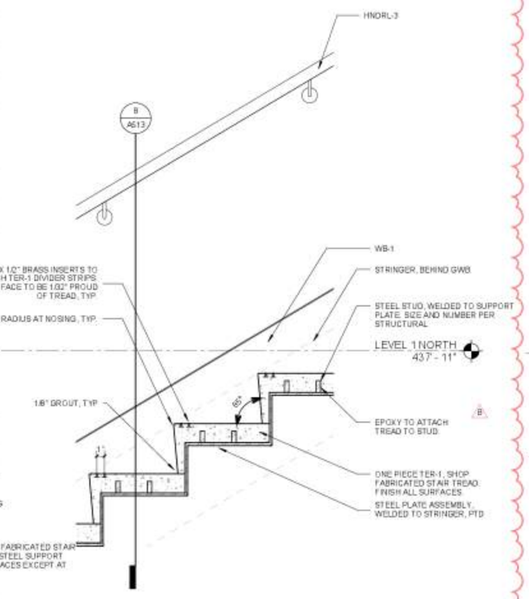
6 A513 STAIR 1 SECTION
1/4" = 1'-0"



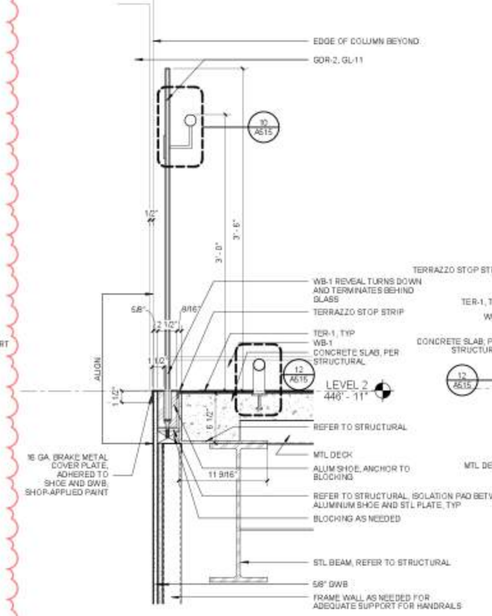
7 A513 STAIR 1 TREAD DETAIL
3" = 1'-0"



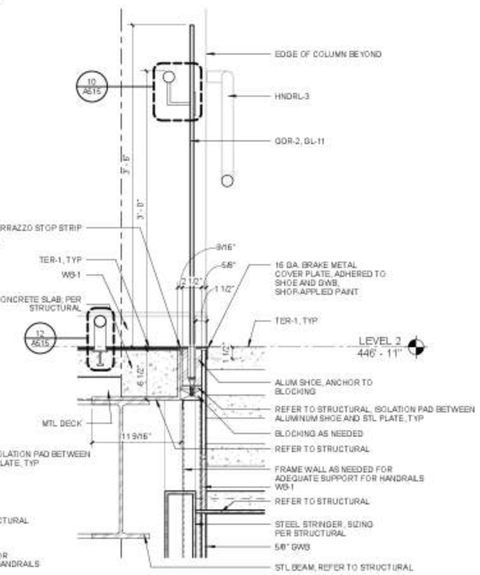
8 A513 STAIR 4B STRINGER DETAIL
1 1/2" = 1'-0"



9 A513 STAIR 4B - SECTION
1 1/2" = 1'-0"



10 A513 STAIR 4B - LEVEL 2 @ WIND BRACE
1 1/2" = 1'-0"



11 A513 STAIR 4B - SLAB EDGE @ LEVEL 2
1 1/2" = 1'-0"

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Revisions

No	Date	Description
0	9/1/17	PERMIT CORRECTIONS 1

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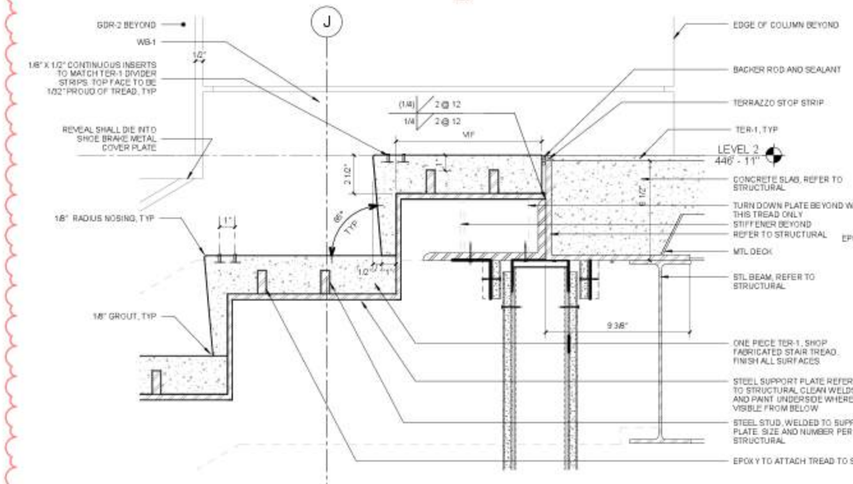
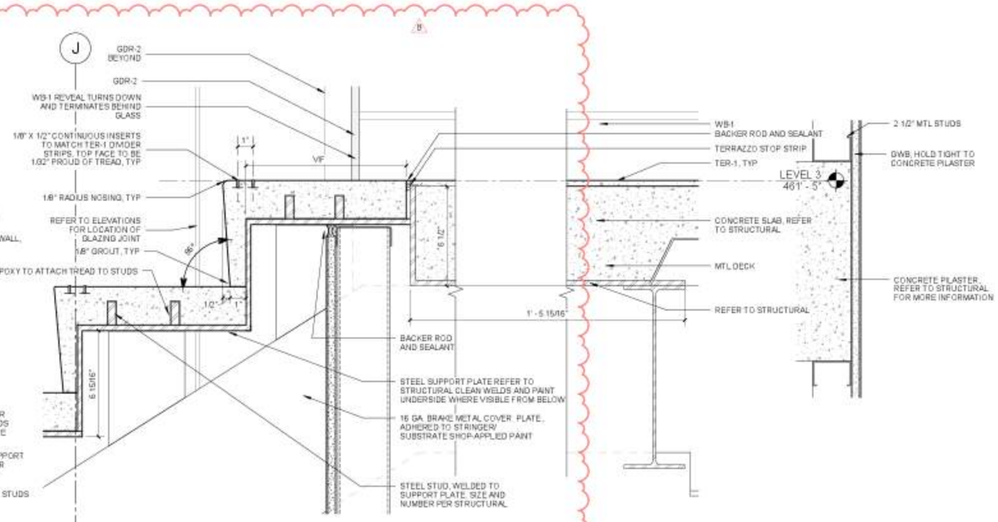
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Stair & Guardrail Details

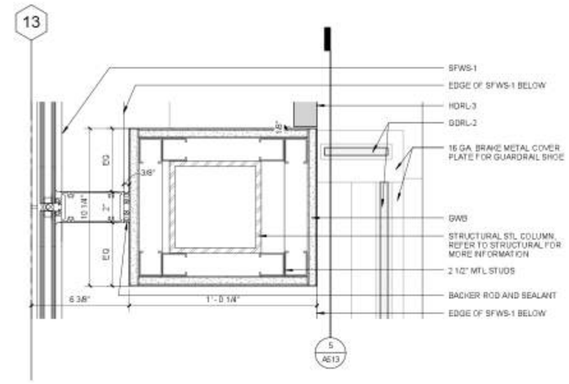
Sheet Number: A513



1 A514 STAIR 4B - TOP @ LEVEL 2
3" = 1'-0"

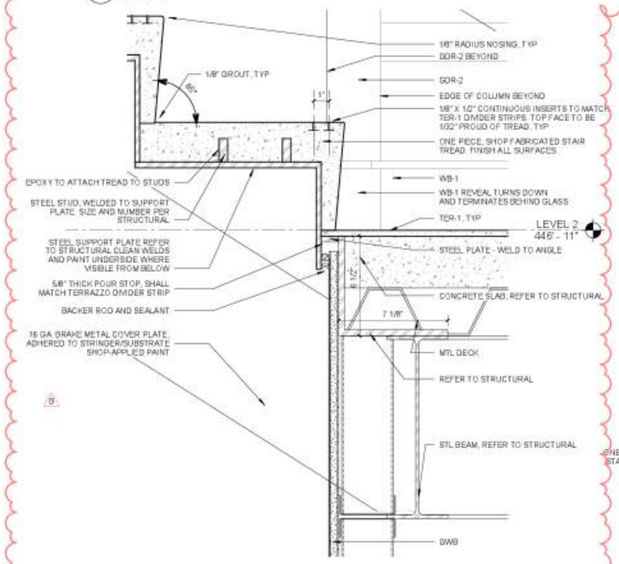


2 A514 STAIR 4A - TOP @ LEVEL 3
3" = 1'-0"

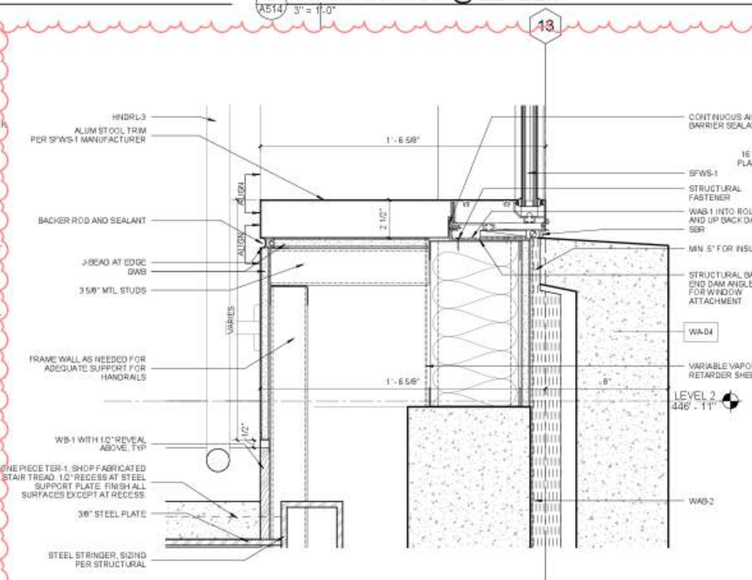


3 A514 STAIR 4B - LVL 1 COL WRAP
3" = 1'-0"

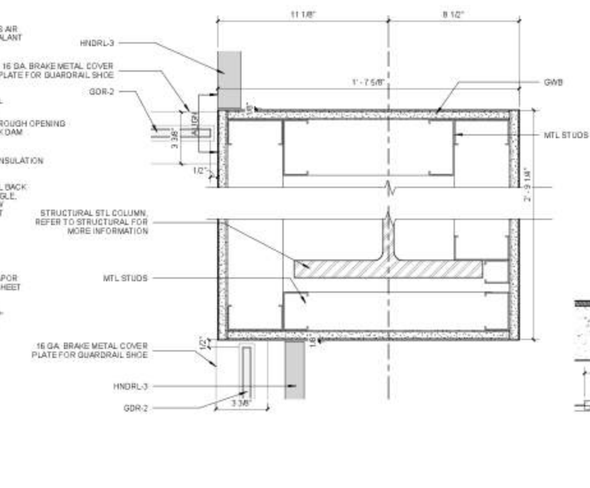
4 A514 STAIR 4B - LVL 2 COL WRAP
3" = 1'-0"



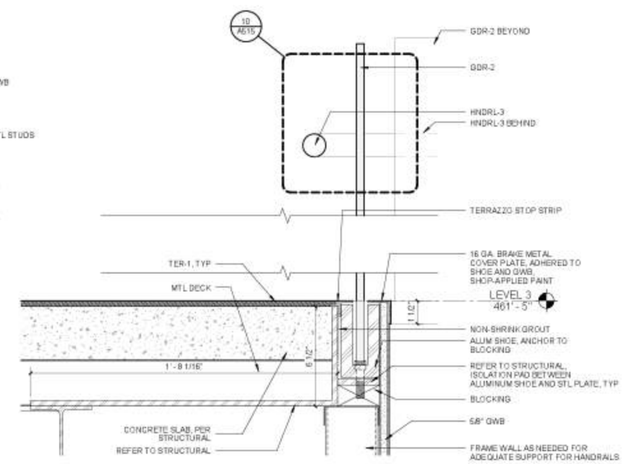
11 A514 STAIR 4A - BOTTOM @ LEVEL 2
3" = 1'-0"



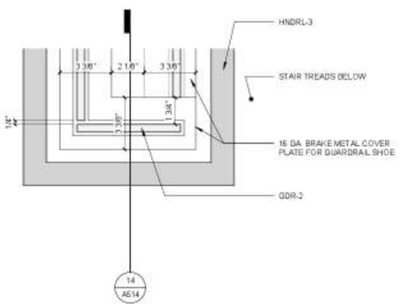
12 A514 STAIR 4 - SFWS-1 SILL
3" = 1'-0"



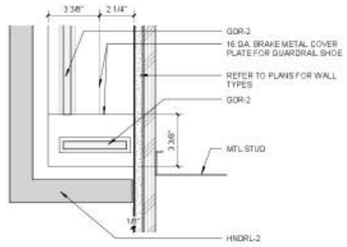
13 A514 STAIR 4B - LVL 2 COL WRAP @ K
3" = 1'-0"



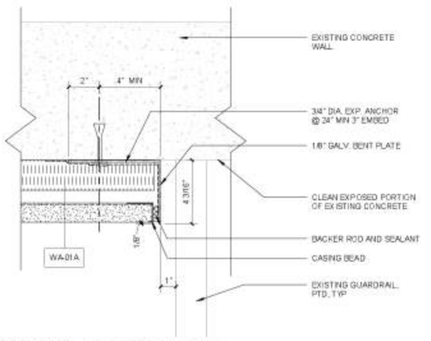
14 A514 STAIR 4A - GUARDRAIL @ LVL 3 SOUTH
3" = 1'-0"



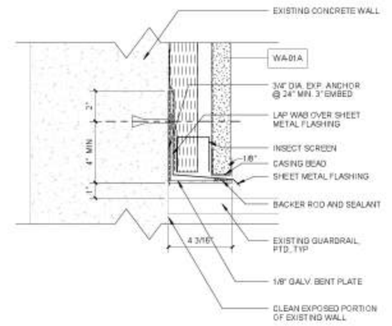
16 A514 STAIR 4A - GUARDRAIL @ LVL 3 NORTH
3" = 1'-0"



17 A514 STAIR 4A - GUARDRAIL @ LVL 3 SOUTH
3" = 1'-0"



18 A514 JAMB REVEAL @ EXIST. GDR
3" = 1'-0"



19 A514 HEADER REVEAL @ EXIST. GDR
3" = 1'-0"

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B	8/1/17	PERMIT CORRECTIONS 1

Sheet Title

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Construction Documents

Drawn: Author
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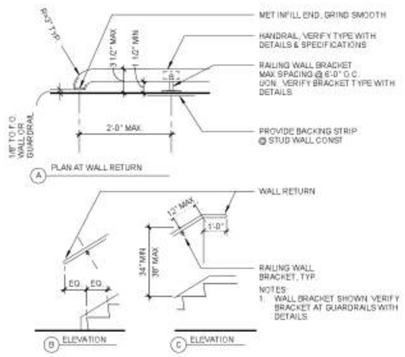
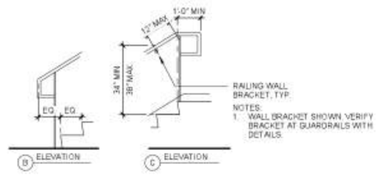
LMN Proj No: 16028.01
Date: 6/23/17

Stair & Guardrail Details

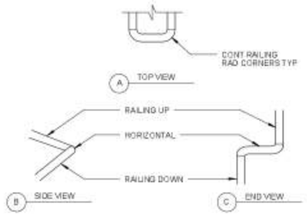
A514



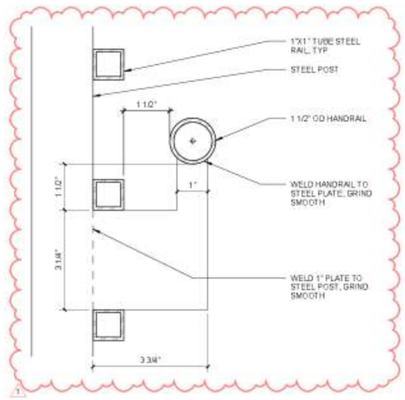
1 A515 TYP. HNDRL @ WALL RETURN
NTS



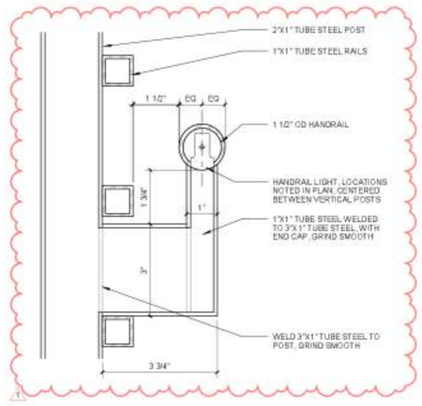
2 A515 TYP HANDRAIL EXTENSIONS
NTS



3 A515 HANDRAIL TRANSITIONS
NTS



4 A515 HNDRL-3 - POST MOUNTED
6" = 1'-0"



5 A515 HNDRL-3A - POST MOUNTED
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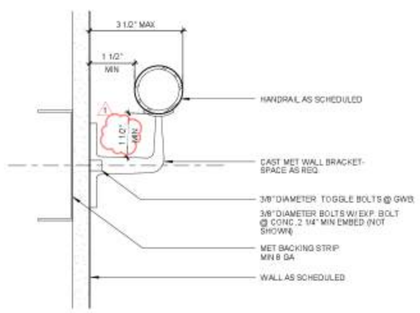

6 A515 HNDRL-1 BRACKET - WALL MOUNTED
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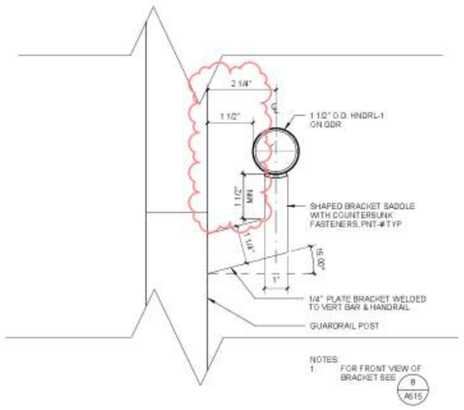

7 A515 HNDRL-1 BRACKET ON GDR
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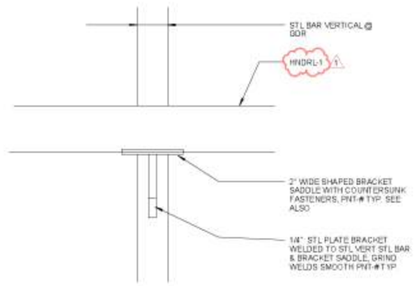

8 A515 HNDRL-1 BRACKET AT GDR - ELEVATION
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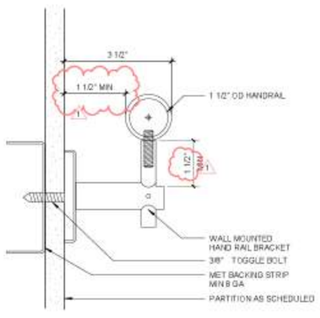
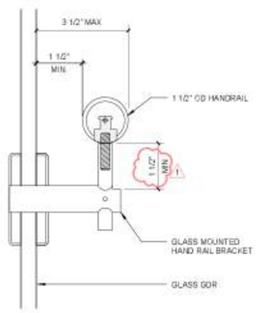
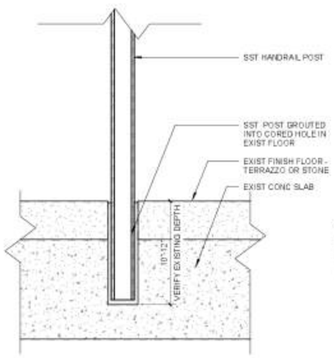


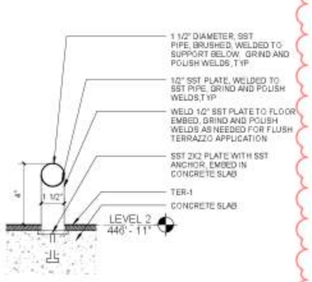
9 A515 HNDRL-3 BRACKET - WALL MOUNTED
6" = 1'-0"



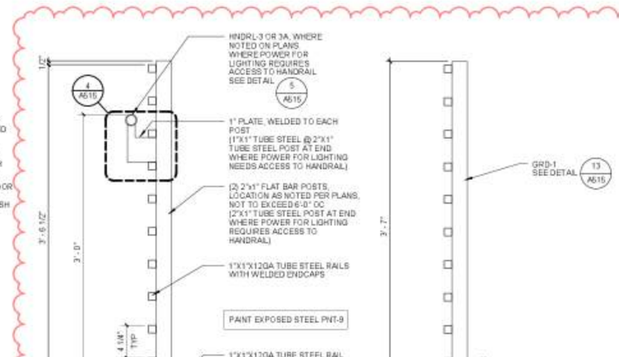
10 A515 HNDRL-3 BRACKET - GLASS MOUNTED
6" = 1'-0"



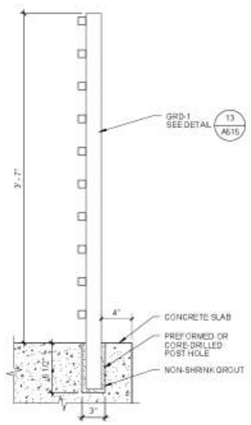
11 A515 HNDRL-2 MOUNTED @ EXIST FLOOR
3" = 1'-0"



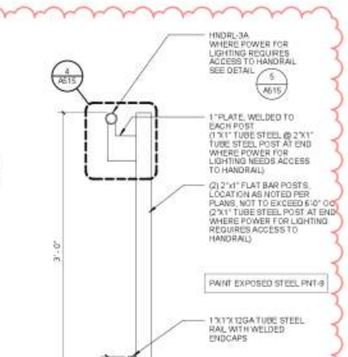
12 A515 CANE RAIL
3" = 1'-0"



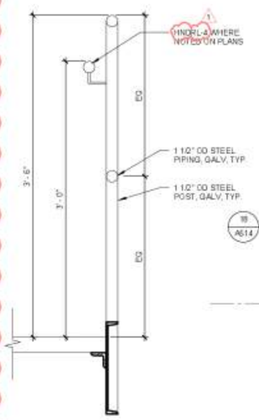
13 A515 GDR-1 @ CONCRETE SLAB
1 1/2" = 1'-0"



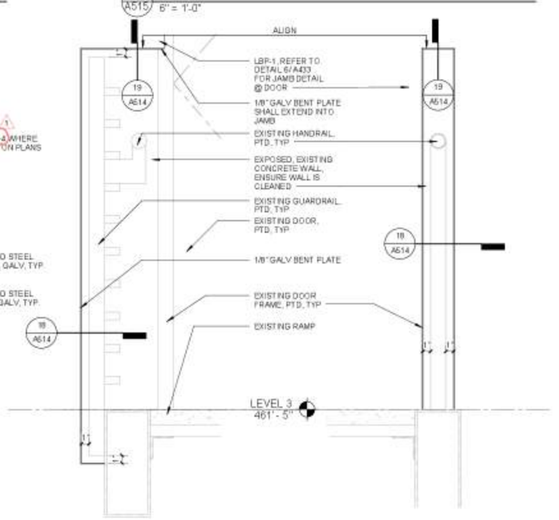
14 A515 GDR-1 @ LOADING
1 1/2" = 1'-0"



14B A515 HNDRL-5
1 1/2" = 1'-0"



15 A515 GDR-3 GUARDRAIL
1 1/2" = 1'-0"



16 A515 EXIST. GDR @ RAMP 4
1 1/2" = 1'-0"

17 A515 EXIST. HNDR @ RAMP 4
1 1/2" = 1'-0"

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Submittal

Revisions

No.	Date	Description
1	7/12/17	ADDENDUM #1

Sheet Title

Sheet Number

LMN Architecture Urban Design Interiors
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6541 REGISTERED ARCHITECT RAUEL MCKEEVER MILLER STATE OF WASHINGTON

ASIAN ART MUSEUM

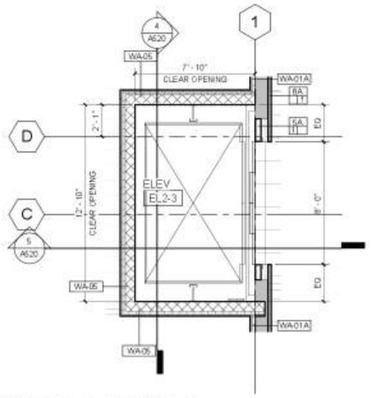
Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Construction Documents

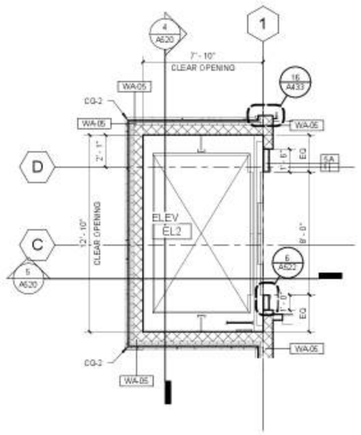
Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Handrails & Guardrails

A515



1 A520 **ELEVATOR 2 - LEVEL 3**
1/4" = 1'-0"



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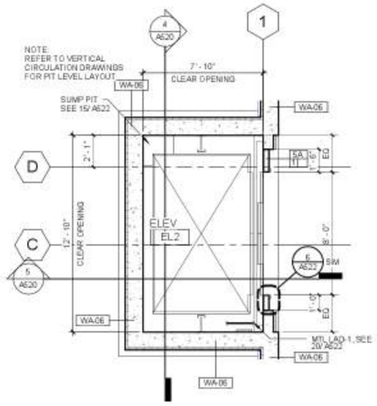

3 A520 **ELEVATOR 2 - LEVEL 1**
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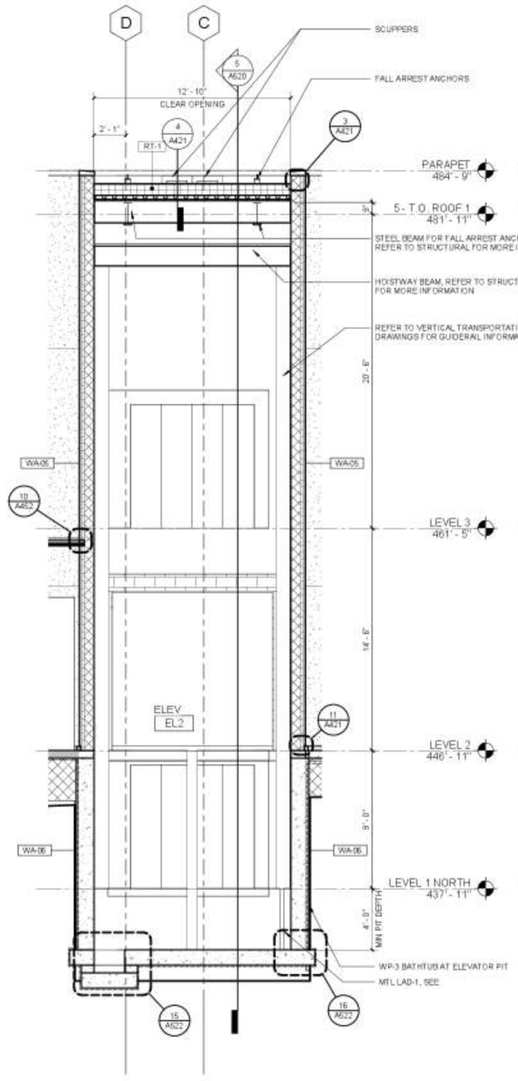
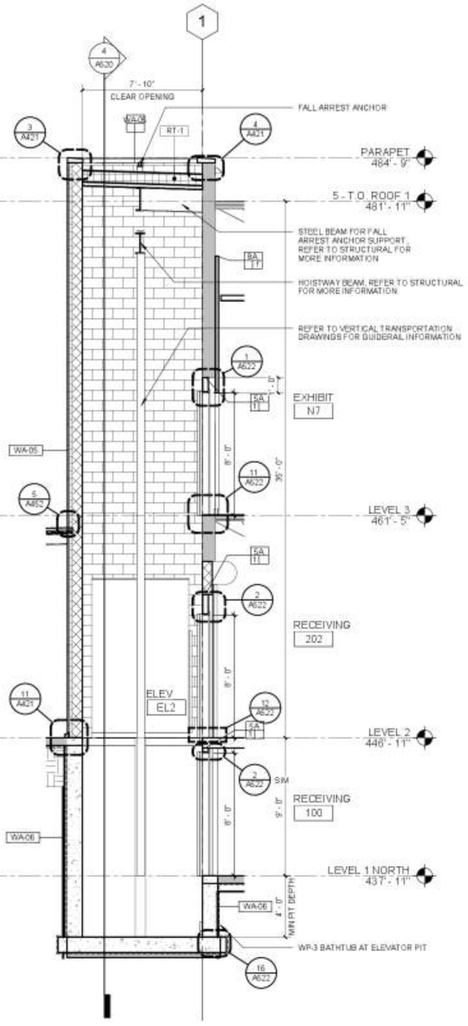


4 A520 **ELEVATOR 2 - EW SECTION**
1/4" = 1'-0"



5 A520 **ELEVATOR 2 - NS SECTION**
1/4" = 1'-0"

ELEVATOR NOTES

REFER TO VERTICAL TRANSPORTATION DRAWINGS FOR ADDITIONAL INFORMATION

CITY OF SEATTLE NOTES:

1. SBC SECTION 3022 AND ASME SECTIONS 2.7 AND 2.8: PIPES, DUCTS, CONDUITS, AND EQUIPMENT NOT USED FOR THE OPERATION OF THE ELEVATORS ARE PROHIBITED IN MACHINE ROOM AND HOISTWAYS.
2. SBC 3020: MAINTAIN ALL REQUIRED WORKING CLEARANCES IN MACHINE ROOM.
3. ASME RULE 2.3.2: WATERPROOF AS NECESSARY TO PREVENT ENTRY OF GROUND WATER. SUMP PUMPS MAY BE INSTALLED FOR FLOOD CONTROL BUT NOT APPROVED TO MAINTAIN A DRY PIT.
4. SBC 3023, ASME RULE 2.2.4: PROVIDE PIT LADDER.
5. ASME RULE 2.7.5.2: PROVIDE MACHINE ROOM VENTILATION.
6. SBC 3016.5: PROVIDE MOTORIZED DAMPERS AS REQUIRED BY SEATTLE ENERGY CODE 1412.4.1 FOR ALL HOISTWAY VENTS.
7. SBC 3016.3: COMPLY WITH SEISMIC REQUIREMENTS.
8. ASME RULE 2.7.4: PROVIDE 7'-0" CLEAR HEADROOM IN MACHINE ROOM.
9. SBC 3016.4 AND CHAPTER 11: ACCOMMODATE PEOPLE WITH DISABILITIES.
10. ASME SECTION 2.4 AND 3.4: PROVIDE PROPER TOP CAR RUNBYS, CLEARANCES AND REFUGE SPACE.
11. ASME RULE 2.1.1.2 AND 2.11.14: GROUT ALL MASONRY JAMBS AND HEADERS TO RETAIN FIRE RATING OF HOISTWAY. IN OTHER THAN MASONRY, PROVIDE LABELED ENTRANCE ASSEMBLIES INSTALLED AS TESTED.
12. SBC 3020: GROUT BEHIND ALL HOISTWAY PENETRATIONS FOR PIPES, FIXTURES, ETC.
13. SBC 3016.5 ELEVATOR HOISTWAYS SHALL NOT BE VENTED OR PRESSURIZED THROUGH ELEVATOR MACHINE ROOMS.
14. SBC 3016.5.4: VENTILATION AND PRESSURIZATION EQUIPMENT, DUCTS, ETC. CANNOT BE LOCATED IN ELEVATOR MACHINE ROOMS, HOISTWAYS, OR SPACES.
15. ASME RULES 2.11.2 AND 2.14.1.8: GLASS USED IN OR ON ELEVATOR HOISTWAYS AND CARS MUST BE LAMINATED AND MEET THE REQUIREMENTS OF ASME Z97.1.
16. SBC 106: PROVIDE CALCULATIONS AND DRAWINGS TO SDCI FOR APPROVAL OF THE STRESSES AS NOTED IN THE APPLICABLE RULES OF ASME SECTION 2.9.
17. ASME SECTION 2.6: PROVIDE CALCULATIONS TO SDCI FOR APPROVAL OF THE ABILITY OF THE PIT FLOOR AND STRUCTURE TO WITHSTAND THE ELEVATOR BUFFER ENGAGEMENT REACTIONS.
18. ASME 2.27.1: PROVIDE MEANS OF TWO-WAY CONVERSATION BETWEEN EACH ELEVATOR AND A READILY ACCESSIBLE POINT (MAIN ELEVATOR LOBBY) OUTSIDE THE HOISTWAY.
19. ASME 2.27.1.1.2: THIS STRUCTURE IS CONSIDERED AS UNATTENDED, AND AN ADDITIONAL EMERGENCY SIGNALING DEVICES SHALL BE PROVIDED (PHONE TO ANSWERING SERVICE).
20. ASME 2.27.1.1.5: PROVIDE AN EMERGENCY POWER SUPPLY FOR THE DEVICES REQUIRED BY 2.27.1.1 THE SUPPLY SHALL BE CAPABLE OF OPERATING THE AUDIBLE DEVICE FOR AT LEAST ONE HOUR AND THE MEANS OF A TWO-WAY CONVERSATION FOR AT LEAST FOUR HOURS.
21. SBC 3016.9: INSTALL APPROVED KEY RETAINER BOX, KEYED TO THE SECURE CITY KEY.
22. SBC 3016.10: KEYS REQUIRED FOR THE OPERATION OF ELEVATOR, FIRE EMERGENCY SERVICE, THE MACHINE ROOM AND THE MECHANICAL HOISTWAY ACCESS KEY SHALL BE TAGGED AND KEPT IN THE KEY BOX.
23. COMPLY WITH APPLICABLE CODES.

APPLICABLE CODES INCLUDE ASME CODES, SEATTLE BUILDING CODES, SEATTLE ELECTRICAL CODES, AND ELEVATOR CODES ADOPTED BY REFERENCE.

INSTALLATION OF SPRINKLER SYSTEMS AND FIRE ALARMS IN ELEVATOR MACHINERY ROOMS, HOISTWAYS AND PITS SHALL ALSO COMPLY WITH JOINT RULING OF DPD DIRECTOR'S RULE 7-2014 & SFD ADMINISTRATIVE RULE 9.06.14

EACH CONVEYANCE REQUIRES A SEPARATE PERMIT WITH DETAILED INSTALLATION PLANS AND SHALL BE INSTALLED BY A WASHINGTON STATE LICENSED ELEVATOR CONTRACTOR.

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SAM ASIAN ART MUSEUM

Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Construction Documents

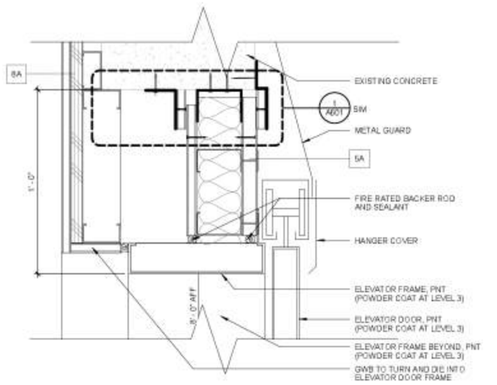
Submittal

Revisions
No. Date Description

Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

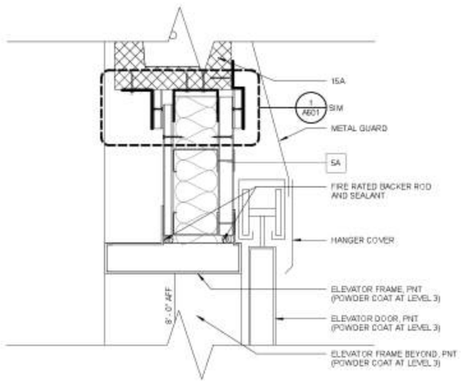
Sheet Title: Enlarged Plans & Sections - Elevator

Sheet Number: **A520**



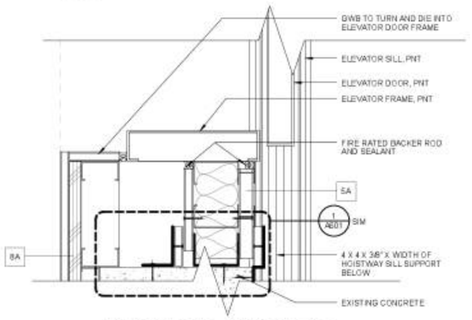
1 A522 3" = 1'-0"

ELEVATOR HEAD LVL 3



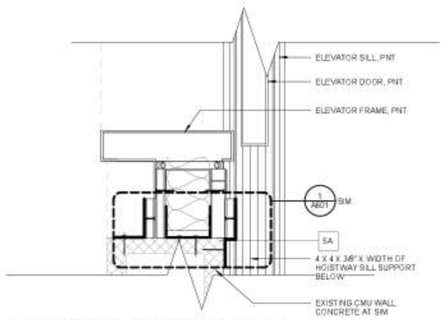
2 A522 3" = 1'-0"

ELEVATOR HEAD LVL 1 & 2



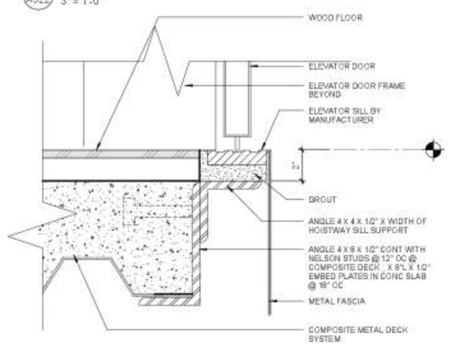
6 A522 3" = 1'-0"

ELEVATOR JAMB LVL 3



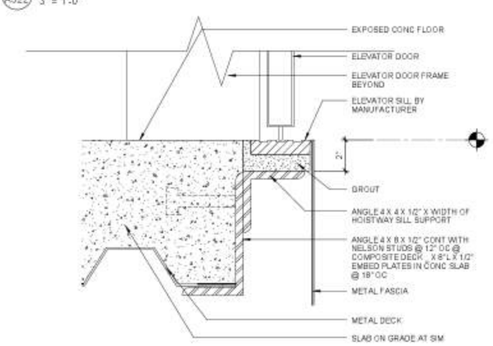
7 A522 3" = 1'-0"

ELEVATOR JAMB LVL 1 & 2



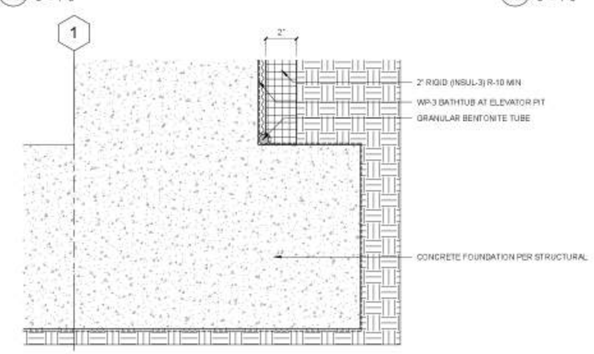
11 A522 3" = 1'-0"

ELEVATOR SILL AT WOOD FLOOR LVL 3



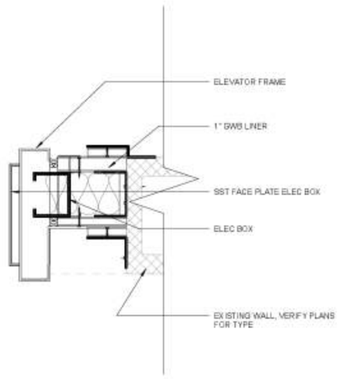
12 A522 3" = 1'-0"

ELEVATOR SILL LVL 1 & 2



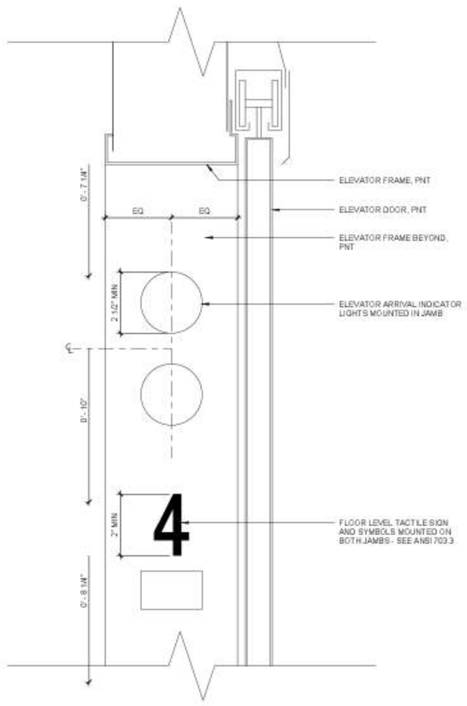
16 A522 3" = 1'-0"

ELEVATOR FOUNDATION



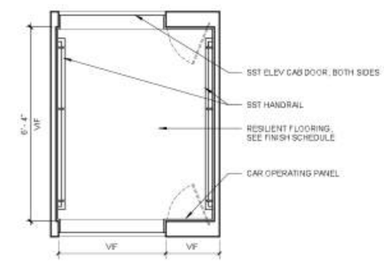
18 A522 3" = 1'-0"

CALL STATION AT ELEVATOR JAMBS



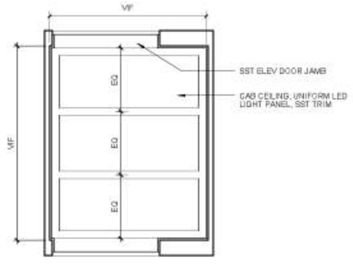
19 A522 3" = 1'-0"

ELEVATOR FLOOR INDICATORS



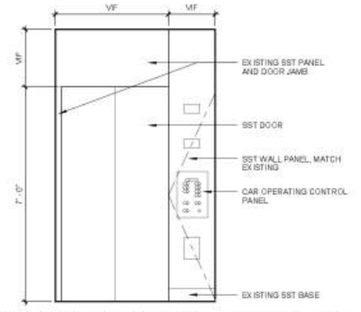
4 A522 1/2" = 1'-0"

FLOOR PLAN - EXIST ELEV 1



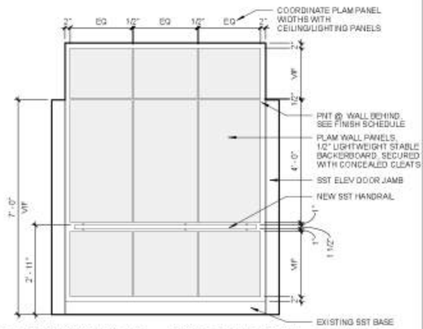
5 A522 1/2" = 1'-0"

RCP - EXIST ELEV 1



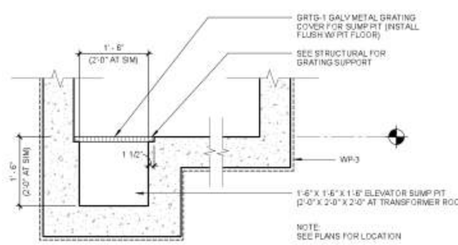
9 A522 1/2" = 1'-0"

FRONT/BACK ELEVATION - EXIST ELEV 1



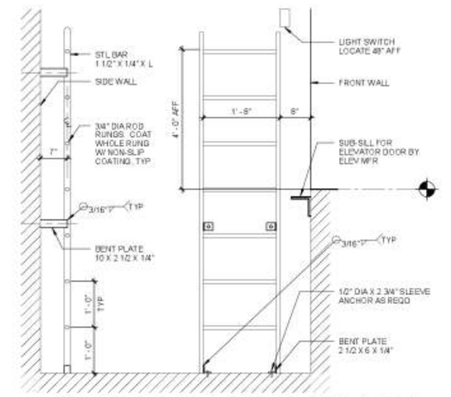
10 A522 1/2" = 1'-0"

SIDE ELEVATION - EXIST ELEV 1



15 A522 3/4" = 1'-0"

ELEV SUMP PIT SECTION



20 A522 3/4" = 1'-0"

ELEVATOR PIT LADDER - MTL LAD-1

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Drawn: Author
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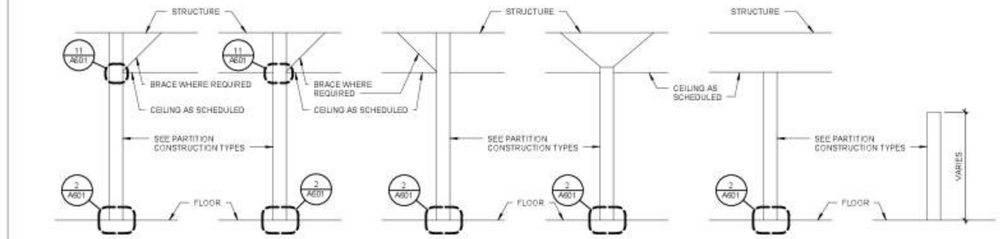
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Elevator Cab & Elevator Details

Sheet Number: A522

PARTITION CONFIGURATION

NOTE:
BRACING NOT ALLOWED WHEN STRUCTURE IS OPEN TO VIEW IN PUBLIC AREAS UON.



A — STUDS AND GWB CONTINUOUS TO UNDERSIDE OF STRUCTURE.

B — STUDS CONTINUOUS TO UNDERSIDE OF STRUCTURE; ONE SIDE OF GWB TO 6" ABOVE CEILING - ONE SIDE GWB TO UNDERSIDE OF STRUCTURE

C — STUDS CONTINUOUS TO UNDERSIDE OF STRUCTURE; GWB TO 6" ABOVE CEILING

D — STUDS & GWB TO 6" ABOVE CEILING

E — STUDS & GWB TO FINISHED FACE OF CEILING

F — PARTIAL HEIGHT PARTITION (FINISHED HEIGHT NOTED AT PARTITION TYPE DESIGNATOR) SEE DETAIL X.X/AX.XX

MODIFICATIONS

NO MODIFIER - CONSTRUCT PARTITION DETAIL AS SHOWN AT PARTITION TYPE DETAIL, WITHOUT MODIFICATIONS

a — INSTALL ACOUSTIC INSULATION BLANKET; PROVIDE ACOUSTIC SEALANT AT HEAD AND SILL - OFFSET AND SEAL AROUND ALL PENETRATIONS

b — INSTALL THERMAL INSULATION BATTS AT STUD PARTITIONS; USE RIGID INSULATION BOARD WHERE CONDITIONS REQUIRE

c — SUBSTITUTE TILE BACKER BOARD FOR FINISH GWB AT TILE FACE(S) OF PARTITION ONLY - COORDINATE WITH ROOM FINISH SCHEDULE AND/OR INTERIOR ELEVATIONS

d — ADD ONE LAYER OF GWB TO FINISHED FACE(S); VERIFY WITH ARCHITECT

e — SUBSTITUTE VENEER PLASTER ON PLASTER BASE FOR GWB

f — ADD 1 LAYER OF 3/4" PLYWOOD AS BACKER TO EXHIBIT WALLS; USE FOILBACKED GWB-5

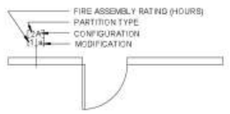
g — ADD 1 EXTRA LAYER OF 5/8" GWB TO CORRIDOR SIDE OF WALL

h — SUBSTITUTE HIGH IMPACT WALLBOARD (GWB-3) FOR GWB

i — SMOKE PARTITION; PROVIDE ACOUSTIC SEALANT AT HEAD AND SILL; OFFSET AND SEAL AROUND ALL PENETRATIONS

INTERIOR PARTITION SCHEDULE NOTES:

THE PARTITION TYPE DESIGNATION IS A 4 UNIT CODE THAT INCLUDES THE FIRE RATING (WHERE APPLICABLE), CONFIGURATION, CONSTRUCTION, AND ANY MODIFICATION TO THE CONSTRUCTION.



PARTITION TYPE INDICATORS ARE NOTED ON FLOOR PLANS. SEE DRAWING SHEETS A201 - A205 FOR LOCATION AND EXTENT OR LIMITS OF RATED PARTITIONS.

ALSO SEE EXTERIOR WALL SECTIONS AND DETAILS FOR ADDITIONAL WALL/PARTITION FRAMING NOT SPECIFICALLY IDENTIFIED ON THE FLOOR PLANS.

PARTITION TYPES SHOWN ON THIS SHEET MAY NOT ALL BE USED ON THIS PROJECT.

ALL FIRE RATED ASSEMBLIES ARE BASED UPON IBC/CC, UL, US GYPSUM AND CURRENT EDITION OF GYPSUM ASSOCIATION FIRE RESISTANCE DESIGN MANUAL GA-600. FIRE RATED PARTITIONS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE TESTING AGENCY(IES) LISTED. REFER TO SPECIFIC TEST REPORTS FOR REQUIRED COMPONENTS AND ASSEMBLY.

ALL ACOUSTIC ASSEMBLIES ARE BASED UPON ASTM E 90 TEST PROCEDURES. ACOUSTIC RATED PARTITIONS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE APPROVED TESTING AGENCY(IES). REFER TO SPECIFIC TEST REPORTS FOR REQUIRED COMPONENTS AND ASSEMBLY.

ALL OTHER (NON-STRUCTURAL) PARTITIONS ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE SPECIFICATIONS, MATERIALS MANUFACTURER, AND INDUSTRY STANDARDS.

METAL STUDS ARE TO BE 24" OC UNLESS OTHERWISE NOTED. DECREASE STUD SPACING AT PARTITIONS WITH ATTACHED CABINETS AND/OR EQUIPMENT.

ALL GYPSUM BOARD IS TO BE 5/8" THICK, UON. SEE PROJECT SPECIFICATIONS FOR GWB TYPE.

PROVIDE BRACING ABOVE CEILING AS REQUIRED TO LIMIT DEFLECTION TO SPECIFIED ALLOWANCES. BRACING NOT ALLOWED WHEN STRUCTURE IS OPEN TO VIEW IN PUBLIC AREAS UON.

SEE PROJECT SPECIFICATIONS FOR LIGHT GAGE METAL SUPPORT FRAMING AND ATTACHMENT, GYPSUM BOARD, THERMAL INSULATION, ACOUSTIC TREATMENT, TRIM, AND ACCESSORIES.

BLOCKING / BACKING IS REQUIRED AT THE FOLLOWING LOCATIONS:
A. WALL MOUNTED CABINETS
B. WALL MOUNTED ACCESSORIES AND EQUIPMENT
C. WALL MOUNTED DOORSTOPS
D. WALL MOUNTED DOOR HOLD-OPEN DEVICES AND/OR CLOSERS
E. TOILET ROOM PARTITIONS
F. TOILET ROOM ACCESSORIES
G. OTHER LOCATIONS AS REQUIRED BY THE ARCHITECT AND INDUSTRY STANDARDS.

SEE DETAILS BELOW FOR TYPICAL PARTITION CONSTRUCTION INFORMATION.

ACOUSTICAL ASSEMBLIES

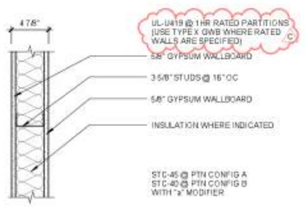
INTERNAL SOUND ISOLATION MUST BE MAINTAINED BETWEEN SELECT INTERIOR SPACES. THE PARTITIONS BETWEEN THESE SPACES ARE DESIGNATED AS 'ACOUSTICAL ASSEMBLIES' OR 'ACOUSTICAL CHASE' IN THE DETAIL DESCRIPTIONS OF PARTITION TYPES ON THE SHEET. ACOUSTICAL ASSEMBLIES ALWAYS EXTEND FROM FLOOR TO THE UNDERSIDE OF DECK ABOVE WITH THE WALLBOARD EXTENDING THE FULL HEIGHT.

THE ACOUSTICAL ASSEMBLIES AT SOUND CRITICAL PARTITIONS FOR THIS PROJECT ARE AS FOLLOWS:

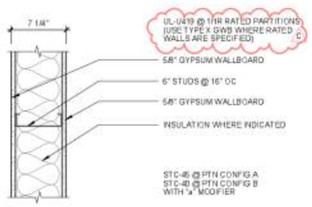
- ALL PARTITIONS IDENTIFIED AS SUCH IN THE TYPES ON THIS SHEET
- HAVING THE MODIFIER 'a' IN THE PLAN TAG WHICH INDICATES ACOUSTICAL INSULATION BLANKET IN THE PARTITION.
- ALL INTERIOR CMU WALLS.

ALL PENETRATIONS THROUGH ACOUSTIC ASSEMBLIES ARE REQUIRED TO BE ACOUSTICALLY PROTECTED PER DETAILS ON SHEETS MXXX, MXXX, EXXX, PX.XX, FAXXX, AND TXX.

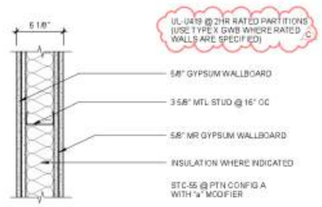
ALL ACOUSTICAL ASSEMBLIES ARE TO RECEIVE SEALING @ THE TOP END AS FOR FIRE RATED ASSEMBLIES AS INDICATED IN DETAILS X.X, & X.X ON AXXX.



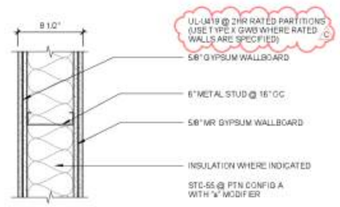
1 GWB PARTITION- TYPE 1
1 1/2" = 1'-0"



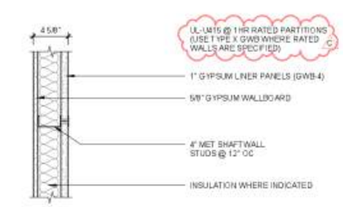
2 GWB PARTITION- TYPE 2
1 1/2" = 1'-0"



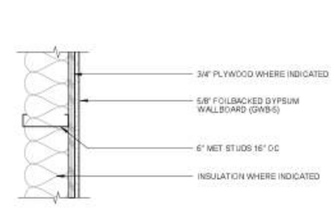
3 GWB PARTITION- TYPE 3
1 1/2" = 1'-0"



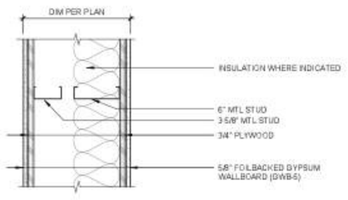
4 GWB PARTITION- TYPE 4
1 1/2" = 1'-0"



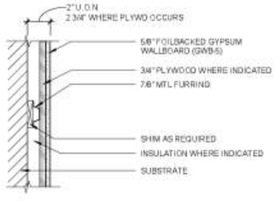
5 GWB PARTITION- TYPE 5
1 1/2" = 1'-0"



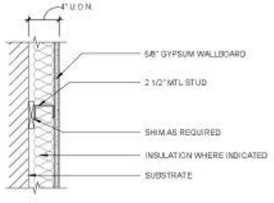
6 GWB PARTITION- TYPE 6
1 1/2" = 1'-0"



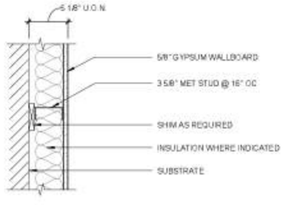
7 GWB PARTITION- TYPE 7
1 1/2" = 1'-0"



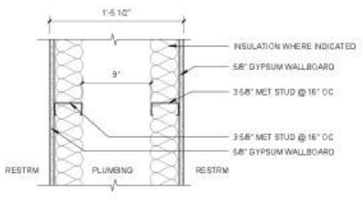
8 GWB PARTITION- TYPE 8
1 1/2" = 1'-0"



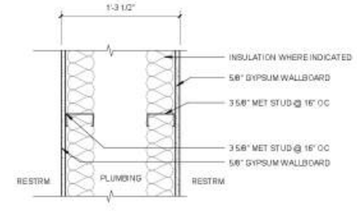
9 GWB PARTITION- TYPE 9
1 1/2" = 1'-0"



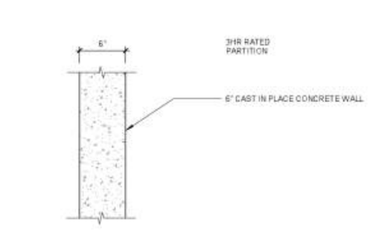
10 GWB PARTITION- TYPE 10
1 1/2" = 1'-0"



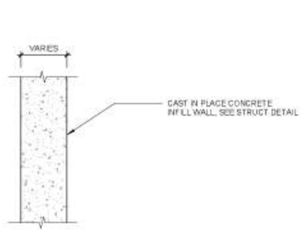
11 GWB PARTITION- TYPE 11
1 1/2" = 1'-0"



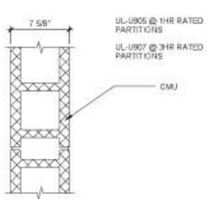
12 GWB PARTITION- TYPE 12
1 1/2" = 1'-0"



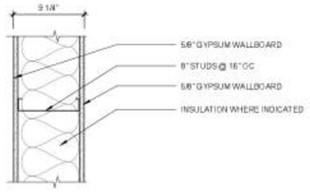
13 CONC PARTITION- TYPE 13
1 1/2" = 1'-0"



14 CONC PARTITION- TYPE 14
1 1/2" = 1'-0"



15 CMU PARTITION- TYPE 15
1 1/2" = 1'-0"



16 GWB PARTITION- TYPE 16
1 1/2" = 1'-0"

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SAM ASIAN ART MUSEUM

Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Submittal: Construction Documents

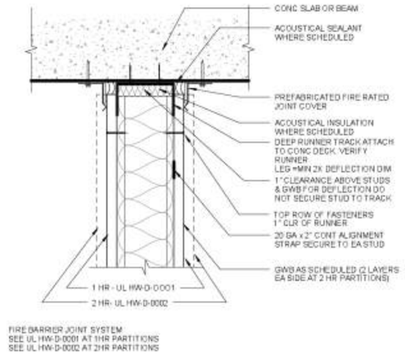
Revisions

No	Date	Description
C	10/23/17	PERMIT CORRECTIONS 2

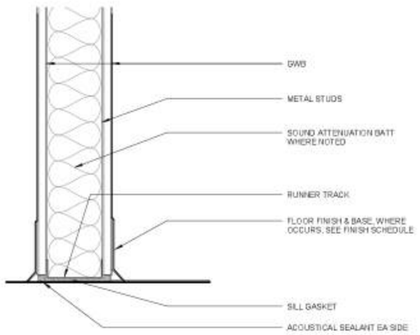
Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Partition Types

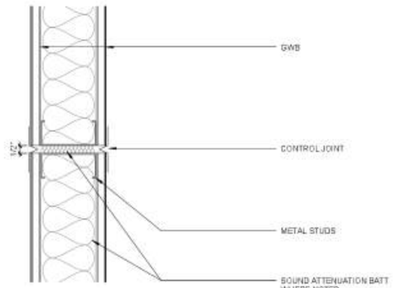
Sheet Number: A600



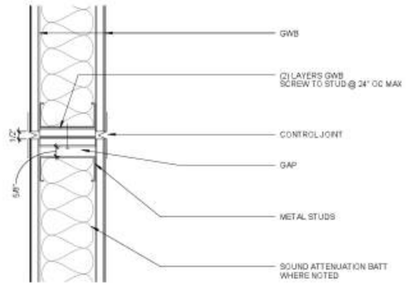
1 A601 RATED GWB @ CONC DECK
3" = 1'-0"



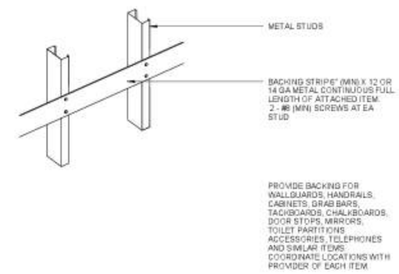
2 A601 GWB @ FLOOR
3" = 1'-0"



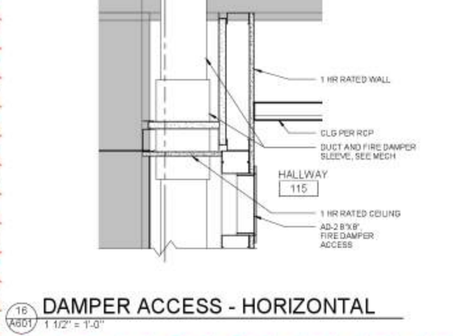
3 A601 CONTROL JOINT
3" = 1'-0"



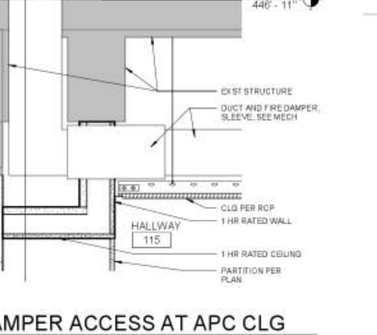
4 A601 CONTROL JOINT - 1HR
3" = 1'-0"



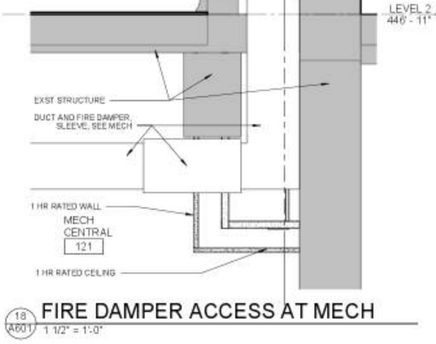
5 A601 TYPICAL BACKING STRIP
1/4" = 1'-0"



6 A601 1 HR WALL - PERIMETER RELIEF
3" = 1'-0"



7 A601 PARTITION INTERSECTION
3" = 1'-0"



8 A601 ELEC J-BOX - RATED PARTITION
3" = 1'-0"

9 A601 2 HR RATED SOUND WALL
1 1/2" = 1'-0"

11 A601 GWB CEILING TO PARTITION
3" = 1'-0"

16 A601 DAMPER ACCESS - HORIZONTAL
1 1/2" = 1'-0"

17 A601 FIRE DAMPER ACCESS AT APC CLG
1 1/2" = 1'-0"

18 A601 FIRE DAMPER ACCESS AT MECH
1 1/2" = 1'-0"

20 A601 EQUIPMENT WALL AT OFFICE 114
3" = 1'-0"

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Submittal

Revisions

No.	Date	Description
A	8/1/17	PERMIT CORRECTIONS 1

Sheet Title

Sheet Number

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6541 REGISTERED ARCHITECT SAMUEL MCKEEVER MILLER STATE OF WASHINGTON

ASIAN ART MUSEUM

Asian Art Museum Expansion & Renovation

Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Construction Documents

Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

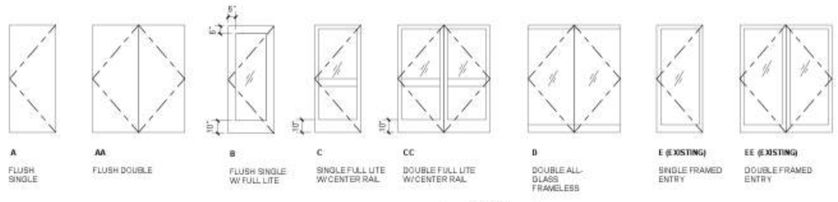
Partition Details

A601

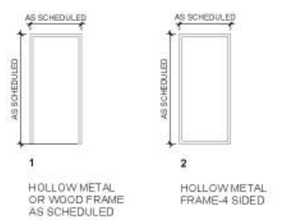
DOOR NO.	EXIST/NEW	RATING (MIN.)	DOOR WIDTH	DOOR HEIGHT	DOOR TYPE	DOOR MATERIAL	DOOR FINISH	DOOR UNDERCUT	FRAME TYPE	FRAME MATERIAL	FRAME FINISH	DETAILS JAMB	DETAILS HEAD	DETAILS THRESH	LOCKSET	CLOSER	CARD READER	PANIC HARDWARE	DELAYED EGRESS	U-VALUE	COMMENTS
100	New Construction		8' - 0"	7' - 8"	AA	HM	PNT	0' - 0"		HM	PNT	6A610	6A610		ED11	Y	Y	Yes			
101	New Construction	3 HR	3' - 6"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	8A610	8A610	10A434	ED3-K	Y		Yes			
102A	New Construction	90 MIN	3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	8A610	8A610		ED3-K	Y		Yes			
102B	New Construction	1 HR	3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	8A610	8A610		ED3-K	Y		Yes		U-0.37	
103	New Construction	1 HR	3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	8A610	8A610		L16-K	Y	Y				
104	New Construction		4' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		ED13-K	Y	Y	Yes		U-0.37	
105A	New Construction		4' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L16	Y	Y				
105B	New Construction		6' - 0"	7' - 0"	AA	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L17	Y	Y				
106	Existing		6' - 0"	7' - 0"	AA	HM	PNT	0' - 0"		-	PNT	-	-	-	L27	Y					
107	Existing		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		-	PNT	-	-	-	L5-K	Y					
108	New Construction		6' - 0"	7' - 0"	AA	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		ED14	Y		Yes			
109	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A610	7A610		L19	Y					
110	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A610	7A610		L19	Y					
111	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A610	7A610		L19	Y					
112	New Construction		4' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L1						
113	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A610	7A610		L19	Y					
114	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A610	7A610		L16	Y	Y				
116	New Construction	1 HR	3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		-	-	8A610	8A610	-	ED11-K	Y		Yes			
117	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A611	6A611		L1	Y					
118A	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L16-K	Y	Y				
118B	New Construction		6' - 0"	7' - 0"	AA	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L18						
119	New Construction		2' - 8"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	5A433	5A433		L6	Y				U-0.37	
121	New Construction		4' - 0"	7' - 0"	A	HM	PNT	0' - 0"		-	PNT	9A610	9A610		L26	Y	Y				
122A	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		ED3-K	Y		Yes			SMOKE CONTROL DOORS
122B	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		ED3-K	Y		Yes			SMOKE CONTROL DOORS
124	New Construction		3' - 0"	7' - 0"	B	WD	PNT	0' - 0"		HM	PNT	7A610	7A610		L3						GLASS TYPE (GL-7)
125	New Construction		3' - 0"	7' - 0"	B	WD	PNT	0' - 0"		HM	PNT	7A610	7A610		L3						GLASS TYPE (GL-7)
126	New Construction		3' - 0"	7' - 0"	B	WD	PNT	0' - 0"		HM	PNT	7A610	7A610		L3						GLASS TYPE (GL-7)
127	New Construction		3' - 0"	7' - 0"	B	WD	PNT	0' - 0"		HM	PNT	7A610	7A610		L3						GLASS TYPE (GL-7)
129A	New Construction		6' - 0"	7' - 0"	J	STL	PNT	0' - 0"		HM	PNT	5A434	1A434		L24	Y					
131	New Construction	1 HR	3' - 6"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	8A610	8A610		L5-K	Y				U-0.37	
133	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L16	Y	Y				
134A	Existing		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		-	PNT	-	-	-	L5	Y					
134B	Existing		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		-	PNT	-	-	-	L5	Y					
135A	New Construction	1 HR	3' - 6"	8' - 0"	A	HM	PNT	0' - 0"		HM	PNT	8A610	8A610		ED17	Y		Yes			
135B	New Construction		6' - 0"	8' - 6 1/2"	EE	AL		0' - 0"		-	-	-	-	13IA433	ED1	Y		Yes	Yes	U-0.487	GLASS TYPE (GL-1), EMERGENCY EXIT ONLY
136	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	8A610	8A610		L19	Y					
137	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	8A610	8A610		L4	Y					
138	New Construction	1 HR	3' - 0"	8' - 0"	H	WD	PNT			HM	PNT	8A610	8A610		L16	Y	Y				GLASS TYPE (GL-13), SEE NOTE 6
139A	New Construction	1 HR	3' - 0"	8' - 0"	H	WD	PNT			HM	PNT	8A610	8A610		ED16	Y		Yes			GLASS TYPE (GL-13), SEE NOTE 6
139B	New Construction	1 HR	3' - 0"	8' - 0"	H	WD	PNT			HM	PNT	8A610	8A610		ED16	Y		Yes			GLASS TYPE (GL-13), SEE NOTE 6
ST2-1	Existing		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		-	PNT	-	-	-	L16	Y	Y				
ST3-1	New Construction	1 HR	3' - 0"	7' - 0"	G	HM	PNT	0' - 0"		HM	PNT	8A610	8A610		ED15	Y		Yes			GLASS TYPE (GL-17), SEE NOTE 7
201	New Construction		6' - 0"	8' - 0"	AA	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L12	Y		Yes			
202A	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		ED6	Y	Y	Yes			
202B	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L16	Y	Y				
202C	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A433	4A433	14IA433	ED6	Y	Y	Yes		U-0.37	
203	New Construction		6' - 0"	7' - 0"	AA	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L17	Y	Y				
204	New Construction		4' - 6"	8' - 0"	F	HM	PNT	0' - 0"		HM	PNT	7A610	7A610		L20	Y	Y				UNEQUAL LEAF
205A	New Construction		3' - 0"	7' - 0"	B	WD	PNT	0' - 0"		HM	PNT	7A610	7A610		L16	Y	Y				
205B	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L4						
205C	New Construction		6' - 0"	8' - 0"	EE	AL		0' - 0"		AL	-	7A610	7A610		ED9	Y	Y				GLASS TYPE (GL-7)
206A	Existing		3' - 0"	7' - 0"	A	WD		0' - 0"		-		-	-	-	L15		Y				
206B	Existing		2' - 6"	7' - 0"	A	WD		0' - 0"		-		-	-	-	L15						
206C	Existing		2' - 6"	7' - 0"	A	WD		0' - 0"		-		-	-	-	L15						
206D	Existing		2' - 6"	7' - 0"	A	WD		0' - 0"		-		-	-	-	L15						
207A	New Construction		3' - 0"	7' - 0"	B	WD	CLR	0' - 0"		-		7A610	7A610		L16	Y	Y				
207B	Existing		3' - 0"	7' - 0"	A	WD		0' - 0"		-		-	-	-	L23		Y				
208	Existing		3' - 4"	7' - 0"	A	WD		0' - 0"		-		-	-	-	L23		Y				
209	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L16	Y	Y				
209A	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L16-K	Y	Y				
209B	New Construction		2' - 0"	3' - 0"	A	HM	PNT	0' - 0"	2	HM	PNT	9A610	9A610		L11						ACCESS PANEL
210A	New Construction		3' - 0"	7' - 0"	B	WD	PNT	0' - 0"		HM	PNT	7A610	7A610		L9	Y					
210B	New Construction		3' - 0"	7' - 0"	B	WD	PNT	0' - 0"		HM	PNT	7A610	7A610		L9	Y					
212	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L28	Y	Y				
212A	New Construction		4' - 6"	8' - 0"	F	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L20	Y	Y				UNEQUAL LEAF
212B	New Construction		9' - 0"	11' - 0"	K					-		20A611	19A611		L11						OHCD-2
214	Existing		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		-	PNT			-	L15						
214A	New Construction		2' - 0"	3' - 0"	A	HM	PNT	0' - 0"	2	HM	PNT	9A610	9A610		L11						ACCESS PANEL
215	New Construction		6' - 0"	7' - 0"	AA	WD	CLR	0' - 0"		HM	PNT	9A652	7A610		ED5	Y	Y	Yes			
215A	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L5	Y					
215B	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A652	7A610		ED11	Y		Yes			
215C	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	8A652	9A610		L4	Y					
216	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A433 12A433	2A433		ED4	Y		Yes		U-0.37	
218	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A610	7A610		L19	Y					
219	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A610	7A610		L2	Y					
220	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A610	7A610		L19	Y					
221	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A610	7A610		L16	Y	Y				
222A	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A610	7A610		L4						
222B	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A611, 7A610	7A610		ED10	Y		Yes	Yes		
225	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A610	7A610		L5						
225A	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L5						
226A	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	7A611	6A611		L5-K	Y					
226B	New Construction		4' - 6"	7' - 0"	F	HM	PNT	0' - 0"		HM	PNT	7A610	7A610		ED8	Y	Y	Yes			UNEQUAL LEAF
227A	New Construction		6' - 0"	7' - 0"	AA	HM	PNT	0' - 0"		HM	PNT	7A610	7A610		ED5	Y	Y	Yes			
227B	New Construction		3' - 1"	7' - 0"	C	AL		0' - 0"		AL		19A611	9A611		ED2	Y		Yes			
228	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L4						
229	New Construction		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		HM	PNT	8A653	7A610		ED11	Y		Yes			
230	New Construction		6' - 0"	9' - 0 1/2"	D	GL				AL			2A653		L11		Y	Yes			GLASS TYPE (GL-12)
230B	New Construction		6' - 0"	8' - 0"	AA	WD	CLR	0' - 0"		HM	PNT	7A610	7A610		L22						
233	New Construction		8' - 0"	10' - 0"	K					-		16A433	11A433		L7						OHCD-2
ST2-2	Existing		3' - 0"	7' - 0"	A	HM	PNT	0' - 0"		-	PNT			-	L15	Y					
ST3-2	New Construction	1 HR	3' - 0"	7' - 0"	G	HM	PNT	0' - 0"		HM	PNT	8A610	8A610		ED7	Y	Y	Yes			GLASS TYPE (GL-17), SEE NOTE 7
GC3A	Existing		3' - 0"	7' - 0"	A	WD		0' - 0"				-	-	-	L15						
GC3B	Existing		3' - 0"	7' - 0"	A	WD		0' - 0"				-	-	-	L15						
M1A	Existing		5' - 6 1/2"	7' - 10"	EE	AL		0' - 0"				-	-	-		Y		Yes		U-0.95	GLASS TYPE (GL-14), EXISTING PANIC HARDWARE TO REMAIN
M1B	Existing		5' - 10"	7' - 10"	EE	AL		0' - 0"				-	-	-		Y		Yes			GLASS TYPE (GL-7), EXISTING PANIC HARDWARE TO REMAIN
M2A	Existing	NR	3' - 6 1/2"	7' - 10"	E	AL		0' - 0"				-	-	-	ED18	Y		Yes		U-0.95	GLASS TYPE (GL-14), AUTOMATIC OPERATOR
M2B	Existing	NR	3' - 6 1/2"	7' - 10"	E	AL		0' - 0"				-	-	-	ED19	Y		Yes		U-0.95	GLASS TYPE (GL-14)
N7	Existing		6' - 0"	7' - 0"	AA	HM	PNT	0' - 0"			PNT	-	-	-	ED12	Y		Yes	Yes	U-0.95	
ST2-3	Existing		3' - 0"	7' - 0"	A	WD		0' - 0"		-		-	-	-	L15	Y					
402A	New Construction		3' - 0"	3' - 10"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610	-	ED17	Y		Yes			
402B	New Construction		2' - 0"	4' - 0"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L11						ACCESS PANEL
403	Existing		3' - 0"	3' - 10"	A	HM	PNT	0' - 0"		-		-	-	-							ACCESS PANEL
404	New Construction		3' - 0"	5' - 6"	A	HM	PNT	0' - 0"		HM	PNT	9A610	9A610		L6	Y					
ST2-4	Existing		3' - 0"	5' - 6"	A	HM	PNT	0' - 0"	2	HM	PNT	-	-		L16	Y	Y				

GENERAL SHEET NOTES

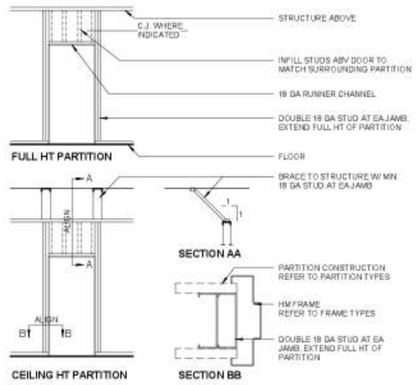
1. ALL DOOR FRAMES ARE TYPE 1 UNO.
2. REFERENCE SPECIFICATION SECTION 087100 FOR DOOR HARDWARE
3. CLEAN AND PREP EXISTING DOORS FOR NEW HARDWARE, TYP.
4. FIRE RATED DOORS SHALL BE LATCHING AND SELF- OR AUTOMATIC CLOSING.
5. EGRESS DOORS MUST BE OPENABLE FROM THE EGRESS SIDE WITHOUT THE USE OF A KEY OR SPECIAL KNOWLEDGE OR EFFORT.
6. GL-13 TO BE 1-HR FIRE-RESISTANCE RATED GLASS TESTED IN ACCORDANCE WITH NFPA 252, UL 10B, OR UL 10C
7. GL-17 TO BE 1-HR FIRE-PROTECTIVE GLASS TESTED IN ACCORDANCE WITH NFPA 252, UL 10B, OR UL 10C
8. **THE USE OF DELAYED EGRESS LOCKING SYSTEMS ARE PERMITTED THROUGH AN APPROVED CODE MODIFICATION. SEE SHEET G004.**
9. SEE SHEET A610a FOR LOCKSET TYPES.
10. SEE SECURITY INFRASTRUCTURE PLANS SHEETS (T401-T404) FOR CARD READER LOCATIONS



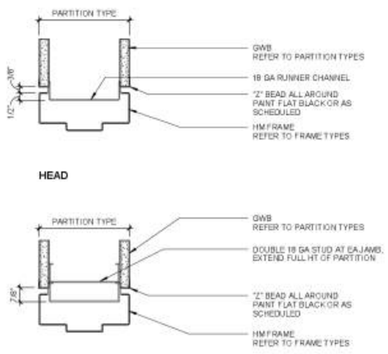
DOOR TYPES
1/4" = 1'-0"



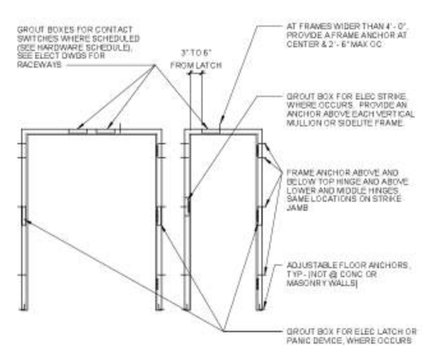
FRAME TYPES
1 A610 1/4" = 1'-0"



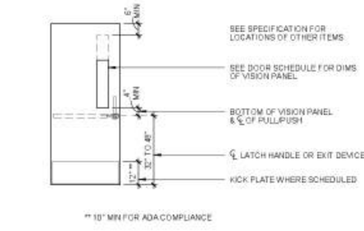
FRAMING AT DOOR OPENINGS
4 A610 3" = 1'-0"



FRAME ANCHOR LOCATIONS
5 A610 3/8" = 1'-0"

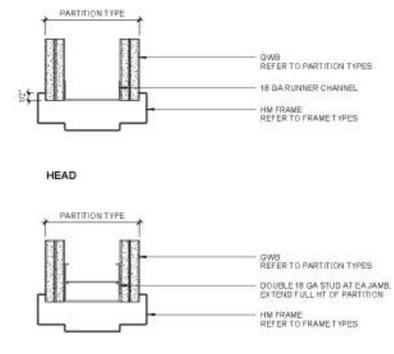


HARDWARE MOUNTING HEIGHTS
6 A610 3/8" = 1'-0"

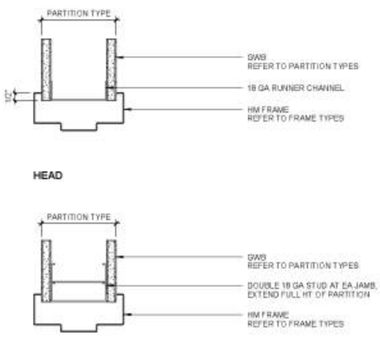


NON-RATED FLUSH HM DETAILS
7 A610 3" = 1'-0"

TYP HM RATED DETAILS
8 A610 3" = 1'-0"



TYP HM DETAILS
9 A610 3" = 1'-0"



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Submittal: Construction Documents

Revisions

No.	Date	Description
B	9/1/17	PERMIT CORRECTIONS 1

Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Door Schedule

Sheet Number: **A610**

SYMBOL	FUNCTION DESCRIPTION	FACTORY NUMBER
L1	Latchset	L9010
L2	Privacy Lock	L9040
	Occupancy Indicator	Trios Type C
L3	Entrance or Office Lockset	L9050R
L4	Classroom Lock	L9070R
L5	Storeroom Lockset	L9080R
L6	Communicating Lock	L9466F
L7	All Hardware by Door Manufacturer	
L8	Entrance Lockset	L9080L
	Mortise Cylinders (2)	KABA "PEAKS"
	Lock Astragal	50007
L8	Push Plate	1001-3 – 4 x 16"
	Pull Plate	1014-3 – 4 x 16"
L10	Classroom Lock	L9070R
	Flush Bolts (2)	3917 – 12"
	Dust Proof Strike	3911
L11	Cylinders	Type and quantity as required, Coordinate with Door Manufacturer
L12	Push Plate (2)	1001-3 – 4 x 16"
	Pull Plates (2)	1014-3 – 4 x 16"
L13	Storeroom Lockset	L9080R
	Flush Bolts (2)	3917 – 12"
	Dust Proof Strike	3911
L14	Classroom Lockset	L9070R
	Set Automatic Flush Bolts	FB31P or FB41P
	Dust Proof Strike	DP2
	Coordinator	COR x FB x 2/MB Brackets
L15	Cylinders	Schlage - Type and quantity as required to fit existing Lockset in Exit Device
	Balance of existing hardware to remain	
L16	Classroom Lockset	L9070L
	Mortise Cylinder	KABA "PEAKS"
	Electric Lock Modification	M1520M-00-1-24VDC
	Electric Through Wire Hinge	ACSI 1104 x 4" Lead Door Side x match type and size
	Door Position Switch	By Division 28
	Card Reader	By Division 28
L17	Classroom Lockset	L9070L
	Mortise Cylinder	KABA "PEAKS"
	Electric Lock Modification	M1520M-00-1-24VDC
	Electric Through Wire Hinge	ACSI 1104 x 4" Lead Door Side x match type and size
	Set Automatic Flush Bolts	FB31P or FB41P
	Dust Proof Strike	DP2
	Coordinator	COR x FB x 2/MB Brackets
	Door Position Switches	By Division 28
	Card Reader	By Division 28
L18	Exit Lock *	L9080L x Less Outside Lever and Rose x L283-192 Mounting Plate
	Flush Bolt (Top Only)	3917 – 12"
	*Outside Door Face Blank	
L19	Privacy Lock with Cylinder	L9456R x DBB
	Occupancy Indicator	Trios Type C
L20	Classroom Lockset	L9070L
	Mortise Cylinder	KABA "PEAKS"
	Electric Lock Modification	M1520M-00-1-24VDC
	Electric Through Wire Hinge	ACSI 1104 x 4" Lead Door Side x match type and size
	Flush Bolts (2)	3917 – 12"
	Dust Proof Strike	3911
	Door Position Switches	By Division 28
	Card Reader	By Division 28
L21	Classroom Lockset	L9071L
	Mortise Cylinders (2)	KABA "PEAKS"
	Electric Lock Modification	M1520M-00-2-24VDC
	Electric Through Wire Hinge	ACSI 1104 x 4" Lead Door Side x match type and size
	Door Position Switch	By Division 28
	Card Readers	By Division 28
L22	Deadlock	L460R
	Flush Bolt (Top Only)	3917 – 24"
	Flush Pulls (2)	1115
	Three Way Catches (2)	804
L23	Cylinders	KABA "PEAKS" - Type and quantity as required to fit existing Lockset or Exit Device
	Electric Strike	6400-FSE
	Card Reader	By Division 28
	Balance of existing hardware to remain	
L24	Storeroom Lockset	L9080L
	Mortise Cylinder	KABA "PEAKS"
	Surface Bolt (Top)	3822L US32D
	Cane Bolt	Crown Industrial 524 D0021 BPU
	Door Position Switches	By Division 28
L25	Exit Lock (Outside Door Face Blank)	L9080L x Less Outside Lever and Rose x L283-192 Mounting Plate
	Door Position Switch	By Division 28
L26	Classroom Lockset	L9070L
	Mortise Cylinder	KABA "PEAKS"
	Electric Lock Modification	M1520M-00-1-24VDC
	Power Transfer	EPT-2
	Door Position Switch	By Division 28
	Card Reader	By Division 28
L27	Storeroom Lockset with Deadbolt	L9480L
	Mortise Cylinder	KABA "PEAKS"
	Set Automatic Flush Bolts	FB31P or FB41P
	Dust Proof Strike	DP2
	Coordinator	COR x FB x 2/MB Brackets
L28	Storeroom Lockset with Deadbolt	L9480L
	Mortise Cylinder	KABA "PEAKS"
	Electric Lock Modification	M1520M-00-1-24VDC
	Electric Through Wire Hinge	ACSI 1104 x 4" Lead Door Side x match type and size
	Door Position Switches	By Division 28
	Card Reader	By Division 28

SYMBOL	FUNCTION DESCRIPTION	FACTORY NUMBER
ED1	Exit Device	3547A-NL-OP
	Rim Cylinder	KABA "PEAKS"
	Exit Device	3547A-EO
	Electric Latch Retraction Mods. (2)	VR1550-MDV-AE
	Power Transfers (2)	EPT-10
	Door Pulls (2)	1191-4
	Power Supply	1452
	Delay Egress Power Supply	1490-22
	Magnetic Locks (2)	371D
	Relay Interface Box	1420-RL1
	Key Switch with Audible Alarm	1310-S-2M/DM
	Mortise Cylinder	KABA "PEAKS"
	Door Position Switches	By Division 28
ED2	Exit Device	CD35-L
	Rim Cylinder	20-057
	Mortise Cylinder	20-061
ED3	Exit Device	98L-F x 996L-NL
	Rim Cylinder	20-057
ED4	Exit Device	LX9850
	Door Position Switch	By Division 28
ED5	Exit Devices (2)	8827L x 996L-NL x LBR
	Rim Cylinders (2)	31TD102H
	Electric Latch Retraction Mods. (2)	VR1550-MDV
	Electric Through Wire Hinges (2)	1104 x Match Size and Type
	Door Position Switches	By Division 28
	Card Reader	By Division 28
ED6	Exit Device	98NL
	Rim Cylinder	KABA "PEAKS"
	Electric Latch Retraction Mod.	RE1550-MDV
	Power Transfer	EPT-2
	Door Position Switch	By Division 28
	Card Reader	By Division 28
ED7	Exit Device	9875L
	Mortise Cylinder	KABA "PEAKS"
	Electronic Exit Device Modification	ME1520M-9875-24VDC
	Electric Through Wire Hinge	1104 x Match Size and Type
	Door Position Switch	By Division 28
	Card Reader	By Division 28
	Private Fire Device at Rated Doors	
ED8	Exit Device	9875L
	Mortise Cylinder	KABA "PEAKS"
	Electronic Exit Device Modification	ME1520M-9875-24VDC
	Electric Through Wire Hinge	1104 x Match Size and Type
	Flush Bolts (2)	3917 – 12"
	Dust Proof Strike	3911
	Door Position Switch	By Division 28
	Card Reader	By Division 28
ED9	Exit Device	3547A-NL-OP
	Rim Cylinder	KABA "PEAKS"
	Exit Device	3547A-EO
	Electric Latch Retraction Mods. (2)	VR1550-MDV-AE
	Power Transfers (2)	EPT-10
	Door Pulls (2)	1191-4
	Door Position Switches	By Division 28
	Card Reader	By Division 28
ED10	Exit Device	9875L
	Mortise Cylinder	KABA "PEAKS"
	Electronic Exit Device Modification	ME1520M-9875-24VDC-AE
	Electric Through Wire Hinge	1104 x Match Size and Type
	Delay Egress Power Supply	1490-22
	Magnetic Lock	371D
	Relay Interface Box	1420-RL1
	Key Switch with Audible Alarm	1310-S-2M/DM
	Mortise Cylinder	KABA "PEAKS"
	Door Position Switch	By Division 28
ED11	Exit Device	9875L
	Mortise Cylinder	20-061
ED12	Exit Devices (2)	98EO
	Removable Mullion	KR4954
	Mortise Cylinder	KABA "PEAKS"
	Electric Exit Modifications (2)	ME1500-AE
	Electric Through Wire Hinges (2)	1104 x Match Existing Size
	Delay Egress Power Supply	1490-22
	Magnetic Locks (2)	371D
	Relay Interface Box	1420-RL1
	Key Switch with Audible Alarm	1310-S-2M/DM
	Mortise Cylinder	KABA "PEAKS"
	Door Position Switch	By Division 28
ED13	Exit Device	LDR9L
	Rim Cylinder	KABA "PEAKS"
	Electronic Exit Device Modification	RE1570-996L-24VDC
	Power Transfer	EPT-2
	Card Reader	By Division 28
ED14	Exit Devices (2)	8827L-F-BE x LBR
ED15	Exit Device	9875L
	Mortise Cylinder	KABA "PEAKS"
	Electronic Exit Device Modification	ME1520M-9875-24VDC
	Door Cord	788-18
	Door Position Switch	By Division 28
	Card Reader	By Division 28
ED16	Exit Device	98L-F
	Rim Cylinder	20-057
ED17	Exit Device	98L-F-BE
ED18	Exit Device	55EO
	Electric Strike	6300-FSE
ED19	Exit Device	55EO
	Cover Plate	NGP 618. Field Verify Size

Product Category	As Specified	Acceptable Substitutions
Butt Hinges	Bommer	Hager, Ives
Continuous Gear Hinges	Select Products	ABH, National Guard
Continuous Pin Hinges	ABH	Select
Locksets and Latchsets	Schlage L9000 Series	None
Cylinders and Keying	KABA "PEAKS" and Schlage	None
Exit Devices	Von Duprin 98 Series	None
Surface Door Closers	LCN 4040XP Series	None
Electric Lock Modifications, Power Supplies	Architectural Control Systems	None
Power Transfers	Von Duprin	None
Floor Closers	Rixson	None
Automatic Flush Bolts	Ives	Door Controls
Coordinators	Ives	Door Controls
Kick & Mop Plates	Tica Industries	Ives, Hager, Trimco
Wall and Floor Stops	Trimco	Hager, Ives
Overhead Stop and Holders	Glynn-Johnson	ABH
Electro-Magnetic Door Releases	LCN	DynaLock
Weatherstrip & Thresholds	National Guard	Reese, Zero
Occupancy Indicators	Trios	Pre-approved equal

DELAYED EGRESS LOCKING SYSTEM NOTES:

1. The delay electronics of the delayed egress locking system shall deactivate upon actuation of the automatic sprinkler system or automatic fire detection system, allowing immediate, free egress.

2. The delay electronics of the delayed egress locking system shall deactivate upon loss of power controlling the lock or lock mechanism, allowing immediate free egress.

3. The delayed egress locking system shall have the capability of being deactivated at the fire command center and other approved locations.

4. An attempt to egress shall initiate an irreversible process that shall allow such egress in not more than 15 seconds when a physical effort to exit is applied to the egress side door hardware for not more than 3 seconds. Initation of the irreversible process shall activate an audible signal in the vicinity of the door. Once the delay electronics have been deactivated, rearming the delay electronics shall be by manual means only.
Exception: Where approved, a delay of not more than 30 seconds is permitted on a delayed egress door.

5. The egress path from any point shall not pass through more than one delayed egress locking system.
Exception: In Group I-2 or I-3 occupancies, the egress path from any point in the building shall pass through not more than two delayed egress locking systems provided the combined delay does not exceed 30 seconds.

6. A sign shall be provided on the door and shall be located above and within 12 inches (305 mm) of the door exit hardware:

6.1. For doors that swing in the direction of egress, the sign shall read: PUSH UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS.

6.2. For doors that swing in the opposite direction of egress, the sign shall read: PULL UNTIL ALARM SOUNDS. DOOR CAN BE OPENED IN 15 [30] SECONDS.

6.3. The sign shall comply with the visual character requirements in ICC A117.1.
Exception: Where approved, in Group I occupancies, the installation of a sign is not required where care recipients who because of clinical needs require restraint or containment as part of the function of the treatment area.

7. Emergency lighting shall be provided on the egress side of the door.

8. The delayed egress locking system units shall be listed in accordance with UL 294.

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Construction Documents

Submittal

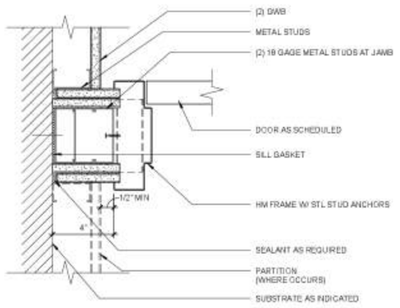
Revisions

No.	Date	Description
A	9/1/17	PERMIT CORRECTIONS 1

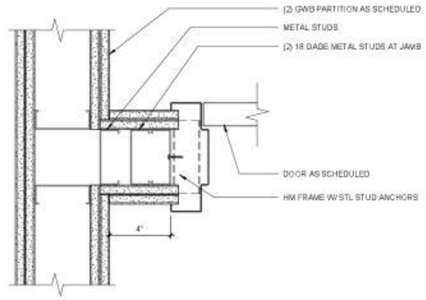
Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Door Hardware

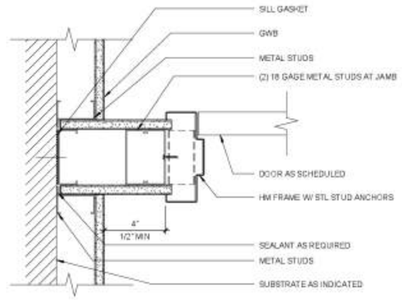
Sheet Number: A610a



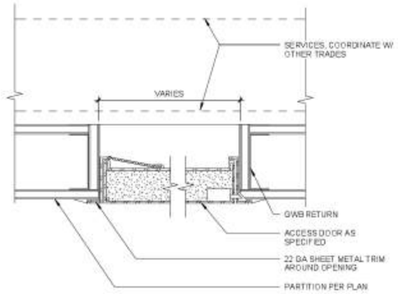
1 A611 JAMB DETAIL
3" = 1'-0"



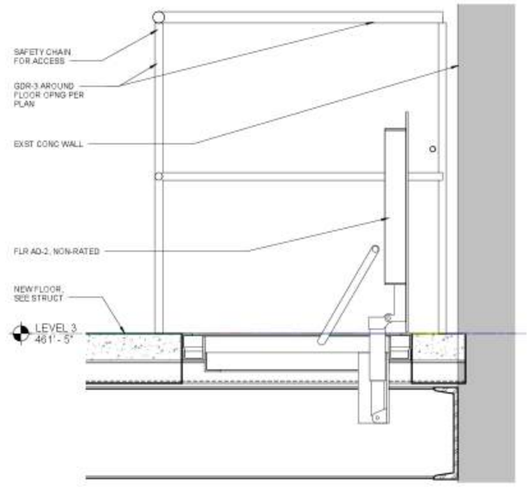
2 A611 JAMB DETAIL
3" = 1'-0"



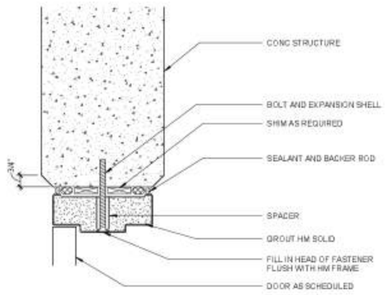
3 A611 JAMB DETAIL AT FURRED WALL
3" = 1'-0"



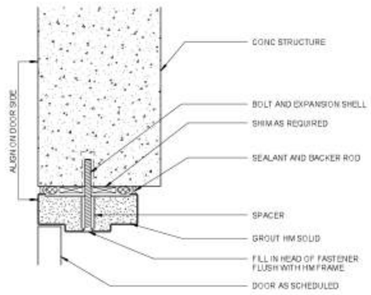
4 A611 ACCESS DOOR SECTION
3" = 1'-0"



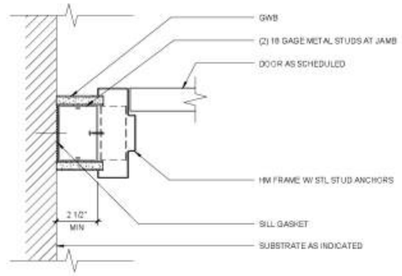
5 A611 FLR AD-2 2 MECH 302
1 1/2" = 1'-0"



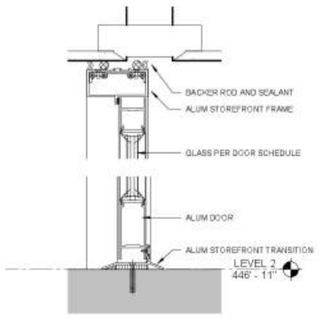
6 A611 HEAD AT CONCRETE
3" = 1'-0"



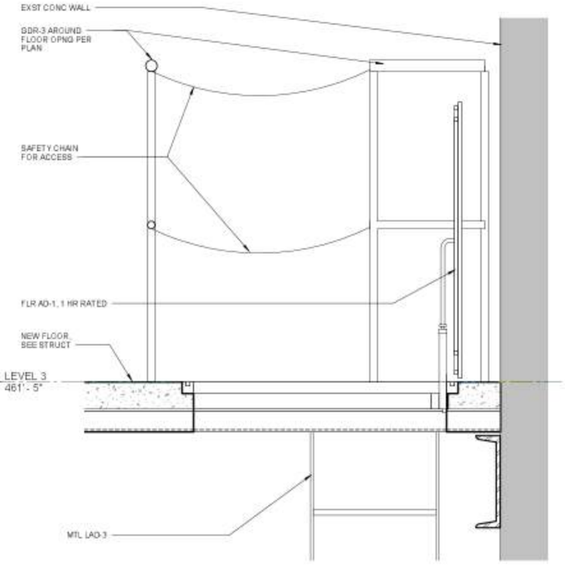
7 A611 JAMB AT CONCRETE
3" = 1'-0"



8 A611 JAMB DETAIL
3" = 1'-0"



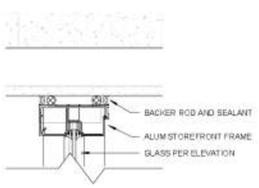
9 A611 STOREFRONT DOOR HEAD/SILL
3" = 1'-0"



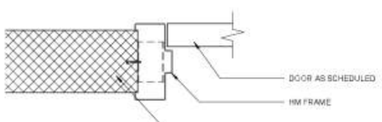
15 A611 FLR AD-1 MECH 301
1 1/2" = 1'-0"

11 A611 INT. STOREFRONT - JAMB @ GWB WALL
3" = 1'-0"

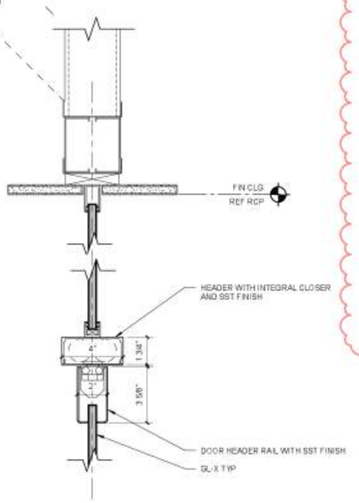
12 A611 GLASS RELITE - SILL
3" = 1'-0"



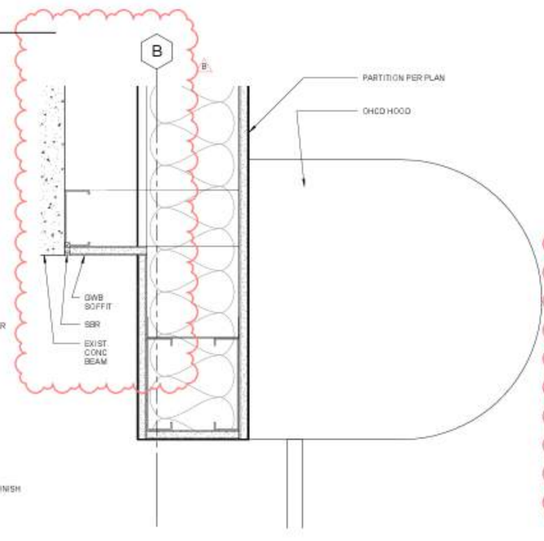
13 A611 STOREFRONT JAMB, TYP
3" = 1'-0"



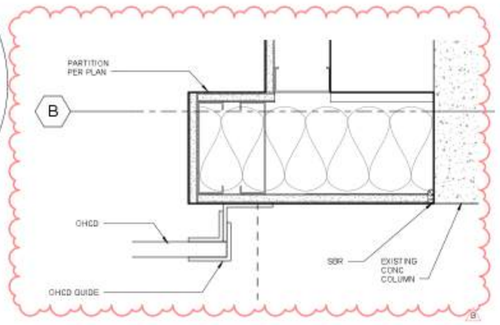
16 A611 JAMB DETAIL AT CLAY TILE
3" = 1'-0"



18 A611 GLASS DOOR - HEADER1
3" = 1'-0"



19 A611 OHCD-2 HEAD @ ART STORAGE
3" = 1'-0"



20 A611 OHCD-2 JAMB @ ART STORAGE
3" = 1'-0"

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Submittal: Construction Documents

Revisions		
No.	Date	Description
0	9/1/17	PERMIT CORRECTIONS 1

Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Door Details

Sheet Number: A611

ROOM #	ROOM NAME	FLOOR	BASE	WALLS NORTH	WALLS EAST	WALLS SOUTH	WALLS WEST	CEILING	REMARKS
100	RECEIVING	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
101	TRANSFORMER ROOM	CONC-S6	--	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
102	ELEC	CONC-S3	--	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
103	PUMP ROOM	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
104	NORTH ELEC	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	INSUL-2	
105	BOH/STORAGE	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
106	ART STORAGE	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
107	ELEV MACH	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
108	HALLWAY	RSF-2	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
108A	VESTIBULE	RSF-2	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
109	WC	PTF-2	CTB-2	CT-3	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
110	LOCKER	RSF-2	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
111	LOCKER	RSF-2	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
112	STORAGE	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
113	WC	PTF-2	CTB-2	CT-3	PNT-1	CT-3	PNT-1	OTS, PNT-1	
114	OFFICE	CPT-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
115	HALLWAY	RSF-2	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
115B	HALLWAY	RSF-2	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
116	ELEC	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
117	WIND TUNNEL	CONC-S3	--	INSUL-7	INSUL-7	EXIST, PNT-1	EXIST, PNT-1	INSUL-7	
118	MECH SOUTH	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
119	PUMP ROOM	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
120	MECH	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
121	MECH CENTRAL	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
122	BOILER	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
124	OFFICE	CPT-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
125	OFFICE	CPT-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
126	OFFICE	CPT-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
127	OFFICE	CPT-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
129	GENERATOR	CONC-S6	--	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
129A	GENERATOR VESTIBULE	CONC-S6	--	PNT-1	PNT-1	PNT-1	PNT-1/INSUL-7	OTS, PNT-1	
131	ELEV MACHINE ROOM	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
133	STORAGE	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
134	HALL	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
134A	STOR	CONC-S3	--	--	--	--	--	OTS, PNT-1	
135	CORRIDOR	TER-1	WB-1	PNT-1	SFWS-1, PNT-1	PNT-1	PNT-1	PNT-1	GWB-8 @ CEILING, SEE RCP FOR EXTENTS & LOCATION
135A	VESTIBULE	RSF-2	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
136	WC	PTF-2	CTB-2	PNT-1	PNT-1	CT-3	PNT-1	PNT-1	
137	BREAK ROOM	RSF-2	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
138	OPEN OFFICE	CPT-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
139	MEETING	TER-1	WB-1	PNT-1	SFWS-1	ASFWF-2	ASFWS-2	PNT-1	GWB-8 @ CEILING, SEE RCP FOR EXTENTS & LOCATION
ST3	STAIR 3	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
200	HALLWAY	TER-1	WB-1	PNT-1	PNT-1	PNT-1	PNT-1	PNT-1	
200A	HALLWAY	TER-1	WB-1	PNT-1, SFWS-2	PNT-1	PNT-1	PNT-1	PNT-1	
201	HALLWAY	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
202	RECEIVING	CONC-S6	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
202A	VEST	WOM-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	PNT-1	
202B	SECURITY	CPT-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
203	EXHIBIT SUPPORT	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
204	WET LAB	RSF-1	RB-2	FRP-1, PNT-1	FRP-1, PNT-1	FRP-1, PNT-1	FRP-1, PNT-1	APC-3	FRP-1 PANELS TO 8'-0" AFF, MIN.
205	CONSERVATION STUDIO	WFS-2	WB-1	PNT-1	PNT-1	PNT-1, SFWS-2	PNT-1	APC-1	
205A	OFFICE	WFS-3	WB-1	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
205B	STORAGE	RSF-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
206	GARDNER CENTER	CPT-1	EXIST	EXIST, PNT-1	PNT-1	EXIST, PNT-1	PNT-1	EXIST, PNT-1	EXIST. VENEER WALL PANELS TO REMAIN. CLEAN & RESTORE ALL EXISTING FINISHES
206A	CL	CPT-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	EXIST, PNT-1	
206B	CL	CPT-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	EXIST, PNT-1	
207	LIBRARY	CPT-1	EXIST	EXIST, PNT-1	EXIST, PNT-1	EXIST, PNT-1	EXIST, PNT-1	PNT-1	EXIST. MILLWORK TO REMAIN. CLEAN & RESTORE ALL EXISTING FINISHES
208	LIBRARY STACKS	CPT-1	EXIST	PNT-1	PNT-1	PNT-1	PNT-1	PNT-1	EXIST. HIGH-DENSITY STORAGE TO REMAIN. CLEAN & RESTORE ALL EXISTING FINISHES
209	JANITOR	CONC-S3	--	FRP-1, PNT-1	PNT-1	FRP-1, PNT-1	FRP-1, PNT-1	OTS, PNT-1	FRP-1 PANELS TO 8'-0" AFF, MIN.
209A	MECH	CONC-S3	--	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
210	RESTROOM	PTF-1	CTB-1, CTT-1	PNT-1, CT-1	PNT-1, CT-1, CT-2	PNT-1, CT-1	PNT-1, CT-1	PNT-1, APC-1	
212	ART STORAGE	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
212A	WORKSHOP	CONC-S6	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
213	LOBBY	TER-1	EXIST	PNT-1	PNT-1	PNT-1	PNT-1	EXIST, PNT-1	CLEAN & RESTORE ALL EXISTING FINISHES. SALVAGE AND REUSE BASE FROM FIREPLACE DEMO
214	STORAGE	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
214A	MECH	CONC-S3	--	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
215	AUDITORIUM	CPT-1/RESF-1	EXIST/ WB-3	PNT-1/2X3, ASFWS-1	PNT-1/2X3, ASFWS-1	PNT-1/2X3, ASFWS-1, WWP-1	PNT-1/2X3, ASFWS-1	PNT-1, AFWDP	PATCH AND REPAIR EXIST CONC AT SEATS. SEAL FLOOR
215A	STAGE	WFS-1	--	PNT-4	PNT-4, AFWWP-1	PNT-4	PNT-4, AFWWP-1	PNT-4	
216	HALLWAY	TER-1	WB-1	PNT-1	PNT-1	PNT-1	PNT-1	PNT-1	
217	COAT	CPT-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	PNT-1	HANGING ROD & SHELF ON SOUTH WALL
218	WC	PTF-2	CTB-2	PNT-1	PNT-1	CT-3	PNT-1	APC-1	
219	WC	PTF-2	CTB-2	CT-3	PNT-1	PNT-1	PNT-1	APC-1	
220	GREEN RM	CPT-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	GL-10: 48" X 72", PORTRAIT ORIENTATION, CENTERED HORIZ. ON PORTION OF WALL ADJACENT TO DOOR
221	AUD EXIT	CPT-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	RESIL NOSING AT STAIR RISERS
222	STAGE ACCESS	CPT-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	APC-1	
222A	A/V	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
222B	VESTIBULE	CPT-1	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
224	HALL	RSF-2	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	APC-2	
225	EDUC STOR	RSF-2	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	APC-2	
225A	A/V	RSF-2	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	APC-2	
226	HALLWAY	RSF-2	WB-1	PNT-1	PNT-1	PNT-1	PNT-1	APC-2, PNT-1	
226A	MECH	CONC-S3	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
227	EDUCATION	RSF-2	WB-1	PNT-1, SFWS-2	PNT-1	PNT-1	PNT-1, TWC-1	APC-1, PNT-1	
228	KITCHEN	RSF-1	RB-2	FRP-1, PNT-1	FRP-1, PNT-1	FRP-1, PNT-1	FRP-1, PNT-1	APC-3	FRP-1 PANELS TO 8'-0" AFF MIN. ; INSTALL ACOUSTICAL UNDERLAYMENT BELOW FINISHED FLOOR
229	VESTIBULE	RSF-2	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	APC-2	GWB-3 IMPACT RESISTANT GWB ALL WALLS
230	EVENT	TER-1	WB-1	ALL GLASS WALL, PNT-1	SFWS-1	SFWS-1, ASFWS-2	ASFWS-2	PNT-1	GWB-8 @ CEILING, SEE RCP FOR EXTENTS & LOCATION
231	HALLWAY	TER-1	WB-1	PNT-1	PNT-1	SFWS-2, PNT-1	PNT-1	PNT-1	
231A	PREFUNCTION	TER-1	WB-1	PNT-1, SFWS-1	SFWS-1	ALL GLASS WALL, PNT-1	PNT-1	PNT-1	GWB-8 @ CEILING, SEE RCP FOR EXTENTS & LOCATION
ST3	STAIR 3	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	

ROOM #	ROOM NAME	FLOOR	BASE	WALLS NORTH	WALLS EAST	WALLS SOUTH	WALLS WEST	CEILING	REMARKS
300	PARK LOBBY	TER-1	WB-2	SGCW-1, PNT-1	SGCW-1	PNT-1	PNT-7	PNT-1	
301	MECH	CONC-S3	--	--	--	--	--	OTS, PNT-1	
302	MECH	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
EL 1	ELEV	RSF-2	EXIST	PLAM-4, PNT-4	SST	PLAM-4, PNT-4	SST	(BY MANUFACTURER)	
GC1	GARDEN COURT	EXIST	EXIST	EXIST.	EXIST	EXIST.	EXIST	SPCL CLG-1, PNT-1	REPAIR EXIST. SCAGLIOLA AT STRUCTURAL TIE-BACKS TO MATCH EXISTING; CLEAN & RESTORE ALL OTHER EXISTING FINISHES
GC2	VESTIBULE	WFS-3A	EXIST	--	EXIST	--	EXIST	EXIST, PNT-1	PNT-6 @ ELEVATOR DOOR AND FRAME
GC3	VESTIBULE	WFS-3A	EXIST	--	EXIST	--	EXIST	EXIST, PNT-1	
GC3A	CLOSET	RSF-2	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	PNT-1	
GC3B	CLOSET	RSF-2	RB-3	PNT-1	PNT-1	PNT-1	PNT-1	PNT-1	
M1	ENTRY VESTIBULE	EXISTWOM-2	EXIST	EXIST	EXIST	EXIST.	EXIST	EXIST	CLEAN & RESTORE ALL EXISTING FINISHES
M2	ENTRY LOBBY	EXIST	EXIST	EXIST	EXIST	EXIST.	EXIST	EXIST	CLEAN & RESTORE ALL EXISTING FINISHES
M22	MUSEUM RETAIL	RSF-2	EXIST	PNT-1	PNT-1	PNT-1	PNT-1	EXIST, PNT-1	CLEAN & RESTORE ALL EXISTING FINISHES
M23	RETAIL COUNTER	EXIST.	EXIST	EXIST, PNT-1	EXIST, PNT-1	EXIST, PNT-1	PNT-1	PNT-1	CLEAN & RESTORE ALL EXISTING FINISHES. PATCH, REPAIR, AND REFINISH EXISTING FLOOR
M23A	STOR	CONC-S3	EXIST	PNT-1	PNT-1	PNT-1	PNT-1	EXIST, PNT-1	CLEAN & RESTORE ALL EXISTING FINISHES
M23B	STOR	CONC-S3	EXIST	PNT-1	PNT-1	PNT-1	PNT-1	EXIST, PNT-1	CLEAN & RESTORE ALL EXISTING FINISHES
M24	STOR	CONC-S3	EXIST	PNT-1	PNT-1	PNT-1	PNT-1	EXIST, PNT-1	CLEAN & RESTORE ALL EXISTING FINISHES
M25	TICKET COUNTER	EXIST.	EXIST	EXIST, PNT-1	EXIST, PNT-1	EXIST, PNT-1	PNT-1	PNT-1	CLEAN & RESTORE ALL EXISTING FINISHES. PATCH, REPAIR, AND REFINISH EXISTING FLOOR
M26	COATS	CONC-S3	EXIST	PNT-1	PNT-1	PNT-1	PNT-1	EXIST, PNT-1	CLEAN & RESTORE ALL EXISTING FINISHES
N1	EXHIBIT	WFS-3A	EXIST	EXIST, PNT-1	EXIST, PNT-1	EXIST, PNT-1	PNT-1	EXIST, PNT-1	REMOVE, REFURBISH & REINSTALL HISTORIC BASE, WAINSCOTTING, & MOULDING
N2	EXHIBIT	WFS-3A	EXIST	PNT-1	EXIST, PNT-1	PNT-1	PNT-1	EXIST, PNT-1	REMOVE, REFURBISH & REINSTALL HISTORIC BASE, WAINSCOTTING, & MOULDING
N3	EXHIBIT	WFS-3A	EXIST	PNT-1	PNT-1	EXIST, PNT-1	PNT-1	SPCL CLG-1, PNT-1	REMOVE, REFURBISH & REINSTALL HISTORIC BASE, WAINSCOTTING, & MOULDING
N4	EXHIBIT	WFS-3A	EXIST	PNT-1	PNT-1	PNT-1	PNT-1	SPCL CLG-1, PNT-1	REMOVE, REFURBISH & REINSTALL HISTORIC BASE, WAINSCOTTING, & MOULDING
N5	EXHIBIT	WFS-3A	EXIST	PNT-1	PNT-1	PNT-1	PNT-1	SPCL CLG-1, PNT-1	REMOVE, REFURBISH & REINSTALL HISTORIC BASE, WAINSCOTTING, & MOULDING
N6	EXHIBIT	WFS-3A	EXIST	EXIST, PNT-1	EXIST, PNT-1	EXIST, PNT-1	EXIST, PNT-1	EXIST, PNT-1	REMOVE, REFURBISH & REINSTALL HISTORIC BASE, WAINSCOTTING, & MOULDING
N7	EXHIBIT	WFS-3B	WB-2	PNT-1	PNT-1	PNT-1	PNT-1	PNT-1	REMOVE EXISTING PLASTER WAINSCOTTING, TRIM & CORNICE MOULDING
S1	EXHIBIT	WFS-3A	EXIST	EXIST, PNT-1	EXIST, PNT-1	EXIST, PNT-1	PNT-1	EXIST, PNT-1	REMOVE, REFURBISH & REINSTALL HISTORIC BASE, WAINSCOTTING, & MOULDING
S2	EXHIBIT	WFS-3A	EXIST	PNT-1	PNT-1	PNT-1	PNT-1	EXIST, PNT-1	REMOVE, REFURBISH & REINSTALL HISTORIC BASE, WAINSCOTTING, & MOULDING
S3	EXHIBIT	WFS-3A	EXIST	PNT-1, EXIST.PNT-1	PNT-1	PNT-1	PNT-1	SPCL CLG-1, PNT-1	REMOVE, REFURBISH & REINSTALL HISTORIC BASE, WAINSCOTTING, & MOULDING
S4	EXHIBIT	WFS-3A	EXIST	PNT-1	PNT-1	PNT-1	PNT-1	SPCL CLG-1, PNT-1	REMOVE, REFURBISH & REINSTALL HISTORIC BASE, WAINSCOTTING, & MOULDING
S5	EXHIBIT	WFS-3A	EXIST	PNT-1	PNT-1	PNT-1	PNT-1	SPCL CLG-1, PNT-1	REMOVE, REFURBISH & REINSTALL HISTORIC BASE, WAINSCOTTING, & MOULDING
S6	EXHIBIT	WFS-3A	EXIST	EXIST, PNT-1	EXIST, PNT-1	EXIST, PNT-1	EXIST, PNT-1	EXIST, PNT-1	REMOVE, REFURBISH & REINSTALL HISTORIC BASE, WAINSCOTTING, & MOULDING
S7	EXHIBIT	WFS-3B	WB-2	PNT-1	PNT-1	PNT-1	PNT-1	PNT-1	REMOVE EXISTING PLASTER WAINSCOTTING, TRIM & CORNICE MOULDING ; INSTALL ACOUSTICAL UNDERLAYMENT BELOW FINISHED FLOOR
S8	EXHIBIT	WFS-3B	WB-2	PNT-1	PNT-1	PNT-1	PNT-1	PNT-1	INSTALL ACOUSTICAL UNDERLAYMENT BELOW FINISHED FLOOR
ST2	STAIR 2	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
ST5A	STAIR 5A	EXIST	EXIST	EXIST.	--	EXIST.	--	EXIST	CLEAN & RESTORE ALL EXISTING FINISHES
ST5B	STAIR 5B	EXIST	EXIST	--	EXIST	--	EXIST	EXIST	CLEAN & RESTORE ALL EXISTING FINISHES
ST5C	STAIR 5C	EXIST	EXIST	--	EXIST	--	EXIST	EXIST	CLEAN & RESTORE ALL EXISTING FINISHES
ST 1	STAIR 1	EXIST	EXIST	EXIST, PNT-1	--	EXIST, PNT-1	--	EXIST, PNT-1	CLEAN & RESTORE ALL EXISTING FINISHES
ST 2	STAIR 2	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	REMOVE DAMAGED EXISTING PAINT AND MITIGATE WATER INFILTRATION PRIOR TO REPAINTING.
401	VEST	CONC-S6	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
402	MECH N	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	
403	MECH S	CONC-S3	RB-1	PNT-1	PNT-1	PNT-1	PNT-1	OTS, PNT-1	

GENERAL SHEET NOTES

1. ALL FINISHES TO COMPLY WITH FLAME SPREAD AND SMOKE DEVELOPMENT REQUIREMENTS, PER SEATTLE BUILDING CODE, CHAPTER 8
2. SEE INTERIOR ELEVATIONS FOR NOTES REGARDING SALVAGE & REPAIR IN HISTORIC SPACES
3. SEE INTERIOR ELEVATIONS FOR NOTES REGARDING EXTENT OF FINISHES AND TRANSITION DETAILS
4. WALL FINISH TO BE PNT-1, UNO
5. PAINT SHEEN: EGGSHELL IN NON-GALLERY AREAS, SATIN IN RESTROOMS, FLAT IN GALLERIES
6. ALL PNT IN RESTROOMS TO BE EPOXY PAINT

LEGEND

TILE START

XXX-#, YYY-#, ZZZ-# ROOM FINISHES: FLOOR, BASE, WALL

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Asian Art Museum Expansion & Renovation

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Submittal: Construction Documents

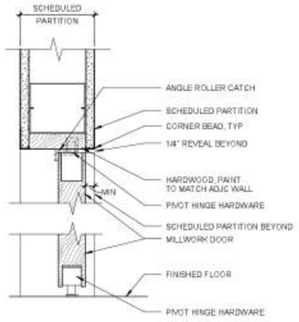
Revisions

No	Date	Description
1	7/12/17	ADDENDUM #1
B	9/1/17	PERMIT CORRECTIONS 1

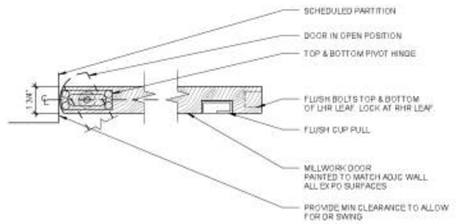
Drawn: MRT
Checked:
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Finish Schedule

Sheet Number: A615



1 A619 DOOR - PIVOT HEAD/THRESHOLD
3" = 1'-0"



2 A619 DOOR - PIVOT JAMB/PULL
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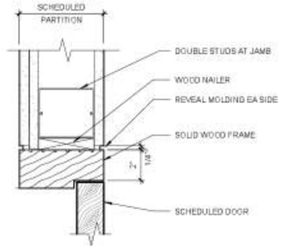

3 A619 DOOR-WD JAMB(HEAD SIM)
3" = 1'-0"

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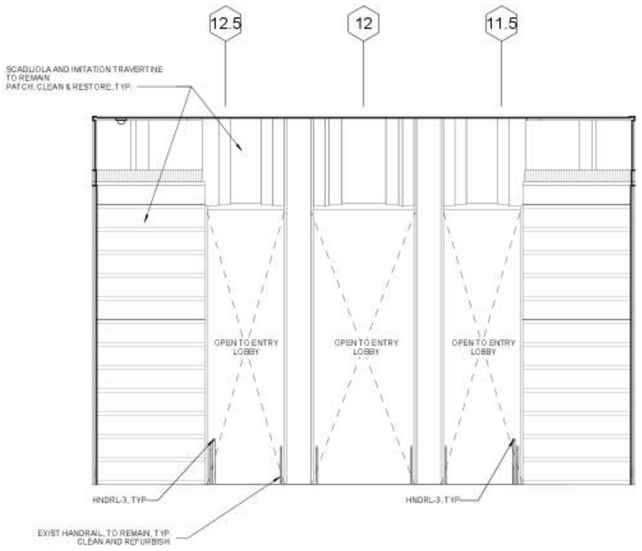
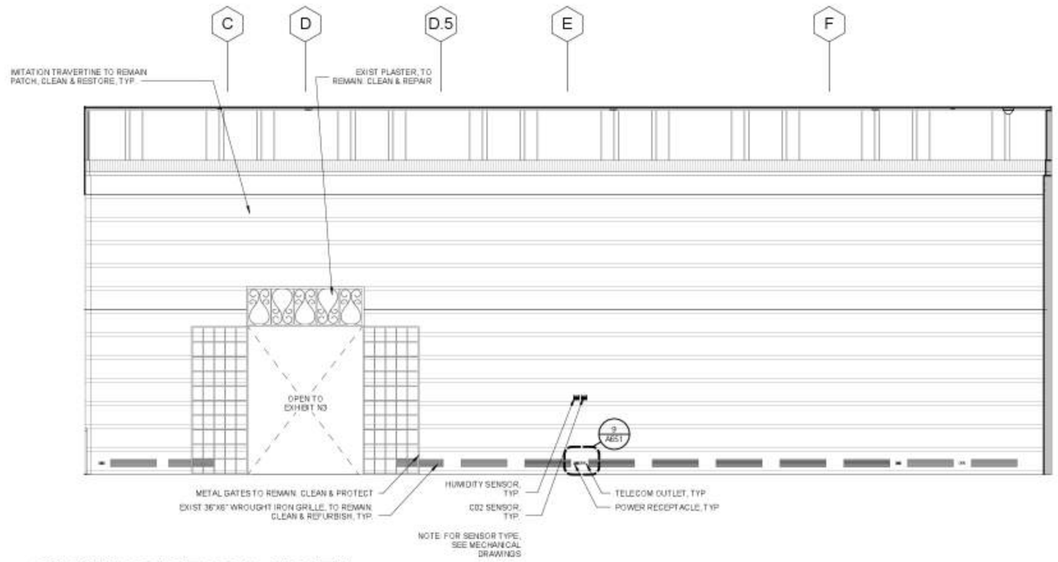
LMN Proj No 16028.01
Date 6/23/17

Sheet Title
Doors & Frames - Wood Doors

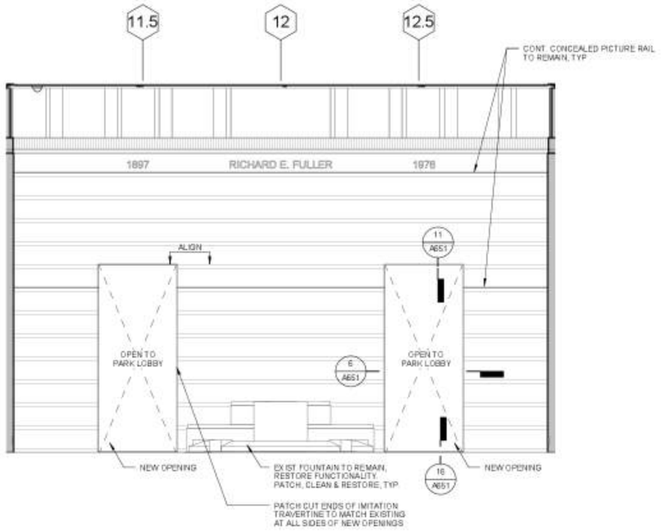
Sheet Number
A619



1 A620 GARDEN COURT GC-1 - WEST
1/4" = 1'-0"



2 A620 GARDEN COURT GC-1 - NORTH
1/4" = 1'-0"



3 A620 GARDEN COURT GC-1 - EAST
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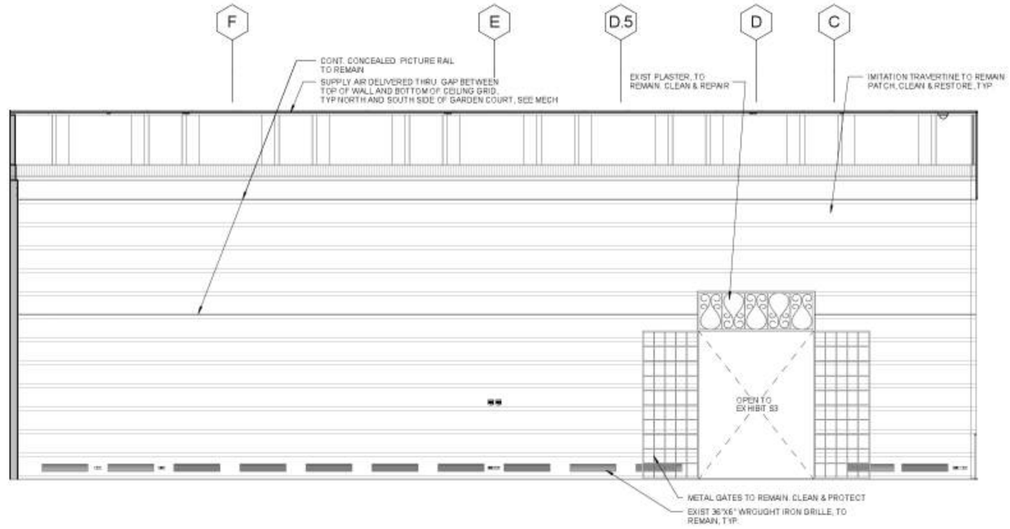

4 A620 GARDEN COURT GC-1 - SOUTH
1/4" = 1'-0"

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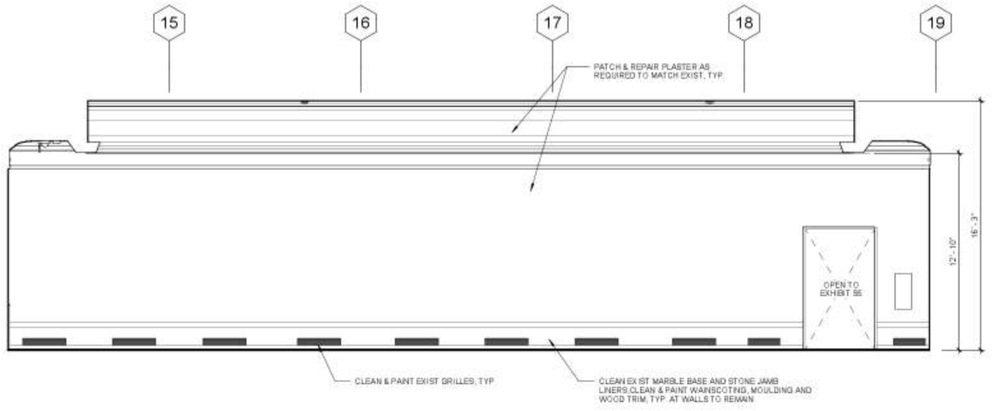
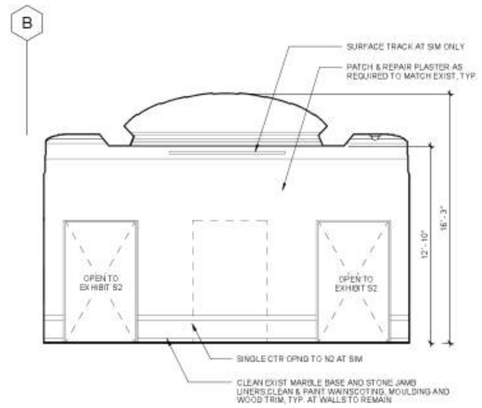
Date 6/23/17

Sheet Title
Interior Elevations - Garden Court

Sheet Number
A620



1 A621 EXHIBIT S1 - EAST (EXHIBIT N1 SIM)
1/4" = 1'-0"



2 A621 EXHIBIT S1 - SOUTH (EXHIBIT N1 NORTH SIM)
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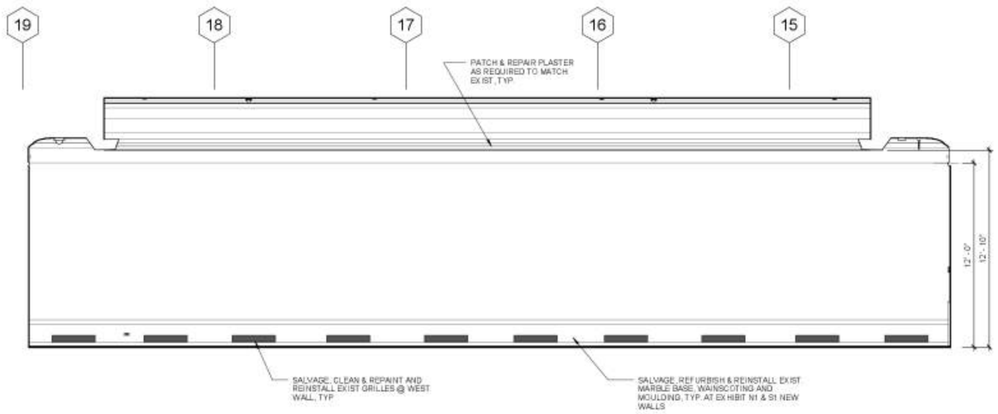

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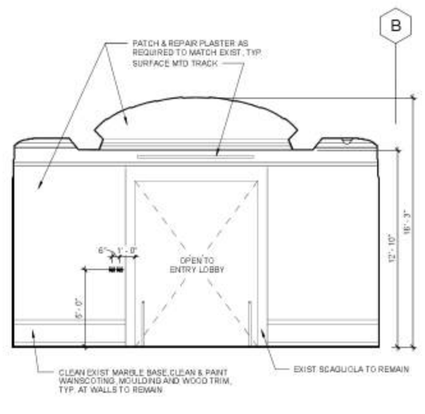
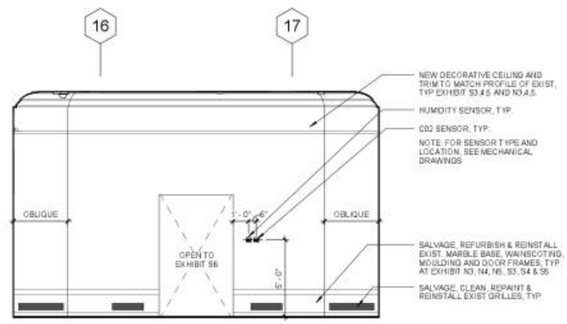
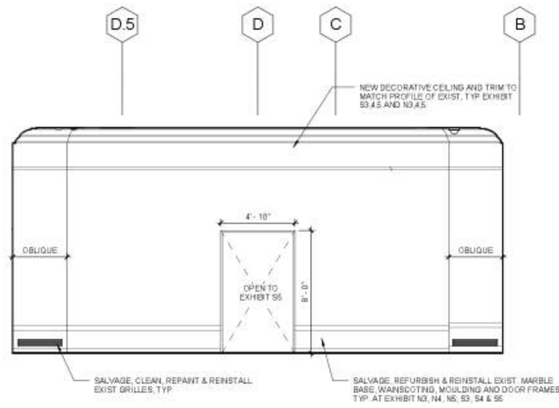
1/4" = 1'-0"



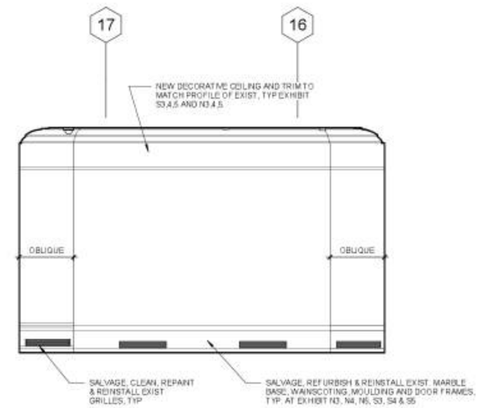
4 A621 EXHIBIT S1- NORTH (EXHIBIT N1 SOUTH SIM)
1/4" = 1'-0"



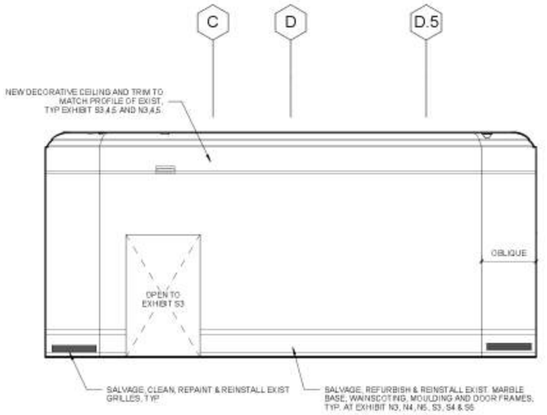
7 A621 EXHIBIT S4 - EAST
1/4" = 1'-0"
EXHIBIT S3,S5,N3,N4,N5 SIM



8 A621 EXHIBIT S4 - SOUTH
1/4" = 1'-0"
EXHIBIT S3,S5,N3,N4,N5 SIM



9 A621 EXHIBIT S4 - WEST
1/4" = 1'-0"
EXHIBIT S3,S5,N3,N4,N5 SIM



10 A621 EXHIBIT S4 - NORTH
1/4" = 1'-0"
EXHIBIT S3,S5,N3,N4,N5 SIM

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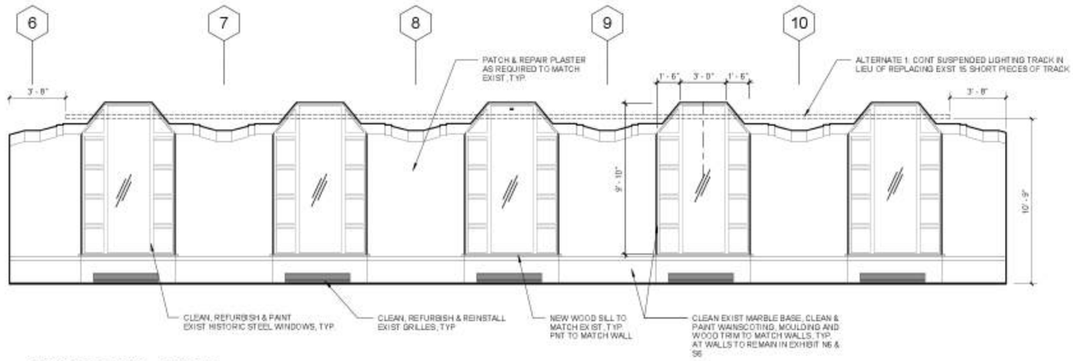
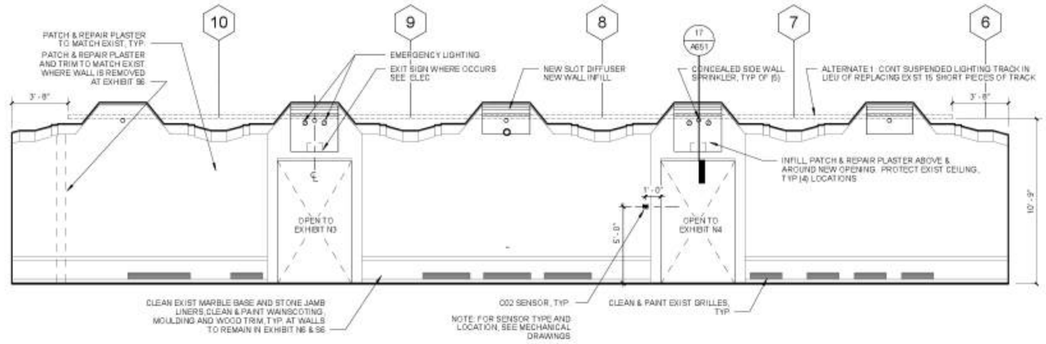
LMN Proj No 16028.01
Date 6/23/17

Sheet Title: Interior Elevations - Galleries

Sheet Number: A621



1 A622 EXHIBIT N6 - EAST
1/4" = 1'-0"



2 A622 EXHIBIT N6 - WEST, EXHIBIT S6 - WEST SIM
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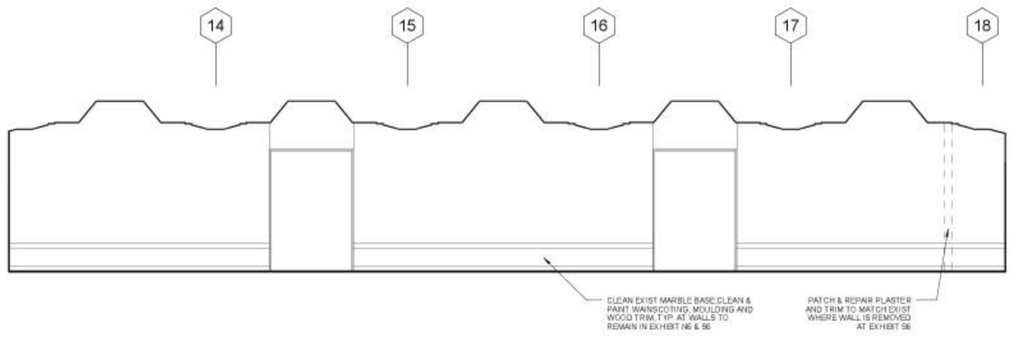
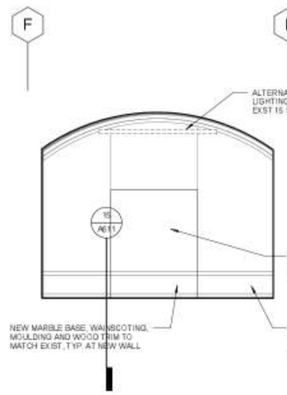


8 A622 EXHIBIT S6 - EAST
1/4" = 1'-0"



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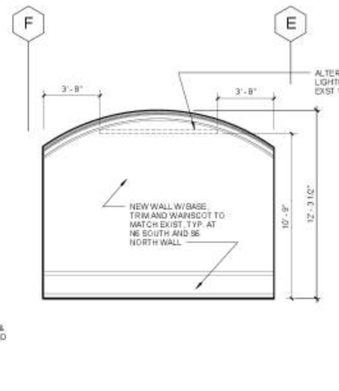
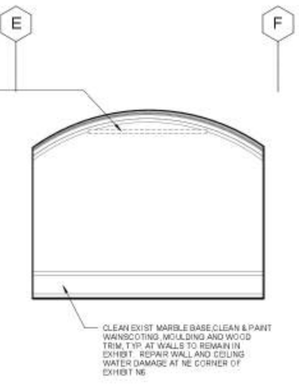
1/4" = 1'-0"



7 A622 EXHIBIT N6 - SOUTH, EXHIBIT S6 NORTH SIM
1/4" = 1'-0"



10 A622 EXHIBIT N6 - NORTH
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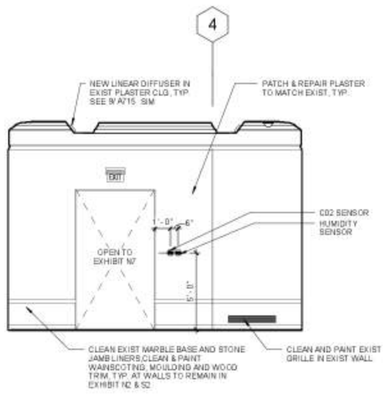

3 A622 EXHIBIT N2 - EAST (EXHIBIT S2 SIM)
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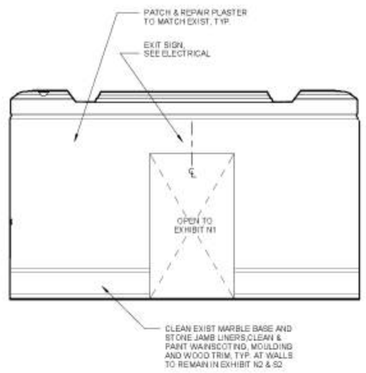

4 A622 EXHIBIT N2 - SOUTH (EXHIBIT S2 SIM)
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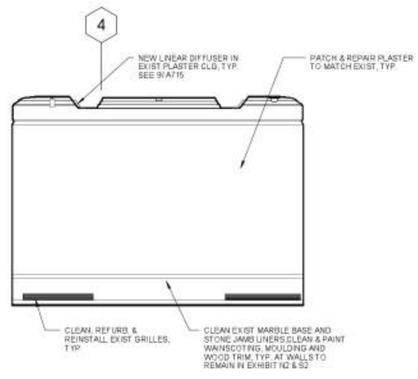
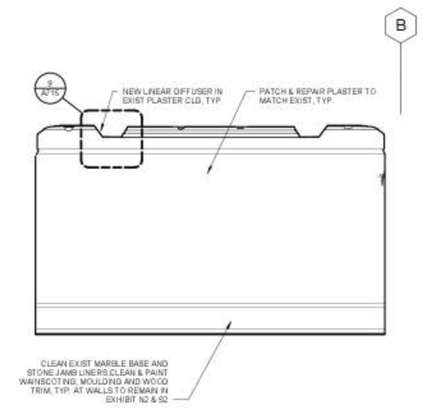


5 A622 EXHIBIT N2 - WEST (EXHIBIT S2 SIM)
1/4" = 1'-0"



6 A622 EXHIBIT N2 - NORTH (EXHIBIT S2 SIM)
1/4" = 1'-0"

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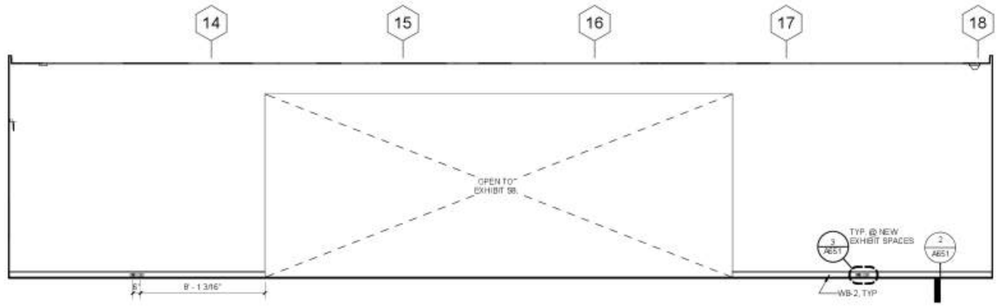
Sheet Title

Interior Elevations - Galleries

Sheet Number

A622



1 A623 EXHIBIT S7 - EAST
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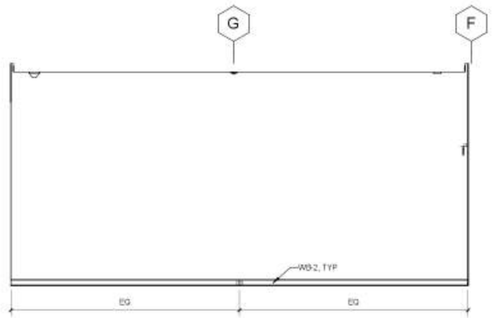

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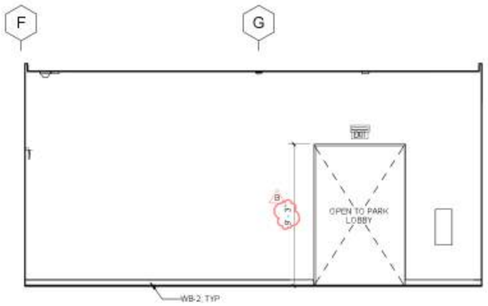

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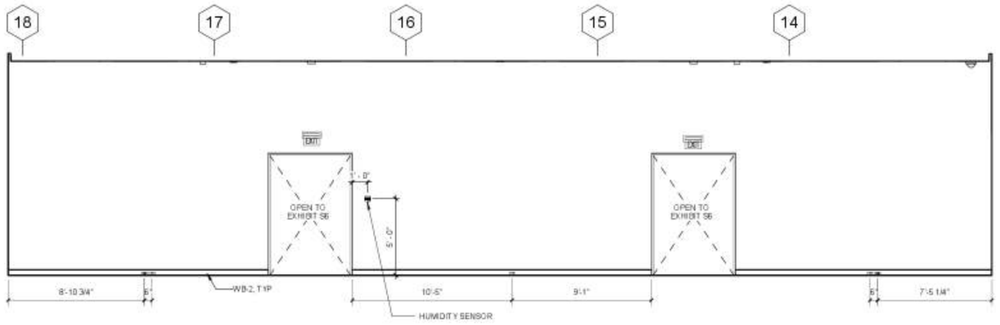

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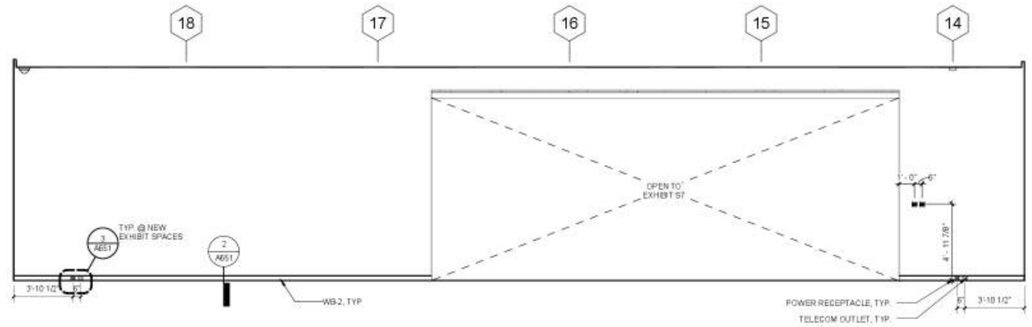

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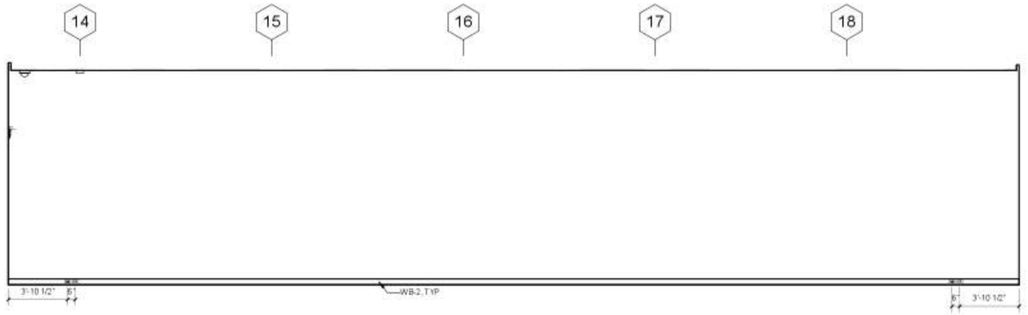
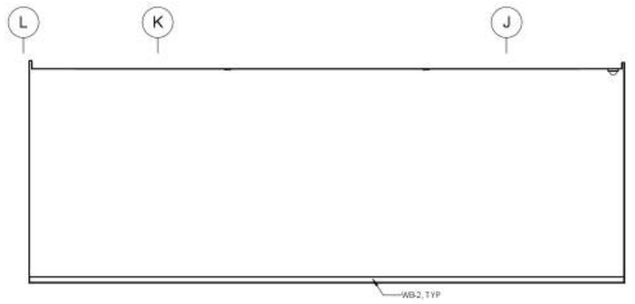
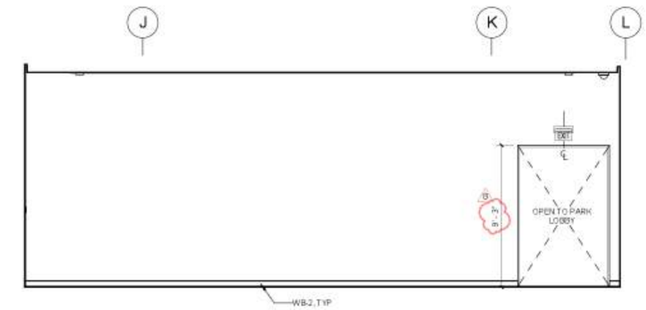


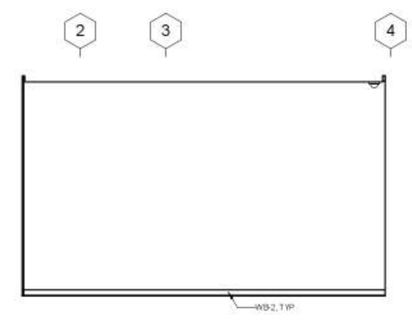
5 A623 EXHIBIT S8 - EAST
1/4" = 1'-0"



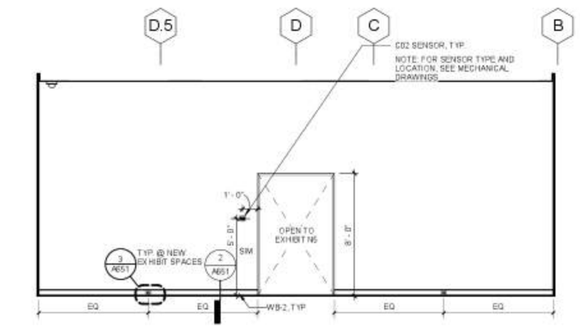
6 A623 EXHIBIT S8 - SOUTH
1/4" = 1'-0"



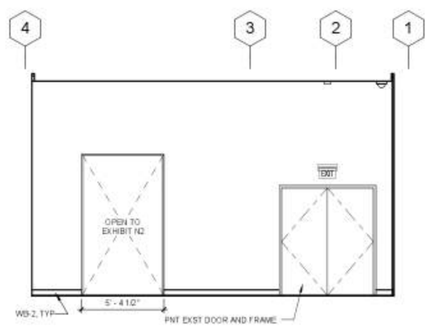
8 A623 EXHIBIT S8 - NORTH
1/4" = 1'-0"



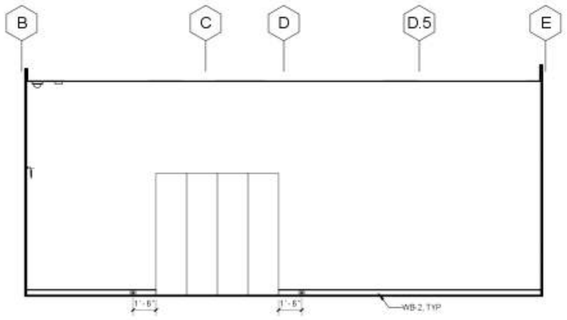
9 A623 N7 EXHIBIT - EAST
1/4" = 1'-0"



10 A623 N7 EXHIBIT - SOUTH
1/4" = 1'-0"



11 A623 N7 EXHIBIT - WEST
1/4" = 1'-0"



12 A623 N7 EXHIBIT - NORTH
1/4" = 1'-0"

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SAM ASIAN ART MUSEUM

Submittal

Revisions

No.	Date	Description
0	9/1/17	PERMIT CORRECTIONS 1

Sheet Title

Sheet Number

Asian Art Museum Expansion & Renovation

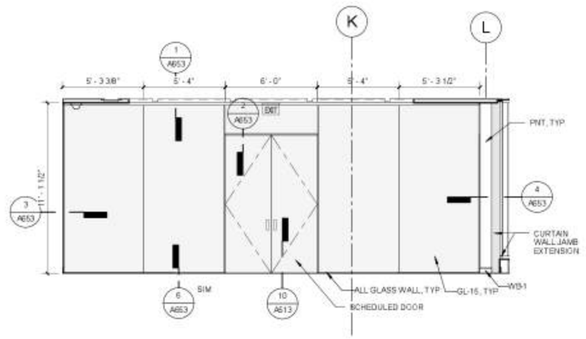
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Construction Documents

Drawn	Author
Checked	Checker
LMN Proj No	160208.01
Date	6/23/17

Interior Elevations - Galleries

A623



1 A624 EVENT 230 - NORTH
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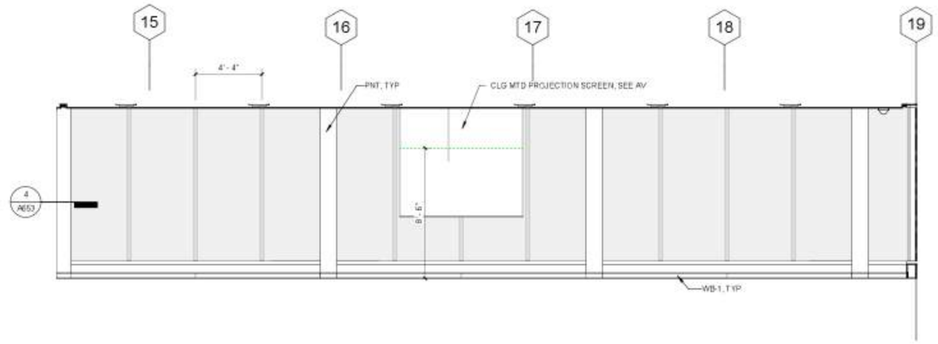
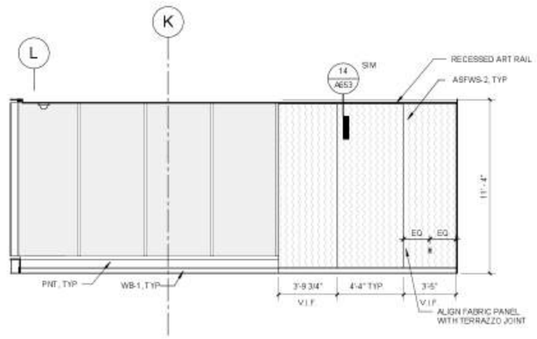
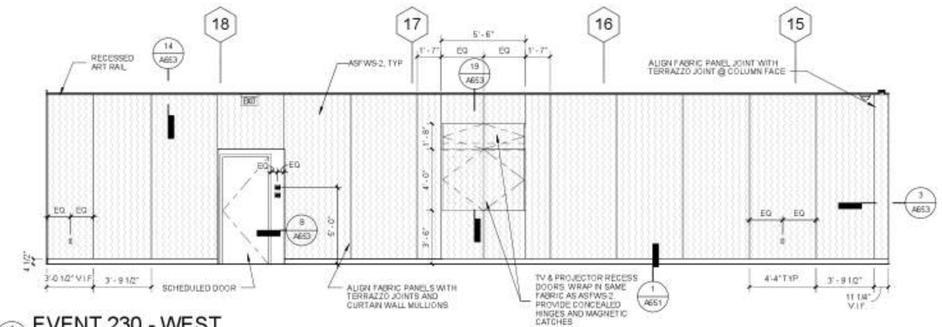


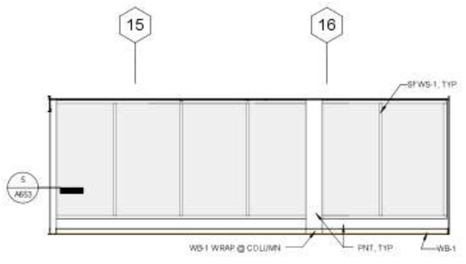
2 A624 EVENT 230 - EAST
1/4" = 1'-0"



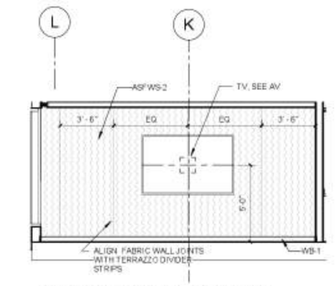
3 A624 EVENT 230 - SOUTH
1/4" = 1'-0"



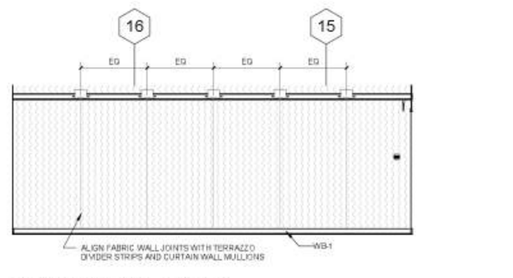
4 A624 EVENT 230 - WEST
1/4" = 1'-0"



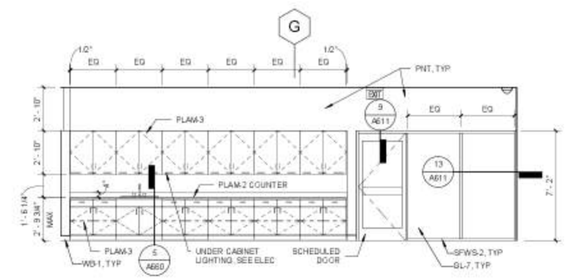
5 A624 MEETING 139 - EAST
1/4" = 1'-0"



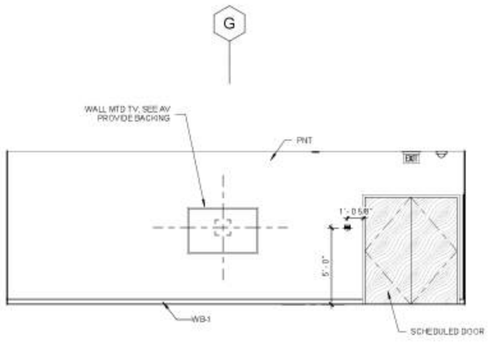
6 A624 MEETING 139 - SOUTH
1/4" = 1'-0"



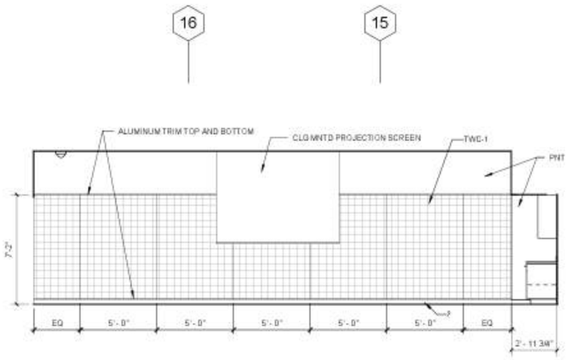
7 A624 MEETING 139 - WEST
1/4" = 1'-0"



8 A624 EDUCATION 227 - NORTH
1/4" = 1'-0"



9 A624 EDUCATION 227 - SOUTH
1/4" = 1'-0"



10 A624 EDUCATION 227 - WEST
1/4" = 1'-0"

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SAM ASIAN ART MUSEUM

Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Construction Documents

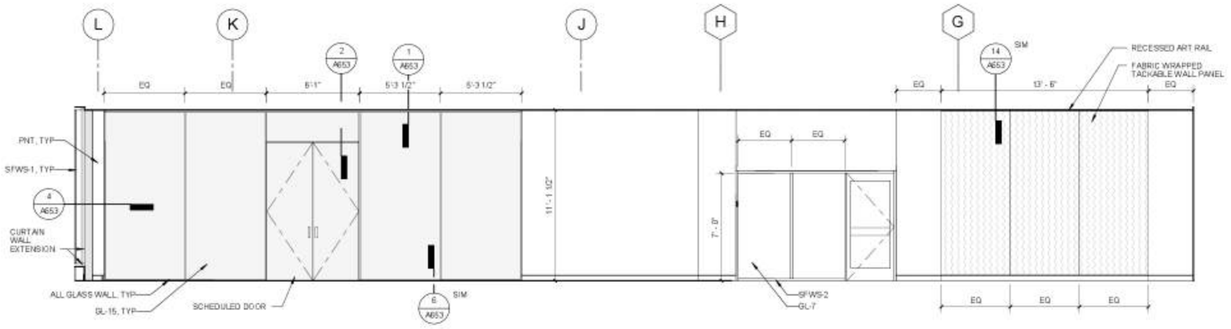
Submittal

Revisions
No. Date Description

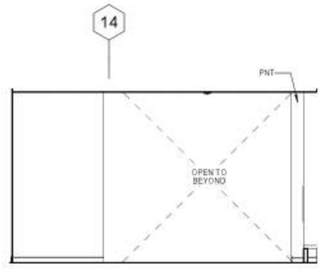
Drawn MRT
Checked Checker
LMN Proj No 16028.01
Date 6/23/17

Sheet Title: Interior Elevations - Education, Event, Mtg Room

Sheet Number: A624



1 A625 HALLWAY 231 - SOUTH
1/4" = 1'-0"



2 A625 PREFUNCTION 231A - WEST
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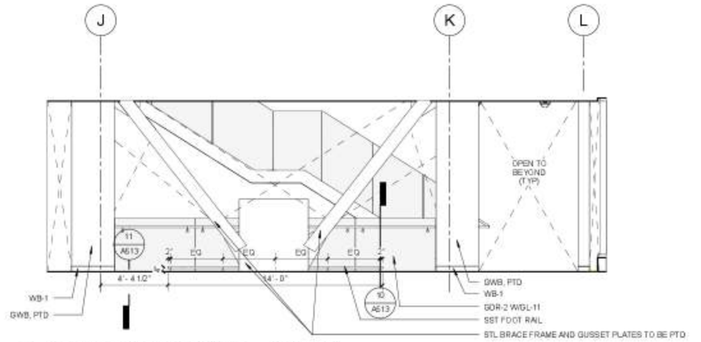
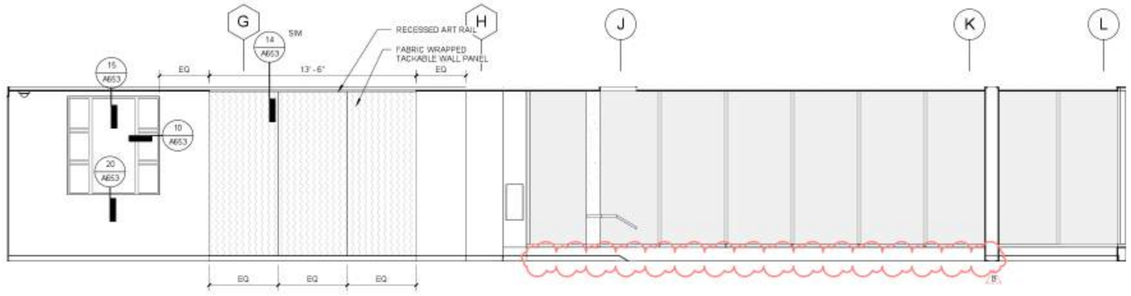


3 A625 PREFUNCTION 231A - NORTH
1/4" = 1'-0"



4 A625 HALLWAY 231 - NORTH
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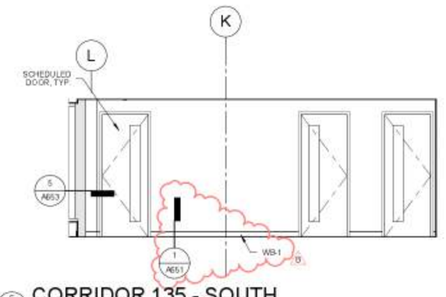
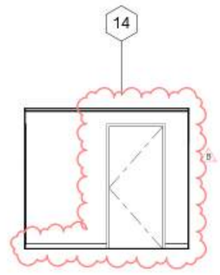


5 A625 CORRIDOR 135 - SOUTH
1/4" = 1'-0"



6 A625 CORRIDOR 135 - WEST
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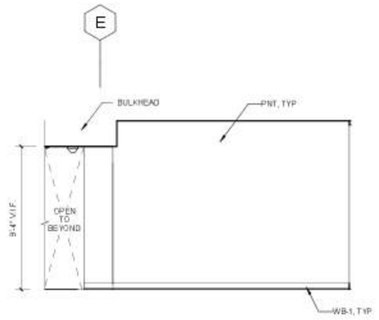
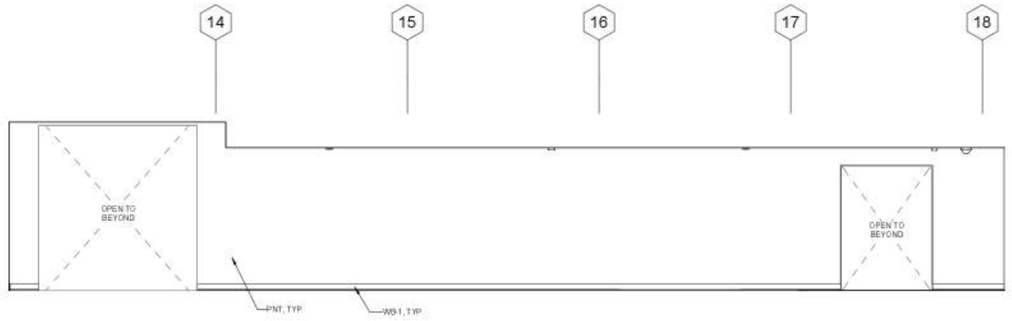
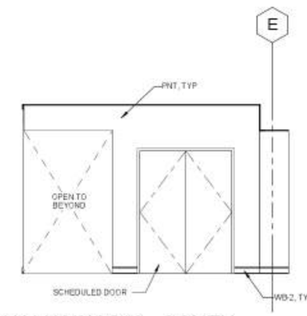


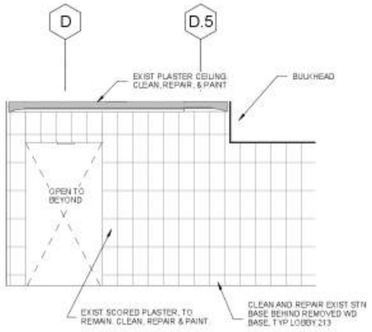
7 A625 HALLWAY 216 - NORTH
1/4" = 1'-0"



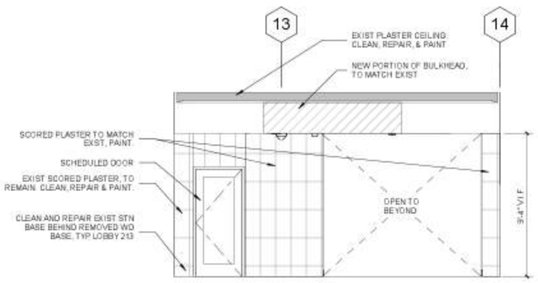
8 A625 HALLWAY 216 - EAST
1/4" = 1'-0"



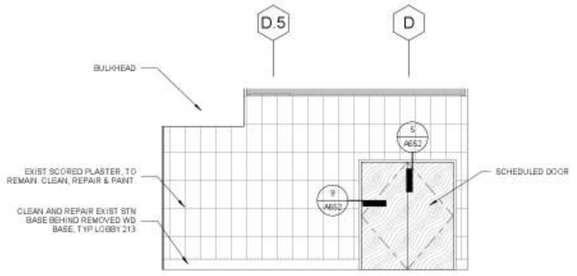
9 A625 HALLWAY 216 - SOUTH
1/4" = 1'-0"



10 A625 LOBBY 213 - NORTH
1/4" = 1'-0"



11 A625 LOBBY 213 - EAST
1/4" = 1'-0"



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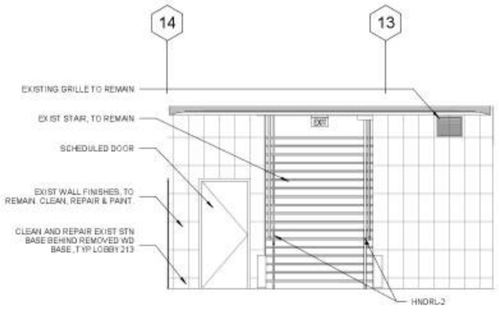
1/4" = 1'-0"



13 A625 LOBBY 213 - WEST
1/4" = 1'-0"

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SAM ASIAN ART MUSEUM

Submittal

Revisions

No.	Date	Description
0	9/1/17	PERMIT CORRECTIONS 1

Sheet Title

Sheet Number

Asian Art Museum Expansion & Renovation

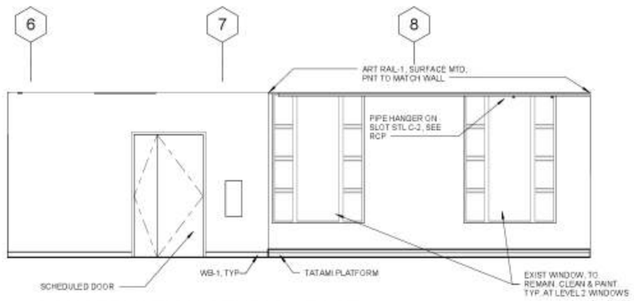
Volunteer Park / 1400 E Prospect / Seattle, WA 98112

Construction Documents

Drawn	Author
Checked	Checker
LMN Proj No	16028.01
Date	6/23/17

Interior Elevations - Hallways and Lobbies

A625



1 A626 CONSERVATION STUDIO - EAST
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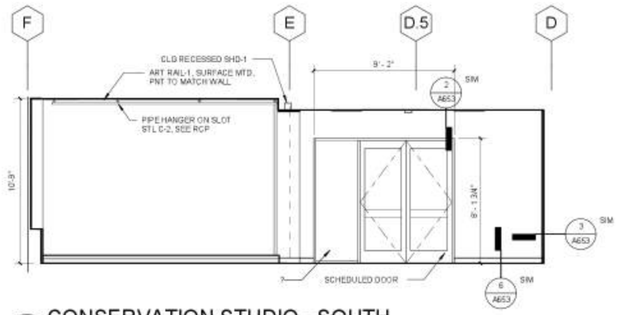
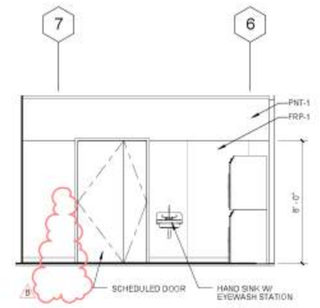


2 A626 CONSERVATION STUDIO - SOUTH
1/4" = 1'-0"



3 A626 WET LAB - WEST
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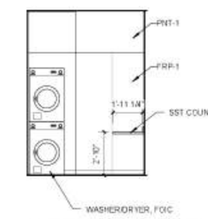
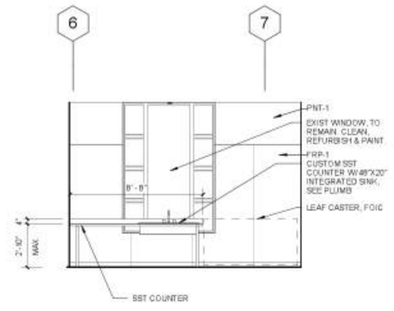


4 A626 WET LAB - NORTH
1/4" = 1'-0"



5 A626 WET LAB - EAST
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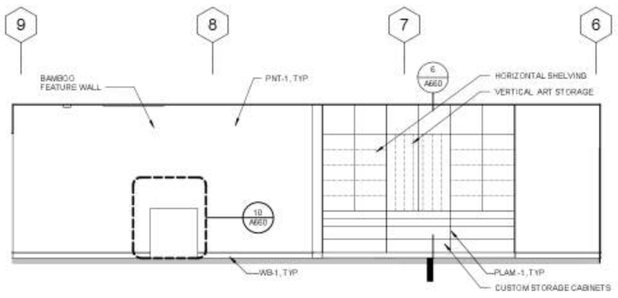

6 A626 CONSERVATION STUDIO - WEST
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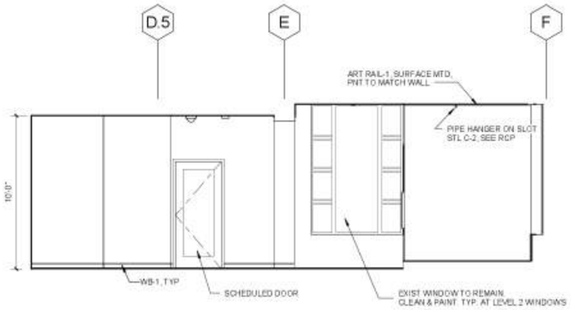

7 A626 CONSERVATION STUDIO - NORTH
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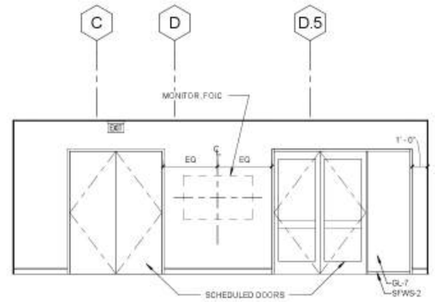

8 A626 HALLWAY 200A - NORTH
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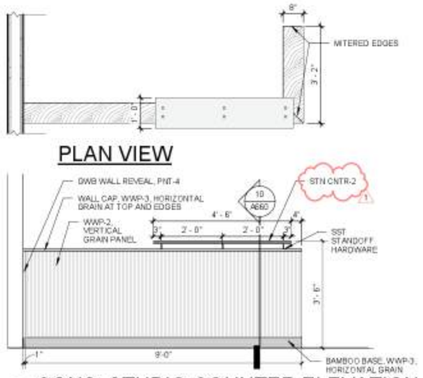

9 A626 CONS. STUDIO COUNTER ELEVATION
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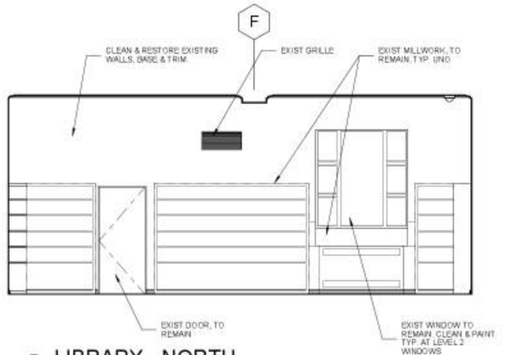

10 A626 LIBRARY - NORTH
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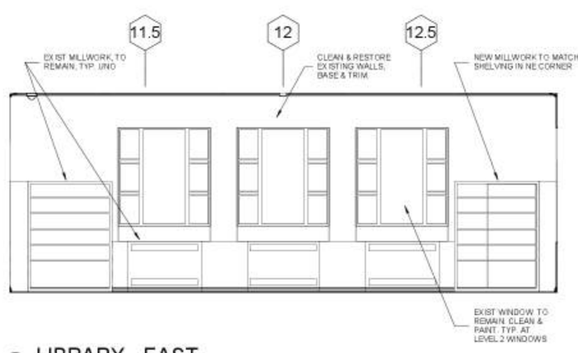

11 A626 LIBRARY - EAST
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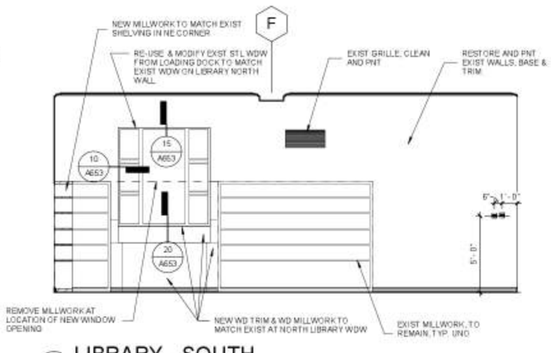

12 A626 LIBRARY - SOUTH
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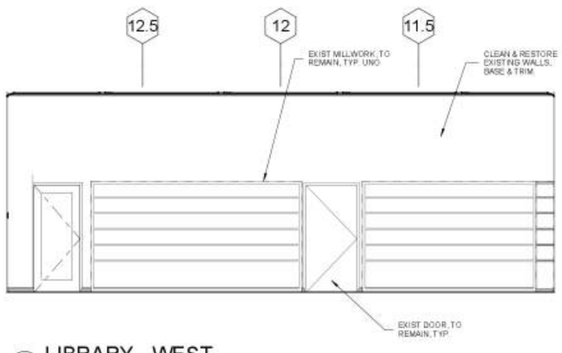

13 A626 LIBRARY - WEST
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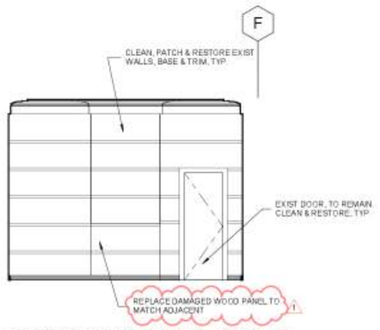
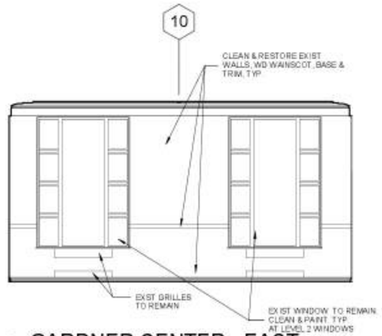
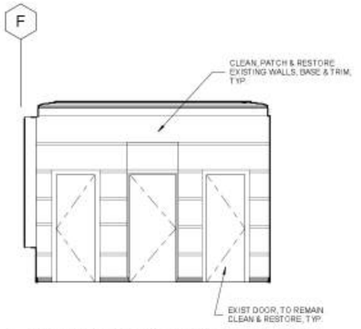


14 A626 GARDNER CENTER - NORTH
1/4" = 1'-0"



15 A626 GARDNER CENTER - EAST
1/4" = 1'-0"



16 A626 GARDNER CENTER - SOUTH
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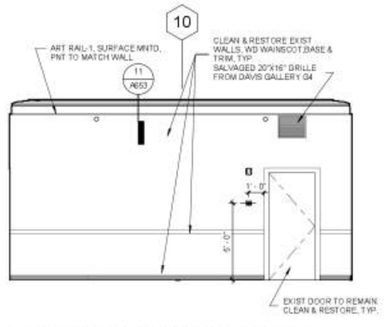

17 A626 GARDNER CENTER - WEST
1/4" = 1'-0"

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ASIAN ART MUSEUM

Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Construction Documents

Submittal

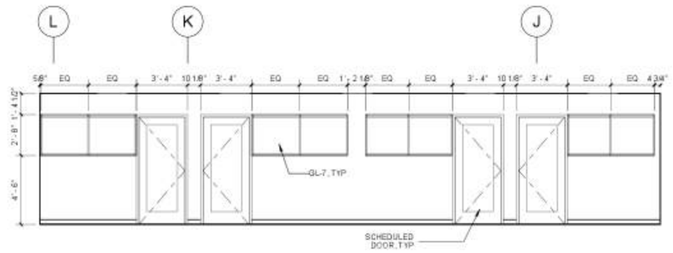
Revisions

No	Date	Description
1	7/12/17	ADDENDUM #1
8	9/1/17	PERMIT CORRECTIONS 1

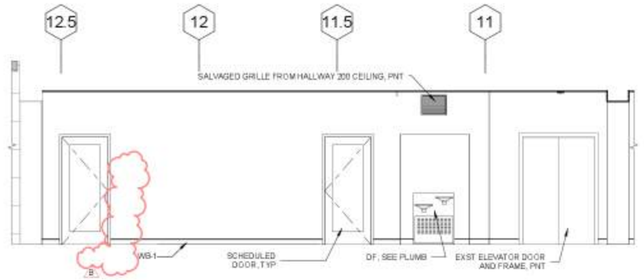
Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Interior Elevations - Conservation Studio, Library, Gardner Ctr

Sheet Number: **A626**

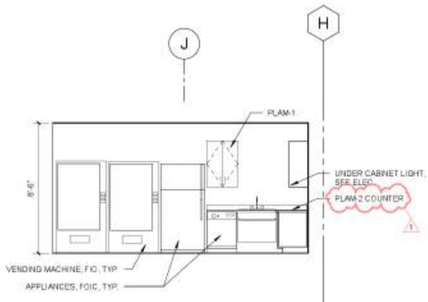


1 A627 OPEN OFFICE 138 - SOUTH
1/4" = 1'-0"

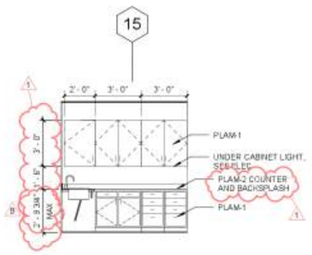


2 A627 HALLWAY 200 - WEST
1/4" = 1'-0"

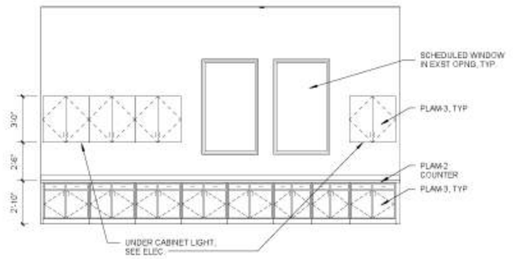
3 A627 HALLWAY 200 - EAST
1/4" = 1'-0"



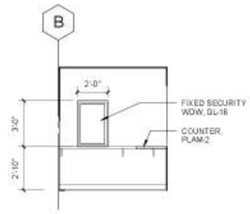
4 A627 BREAK ROOM 137 - SOUTH
1/4" = 1'-0"



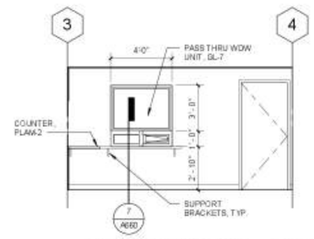
5 A627 BREAK ROOM 137 - EAST
1/4" = 1'-0"



6 A627 WORKSHOP 212A - NORTH
1/4" = 1'-0"



7 A627 SECURITY 202B - NORTH
1/4" = 1'-0"



8 A627 SECURITY 202B - EAST
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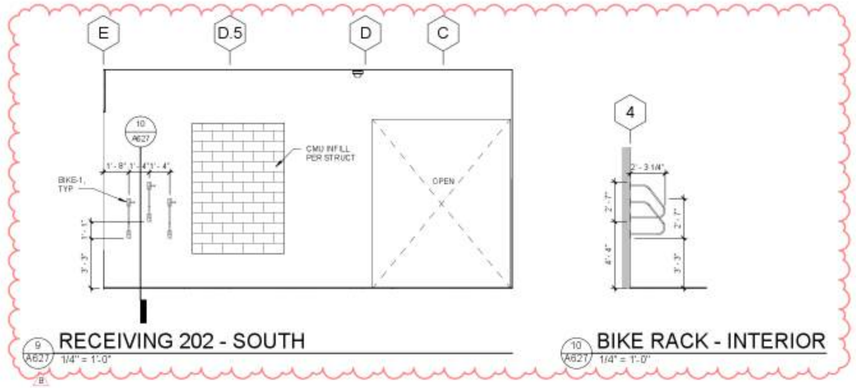

9 A627 RECEIVING 202 - SOUTH
1/4" = 1'-0"

10 A627 BIKE RACK - INTERIOR
1/4" = 1'-0"

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SAM ASIAN ART MUSEUM

Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Submittal
Construction Documents

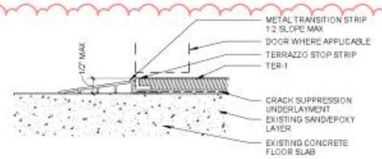
Revisions

No	Date	Description
1	7/12/17	ADDENDUM #1
B	9/1/17	PERMIT CORRECTIONS 1

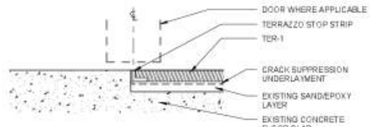
Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Interior Elevations - Level 1 Office Suite, Misc.

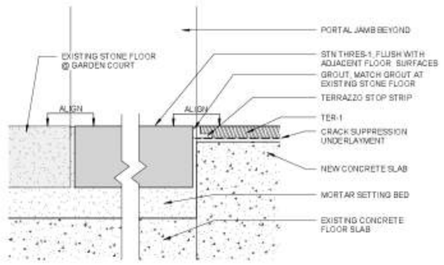
Sheet Number: **A627**



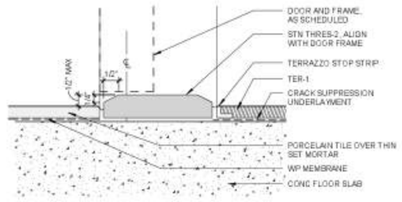
1A A630 FLR TRANS TERRAZZO/CONCRETE
6" = 1'-0"



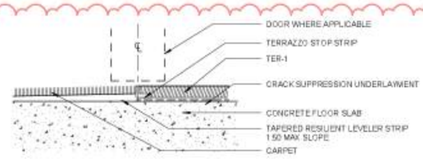
1B A630 FLR TRANS TERRAZZO/CONCRETE
6" = 1'-0"



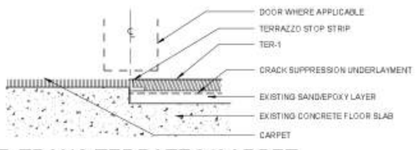
2 A630 FLR TRANS TERRAZZO/STONE (EXIST)
6" = 1'-0"



3 A630 FLR TRANS TERRAZZO/PORCELAIN TILE
6" = 1'-0"



4A A630 FLR TRANS TERRAZZO/CARPET
6" = 1'-0"



4B A630 FLR TRANS TERRAZZO/CARPET
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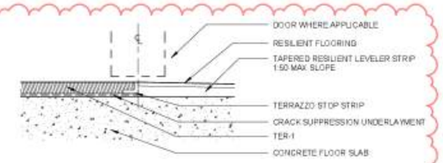
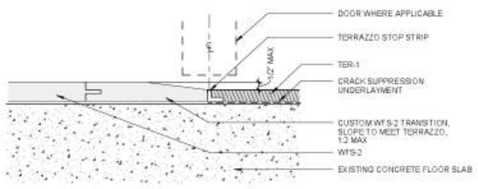
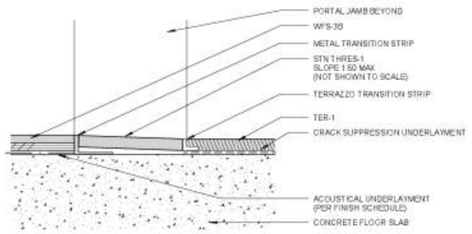


5A A630 FLR TRANS TERRAZZO/RESILIENT
6" = 1'-0"

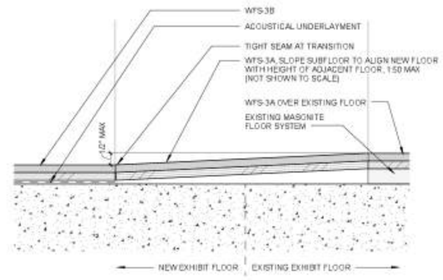
5B A630 FLR TRANS TERRAZZO/RESILIENT
6" = 1'-0"



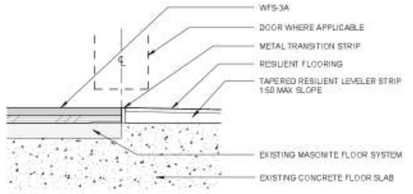
6 A630 FLR TRANS TERRAZZO/BAMBOO
6" = 1'-0"



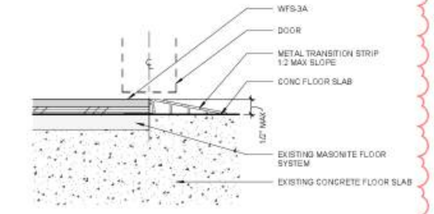
7 A630 FLR TRANS TERRAZZO/MASONITE (NEW)
6" = 1'-0"



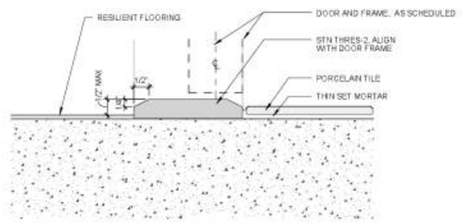
8 A630 FLR TRANS MASONITE (NEW)/(EXIST)
6" = 1'-0"



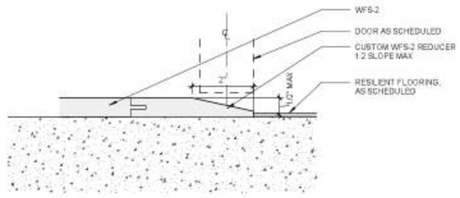
9 A630 FLR TRANS MASONITE(EXIST)/RESILIENT
6" = 1'-0"



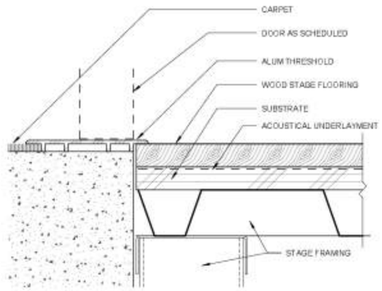
10 A630 FLR TRANS MASONITE(EXIST)/CONCRETE
6" = 1'-0"



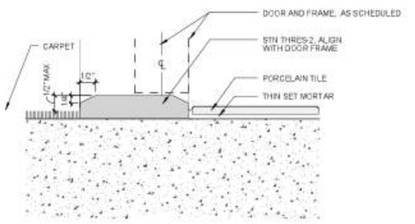
11 A630 FLR TRANS RESILIENT/PORCELAIN TILE
6" = 1'-0"



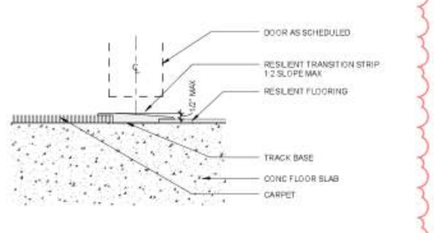
12 A630 FLR TRANS BAMBOO/RESILIENT
6" = 1'-0"



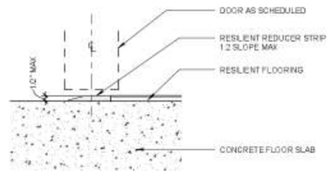
13 A630 FLR TRANS CARPET/WOOD (AT STAGE)
6" = 1'-0"



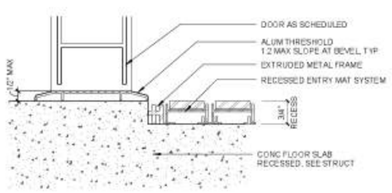
14 A630 FLR TRANS CARPET/PORCELAIN TILE
6" = 1'-0"



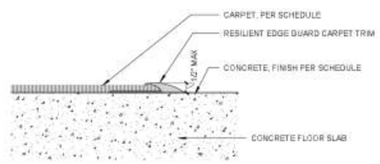
15 A630 FLR TRANS CARPET/RESILIENT
6" = 1'-0"



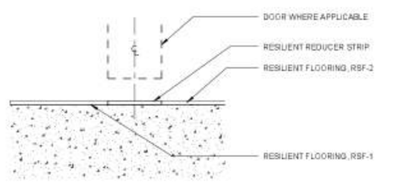
16 A630 FLR TRANS CONCRETE/RESILIENT
6" = 1'-0"



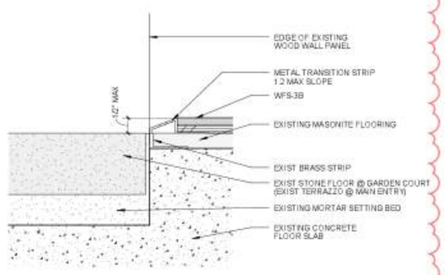
17 A630 FLR TRANS CONCRETE/WALK-OFF MAT
6" = 1'-0"



18 A630 CARPET TO CONCRETE
6" = 1'-0"



19 A630 FLR TRANS RESILIENT (RSF-1)/(RSF-2)
6" = 1'-0"



FLR TRANS MASONITE/EXIST STONE (EXIST TERRAZZO SIM)
20 A630 6" = 1'-0"

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Revisions

No	Date	Description
B	6/1/17	PERMIT CORRECTIONS 1

Sheet Title

Sheet Number

B

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6541 REGISTERED ARCHITECT SAMUEL MCKEEVER MILLER STATE OF WASHINGTON

SAM ASIAN ART MUSEUM

Asian Art Museum Expansion & Renovation

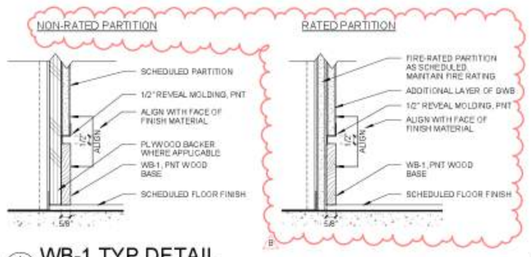
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Construction Documents

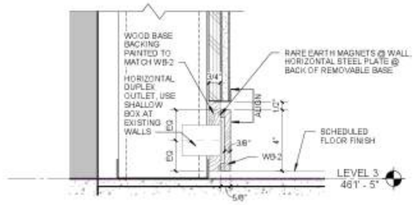
Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Interior Details - Floor Transitions

A630



1 A651 WB-1 TYP DETAIL
3" = 1'-0"



2 A651 WB-2 @ NEW EXHIBIT SPACES, TYP
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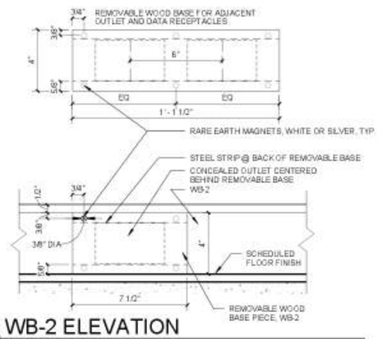
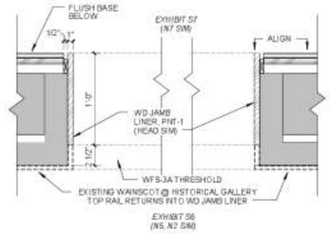
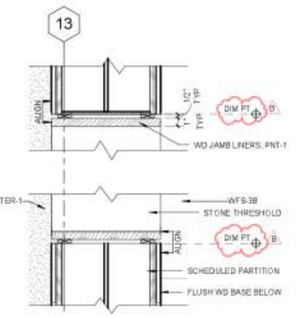


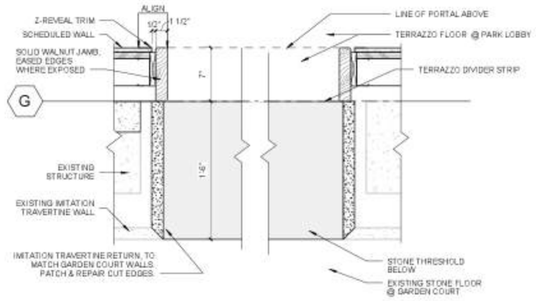
3 A651 WB-2 ELEVATION
3" = 1'-0"



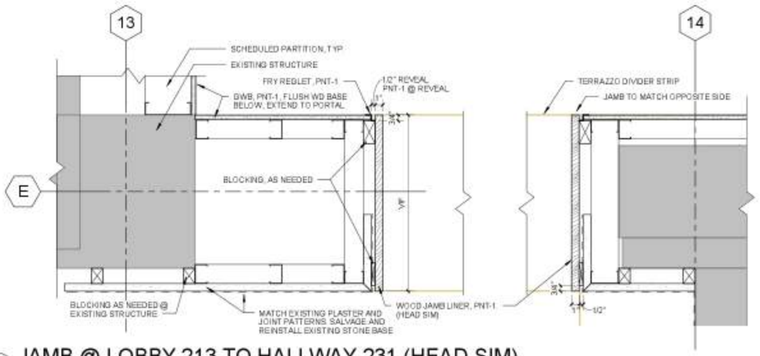
4 A651 JAMB @ EXHIBIT N7, S7 (HEAD SIM)
1 1/2" = 1'-0"



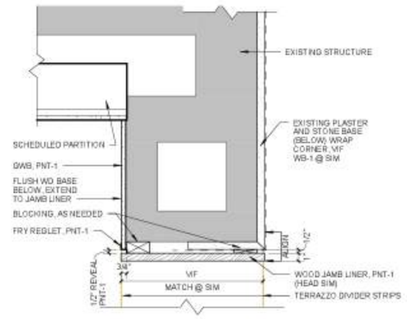
5 A651 EXHIBIT S7, S8 JAMB TO PARK LOBBY
1 1/2" = 1'-0"



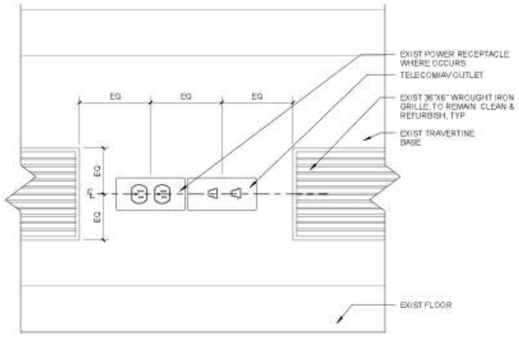
6 A651 GARDEN COURT JAMB
1 1/2" = 1'-0"



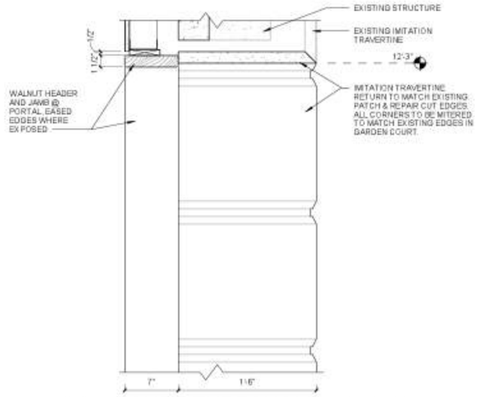
7 A651 JAMB @ LOBBY 213 TO HALLWAY 231 (HEAD SIM)
1 1/2" = 1'-0"



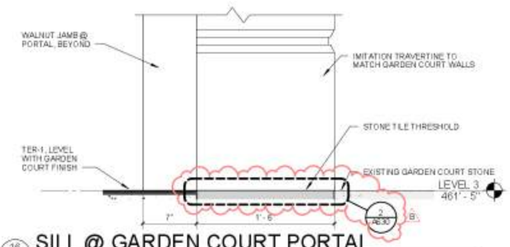
8 A651 LOBBY 213 TO HALLWAY 200
1 1/2" = 1'-0"



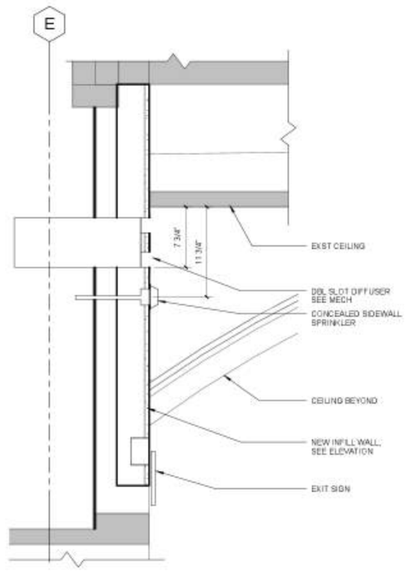
9 A651 GARDEN COURT RECEPTACLE
3" = 1'-0"



11 A651 GARDEN COURT THRESHOLD HEADER
1 1/2" = 1'-0"



16 A651 SILL @ GARDEN COURT PORTAL
1 1/2" = 1'-0"



17 A651 DIFFUSER @ EXHIBIT N6/S6
1 1/2" = 1'-0"

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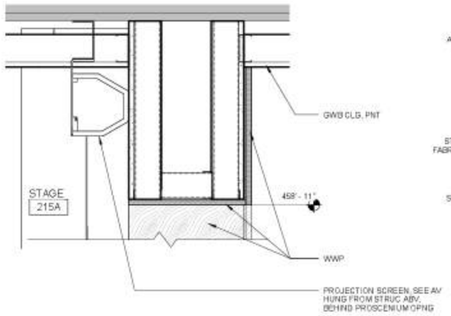
Revisions

No	Date	Description
B	9/1/17	PERMIT CORRECTIONS 1

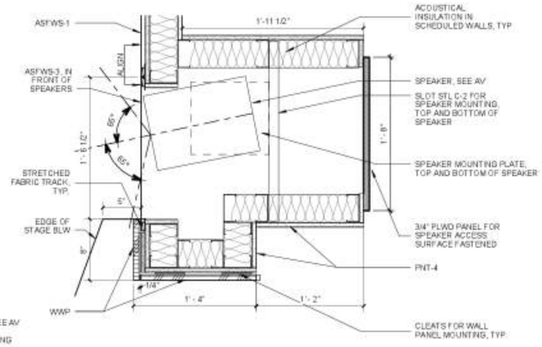
Drawn: MRT, JT
Checked:
LMN Proj No: 160208.01
Date: 6/23/17

Sheet Title: Interior Details - Galleries

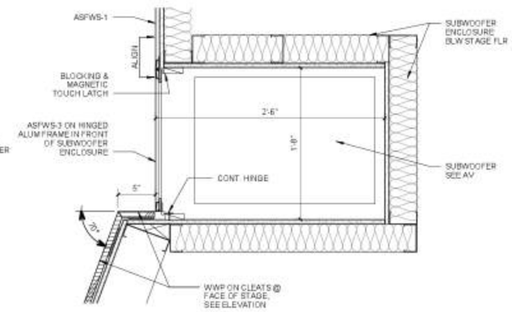
Sheet Number: A651



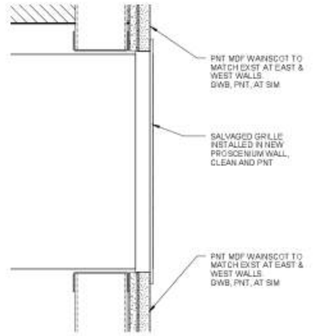
1 A652 PROSCENIUM HEAD
1 1/2" = 1'-0"



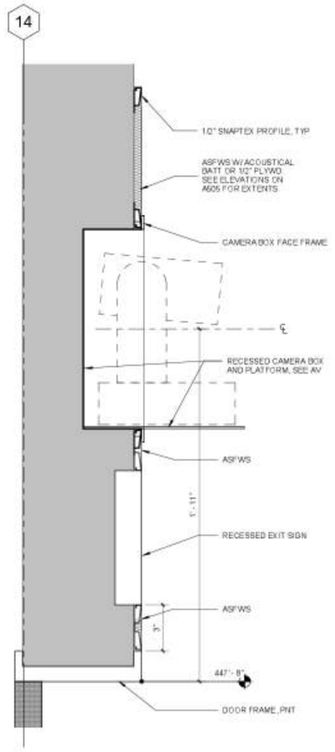
2 A652 PROSCENIUM JAMB
1 1/2" = 1'-0"



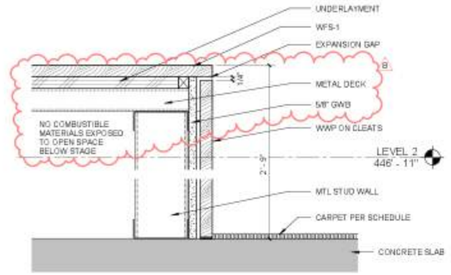
3 A652 SUBWOOFER ENCLOSURE - PLAN
1 1/2" = 1'-0"



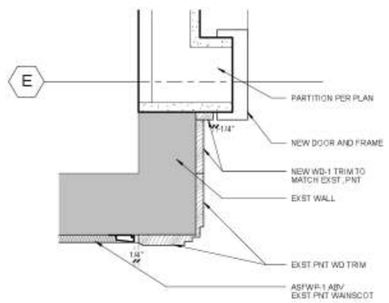
4 A652 WALL GRILLE
3" = 1'-0"



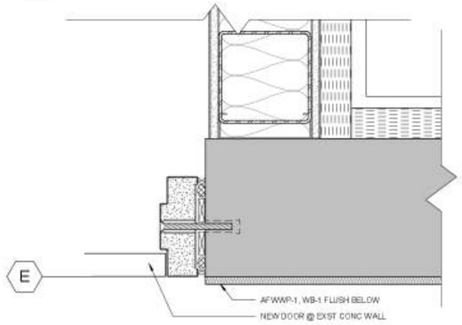
5 A652 RECESSED EXIT SIGN AND CAMERA BOX
3" = 1'-0"



6 A652 SECTION @ STAGE APRON
3" = 1'-0"



7 A652 JAMB @ AUDITORIUM SIDE DR
3" = 1'-0"



8 A652 JAMB @ STAGE DOOR
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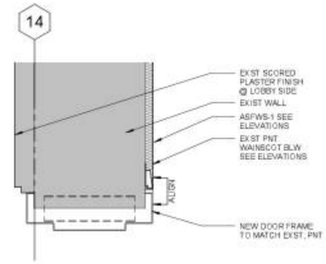

9 A652 JAMB @ AUDITORIUM DOOR
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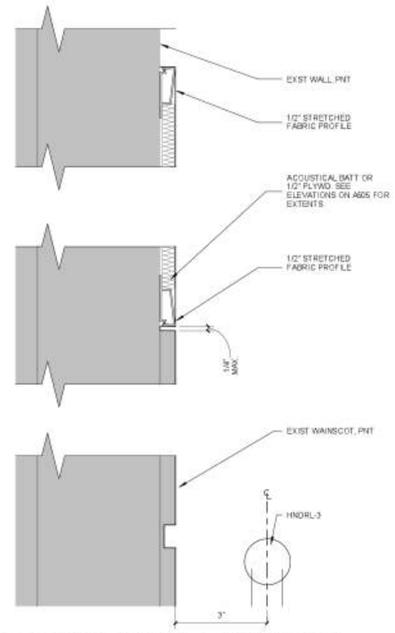
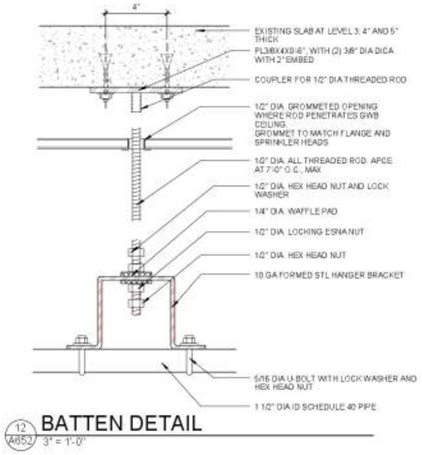
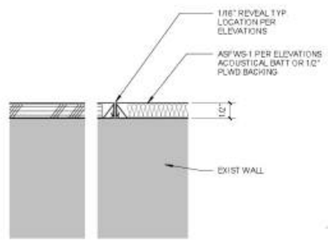


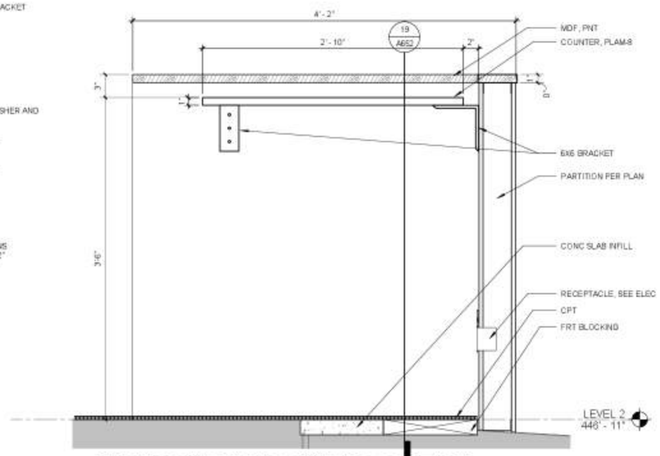
16 A652 FABRIC WALL PANEL @ WAINSCOT
6" = 1'-0"



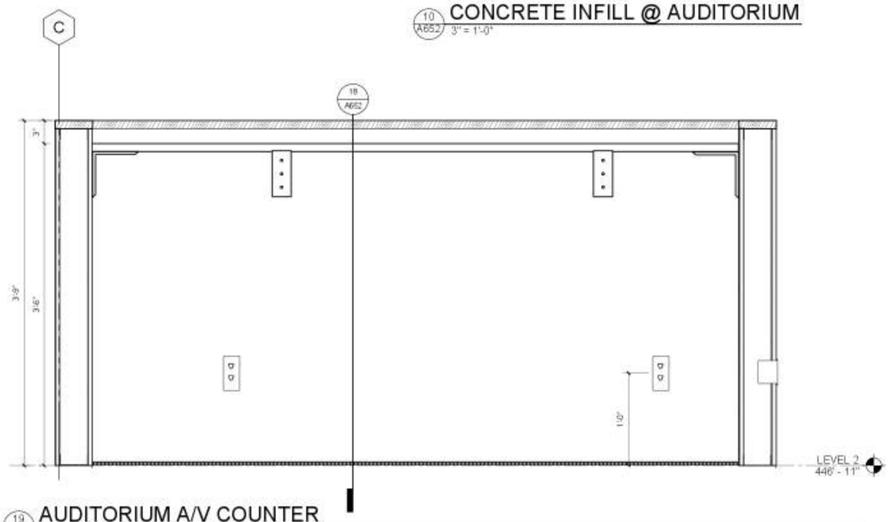
12 A652 BATTEN DETAIL
3" = 1'-0"



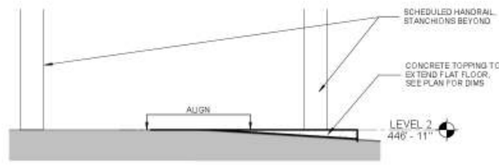
17 A652 PLAN - ASFWS-1 JOINT
6" = 1'-0"



18 A652 AUDITORIUM A/V COUNTER SECTION
1 1/2" = 1'-0"



19 A652 AUDITORIUM A/V COUNTER
1 1/2" = 1'-0"



10 A652 CONCRETE INFILL @ AUDITORIUM
3" = 1'-0"

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Revisions

No.	Date	Description
B	9/1/17	PERMIT CORRECTIONS 1

Sheet Title

Sheet Number

SAM ASIAN ART MUSEUM

Asian Art Museum Expansion & Renovation

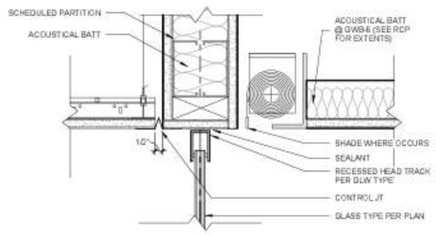
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Construction Documents

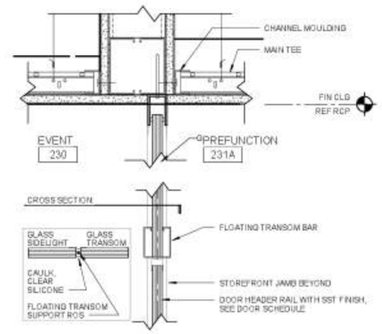
Drawn	Author
Checked	Checker
LMN Proj No	16028.01
Date	6/23/17

Interior Details - Auditorium

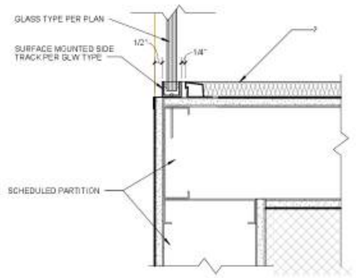
A652



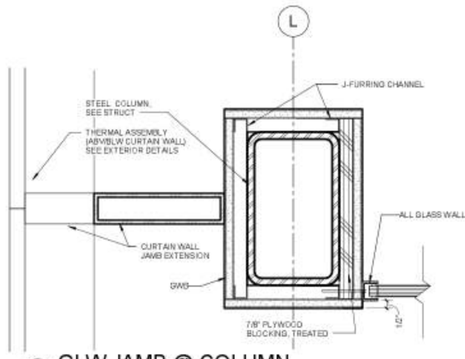
1 A653 GLW HEAD @ EVENT 230
3" = 1'-0"



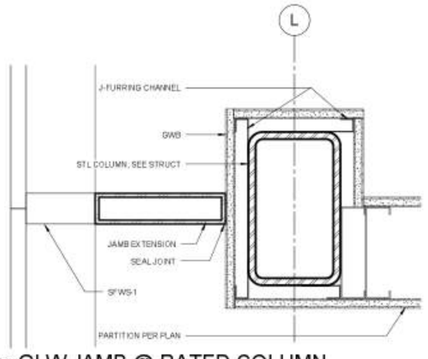
2 A653 GLW HEAD @ GLASS DOOR FRAME
3" = 1'-0"



3 A653 GLW JAMB @ CORNER, TYP
3" = 1'-0"



4 A653 GLW JAMB @ COLUMN
3" = 1'-0"



5 A653 GLW JAMB @ RATED COLUMN
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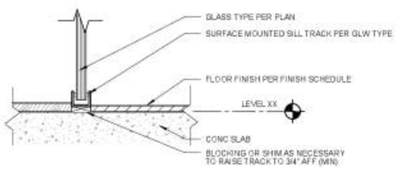
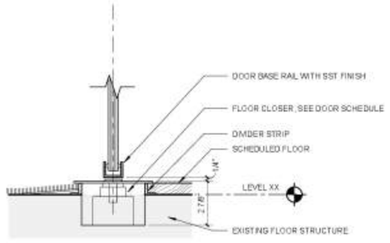
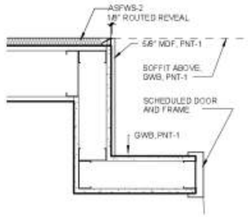


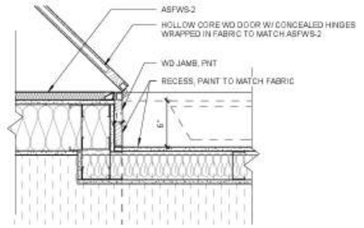
6 A653 GLW SILL, TYP
3" = 1'-0"



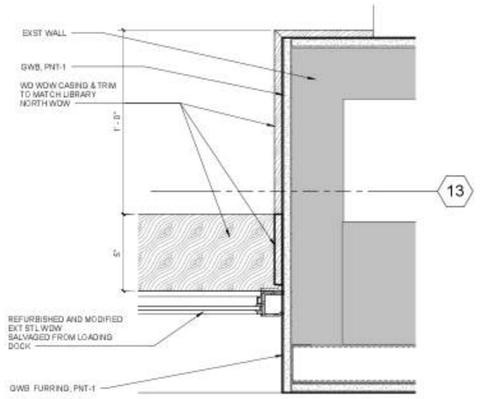
7 A653 GLASS DOOR - THRESHOLD
3" = 1'-0"



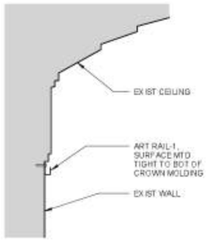
8 A653 DOOR FRAME @ EVENT
1 1/2" = 1'-0"



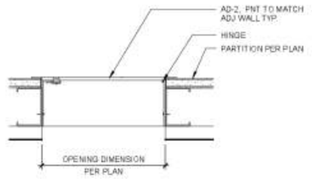
9 A653 PLAN DTL @ MONITOR RECESS
1 1/2" = 1'-0"



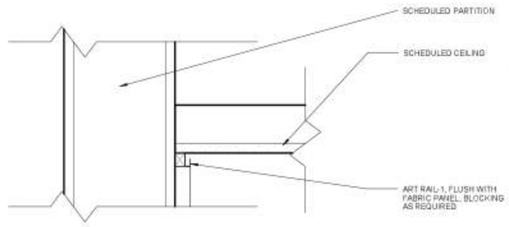
10 A653 WINDOW 216 JAMB
3" = 1'-0"



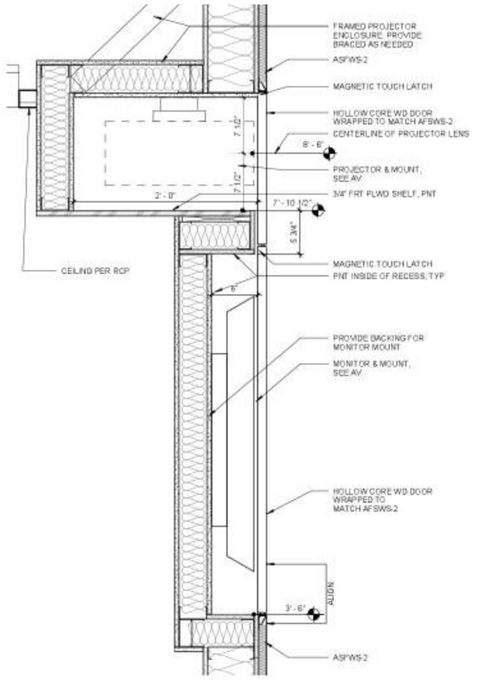
11 A653 ART RAIL-1 @ GARDNER CENTER
3" = 1'-0"



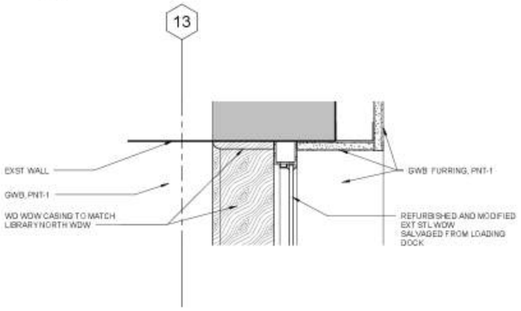
13 A653 ACCESS DOOR DETAIL
3" = 1'-0"



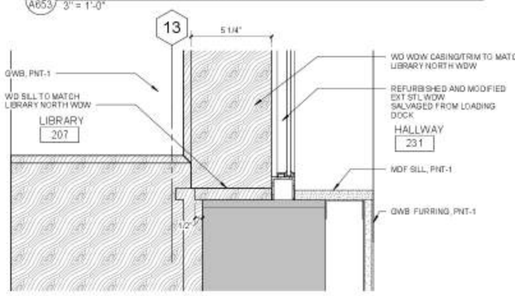
14 A653 RECESSED ART RAIL @ FABRIC PANEL
3" = 1'-0"



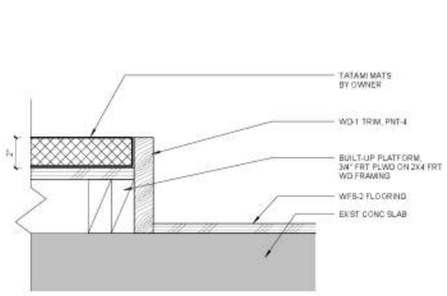
19 A653 SECTION @ MONITOR/PROJECTOR RECESS
1 1/2" = 1'-0"



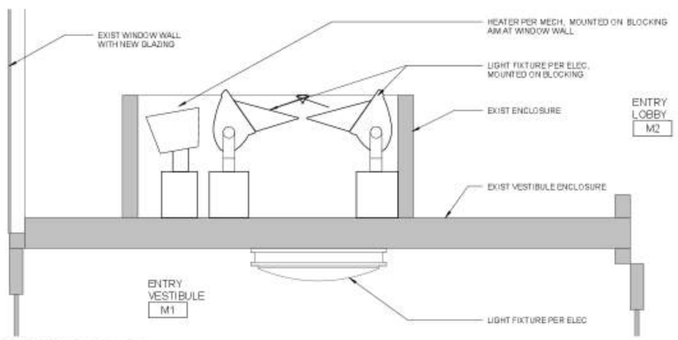
15 A653 WINDOW 216 HEAD
3" = 1'-0"



20 A653 WINDOW 216 SILL
3" = 1'-0"



16 A653 TATAMI PLATFORM EDGE
3" = 1'-0"



17 A653 VESTIBULE ROOF
1 1/2" = 1'-0"

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SAM ASIAN ART MUSEUM

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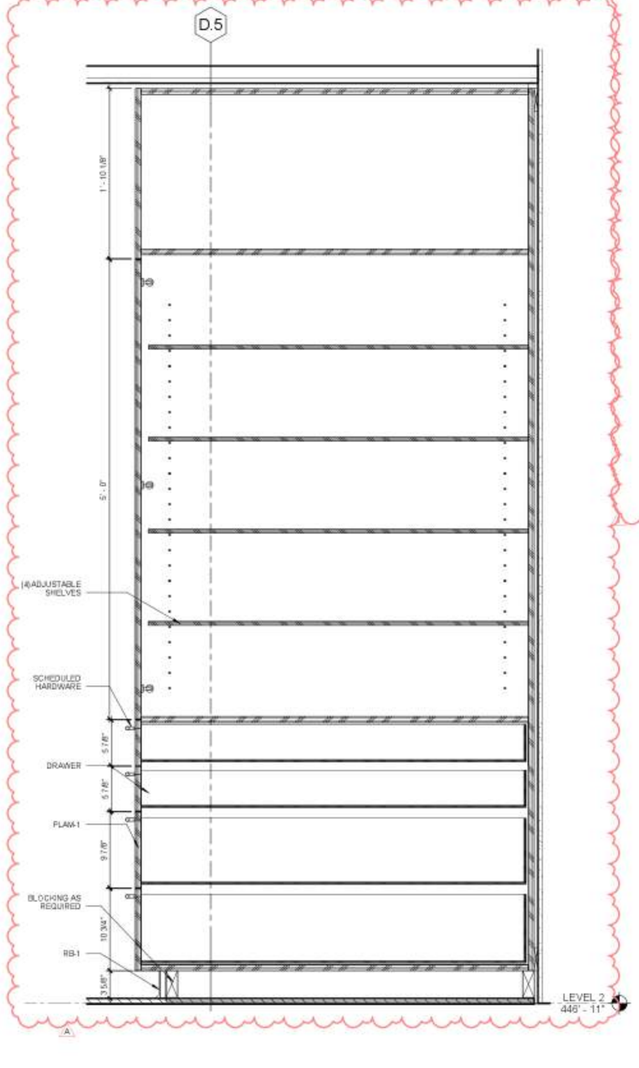
Construction Documents

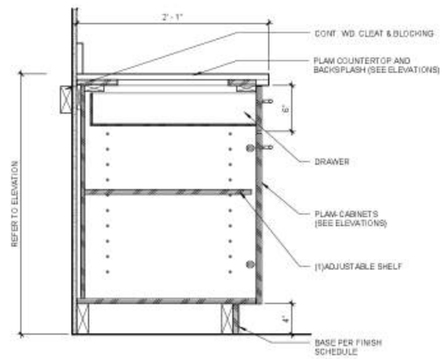
Drawn Author
Checked Checker
LMN Proj No 16028.01
Date 6/23/17

Interior Details

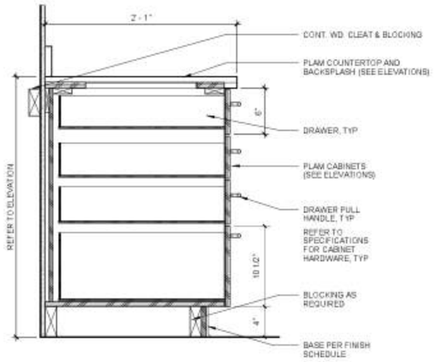
A653



6 A660 MILLWORK @ CONSERV. STUDIO
1 1/2" = 1'-0"



2 A660 CABINET BASE-DRAWER/DOOR
1 1/2" = 1'-0"



3 A660 CABINET BASE DRAWERS
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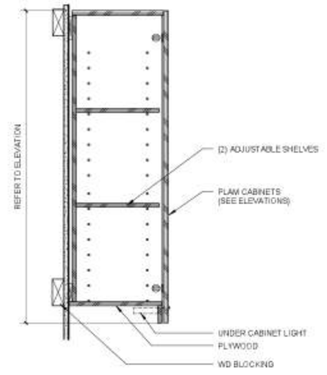
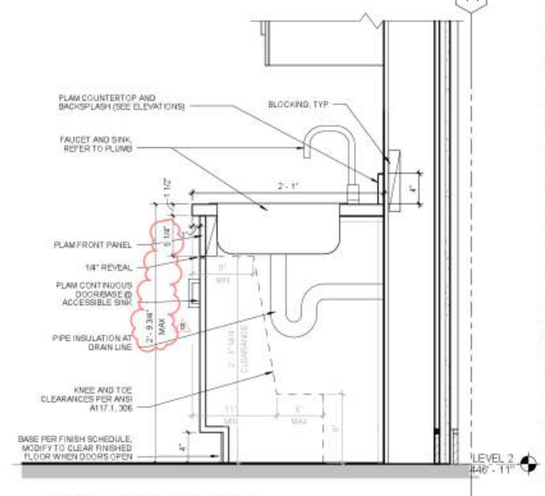


4 A660 CABINET UPPER
1 1/2" = 1'-0"



5 A660 SINK @ EDUCATION
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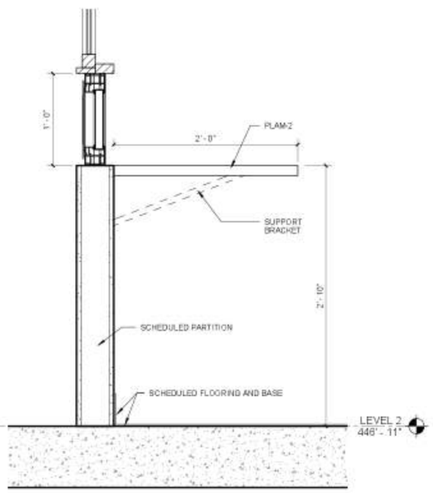

7 A660 SECURITY COUNTER
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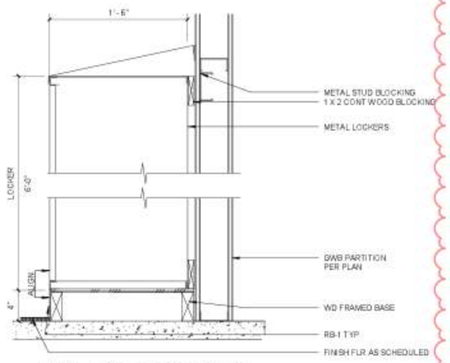

8 A660 MTL LKR-1 SECTION
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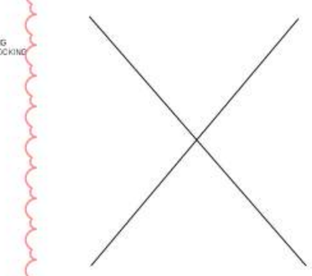

9 A660 CABINET BASE - NOT USED
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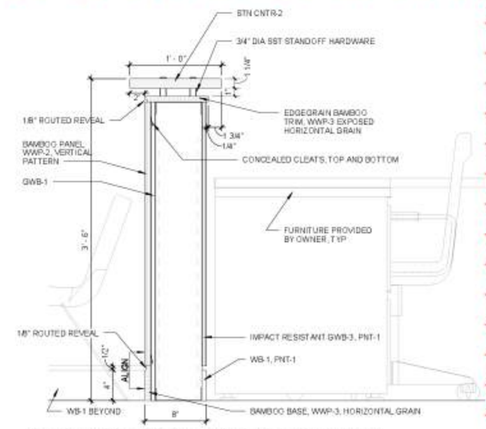

10 A660 CONSERVATION STUDIO COUNTER
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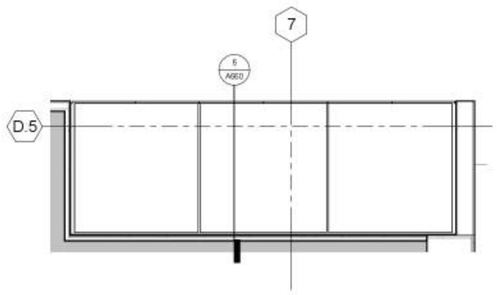

1 A660 CONSERVATION STORAGE
1/2" = 1'-0"

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Submittal
Construction Documents

Revisions

No.	Date	Description
1	7/12/17	ADDENDUM #1
A	9/1/17	PERMIT CORRECTIONS 1
B	9/1/17	PERMIT CORRECTIONS 1

Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Casework Details
Sheet Number: **A660**

RCP NOTES

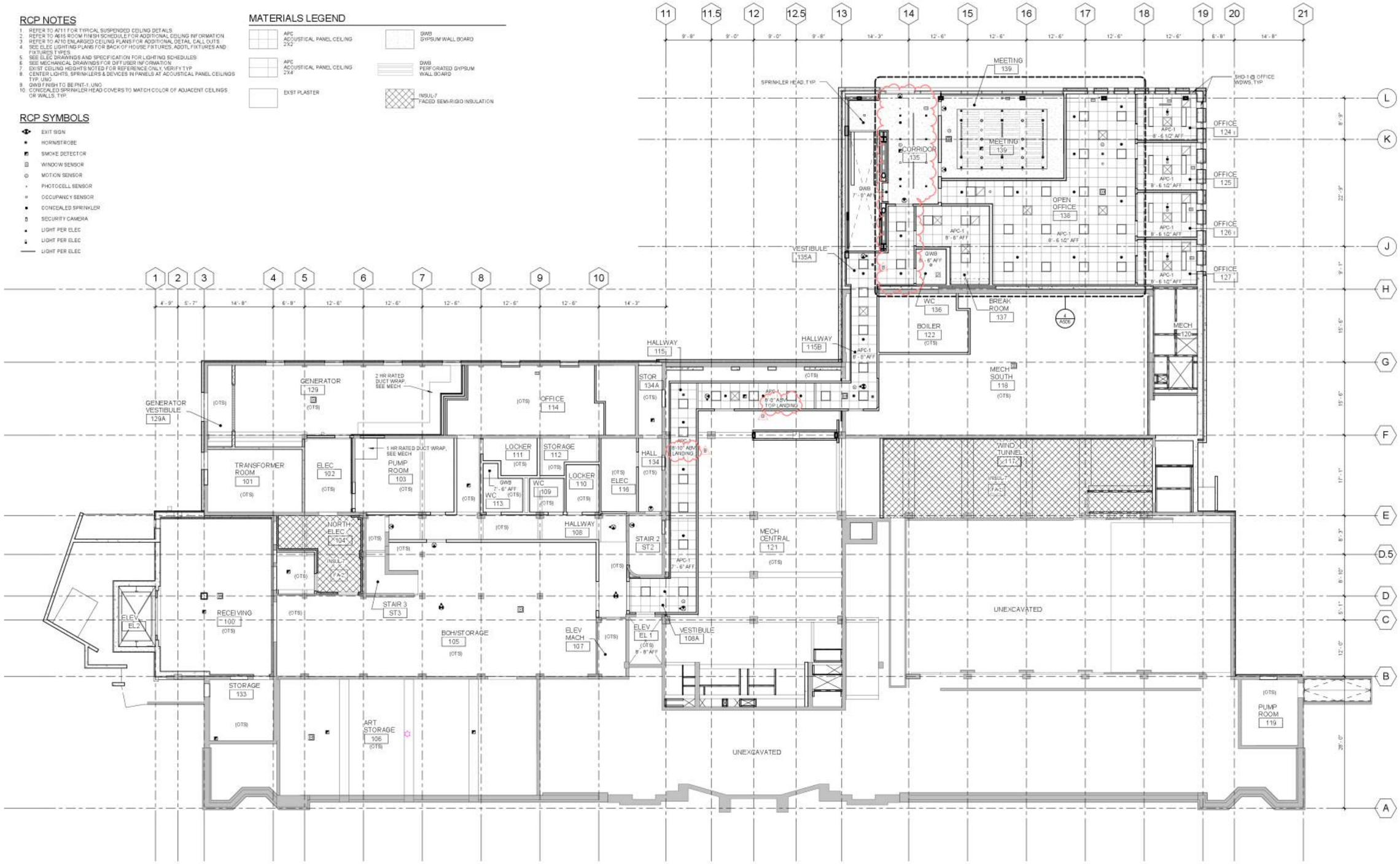
1. REFER TO A711 FOR TYPICAL SUSPENDED CEILING DETAILS.
2. REFER TO A615 ROOM FINISH SCHEDULE FOR ADDITIONAL CEILING INFORMATION.
3. REFER TO A710 ENLARGED CEILING PLANS FOR ADDITIONAL DETAIL CALL OUTS.
4. SEE ELEC LIGHTING PLANS FOR BACK OF HOUSE FIXTURES, ADDTL FIXTURES AND FIXTURES TYPES.
5. SEE ELEC DRAWINGS AND SPECIFICATION FOR LIGHTING SCHEDULES.
6. SEE MECHANICAL DRAWINGS FOR DIFFUSER INFORMATION.
7. EXIST CEILING HEIGHTS NOTED FOR REFERENCE ONLY. VERIFY TYP.
8. CENTER LIGHTS, SPRINKLERS & DEVICES IN PANELS AT ACOUSTICAL PANEL CEILINGS TYP, UNO.
9. GWB FINISH TO BE PNT-1, UNO.
10. CONCEALED SPRINKLER HEAD COVERS TO MATCH COLOR OF ADJACENT CEILINGS OR WALLS, TYP.

RCP SYMBOLS

- EXIT SIGN
- HORN/STROBE
- SMOKE DETECTOR
- WINDOW SENSOR
- MOTION SENSOR
- PHOTOCELL SENSOR
- OCCUPANCY SENSOR
- CONCEALED SPRINKLER
- SECURITY CAMERA
- LIGHT PER ELEC
- LIGHT PER ELEC
- LIGHT PER ELEC

MATERIALS LEGEND

- APC ACOUSTICAL PANEL CEILING 2X2
- APC ACOUSTICAL PANEL CEILING 2X4
- EXST PLASTER
- GWB GYPSUM WALL BOARD
- GWB PERFORATED GYPSUM WALL BOARD
- INSUL-7 FACED SEMI-RIGID INSULATION



1 A701 LEVEL 1 RCP
1/8" = 1'-0"

TRUE NORTH · PLAN NORTH · 0' 4' 8' 16' 32'

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Revisions		
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LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: RCP - Level 1

Sheet Number: A701

RCP NOTES

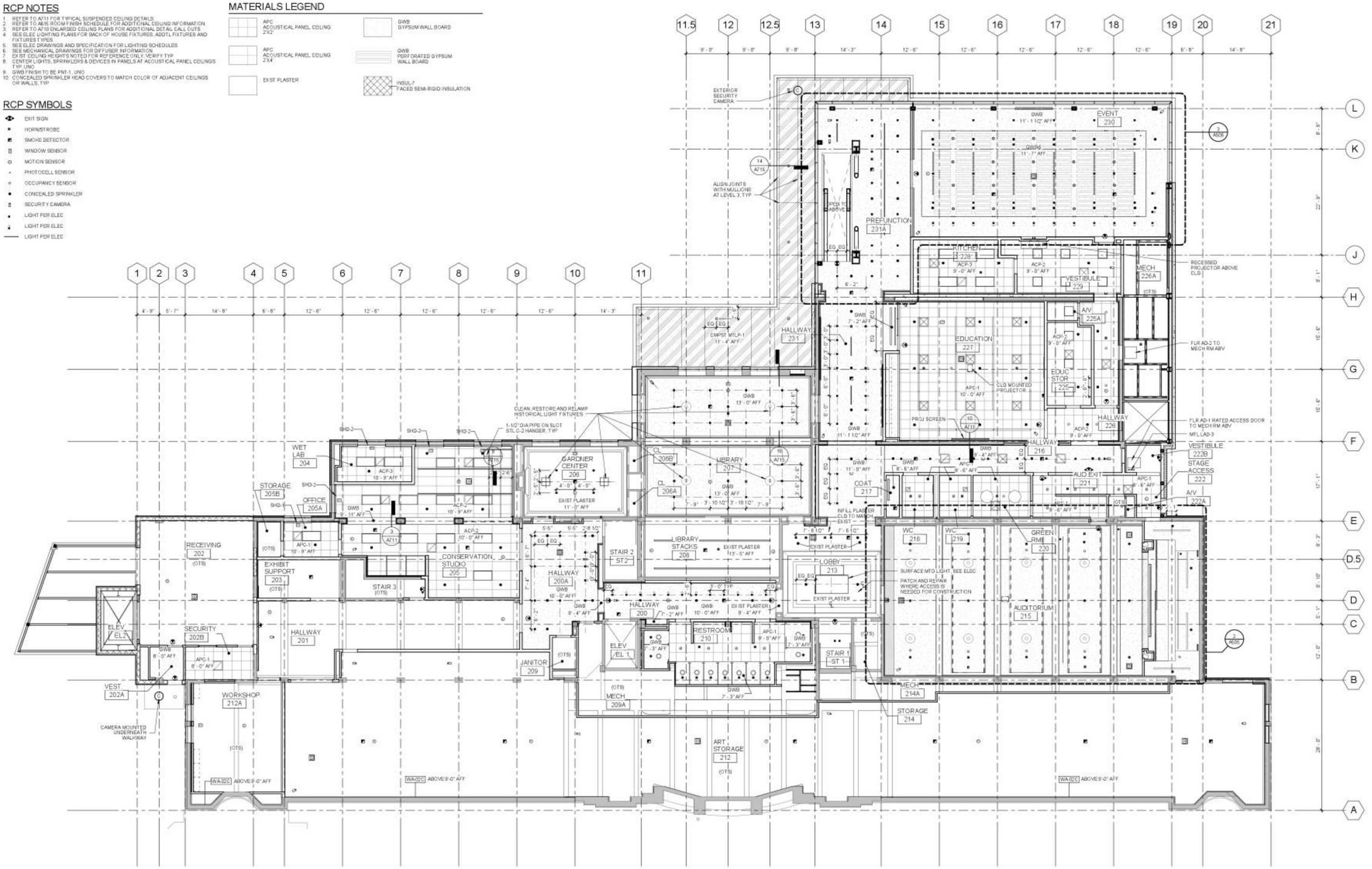
1. REFER TO A711 FOR TYPICAL SUSPENDED CEILING DETAILS.
2. REFER TO A615 ROOM FINISH SCHEDULE FOR ADDITIONAL CEILING INFORMATION.
3. REFER TO A710 ENLARGED CEILING PLANS FOR ADDITIONAL DETAIL CALL OUTS.
4. SEE ELEC LIGHTING PLANS FOR BACK OF HOUSE FIXTURES. ADDTL FIXTURES AND FIXTURES TYPES.
5. SEE ELEC DRAWINGS AND SPECIFICATION FOR LIGHTING SCHEDULES
6. SEE MECHANICAL DRAWINGS FOR DIFFUSER INFORMATION.
7. EXIST CEILING HEIGHTS NOTED FOR REFERENCE ONLY. VERIFY TYP.
8. CENTER LIGHTS, SPRINKLERS & DEVICES IN PANELS AT ACOUSTICAL PANEL CEILINGS TYP. UNO.
9. GWB FINISH TO BE PNT-1, UNO.
10. CONCEALED SPRINKLER HEAD COVERS TO MATCH COLOR OF ADJACENT CEILINGS OR WALLS, TYP.

MATERIALS LEGEND

- APC ACOUSTICAL PANEL CEILING 2'X2'
- APC ACOUSTICAL PANEL CEILING 2'X4'
- EXIST PLASTER
- GWB GYPSUM WALL BOARD
- GWB PERFORATED GYPSUM WALL BOARD
- INSUL-7 FACED SEMI-RIGID INSULATION

RCP SYMBOLS

- EXIT SIGN
- HORN/STROBE
- SMOKE DETECTOR
- WINDOW SENSOR
- MOTION SENSOR
- PHOTOCELL SENSOR
- OCCUPANCY SENSOR
- CONCEALED SPRINKLER
- SECURITY CAMERA
- LIGHT PER ELEC
- LIGHT PER ELEC
- LIGHT PER ELEC



1 A702 LEVEL 2 RCP
1/8" = 1'-0"

TRUE NORTH
PLAN NORTH
0' 4' 8' 16' 32'

Printed: 6/1/2017 10:55:29 AM

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Revisions
No. Date Description

Drawn Author
Checked Checker
LMN Proj No 16028.01
Date 6/23/17

Sheet Title: RCP - Level 2

Sheet Number: A702

RCP NOTES

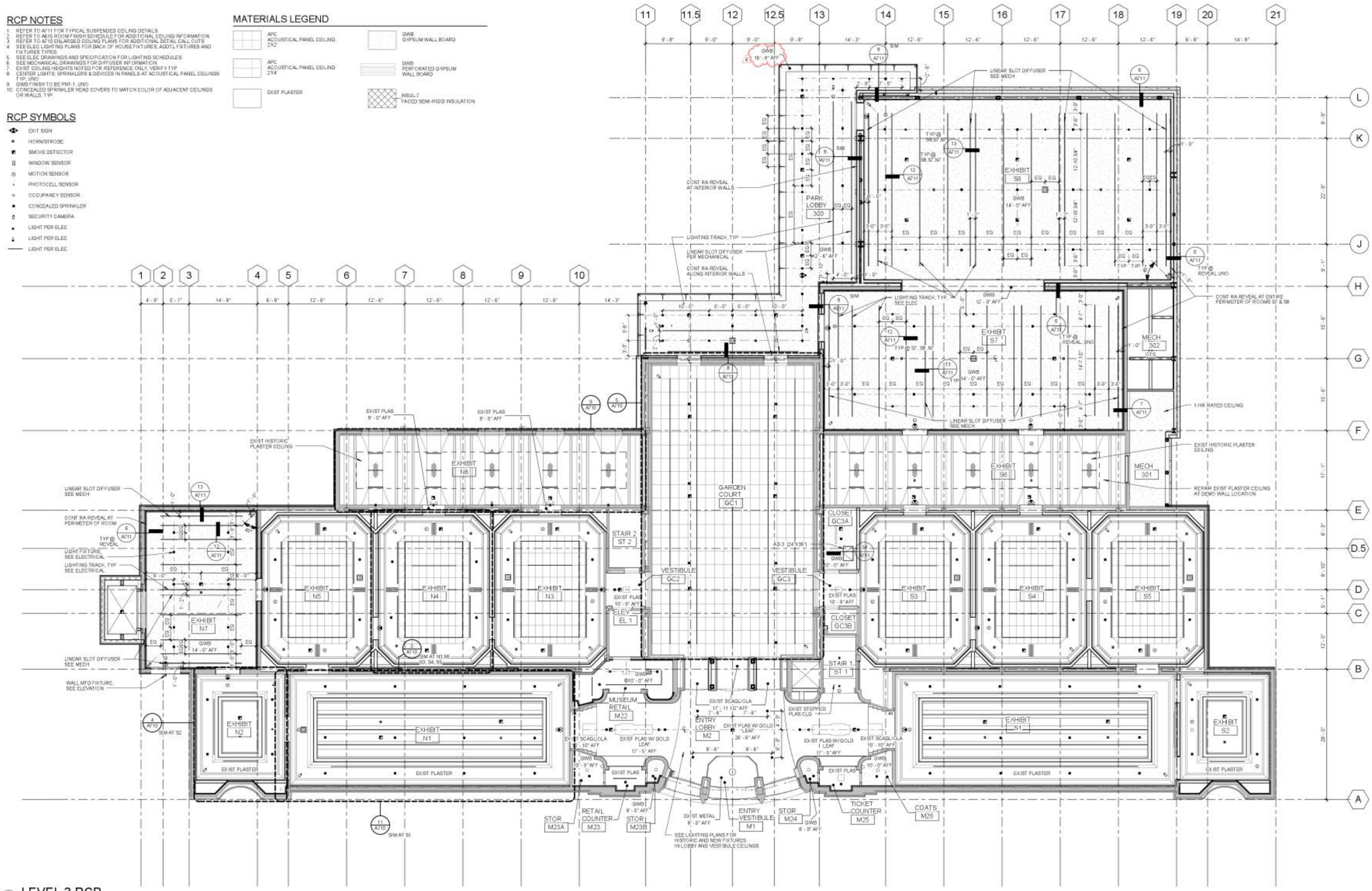
1. REFER TO A711 FOR TYPICAL SUSPENDED CEILING DETAILS
2. REFER TO A615 ROOM FINISH SCHEDULE FOR ADDITIONAL CEILING INFORMATION
3. REFER TO A710 ENLARGED CEILING PLANS FOR ADDITIONAL DETAIL CALL OUTS
4. SEE ELEC LIGHTING PLANS FOR BACK OF HOUSE FIXTURES, ADDTL FIXTURES AND FIXTURES TYPES
5. SEE ELEC DRAWINGS AND SPECIFICATION FOR LIGHTING SCHEDULES
6. SEE MECHANICAL DRAWINGS FOR DIFFUSER INFORMATION
7. EXIST CEILING HEIGHTS NOTED FOR REFERENCE ONLY, VERIFY TYP
8. CENTER LIGHTS, SPRINKLERS & DEVICES IN PANELS AT ACOUSTICAL PANEL CEILINGS TYP, UNO
9. GWB FINISH TO BE PNT-1, UNO
10. CONCEALED SPRINKLER HEAD COVERS TO MATCH COLOR OF ADJACENT CEILINGS OR WALLS, TYP

MATERIALS LEGEND

- APC ACOUSTICAL PANEL CEILING 2'X2'
- APC ACOUSTICAL PANEL CEILING 2'X4'
- EXIST PLASTER
- GWB GYPSUM WALL BOARD
- GWB PERFORATED GYPSUM WALL BOARD
- INSUL-7 FACED SEMI-RIGID INSULATION

RCP SYMBOLS

- EXIT SIGN
- HORN/STROBE
- SMOKE DETECTOR
- WINDOW SENSOR
- MOTION SENSOR
- PHOTOCELL SENSOR
- OCCUPANCY SENSOR
- CONCEALED SPRINKLER
- SECURITY CAMERA
- LIGHT PER ELEC
- LIGHT PER ELEC
- LIGHT PER ELEC



1 A703 LEVEL 3 RCP
1/8" = 1'-0"

TRUE NORTH | PLAN NORTH | 0' 4' 8' 16' 32'

Printed: 9/5/2017 1:52:27 PM

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Asian Art Museum Expansion & Renovation

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Seattle, WA 98112

Construction Documents

Submittal

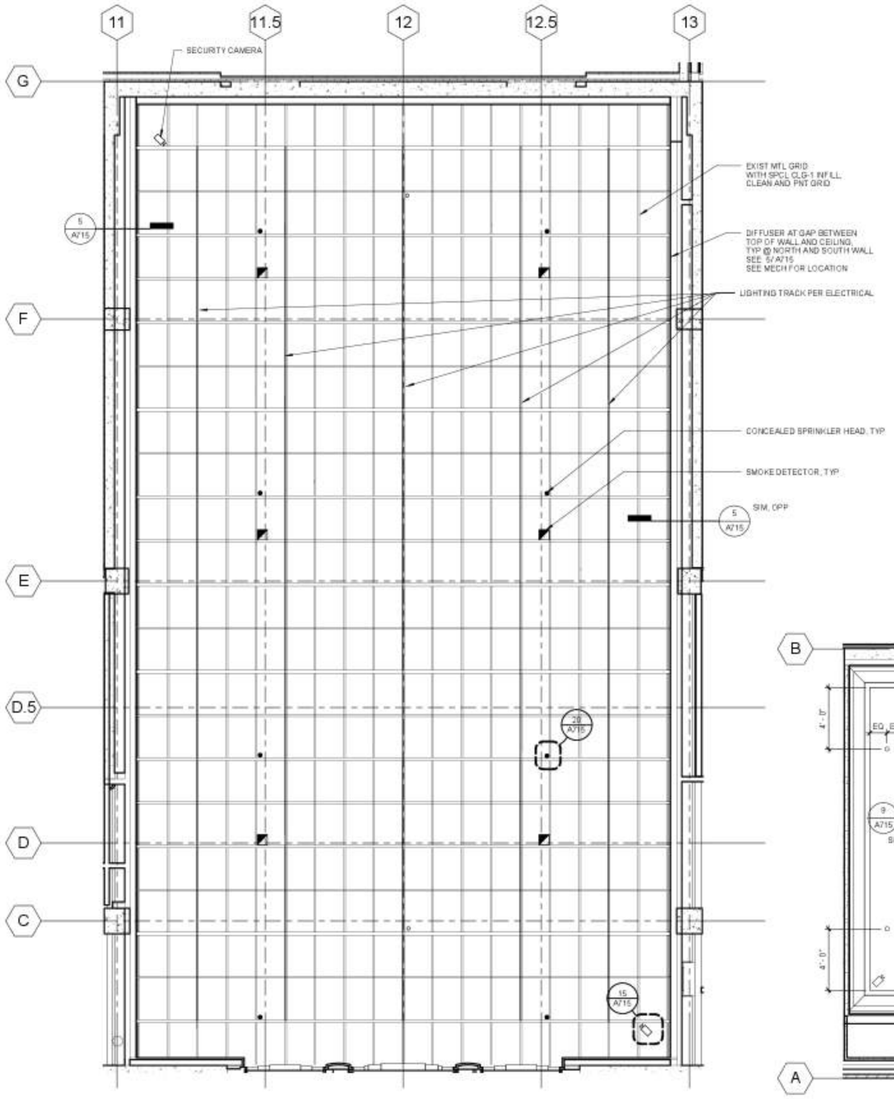
Revisions

No.	Date	Description
4	7/26/17	ADDENDUM #4
13	8/15/17	ADDENDUM #13

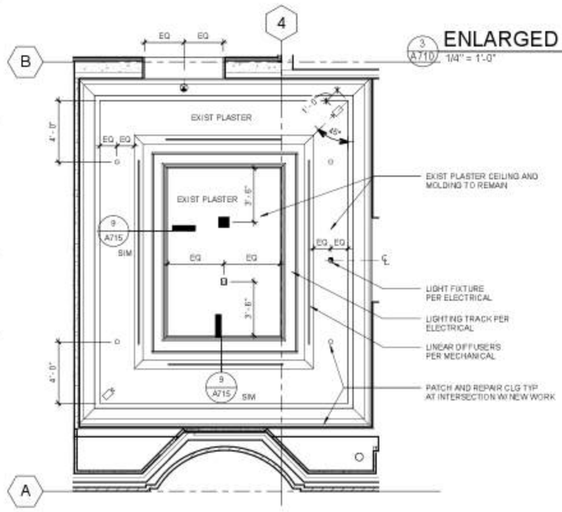
Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: RCP - Level 3

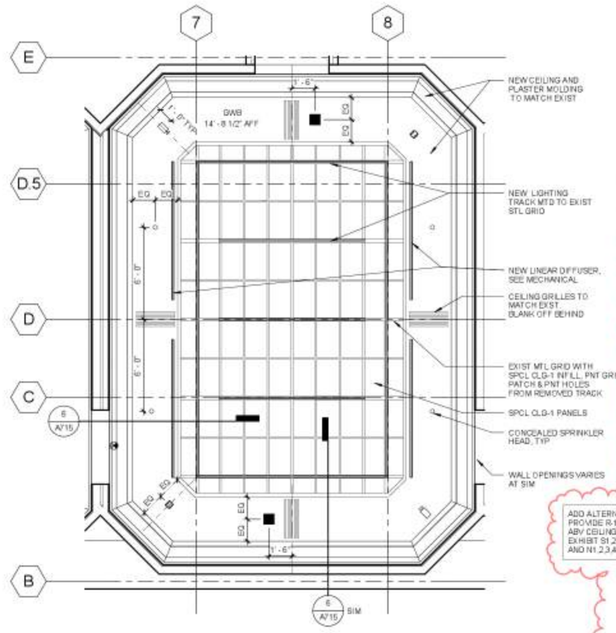
Sheet Number: A703



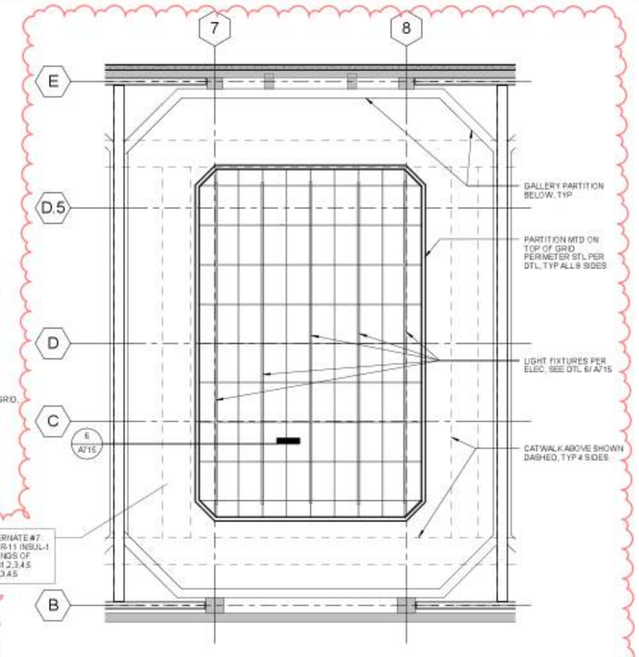
5/A710 ENLARGED RCP - GARDEN COURT
1/4" = 1'-0"



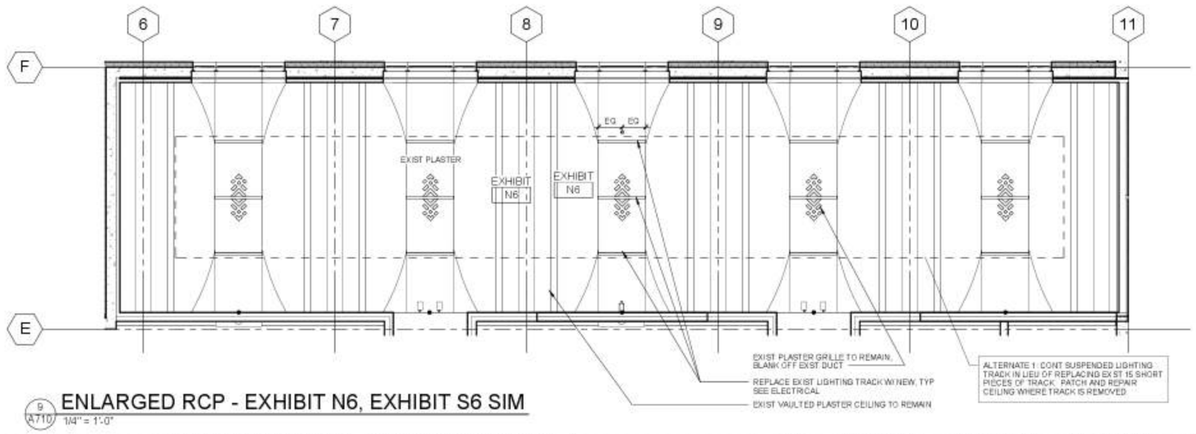
4/A710 ENLARGED RCP - EXHIBIT N2, EXHIBIT S2 SIM
1/4" = 1'-0"



3/A710 ENLARGED RCP - EXHIBIT N4, EXHIBIT S3,4,5 & N3,5 SIM
1/4" = 1'-0"



1/A710 ATTIC LIGHTBOX PLAN - EXHIBIT N4, S3,4,5 & N3,5 SIM
1/4" = 1'-0"



9/A710 ENLARGED RCP - EXHIBIT N6, EXHIBIT S6 SIM
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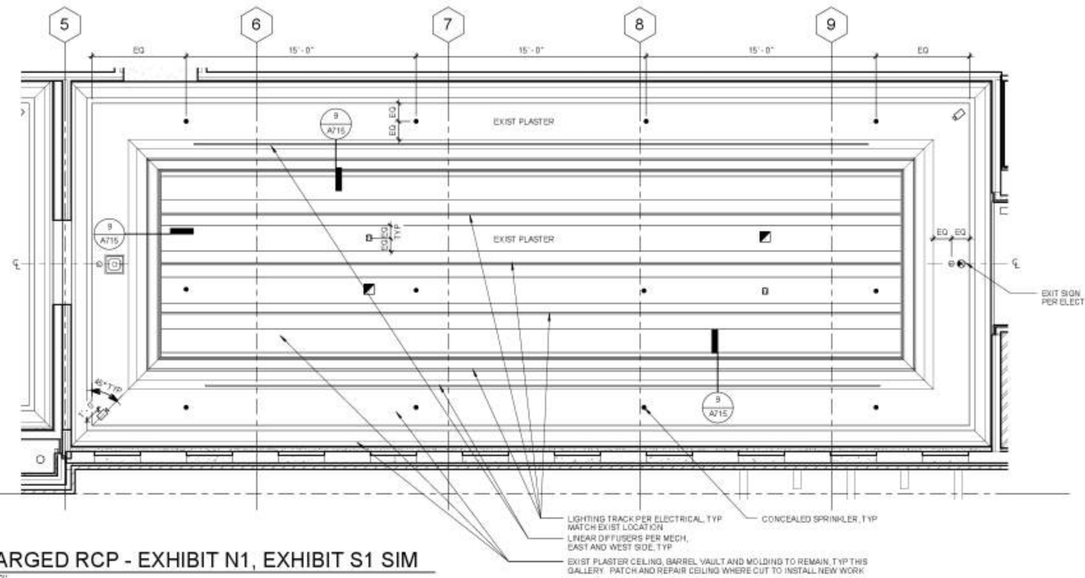

11/A710 ENLARGED RCP - EXHIBIT N1, EXHIBIT S1 SIM
1/4" = 1'-0"

Printed: 6/6/2017 1:52:29 PM

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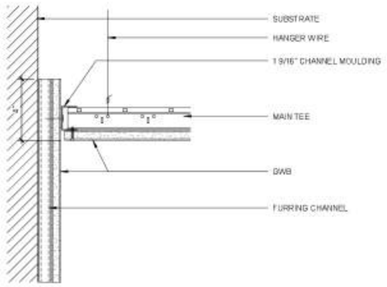
Revisions

No	Date	Description
A	9/1/17	PERMIT CORRECTIONS 1

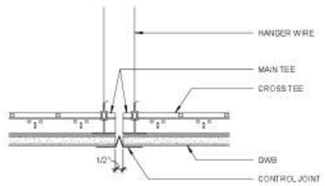
Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Enlarged Ceiling Plans

Sheet Number: **A710**



1 A711 GWB CEILING - WALL INTERSECTION
3" = 1'-0"



2 A711 GWB CEILING - CONTROL JOINT
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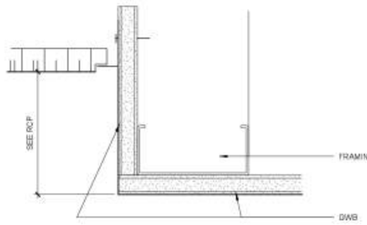
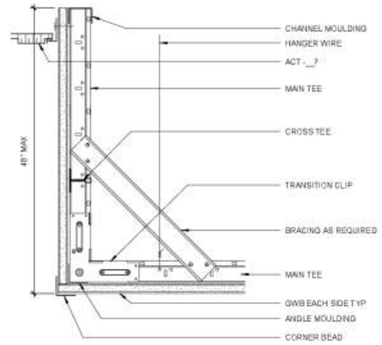
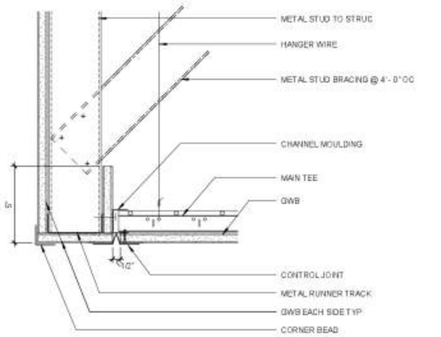


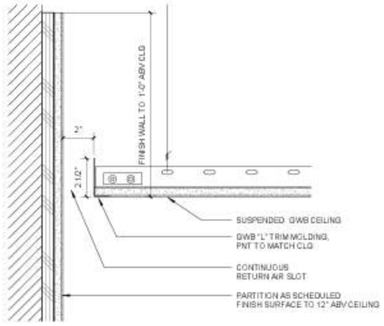
3 A711 GWB TO APC STEP
6" = 1'-0"



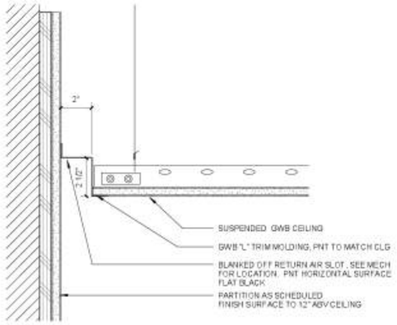
4 A711 GWB CEILING AT FURR DOWN
3" = 1'-0"



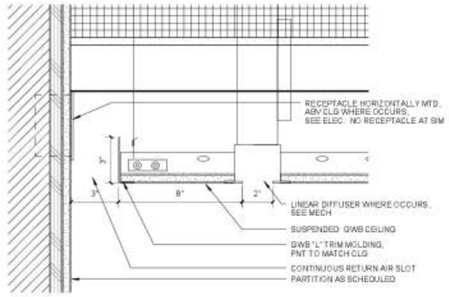
5 A711 GWB CEILING AT FURR DOWN
3" = 1'-0"



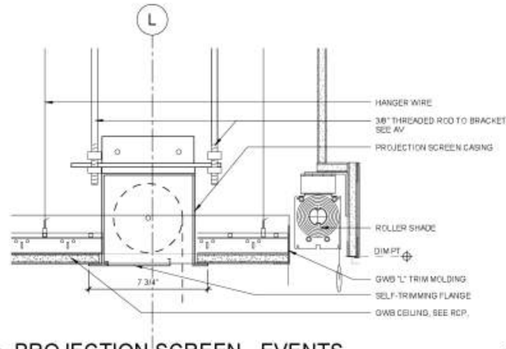
6 A711 RETURN AIR SLOT AT GALLERY
3" = 1'-0"



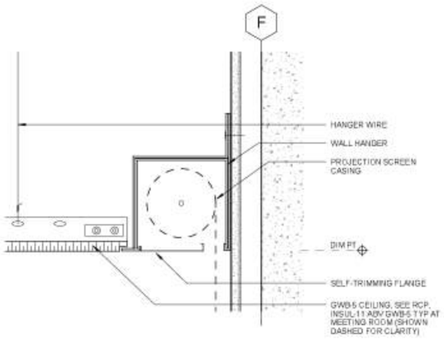
7 A711 BLANKED OFF SLOT AT GALLERY
3" = 1'-0"



8 A711 RETURN AIR SLOT AT PARK LOBBY
3" = 1'-0"



9 A711 PROJECTION SCREEN - EVENTS
3" = 1'-0"



10 A711 PROJECTION SCREEN - EDUCATION
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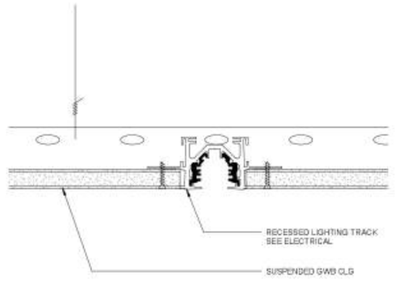
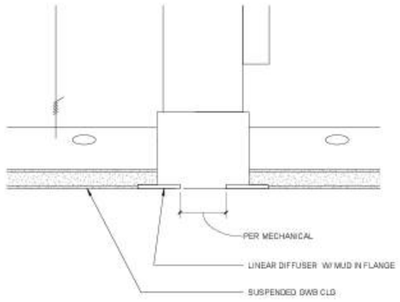
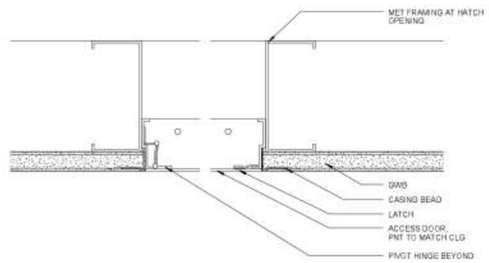


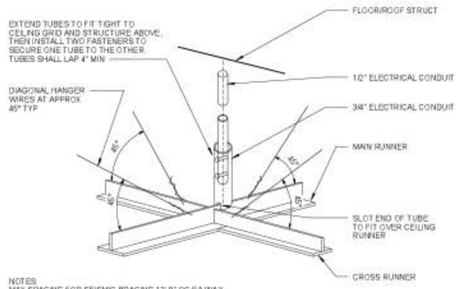
12 A711 RECESSED LIGHTING TRACK
6" = 1'-0"



13 A711 TYPICAL LINEAR DIFFUSER
6" = 1'-0"



14 A711 CLOSET GC3A CEILING ACCESS DOOR
6" = 1'-0"



16 A711 TYP SEISMIC BRACING AT GRID
3" = 1'-0"

Printed: 9/1/2017 10:55:55 AM

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Construction Documents

Submittal

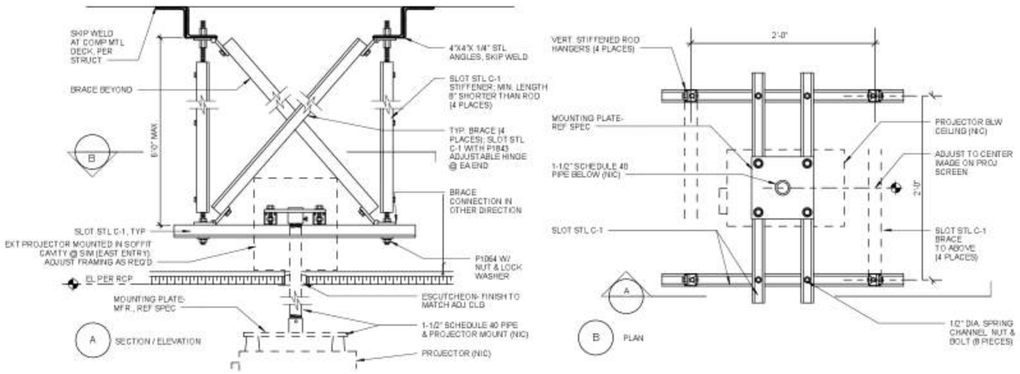
Revisions

No.	Date	Description

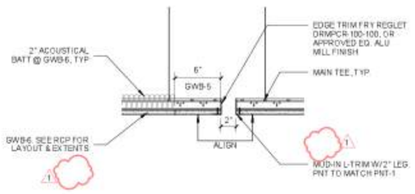
Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Ceiling Details

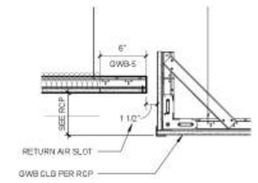
Sheet Number: A711



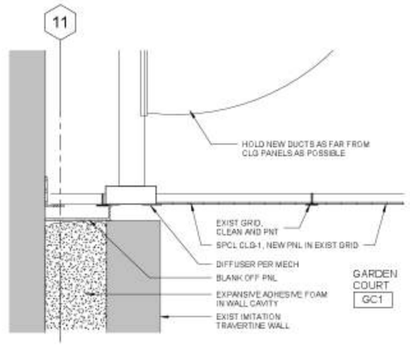
1 A715 — PROJECTOR SUPPORT ABOVE CLG
1 1/2" = 1'-0"



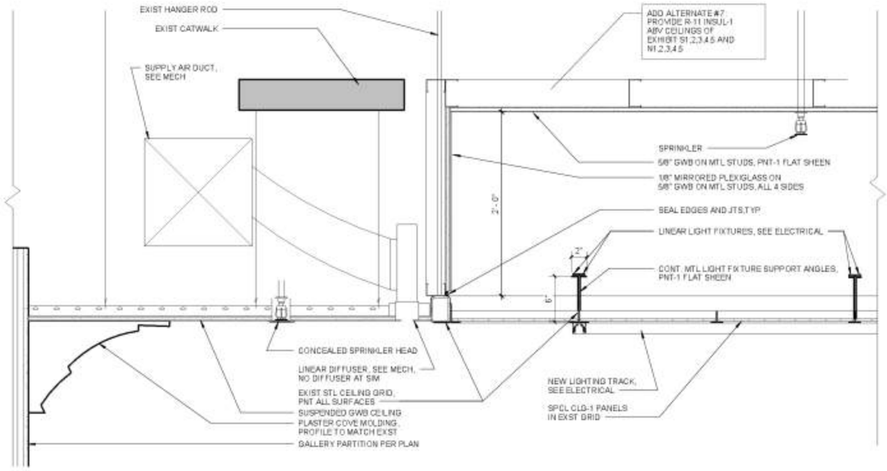
3 A715 — REVEAL @ GWB-6 CLG
1 1/2" = 1'-0"



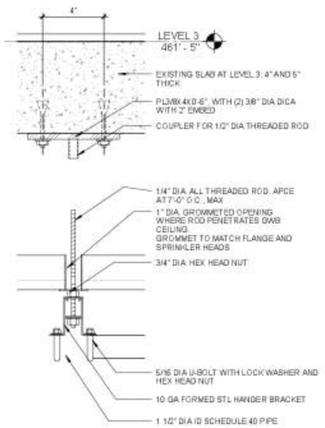
4 A715 — REVEAL @ EVENT CEILING
1 1/2" = 1'-0"



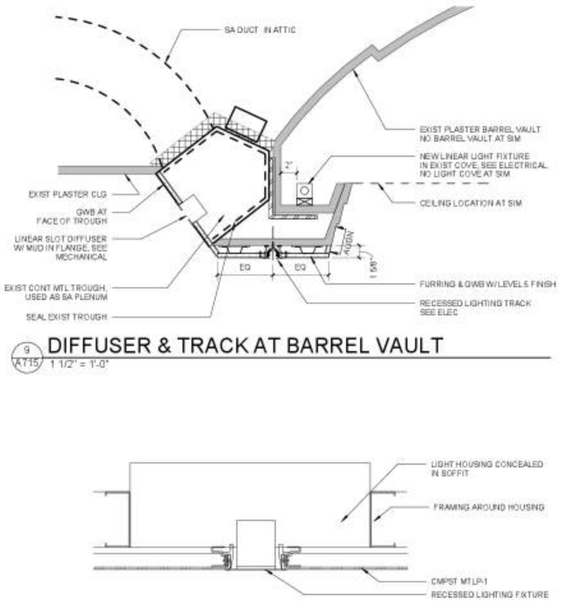
5 A715 — GARDEN COURT CEILING DIFFUSER
1 1/2" = 1'-0"



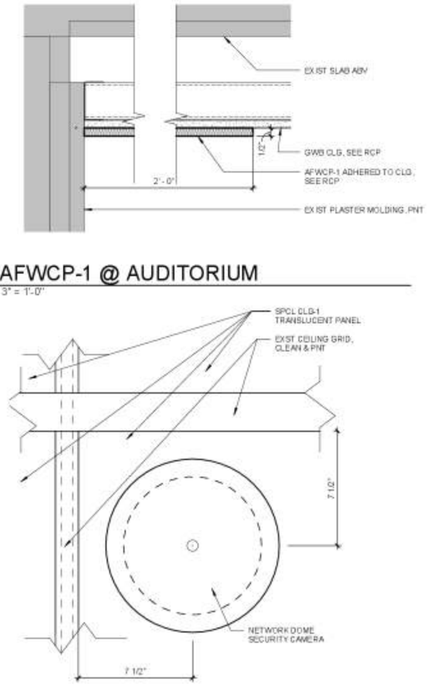
6 A715 — LIGHTBOX ABOVE CEILING - EXHIBIT N3, N4, N5, S3, S4, S5
1 1/2" = 1'-0"



8 A715 — UNISTRUT HANGER, TYP.
3" = 1'-0"

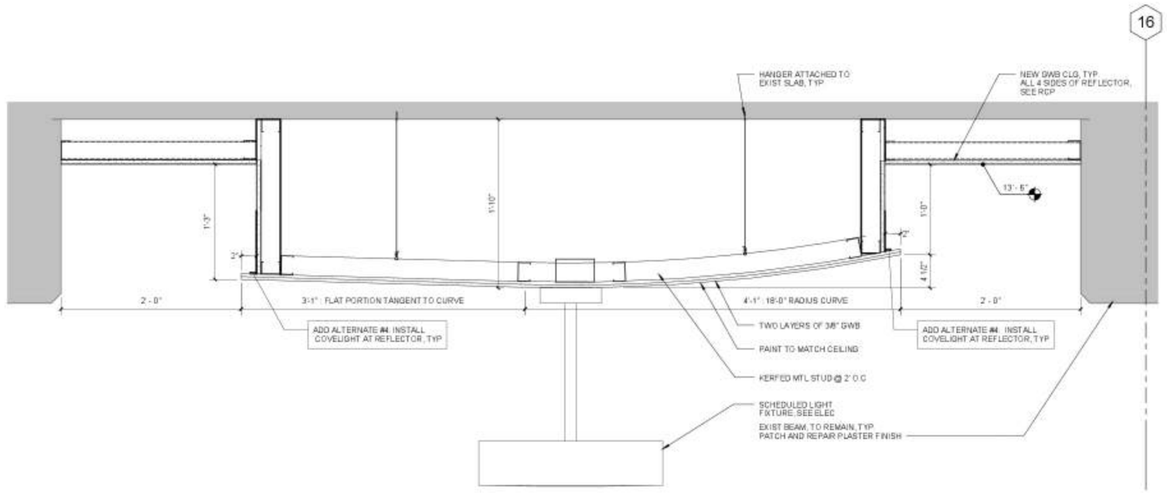


9 A715 — DIFFUSER & TRACK AT BARREL VAULT
1 1/2" = 1'-0"



10 A715 — AFWCP-1 @ AUDITORIUM
3" = 1'-0"

15 A715 — SECURITY CAMERA AT GARDEN CT
3" = 1'-0"



16 A715 — ACOUSTICAL REFLECTOR
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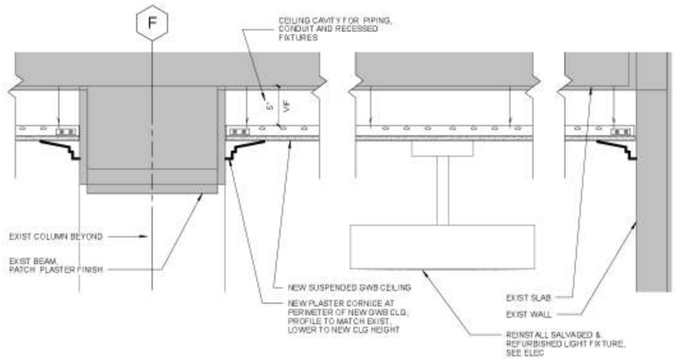
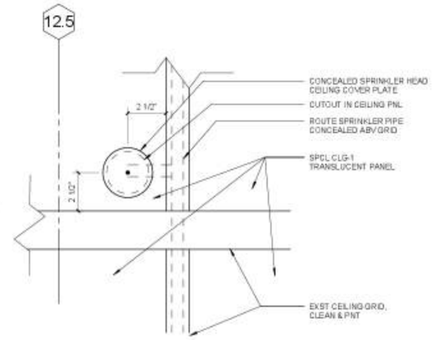


19 A715 — CEILING AND PLASTER CORNICE @ LIBRARY
1 1/2" = 1'-0"



20 A715 — CONCEALED SPRINKLER AT GARDEN CT
3" = 1'-0"

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Construction Documents

Submittal

Revisions

No.	Date	Description
1	7/12/17	ADDENDUM #1

Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Ceiling - Special Details

Sheet Number: A715

Construction Documents

Volume 2

MECHANICAL
PLUMBING
ELECTRICAL AND FIRE ALARM
TELECOMM
AUDIO VISUAL
VERTICAL TRANSPORTATION

Asian Art Museum Expansion & Renovation

Printed: 6/5/2017 9:57:07 AM

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Seattle, WA 98112

Construction Documents

Submittal

Revisions
No. Date Description

Drawn: Author
Checked: Checker
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: Cover Sheet

Sheet Number: **G000.2**

PROJECT INFORMATION

PROJECT ADDRESS:
VOLUNTEER PARK
1400 E PROSPECT STREET
SEATTLE, WA 98112

PROPERTY OWNER:
CITY OF SEATTLE
SEATTLE PARKS AND RECREATION
800 MAYNARD AVE S, 3RD FLOOR
SEATTLE, WA 98134
CONTACT: DAVID GRAVES
DAVID.GRAVES@SEATTLE.GOV
206-684-7048

APPLICANT:
SEATTLE ART MUSEUM
1300 1ST AVE
SEATTLE, WA 98101
CONTACT: RICHARD BECKERMAN
RICHARDB@SEATTLEARTMUSEUM.ORG
206-434-3150

APPLICANT'S AGENT:
LMN ARCHITECTS
801 2ND AVE, SUITE 501
SEATTLE, WA 98104
A CONTACT: PAMELA TREVITHICK
PTREVITHICK@LMNARCHITECTS.COM
206.682.3460

DPD PROJECT NUMBERS:
MUP: 3024753
CONSTRUCTION: 6529634

PARCEL NUMBER:
2925049087

LEGAL DESCRIPTION:

Volunteer Park

A The Northeast Quarter of the Northeast Quarter (NE 1/4 NE 1/4) of Section Twenty-nine (29) in Township Twenty-five (25) north (N) of Range Four (4) east (E), Willamette Meridian, also beginning at the northeast (NE) corner of the northeast quarter (NE 1/4) of Section Twenty-nine (29) in Township Twenty-five (25) north (N) of Range Four (4) east (E), Willamette Meridian, thence south one degree thirty-six minutes forty-eight seconds (1°36'48") west a distance of fourteen hundred thirty-three and fifty-two one-hundredths (1433.52) feet along the east line of Section 29 in Township 25 north Range 4 east, thence north (N) eighty-eight degrees eighteen minutes twenty-seven seconds (88°18'27") west a distance of four hundred eighty-two and ten one-hundredths (482.10) feet, thence north (N) eighty-eight degrees eighteen minutes thirty-one seconds (88° 18'31") west a distance of two hundred seventy-two and five one-hundredths (272.05) feet, thence north (N) eighty-eight degrees eighteen minutes thirty-eight seconds (88°18'38") west a distance of two hundred seventy-two and four one-hundredths (272.04) feet, thence north (N) eighty-eight degrees eighteen minutes twenty-nine seconds (88°18'29") west a distance of three hundred eleven and seven one-hundredths (311.07) feet to a point on the west line of the northwest (NW) quarter of the northeast (NE) quarter of the northeast (NE) quarter of Section 29 in Township 25 north Range 4 east, thence north (N) one degree eighteen minutes twenty seconds (1°18'20") east, more or less, a distance of fourteen hundred five and sixty-nine one-hundredths (1405.69) feet, more or less, to a point on the north line of Section 29 in Township 25 north Range 4 east, thence south (S) eighty-nine degrees thirty minutes and five seconds (89°30'05") east a distance of one thousand three hundred forty-five (1345) feet, more or less, along the north line of Section 29 in Township 25 north Range 4 east to the point of beginning. Also the east one-half (E 1/2) of blocks E and F of Phinney's Addition to the City of Seattle as recorded in Vol. 1, Page 175 of King County Plats. Also the portion of Eleventh (11th) Avenue North in the City of Seattle from the north line of Furth's Addition to the City of Seattle and the north line of Phinney's Addition to the City of Seattle as vacated by ordinance 26793.

PROJECT DESCRIPTION:

Renovation of existing 50,345 sf museum with 13,905 sf addition. Project will also include landscape, hardscape and grading modifications associated with building expansion. Renovations include major systems, structural and exterior/interior finish upgrades.

DRAWING INDEX

VOLUME 1

DRAWING INDEX - CD VOL 1

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B G004	Code Modifications
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G011	Land Use Area Plans
G100	Historic Landmark Preservation Plans
G201	Life Safety Plan - Level 1
G202	Life Safety Plan - Level 2
G203	Life Safety Plan - Level 3
G204	Life Safety Plan - Mezz/Attic
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2	Survey (For Reference Only)
3	Survey (For Reference Only)
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C101	Site Demolition Plan
C200	T.E.S.C. Plan
C201	T.E.S.C. Plan
C210	T.E.S.C. Details
C300	Site Plan
C301	Site Plan
C310	Site Details
C311	Site Details
C320	Utility Profile
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L201	Materials Plan West
L202	Materials Plan East
L301	Layout Plan West
L302	Layout Plan East
L401	Grading Plan West
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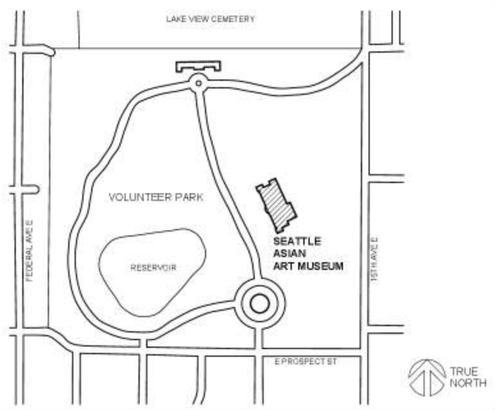

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Construction Documents

Submittal

Revisions

No	Date	Description
A	8/1/17	PERMIT CORRECTIONS 1
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Sheet Title: Drawing Index and Project Info

Sheet Number: **G001.2**

ABBREVIATIONS

GENERAL

AD	ACCESS DOOR
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AMP	AMPERE
ARCH	ARCHITECT; ARCHITECTURAL
AUTO	AUTOMATIC
AUX	AUXILIARY
BS	BIRD SCREEN
BTU	BRITISH THERMAL UNIT
BTUH	BRITISH THERMAL UNITS PER HOUR
COND	CONDENSATE
C/L	CENTERLINE
CLG	CEILING
CO	CARBON MONOXIDE
CO2	CARBON DIOXIDE
DET	DETAIL
DIA	DIAMETER
DISCH	DISCHARGE
DN	DOWN
DWG	DRAWING
DWV	DRAIN, WASTE, VENT
(E)	EXISTING
EA	EACH
EC	ELECTRICAL CONTRACTOR; END CAP
EL	ELEVATION
ELEC	ELECTRICAL
ELEV	ELEVATION
ESP	EXTERNAL STATIC PRESSURE
EXH	EXHAUST
EXIST	EXISTING
F	FAHRENHEIT
FA	FIRE ALARM
FCO	FLOOR CLEANOUT
FDC	FIRE DEPARTMENT CONNECTION
FLEX	FLEXIBLE
FLG	FLANGE
FLR	FLOOR
FO	FUEL OIL
FP	FIRE PROTECTION
FPM	FEET PER MINUTE
FT	FOOT; FEET
FURN	FURNISH
GA	GUAGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GPM	GALLONS PER MINUTE
GWB	GYPSUM WALL BOARD
HP	HORSE POWER
ID	INSIDE DIAMETER/DIMENSION
LF	LINEAL FOOT
MAX	MAXIMUM
MBH	1000 BRITISH THERMAL UNITS PER HOUR
MED	MEDUIM
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
M/N	MODEL NUMBER
MTD	MOUNTED
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
NEG	NEGATIVE
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN; NUMBER
NOM	NOMINAL
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
POC	POINT OF CONNECTION
PRELIM	PRELIMINARY
PSI	POUNDS PER SQUARE INCH
PSIG	POUNDS PER SQUARE INCH GUAGE
QTY	QUANTITY
REQD	REQUIRED
RPM	REVOLUTIONS PER MINUTE
SF	SQUARE FOOT
SPEC	SPECIFICATION
SQ	SQUARE
STD	STANDARD
TBD	TO BE DETERMINED
TI	TENANT IMPROVEMENTS
TOC	TOP OF CONCRETE
TOS	TOP OF STEEL
TYP	TYPICAL
UG	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE
VAV	VARIABLE AIR VOLUME
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
W/	WITH
W/O	WITHOUT

ABBREVIATIONS CONTINUED

HVAC

AC	AIR CONDITIONING
ACT	ACOUSTICAL CEILING TILE
AHU	AIR HANDLING UNIT
BDD	BACKDRAFT DAMPER
BOD	BOTTOM OF DUCT
CC	COOLING COIL
CV	CONSTANT VOLUME
DB	DRY BULB
DIFF	DIFFUSER
DMPR	DAMPER
EA	EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
GRD	GRILLE, REGISTER, DIFFUSER
HVAC	HEATING, VENTILATION, AND AIR CONDITIONING
LAT	LEAVING AIR TEMPERATURE
MC	MECHANICAL CONTRACTOR
MECH	MECHANICAL
MOD	MOTOR OPERATED DAMPER; MODULATING
MUA	MAKE UP AIR
OA	OVERALL; OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
RA	RETURN AIR
RAT	RETURN AIR TEMPERATURE
RCP	REFLECTED CEILING PLAN
SA	SUPPLY AIR
SAT	SUPPLY AIR TEMPERATURE
SD	SMOKE DAMPER
SF	SUPPLY FAN
SL	SOUND LINED
SLSM	SOUND LINED SHEET METAL
SM	SHEET METAL
SP	STATIC PRESSURE
TG	TRANSFER GRILLE
TOD	TOP OF DUCT
TSP	TOTAL STATIC PRESSURE
UH	UNIT HEATER
WB	WET BULB
WC	WATER COLUMN
WG	WATER GUAGE

PLUMBING

CO	CLEAN OUT; CARBON MONOXIDE
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DHWC	DOMESTIC HOT WATER RECIRCULATION
EWC	ELECTRICAL WATER COOLER
FD	FLOOR DRAIN
GD	GARBAGE DISPOSAL
IE	INVERT ELEVATION
IN WC	INCHES WATER COLUMN
IW	IONIZED WATER; INDIRECT WASTE
NPCW	NON POTABLE COLD WATER
ORL	OVERFLOW RAINWATER LEADER
PD	PLANTER DRAIN; PRESSURE DROP
PERF	PERFORATED
PLBG	PLUMBING
PRV	PRESSURE REDUCING VALVE
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
SD	STORM DRAIN
SS	SANITARY SEWER
VTR	VENT THROUGH ROOF
W	WASTE
WC	WATER CLOSET
WH	WATER HEATER
WSP	WET STANDPIPE

PIPING

BP	BACKFLOW PREVENTOR
CD	CONDENSATE DRAIN
CHW	CHILLED WATER
CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CT	CONICAL TEE
EWT	ENTERING WATER TEMPERATURE
FHV	FIRE HOSE VALVE
HRR	HEAT RECOVERY RETURN
HRS	HEAT RECOVERY SUPPLY
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
LWT	LEAVING WATER TEMPERATURE
RL	REFRIGERENT LIQUID
RS	REFRIGERENT SUCTION
TOP	TOP OF PIPE

GRILLES, REGISTERS, DIFFUSERS, AND LOUVERS

X"xX" CD CFM	CEILING DIFFUSER (LAY-IN T-BAR CEILING) 4 CORE ADJUSTABLE, WITH FILLER FOR 24" x 24" LAY-IN MODULE TITUS MODEL MCD, BORDER TYPE 3 - KRUEGER SERIES 1244, FRAME 23 (USE X"ø RUNOUT UNLESS OTHERWISE NOTED) (SEE BALANCE NOTE BELOW)
X"xX" CD/P CFM	CEILING DIFFUSER (PLASTER/GWB CEILING) 4 CORE ADJUSTABLE, "V" FRAME TITUS MODEL MCD, BORDER TYPE 6 - KRUEGER SERIES 1244, FRAME 21 (USE X"ø RUNOUT UNLESS OTHERWISE NOTED) (SEE BALANCE NOTE BELOW)
LS-#SL-W.(IN)/GC CFM L.(FT)	SLOT DIFFUSER FOR LAY-IN CEILING IN GARDEN COURT (SEE BALANCE NOTE BELOW) TITUS FLOWBAR LINEAR DIFFUSER WITH GRID SUPPORT ON ONE SIDE MODEL FL-XX-HT WITH BORDER TYPE 16 (QTY) AND SIZE OF INLET CALLED OUT
LS-#SL-W.(IN) CFM L.(FT)	SLOT DIFFUSER FOR LAY-IN CEILING (SEE BALANCE NOTE BELOW) AIR FACTORS LINEAR DIFFUSER WITH HIDDEN FLANGE B-W0(#SL)-HFHF WITH TITUS 1900 BOOT WITH (QTY) AND SIZE OF INLET CALLED OUT
LS-#SL-W.(IN)/P CFM L.(FT)	SLOT DIFFUSER FOR PLASTER CEILING (SEE BALANCE NOTE BELOW) AIR FACTORS LINEAR DIFFUSER WITH HIDDEN FLANGE B-W0(#SL)-HFHF - FBP PLENUM (QTY) AND SIZE OF INLET CALLED OUT WITH CONTINUOUS SLOT
LSS-#SL-W.(IN)/P CFM L.(FT)	SLOT DIFFUSER FOR PLASTER SIDEWALL (SEE BALANCE NOTE BELOW) AIR FACTORS JET THROW LINEAR DIFFUSER WITH HIDDEN FLANGE B-W0(#SL)-HFHF-JP
LR-#SL-W.(IN)/P CFM L.(FT)	SLOT RETURN FOR PLASTER CEILING (SEE BALANCE NOTE BELOW) AIR FACTORS LINEAR DIFFUSER WITH HIDDEN FLANGE B-W0(#SL)-HFHF - FBP PLENUM (QTY) AND SIZE OF INLET CALLED OUT WITH CONTINUOUS SLOT
L.(FT) LSR-#SL-W.(IN)/P CFM	SLOT DIFFUSER FOR PLASTER SIDEWALL (SEE BALANCE NOTE BELOW) AIR FACTORS LINEAR DIFFUSER WITH HIDDEN FLANGE B-W0(#SL)-HFHF - FBP PLENUM (QTY) AND SIZE OF INLET CALLED OUT
S.S.R.	SIDEWALL SUPPLY REGISTER DOUBLE DEFLECTION, HORIZONTAL FRONT BLADES, WITH O.B.D. TITUS MODEL 272RL O.B.D. / KRUEGER MODEL 880H O.B.D.
S.S.G.	SIDEWALL SUPPLY GRILLE DOUBLE DEFLECTION, HORIZONTAL FRONT BLADES TITUS MODEL 272RL / KRUEGER MODEL 880H
X"xX" LFS CFM	FLOOR SUPPLY GRILLE, HEAVY DUTY MOUNTING FRAME 15º FIXED DEFLECTION, TITUS MODEL D-CT-HD-481 WITH FRAME TYPE 5
R.A.G.	RETURN AIR GRILLE ALUMINUM EGGCRATE WITH 1/2" x 1/2" x 1/2" CORE TITUS MODEL 50F / KRUEGER EG-5
R.A.G./P.	RETURN AIR GRILLE (PLASTER/GWB CEILING) FIXED 35 DEGREE DEFLECTION BLADES TITUS MODEL 350RL / KRUEGER MODEL S80H
S.R.G.	SIDEWALL RETURN GRILLE FIXED 35 DEGREE DEFLECTION BLADES, WITHOUT O.B.D. TITUS MODEL 350RL / KRUEGER MODEL S80H
S.E.G.	SIDEWALL EXHAUST GRILLE FIXED 35 DEGREE DEFLECTION BLADES, WITHOUT O.B.D. TITUS MODEL 350RL / KRUEGER MODEL S80H
C.E.G.	CEILING EXHAUST GRILLE ALUMINUM EGGCRATE WITH 1/2" x 1/2" x 1/2" CORE AND 24"x24" BORDER TYPE 3 TITUS MODEL 50F / KRUEGER EG-5
E.G.	EXHAUST GRILLE ALUMINUM EGGCRATE WITH 1/2" x 1/2" x 1/2" CORE TITUS MODEL 50F / KRUEGER EG-5
E.G./P.	RETURN AIR GRILLE (PLASTER/GWB CEILING) FIXED 35 DEGREE DEFLECTION BLADES TITUS MODEL 350RL / KRUEGER MODEL S80H
T.G.	TRANSFER GRILLE ALUMINUM EGGCRATE WITH 1/2" x 1/2" x 1/2" CORE TITUS MODEL 350RL / KRUEGER EG-5
T.G./P.	TRANSFER GRILLE (PLASTER/GWB CEILING OR WALL) FIXED 35 DEGREE DEFLECTION BLADES TITUS MODEL 350RL / KRUEGER MODEL S80H
SCREENED OPENING	6"x6"x6" EXTRUDED ALUMINUM SCREEN GRID RUSKIN EG100 GRID SCREEN

NOTE: BALANCE CONTRACTOR IS RESPONSIBLE FOR ADJUSTING ALL DIFFUSERS THROWS.

NOTE: ALL SUPPLY DIFFUSERS ARE TO BE INSTALLED WITH A DIFFUSER CAN W/ PERF DIVIDER, GENSCO REGISTER BOX W/ FLEX COLLAR & DIFF, MODEL COLDC21 OR EQUIV.

NOTE: FOR EXPOSED DUCTWORK WITH SUPPLY EXHAUST GRILLES TAKEOFFS TO BE GRILLE SIZE PLUS 2" TO MATCH GRILLE FRAME.

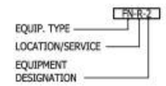
HVAC AND DUCTWORK ACCESSORIES

	SUPPLY AIR AIRFLOW DIRECTION
	RETURN AIR AIRFLOW DIRECTION
	EXHAUST AIR AIRFLOW DIRECTION
	TRANSFER AIR AIRFLOW DIRECTION
	OUTSIDE AIR AIRFLOW DIRECTION
FE	FLEXIBLE EQUIPMENT/DUCTWORK CONNECTION
	MANUAL VOLUME DAMPER
	MANUAL VOLUME DAMPER
M	MOTORIZED DAMPER
FM	AIRFLOW MONITOR
T	REMOTELY OPERATED DAMPER (YOUNG REGULATOR OR APPROVED)
BDD	BACKDRAFT DAMPER
CB-BDD	COUNTER-BALANCED BACKDRAFT DAMPER
BDD-L	BACKDRAFT DAMPER RUSKIN MODEL BD2/A1, LOCAL VELOCITY < 1500 FPM
BDD-M	BACKDRAFT DAMPER RUSKIN MODEL BD2/A2, LOCAL VELOCITY < 2500 FPM
BDD-H	BACKDRAFT DAMPER RUSKIN MODEL BD6, LOCAL VELOCITY < 3500 FPM
SD	SMOKE DETECTOR
	VERTICAL FIRE DAMPER (1-1/2 HOUR) IN AIRSTREAM RUSKIN MODEL DIB2 STYLE A
	HORIZONTAL FIRE DAMPER (1-1/2 HOUR) IN AIRSTREAM RUSKIN MODEL DIB2 STYLE A
3 HR	VERTICAL FIRE DAMPER (3 HOUR) IN AIRSTREAM RUSKIN MODEL DIB23 STYLE A
3 HR	VERTICAL FIRE DAMPER (3 HOUR) IN AIRSTREAM RUSKIN MODEL DIB23 STYLE A
SD	SMOKE DAMPER
SD	HORIZONTAL COMBINATION SMOKE AND FIRE DAMPER
SD	VERTICAL COMBINATION SMOKE AND FIRE DAMPER
	DUCT HEATER
	INDICATES AIRFLOW DIRECTION THROUGH THE PARKING GARAGE TO THE GARAGE EXHAUST FANS.
	CEILING EXHAUST FAN SEE SCHEDULE FOR SPECIFICATIONS

CONTROLS INSTRUMENTATION LEGEND

T	THERMOSTAT
S	TEMPERATURE SENSOR
H	HUMIDITY SENSOR
CO2	CARBON DIOXIDE SENSOR
CO	CARBON MONOXIDE SENSOR
	VISUAL ALARM LIGHT - WALL MOUNTED
S	SWITCH

EQUIPMENT TAG LEGEND



PROJECT ADDRESS:

1400 E. PROSPECT
SEATTLE, WA 98112

JURISDICTION:

CITY OF SEATTLE

CONSTRUCTION:

SEE ARCHITECTURAL DRAWING A001

OCCUPANCY:

SEE ARCHITECTURAL DRAWING A001

DUCTWORK SYMBOLS AND FITTINGS

	ROUND SUPPLY DUCT UP
	ROUND SUPPLY DUCT DN
	ROUND RETURN DUCT UP
	ROUND RETURN DUCT DN
	ROUND EXHAUST DUCT UP
	ROUND EXHAUST DUCT DN
	RECTANGULAR SUPPLY DUCT UP
	RECTANGULAR SUPPLY DUCT DN
	RECTANGULAR RETURN DUCT UP
	RECTANGULAR RETURN DUCT DN
	RECTANGULAR EXHAUST DUCT UP
	RECTANGULAR EXHAUST DUCT DN
12ø	12" ROUND ID SHEET METAL DUCT
12x12	12"x12" ID RECTANGULAR SHEET METAL DUCT
16x12/SL	16"x12" ID RECTANGULAR SHEET METAL DUCT WITH 1" SOUND LINING (OD OF DUCT IS 18"X14")
16x12/2"SL	16"x12" ID RECTANGULAR SHEET METAL DUCT WITH 2" SOUND LINING (OD OF DUCT IS 20"X16")
12x12/DB	INDICATES 12" x 12" I.D. DUCTBOARD
12x12/W	12"x12" ID RECTANGULAR SHEET METAL DUCT WITH 1" WRAP (OD OF DUCT WITH WRAP IS 14"X14")
	FLEXIBLE ROUND DUCT
38x24/OV	FLAT OVAL DUCT: MAJOR AXIS=38" & MINOR AXIS=24"
	SPIN-IN TAKE-OFF & VOLUME DAMPER WITH RIGID ROUND FIBERGLASS DUCT
	TURNING VANES

MECHANICAL DRAWING INDEX

SHEET NUMBER	SHEET TITLE	SHEET SCALE	PERMIT CORRECTIONS 1 9/1/2017
M000	LEGENDS AND ABBREVIATIONS - HVAC	NTS	X
M001	COORDINATION NOTES	NTS	X
M002	MECHANICAL SPECIFICATIONS	NTS	X
M003	MECHANICAL SPECIFICATIONS	NTS	X
M004	MECHANICAL BASIS OF DESIGN	NTS	X
M005	MECHANICAL BASIS OF DESIGN	NTS	X
M006	VENTILATION CALCULATIONS	NTS	X
M007	VENTILATION CALCULATIONS	NTS	X
M010	MECHANICAL SCHEDULES - AIR BALANCE	NTS	X
M011	MECHANICAL SCHEDULES - AHU	NTS	X
M012	MECHANICAL SCHEDULES - FANS	NTS	X
M013	MECHANICAL SCHEDULES - HUMIDIFIERS	NTS	X
M014	MECHANICAL SCHEDULES - BOILER, SS, ET	NTS	X
M015	MECHANICAL SCHEDULES - VAV	NTS	X
M016	MECHANICAL SCHEDULES - EH	NTS	X
M017	MECHANICAL SCHEDULES - PUMP, RELIEF HOOD	NTS	X
M018	MECHANICAL SCHEDULES - HEAT PUMPS	NTS	X
M019	MECHANICAL SCHEDULES - MOTORIZED DAMPERS	NTS	X
M101-A	HVAC DEMO PLAN - LEVEL 1	1/8" = 1'-0"	X
M101-B	HVAC DEMO PLAN - PARTIAL LEVEL 1	1/8" = 1'-0"	X
M102	HVAC DEMO PLAN - LEVEL 2	1/8" = 1'-0"	X
M103	HVAC DEMO PLAN - LEVEL 3	1/8" = 1'-0"	X
M104	HVAC DEMO PLAN - ATTIC	1/8" = 1'-0"	X
M201	HVAC PLAN - LEVEL 1	1/8" = 1'-0"	X
M202	HVAC PLAN - LEVEL 2	1/8" = 1'-0"	X
M203	HVAC PLAN - LEVEL 3	1/8" = 1'-0"	X
M204	HVAC PLAN - ATTIC	1/8" = 1'-0"	X
M205	HVAC PLAN - ROOF	1/8" = 1'-0"	X
M301	ENLARGED HVAC PLANS	1/4" = 1'-0"	X
M302	ENLARGED MECHANICAL ROOMS	1/4" = 1'-0"	X
M401	HVAC SECTIONS	AS NOTED	X
M402	HVAC SECTIONS	AS NOTED	X
M403	HVAC SECTIONS	AS NOTED	X
M404	HVAC SECTIONS	AS NOTED	X
M405	HVAC SECTIONS	AS NOTED	X
M406	HVAC SECTIONS	AS NOTED	X
M501	MECHANICAL DETAILS	NTS	X
M502	GENERATOR DETAILS	NTS	X
M503	MECHANICAL DETAILS	NTS	X
M504	MECHANICAL DETAILS	NTS	X
M601	HUMIDITY & TEMPERATURE CONTROL ZONE PLANS	NTS	X
M602	HUMIDITY & TEMPERATURE CONTROL DIAGRAM	NTS	X
M603	HUMIDITY & TEMPERATURE CONTROL DIAGRAM	NTS	X
M604	AIR HANDLING UNIT DIAGRAMS	NTS	X
M605	HVAC - PLENUM ZONES	NTS	X
M701	PUMPING AND SOURCE EQUIPMENT SCHEMATIC	NTS	X
M702	HEATING AND CHILLED WATER LOAD SCHEMATIC	NTS	X
M703	HEATING WATER RISER DIAGRAMS	NTS	X
M704	DDC SYSTEM POINTS LIST	NTS	X
M705	MECHANICAL CONTROLS DESCRIPTION	NTS	X
M706	MECHANICAL CONTROLS DESCRIPTION	NTS	X
M707	MECHANICAL CONTROLS DESCRIPTION	NTS	X
M708	MECHANICAL CONTROLS DESCRIPTION	NTS	X
M709	MECHANICAL CONTROLS DESCRIPTION	NTS	X

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SAM ASIAN ART MUSEUM

Submittal

Revisions

No.	Date	Description
1	9/1/17	PERMIT CORRECTIONS 1

Sheet Title

Sheet Number

Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Construction Documents

Drawn	DD/DG
Checked	JL-RSR
LMN Proj No	16028.01
Date	6/23/17

LEGENDS AND ABBREVIATIONS - HVAC

M000

MECHANICAL CONTRACTOR NOTES

1. ALL MECHANICAL SHEET METAL AND PIPING TO COMPLY WITH ALL APPLICABLE CODES.
2. MECHANICAL CONTRACTOR TO PROVIDE AS-BUILT MECHANICAL DRAWINGS THAT OUTLINE ALL CHANGES FROM MECHANICAL CONSTRUCTION DRAWING SET AND COMPLY WITH 2015 SEATTLE ENERGY CODE PROJECT COMPLETION REQUIREMENTS.
3. ALL DUCTWORK TO BE CONSTRUCTED AND INSTALLED TO SMACNA STANDARDS IN ACCORDANCE WITH THE SPECIFICATIONS OUTLINED IN THE SHEET METAL DUCT SPECIFICATION. DUCT SIZES INDICATED ON PLANS ARE MINIMUM SIZES AND DEVIATIONS FROM THESE SIZES AS REQUIRED DURING DETAILERS SHALL BE APPROVED BY RUSHING.
4. MECHANICAL CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR MECHANICAL ENGINEER REVIEW PRIOR TO FABRICATION OR INSTALLATION OF MECHANICAL DUCTWORK OR EQUIPMENT.
5. ALL DUCTWORK TO BE INSULATED PER 2015 SEATTLE ENERGY CODE REQUIREMENTS AS INDICATED IN THE SHEET METAL DUCT SPECIFICATION.
6. HIGH PRESSURE DUCT SYSTEMS THOSE IN EXCESS OF 3 INCHES WATER GAUGE SHALL BE PRESSURE TESTED IN ACCORDANCE WITH SEC C403.2.8.3.3. NO PRESSURE TESTING FOR LEAKAGE IS REQUIRED FOR THE HVAC DUCTWORK OF LOWER PRESSURES.
7. DUCT SIZES INDICATED ON PLANS ARE NET INSIDE DIMENSIONS. A CALL-OUT SUCH AS 12X12/SL INDICATES A DUCT THAT IS 12X12 OUTSIDE DIMENSION WITH 1" SOUNDLINER (THEREFORE NET OD IS 14X14).
8. MECHANICAL PIPING TO BE CONSTRUCTED AND INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS. PIPE SIZES INDICATED ON PLANS ARE MINIMUM SIZES AND DEVIATIONS SHALL BE APPROVED BY RUSHING. PIPING DRAIN VALVES ARE TO BE PROVIDED AT ALL PIPING LOW POINTS. ADDITIONAL ISOLATION VALVES MAY BE REQUIRED FOR SERVICING THE SYSTEM THAT ARE NOT SHOWN ON SCHEMATICS AND SHALL BE PROVIDED WHEN REQUIRED FOR PROPER SYSTEM MAINTENANCE.
9. MECHANICAL CONTRACTOR TO SUBMIT SHOP DRAWINGS FOR MECHANICAL ENGINEER REVIEW PRIOR TO FABRICATION OR INSTALLATION OF MECHANICAL PIPING OR EQUIPMENT.
10. ALL PIPING TO BE PRESSURE TESTED IN ACCORDANCE WITH THE SPECIFICATIONS OUTLINED AND ALL APPLICABLE CODES.
11. ALL THROUGH PENETRATIONS OR MEMBRANE PENETRATIONS FOR DUCTWORK AND PIPING SHALL BE FIRESTOPPED AS REQUIRED BY THE 2015 WASHINGTON STATE BUILDING AND MECHANICAL CODES.
12. ALL DUCTWORK, PIPING AND EQUIPMENT TO BE SEISMICALLY RESTRAINED PER THE ISOLATION & TIEDOWN SCHEDULE.
13. EQUIPMENT SHALL BE PROVIDED AS INDICATED IN MECHANICAL SCHEDULES. THE EQUIPMENT HAS AN INDICATED "BASIS OF DESIGN" MANUFACTURER AND HAS BEEN COORDINATED WITH THE DESIGN TEAM AS SHOWN. IF ALTERNATE MANUFACTURERS ARE USED BY THE MECHANICAL CONTRACTOR THEN THE CONTRACTOR SHALL INCLUDE COSTS FOR ALL ASSOCIATED ENGINEERING AND ARCHITECTURAL SERVICES REQUIRED TO RE-ENGINEER AROUND THE ALTERNATE VENDOR IN THE SUBSTITUTION REQUEST PRICING TO THE GENERAL CONTRACTOR. THESE SERVICES INCLUDE, BUT ARE NO LIMITED TO, MECHANICAL DESIGN, CONTROLS DESIGN, ARCHITECTURAL DESIGN, STRUCTURAL DESIGN, ETC.
14. ALL ACCESS PANELS IN WALLS AND/OR CEILINGS ARE PROVIDED AND INSTALLED BY OTHERS. MECHANICAL CONTRACTOR TO COORDINATE REQUIRED LOCATION AND SIZE WITH CONTRACTOR PROVIDING AND INSTALLING ACCESS PANELS.
15. BALANCING CONTRACTOR TO REVIEW AND PERFORM SPECIAL BALANCING REQUIREMENTS CALLED OUT IN PROJECT COMPLETION REQUIREMENTS AND NOTES ON THE DIFFUSER PLAN SHEETS.

GENERAL COORDINATION NOTES

1. ALL TRADES TO LEAVE A MINIMUM 36" CLEARANCE IN FRONT OF MECHANICAL EQUIPMENT ACCESS PANELS FOR SERVICING. NOTE: SOME ELECTRICAL PANELS MAY REQUIRE MORE CLEARANCE COORDINATE WITH ELECTRICAL CONTRACTOR FOR CLEARANCE REQUIREMENTS.
2. CUTTING, FRAMING, PATCHING AND PAINTING OF WALL, CEILING AND FLOOR OPENINGS SHALL BE BY OTHERS.
3. ROOF CURBS, FLASHINGS, SLEEPERS, PITCH POCKETS, AND CUTTING AND PATCHING OF ROOF OPENINGS SHALL BE BY OTHERS.
4. ROOF CURBS, SLEEPERS, AND CANT STRIPS TO BE BUILT AND ATTACHED TO THE ROOF BY OTHERS. CURBS TO BE CONSTRUCTED ACCORDING TO SIZES PROVIDED BY MECHANICAL CONTRACTOR SHOP DRAWINGS. SHIM AS REQUIRED TO MAKE ROOF CURBS AND SLEEPERS LEVEL. TOP OF CURB MUST BE TRUE (FLAT) TO PROVIDE AN ACCEPTABLE SEALING SURFACE. MAXIMUM ALLOWABLE DEVIATION FROM LEVEL OR FLAT SHALL BE 1/4" IN 10'. ROOF CURBS AND SLEEPERS MUST BE SECURELY FASTENED TO STRUCTURAL SUPPORT MEMBERS. SEE EQUIPMENT TIEDOWN SCHEDULE FOR MORE DETAIL.
5. LEVELING CURBS TO BE ATTACHED TO THE ROOF BY OTHERS. CURBS TO BE CONSTRUCTED ACCORDING TO SIZES PROVIDED BY MECHANICAL CONTRACTOR SHOP DRAWINGS. TOP OF CURB MUST BE TRUE (FLAT) TO PROVIDE AN ACCEPTABLE SEALING SURFACE. MAXIMUM ALLOWABLE DEVIATION FROM LEVEL OR FLAT SHALL BE 1/4" IN 10'. ROOF CURBS AND SLEEPERS MUST BE SECURELY FASTENED TO STRUCTURAL SUPPORT MEMBERS. SEE EQUIPMENT TIEDOWN SCHEDULE FOR MORE DETAIL.
6. FINAL PAINTING OF GRILLES, REGISTERS, AND DIFFUSERS, AS MAY BE REQUIRED BY ARCHITECT, SHALL BE DONE IN THE FIELD BY OTHERS.
7. ALL LOUVERS, BOTH DUCTED AND NON-DUCTED, ARE TO BE FURNISHED AND INSTALLED BY THE MECHANCIAL CONTRACTOR. LOUVERS ARE SHOWN AND SCHEDULED ON ELSEWHERE IN THE DOCUMENTS, AND TO INDICATE THE REQUIRED LEVEL OF PERFORMANCE. LOUVERS OF ALTERNATE MAKE AND/OR TYPE MAY BE SUBSTITUTED ONLY IF THEY HAVE BOTH PRESSURE DROP AND WATER CARRY-OVER PERFORMANCE EQUAL TO OR BETTER THAN THE LOUVERS SPECIFIED. ALL UNUSED PORTIONS OF LOUVER BAND ARE TO BE BLANKED OFF AND INSULATED.
8. IN NO INSTANCE SHALL OTHER TRADES HANG OR SUPPORT EQUIPMENT, CEILING WIRES, LIGHT FIXTURE HANGERS, ETC., FROM HVAC EQUIPMENT OR DUCTWORK.
9. PLUMBER SHALL ROUTE PLUMBING VENTS SO AS TO MAINTAIN MINIMUM 15 FEET OF CLEARANCE FROM OUTSIDE AIR INTAKES.
10. ALL ACCESS PANELS IN WALLS AND/OR CEILINGS ARE PROVIDED AND INSTALLED BY OTHERS. MECHANICAL CONTRACTOR TO COORDINATE REQUIRED LOCATION AND SIZE WITH CONTRACTOR PROVIDING AND INSTALLING ACCESS PANELS.

ELECTRICAL COORDINATION NOTES

1. WHERE INDICATED ON EQUIPMENT SCHEDULES THE EQUIPMENT COMES COMPLETE FROM THE FACTORY WITH MOTOR CONTROLS AS REQUIRED. ELECTRICIAN SHALL PROVIDE SERVICE AND A DISCONNECT PER CODE, AND ALL POWER WIRING, INCLUDING CONNECTING TO EQUIPMENT.
2. WHERE INDICATED ON EQUIPMENT SCHEDULES THE EQUIPMENT REQUIRES FIELD INSTALLED MOTOR STARTERS. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL MOTOR STARTERS (OR CONTACTORS WHERE INDICATED), PROVIDE SERVICE AND DISCONNECT PER CODE, AND DO ALL POWER WIRING, INCLUDING CONNECTING TO EQUIPMENT. HOLDING COIL CIRCUIT SHALL BE POWERED BY ELECTRICAL CONTRACTOR (120/1 UNLESS INDICATED OTHERWISE). ALL STARTERS SHALL BE PROVIDED WITH H-O-A SWITCH.
3. WHERE INDICATED ON EQUIPMENT SCHEDULES THE EQUIPMENT IS SERVED BY A VARIABLE FREQUENCY DRIVE (VFD). VFD'S ARE PROVIDED BY THE MECHANICAL CONTRACTOR AND ARE INSTALLED (MOUNTED) AND WIRED BY THE ELECTRICAL CONTRACTOR. ALL REQUIRED DISCONNECTS ARE PROVIDED AND INSTALLED BY THE ELECTRICAL CONTRACTOR.
4. ALL BUILDING HARMONIC STUDIES FOR THE IMPACT OF THE VARIABLE FREQUENCY DRIVES ON THE BUILDING ELECTRICAL SYSTEM AND ON THE POWER GRID FROM THE BUILDING ARE BY THE ELECTRICAL DESIGN CONSULTANT AND/OR ELECTRICAL CONTRACTOR. IT IS THE RESPONSIBILTY OF THE ELECTRICAL DESIGN CONSULTANT AND/OR ELECTRICAL CONTRACTOR TO COORDINATE ANY ADDITIONAL INPUT LINE REACTORS, HARMONIC FILTERS, OR OTHER ASSOCIATED ELECTRICAL VFD DEVICES TO PROVIDE A FULLY COMPLIANT ELECTRICAL SYSTEM WITH RUSHING AND/OR THE MECHANICAL CONTRACTOR.
5. A FIRE AND/OR SMOKE DETECTION AND ALARM SYSTEM, AS MAY BE REQUIRED BY THE OWNER, ARCHITECT, OR CODE AUTHORITY, IS THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR.
6. IT IS THE ELECTRICAL CONTRACTOR'S RESPONSIBILITY TO INTERLOCK THE ABOVE DEVICES WITH THE CENTRAL FIRE AND/OR SMOKE DETECTION AND ALARM SYSTEM.

HYDONRIC PIPING

1. SEE MATERIALS MATRIX FOR PIPING CONSTRUCTION CRITERIA.
2. ALL MECHANICAL PIPING WILL COMPLY WITH ALL APPLICABLE CODES.
3. ALL PIPING IS TO BE INSULATED PER 2015 SEATTLE ENERGY CODE REQUIREMENTS. SEE PIPING INSULATION MATRIALS MATRIX FOR DETAILS.
4. ALL PIPING TO BE PRESSURE TESTED IN ACCORDANCE WITH 2015 SMC SECTION 1208.
5. ALL PIPING AND PLUMBING WILL BE LABELED EXTENSIVELY IN COMPLIANCE WITH ACCEPTED INDUSTRY STANDARDS AND BUILDING STANDARDS.
6. THE MC WILL OBTAIN HW SYSTEM TESTING FOR CORROSION INHIBITOR LEVELS PRIOR TO OPENING UP SYSTEM FOR NEW WORK. IF LEVELS ARE LOW, PRESENT REPORT TO TEAM FOR NEGOTIATION WITH OWNER FOR POST MODIFICATION REFILL AND TREATMENT.
7. THE MC WILL CLEAN AND FLUSH THE MODIFIED PORTION OF THE HW SYSTEM AFTER PIPING COMPLETION WHILE STILL ISOLATED FROM THE REST OF THE SYSTEM. PRESENT PROCEDURE TO ENGINEER FOR APPROVAL PRIOR TO EXECUTING.
8. AFTER COMPLETION OF CLEAN AND FLUSH, FILL SYSTEM AND ADD CORROSION INHIBITORS AS REQUIRED FOR FULL PROTECTION. PROVIDE FINAL TESTING DOCUMENTATION AS PART OF CLOSEOUT DOCUMENTATION.
9. HEATING HOT WATER PIPING
   - A. INSULATE PER 2015 SEC TABLE C403.2.8 AND THE PIPING INSULATION MATRIALS MATRIX: THERMAL CONDUCTIVITY 0.21 TO 0.28, 1.5" NOMINAL THICKNESS.
   - B. USE RIGID INSERTS CAL SIL, SNAPITZ OR EQUIVALENT. INSULATION TO BE CONTINUOUS THROUGH THE HANGER. SHEETMETAL SHIELD IS NOT REQUIRED.
   - C. ALL PIPING MATERIAL, FITTINGS, AND DEVICES TO BE RATED FOR 150 PSIG SERVICE. SEE PIPING MATERIALS MATRIX AND SPECIFICATIONS FOR DETAILS.
   - D. PIPE EXPANSION
     - I. ALL PIPING EXPANSION CALCULATIONS FOR PROPER ANCHORING, SUPPORT, AND THERMAL EXPANSION ARE BY THE MC.
     - II. PIPE EXPANSION, UNLESS SHOWN OTHERWISE, IS TO BE ABSORBED IN BENDS, SWING JOINTS, EXPANSION LOOPS, AND OFFSETS. ALL PIPING MAINS, BRANCHES AND RUNOUTS SHALL BE INSTALLED TO ALLOW FOR FREE EXPANSION AND CONTRACTION WITHOUT DEVELOPING LEAKS OR UNDUE STRESSING OF PIPE.

REFRIGERANT PIPING

1. SEE MATERIALS MATRIX FOR PIPING CONSTRUCTION CRITERIA. ALL PIPING AND FITTINGS TO BE INSTALLED PER UNIT MANUFACTURER INSTALLATION REQUREMRENTS.
2. ALL MECHANICAL PIPING WILL COMPLY WITH ALL APPLICABLE CODES.
3. ALL PIPING IS TO BE INSULATED PER 2015 SEATTLE ENERGY CODE REQUIREMENTS. SEE PIPING INSULATION MATRIALS MATRIX FOR DETAILS.
4. ALL PIPING TO BE PRESSURE TESTED IN ACCORDANCE WITH 2015 SMC SECTION 1108.
5. ALL PIPING WILL BE LABELED EXTENSIVELY IN COMPLIANCE WITH ACCEPTED INDUSTRY STANDARDS AND BUILDING STANDARDS.
6. REFRIGERANT PIPING TO BE INSTALLED PER 2015 SMC SECTION 1107. SPECIFICALLY, PER 2015 SMC SECTION 1107.2 REFRIGERANT PIPING TO BE INSTALLED PER THE FOLLOWING:
   - A. PIPING IN OPEN TO STRUCTURE AREAS TO BE INSTALLED ABOVE 7'-3"AFF
   - B. PIPING SHALL NOT BE INSTALLED IN ELEVATOR SHAFTS OR ANY SHAFT THAT HAS OPENINGS TO LIVING QUARTERS OR AN EXIT ACCESS CORRIDOR, ENCLOSED STAIRWAY, OR EXIT PASSAGEWAY.
   - C. PIPING SHALL NOT BE INSTALLED IN A LOBBY THAT IS PART OF AN EXIT SYSTEM, STAIRWAY, EXIT PASSAGEWAY, OR EXIT ACCESS CORRIDOR UNLESS ONE OF THE FOLLOWING CONDITIONS IS MET:
     - REFRIGERANT PIPING AND EQUIPMENT ARE PERMITTED TO BE SEPARATED FROM THE CORRIDOR, STAIR OR PASSAGEWAY BY CONSTRUCTION EQUAL TO THE RATED CONSTRUCTION OF THE SPACE AND LOCATED SO THAT ALL REQUIRED CLEARANCES ARE MAINTAINED.
     - REFRIGERANT PIPING IS PERMITTED TO PASS THROUGH CORRIDORS IF LOCATED ABOVE A CEILING AND THE PIPING HAS NO JOINTS IN THE CORRIDOR.
     - REFRIGERANT PIPING IS PERMITTED TO PASS THROUGH LOBBIES THAT ARE PART OF AN EXIT SYSTEM IF THE REFFIGERATION SYSTEM CONTAINS NOT MORE THAT THE AMOUNT OF REFRIGERANT ALLOWED BY SECTION 1104.3.

HVAC AND PLUMBING - ACOUSTICAL AND VIBRATIONAL ISOLATION

1. DO NOT ALLOW CONTACT BETWEEN ISOLATED DUCTS OR PIPES AND NON-ISOLATED EQUIPMENT OR STRUCTURE. "ISOLATED DUCTS OR PIPES" INCLUDE THE ISOLATED PORTIONS OF THEIR SUPPORTS OR HANGERS.
2. FULL HEIGHT WALL PENTRATIONS: ISOLATE ALL DUCTWORK AND PIPEWORK (INCLUDING SPRINKLER SYSTEM) GREATER THAN 2" IN DIAMETER AT PENETRATIONS AS FOLLOWS:
   - A. PROVIDE A SHEET METAL (22 GAUGE) SLEEVE TO COVER THE ENTIRE PERIMETER OF A 1 INCH TO 1-1/2 INCH (1/2 INCH TO 3/4 INCH ON EACH SIDE) OVERSIZED PENETRATION CUT. PENETRATION OPENINGS THAT ARE FRAMED ON ALL SIDES OF THE PARTITION DO NOT REQUIRE THE STRUCTURAL SLEEVE. OVERSIZE FRAMING PENETRATION AS CALLED FOR OPENINGS WITH SLEEVES.
   - B. PLASTER OR CAULK SLEEVE TO THE WALL, CEILING, OR FLOOR, TO ENSURE AN AIRTIGHT SEAL.
   - C. IF DUCTWORK OR PIPEWORK PENETRATES A DOUBLE WALL, USE A SEPARATE SLEEVE AT EACH SIDE OF THE WALL (ALLOW NO SLEEVE CONNECTION BETWEEN WALLS).
   - D. PACK THE GAP BETWEEN THE PENETRATING DUCT OR PIPE AND THE SLEEVE WITH ACOUSTICAL INSULATION AND SEAL AIRTIGHT ON BOTH SIDES OF THE WALL, FLOOR, OR CEILING WITH AN OUTER LAYER OF ACOUSTICAL SEALANT.
   - E. DO NOT USE WALL, FLOOR, OR CEILING PENETRATIONS TO SUPPORT PIPEWORK OR DUCTWORK. SUPPORT PIPE OR DUCT JUST PRIOR TO AND JUST AFTER THE PENETRATION, SO THAT THE PIPE OR DUCT IS CENTERED IN PENETRATION
   - F. USE THE ABOVE PENETRATION TREATMENT REGARDLESS OF THE EXISTENCE OF EXTERNAL DUCT OR PIPE INSULATION. SIZE PENETRATION LARGE ENOUGH TO PACK ADDITIONAL ACOUSTICAL INSULATION AND APPLY ACOUSTICAL SEALANT BETWEEN THE EXTERNAL INSULATION AND THE SHEET METAL SLEEVE.
   - G. NO FLEX DUCT ALLOWED AT WALL PENETRATIONS.
   - H. ACOUSTICAL SEALANT SHALL MEET THE FOLLOWING REQUIREMENTS:
     - I. SEALANT SHALL BE A NON-HARDENING, NON-BLEEDING, NON-DRYING, RESILIENT CAULK.
     - II. SEALANTS SHALL MEET LEED INDOOR ENVIRONMENTAL QUALITY (EQ) CREDIT 4.1 REQUIREMENTS FOR ARCHITECTURAL SEALANTS (VOC LIMIT OF 250 G/L LESS WATER.
     - III. ACCEPTABLE PRODUCTS - CONCEALED FIRE RATED ACOUSTICAL SEALANTS CP 604 SELF-LEVELING FIRESTOP SEALANT BY HILTI OR FIRE BARRIER WATER TIGHT SEALANT 1003 SL (SELF-LEVELING) BY 3M VIBRATION CONTROL
     - IV. ACCEPTABLE PRODUCTS - CONCEALED ACOUSTICAL SEALANT 790 SILICONE BUILDING SEALANT BY DOW CORNING
3. FULL HEIGHT WALPENTRATIONS: ISOLATE ALL DUCTWORK AND PIPEWORK (INCLUDING SPRINKLER SYSTEM) LESS THAN OR EQUAL TO 2" IN DIAMETER AT PENETRATIONS AS FOLLOWS:
   - A. OVERSIZE PENETRATION BY 3/8 INCH ON EACH SIDE.
   - B. SEAL GAP AIRTIGHT WITH ACOUSTICAL SEALANT.
   - C. DO NOT USE WALL, FLOOR, OR CEILING PENETRATIONS TO SUPPORT PIPEWORK OR DUCTWORK. SUPPORT PIPE OR DUCT JUST PRIOR TO AND JUST AFTER THE PENETRATION, SO THAT THE PIPE OR DUCT IS CENTERED IN PENETRATION.
   - D. USE THE ABOVE PENETRATION TREATMENT REGARDLESS OF THE EXISTENCE OF EXTERNAL DUCT OR PIPE INSULATION. SIZE PENETRATION LARGE ENOUGH TO APPLY ACOUSTICAL SEALANT BETWEEN THE EXTERNAL INSULATION AND THE PENETRATION
4. EQUIPMENT VIBRATION ISOLATION
   - A. SEE PROJECT EQUIPMENT TIEDOWN MATRIX AND SPECIFICATIONS FOR DETAILS.

HVAC AND PLUMBING SEISMIC RESTRAINT PER 2015 IBC & ASCE 7 & ERRATA

1. STRUCTURES WITH (IP) = 1.0: TABLE A, SPECIFIES THE MBP APPROVED SEISMIC BRACING REQUIREMENTS. [IMPORTANCE FACTOR (IP) AS DEFINED IN ASCE 7]
2. STRUCTURES WITH IP >1.0: ALL PROJECTS WITH IP >1.0 REQUIRE AN ENGINEERED DESIGN OF SEISMIC BRACING SYSTEMS FOR ALL MECHANICAL (M), ELECTRICAL (E), PLUMBING (P), SPRINKLER (S), FIRE ALARM (FA), AND SMOKE CONTROL (SC) SYSTEM COMPONENTS WHEN THE SYSTEM COMPONENT HAS BEEN ASSIGNED AN IP OF 1.5. THE COMPONENT IP SHALL BE TAKEN AS 1.5 IF ANY OF THE FOLLOWING CONDITIONS APPLY.
   - A. THE COMPONENT IS REQUIRED TO FUNCTION FOR LIFE-SAFETY PURPOSES AFTER AN EARTHQUAKE, INCLUDING FIRE PROTECTION SPRINKLER SYSTEMS.
   - B. THE COMPONENT CONTAINS HAZARDOUS MATERIALS.
   - C. THE COMPONENT IS IN OR ATTACHED TO AN OCCUPANCY CATEGORY IV STRUCTURE AND IT IS NEEDED FOR CONTINUE OPERATION OF THE FACILITY OR WHERE ITS FAILURE COULD IMPAIR THE CONTINUED OPERATION OF THE FACILITY.

TABLE – GUIDELINES FOR SYSTEM COMPONENT SEISMIC BRACING WHERE IP = 1.0

	DUCTS & PIPING	EQUIPMENT < 75#	75# < EQUIP ≤ 400#	EQUIP > 400# $^{(H)}$
MECHANICAL DUCTWORK	SMACNA $^{(I,K,M)}$ DETAILS/ SPACING	N.A.	N.A.	N.A.
GAS AND HYDRONIC PIPING	SMACNA $^{(I,L,M,O,P)}$ DETAILS/ SPACING	N.A.	N.A.	N.A.
M, E, P EQUIP MOUNTED ≤ 4' ABOVE THE FLOOR/ROOF & MOUNTED WITH FLEXIBLE CONNECTIONS $^{(A,B,C)}$	N.A.	NO REQUIREMENT	NO REQUIREMENT	ENGINEERING FOR GRAVITY AND LATERAL SUPPORT $^{(D,E,G)}$ (PLAN REVIEW REQUIRED)
M, E, P EQUIP MOUNTED > 4' ABOVE THE FLOOR/ROOF $^{(A,C)}$	N.A.	NO REQUIREMENT	ENGINEERING FOR GRAVITY AND LATERAL SUPPORT $^{(D,E,G)}$ (FIELD APPROVE)	ENGINEERING FOR GRAVITY AND LATERAL SUPPORT $^{(D,E,G)}$ (PLAN REVIEW REQUIRED)
M, E, P EQUIP < 20# MOUNTED WITH FLEXIBLE CONNECTIONS $^{(B,C)}$	N.A.	N.A.	N.A.	N.A.
M, E, P EQUIP > 20# MOUNTED WITH FLEXIBLE CONNECTIONS $^{(B,C)}$	N.A.	ENGINEERING FOR GRAVITY AND LATERAL SUPPORT BRACED WITH DUCT/PIPING SYSTEM$^{(D,E,G)}$ (FIELD APPROVE)	ENGINEERING FOR GRAVITY AND LATERAL SUPPORT BRACED INDEPENDENT OF DUCT/PIPING SYSTEM $^{(D,E,G)}$ (FIELD APPROVE)	ENGINEERING FOR GRAVITY AND LATERAL SUPPORT BRACED INDEPENDENT OF DUCT/PIPING SYSTEM $^{(D,E,G)}$ (PLAN REVIEW REQUIRED)
M, E, P EQUIP MOUNTED FROM A WALL OR SUSPENDED FROM STRUCTURE $^{(F)}$	N.A.	N.A.	ENGINEERING FOR GRAVITY AND LATERAL SUPPORT (FIELD APPROVE)	ENGINEERING FOR GRAVITY AND LATERAL SUPPORT (PLAN REVIEW REQUIRED)
PLUMBING PIPING (DRAIN, WASTE, & VENT)	PER UPC	N.A.	N.A.	N.A.

- **A.** 4' DIMENSION MEASURED FROM THE FLOOR TO THE MOUNTING POINT LOCATION.
- **B.** MECHANICAL, ELECTRICAL AND PLUMBING COMPONENTS WITH FLEXIBLE CONNECTIONS INSTALLED BETWEEN THE COMPONENTS AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.
- **C.** WATER TANK RESTRAINTS REQUIRED PER UPC SECTION 508.2.
- **D.** ENGINEERING FOR GRAVITY NOT REQUIRED WHEN MOUNTED AT SLAB ON GRADE.
- **E.** ENGINEERING FOR LATERAL NOT REQUIRED WHEN THE HEIGHT/WIDTH RATIO IS ≤ 1.0 (IN ALL HORIZONTAL DIRECTIONS) UNLESS SUSPENDED.
- **F.** ENGINEERING SHALL ADDRESS THE BRACING SYSTEM, THE POINT(S) OF ATTACHMENT AND THE CAPACITY OF THE BUILDING ELEMENT OR STRUCTURE SUPPORTING THE ATTACHMENT AND BRACING SYSTEM.
- **G.** ROOFTOP EQUIPMENT: CHANGE OUT WEIGHT LIKE FOR LIKE, NO ENGINEERING REQUIRED. NEW UNITS WITH WEIGHT EXCEEDING 5% OF ORIGINAL, ENGINEERING REQUIRED FOR GRAVITY (IBC SECTION 3403.2).
- **H.** WATER HEATERS ≥ 60 GALLONS WILL FALL UNDER THIS CATEGORY.
- **I.** SMACNA RESTRAINT MANUAL "GUIDELINES FOR MECHANICAL SYSTEMS": 2ND ED. FEB. 1998, 2009 UNIFORM PLUMBING CODE TABLE 3-2.
- **J.** SEISMIC BRACING FOR FIRE PROTECTION SPRINKLER SYSTEMS IN SEISMIC DESIGN CATEGORY D-F DESIGNED PER NFPA 13 AS SPECIFIED IN ASCE 7 SECTION 13.6.6.3.
- **K.** SEISMIC BRACES ARE NOT REQUIRED ON DUCTWORK FABRICATED AND INSTALLED PER ACCEPTED STANDARD AND, FOR THE ENTIRE RUN OF DUCT WHEN:
  - THE HANGERS ARE 12 IN. OR LESS IN LENGTH FROM THE TOP OF DUCT TO THE SUPPORTING STRUCTURE DETAILED TO AVOID BENDING OF THE HANGERS OR THEIR CONNECTIONS
  - THE CROSS-SECTIONAL AREA IS LESS THAN 6 SQUARE FEET.
- **L.** SEISMIC BRACES ARE NOT REQUIRED ON PIPING WHEN:
  - THE PIPING IS SUPPORTED BY ROD HANGERS AND THE HANGERS IN THE ENTIRE RUN ARE 12" OR LESS IN LENGTH FROM THE TOP OF THE PIPE TO THE SUPPORTING STRUCTURE, HANGERS ARE DETAILED TO AVOID BENDING OF THE HANGERS, AND THEIR ATTACHMENTS AND PROVISIONS ARE MADE FOR PIPING TO ACCOMMODATE EXPECTED DEFLECTIONS.

  SEISMIC BRACING FOR FIRE PROTECTION SPRINKLER SYSTEMS IN SEISMIC DESIGN CATEGORY D-F DESIGNED PER NFPA 13 AS SPECIFIED IN ASCE 7 SECTION 13.6.6.3.
- **M.** SEISMIC BRACES ARE NOT REQUIRED FOR DISTRUBITION SYSTEMS WEIGHLING LESS THAN 5#/LF.
- **O.** SEISMIC BRACING IS NOT REQUIRED IF HIGH-DEFORMABILITY PIPING IS USED, PROVISIONS ARE MADE TO AVOID IMPACT WITH LARGER PIPING OR MECHANICAL COMPONENTS OR TO PROTECT THE PIPING IN THE EVENT OF SUCH IMPACT, AND:
  - FOR SEISMIC DESIGN CATEGORY D, E OR F WHEN IP=1.0 AND THE PIPING IS NOMINAL PIPE SIZE 3" OR SMALLER.
  - FOR SEISMIC DESIGN CATEGORY D, E OR F WHEN IP=1.5 AND THE PIPING IS NOMINAL PIPE SIZE 1" OR SMALLER.

  HIGH-DEFORMABILITY PIPING INCLUDES WELDED STEEL, BRAZED, SOLDERED, THREADED, OR GROOVED COUPLING COPPER.
- **P.** PER ASCE 7, PIPING MOUNTED ON TRAPEZE SUPPORTS DOES NOT NEED TO BE DESIGNED FOR SEISMIC LOADS OR DISPLACEMENTS IF NO SINGLE PIPE EXCEEDS THE 5#/LF SIZE LIMIT AND THE TOTAL WEIGHT OF THE SYSTEM DOES NOT EXCEED 10#/FT.

RESOURCE DOCUMENT 1:
- http://www.mybuildingpermit.com/Constuction%20Tip%20Sheets/MBP%20Seismic%20bracing.pdf

RESOURCE DOCUMENT 2:
- 2015 SBC

PROJECT COMPLETION REQUIREMENTS

1. THE BELOW PROJECT COMPLETION REQUIREMENTS ARE PER 2015 WASHINGTON STATE ENERGY CODE. SECTION NUMBER INDICATE THE APPROPRIATE ENERGY CODE SECTION. MECHANICAL CONTRACTOR TO COMPLY WITH ALL REQUIREMENTS BELOW INCLUDING PROVIDING ALL REQUIRED PROJECT COMPLETION DOCUMENTATION.
2. MECHANICAL CONTRACTOR AND/OR PLUMBING CONTRACTOR TO APPLY FOR AND SECURE ALL REQUIRED PERMITS, INCLUDING BUT NOT LIMITED TO, PRESSURE VESSEL, GAS PIPING, REFRIGERANT PIPING, PLUMBING, AND LOW VOLTAGE WIRING FOR THEIR ASSOCIATED SCOPE OF WORK.
3. COMMISSIONING, TEST AND BALANCE OF HVAC AND PLUMBING SYSTEMS
   - A. OWNER WILL PERFORM ALL COMMISSIONING ACTIVITES AND IS REQUIRED TO MEET THE CCP QUALIFICATIONS OF C408.1.
   - B. THE COMMISSIONING AGENT WILL PROVIDE THE WRITTEN FUNCTIONAL TESTS FOR REVIEW BY THE ENGINEER OF RECORD. THE ENGINEER OF RECORD WILL PROVIDE COMMENTS TO BE INCORPORATED BY THE CONTRACTOR.
   - C. CONTRACTORS WILL BE RESPONSIBLE FOR EXECUTING PREFUNCTIONAL TESTING OF EQUIPMENT PER THE REVIEWED TESTS. THE CONTRACTORS WILL CORRECT DEFICIENCIES PRIOR TO FINAL FUNCTIONAL TESTING.
   - D. THE ENGINEER OF RECORD WILL BE NOTIFIED AND MAY SELECT TO BE PRESENT WHEN THE THE CONTRACTOR EXECUTES FINAL FUNCTIONAL TESTING.
   - E. INSTALLING CONTRACTORS WILL PROVIDE EQUIPMENT, MATERIALS, AND LABOR NECESSARY TO CORRECT DEFICIENCIES FOUND DURING THE COMMISSIONING PROCESS TO FULFILL CONTRACT AND WARRANTY REQUIREMENTS.
   - F. THE CONTRACTOR WILL BE EXPECTED TO FULLY PARTICIPATE IN ALL COMMISSIONING MEETINGS AND EXECUTE WORK, START, TEST, BALANCE, FUNCTIONAL TESTING, DEFICIENCY CORRECTIONS, ETC. PER THE AGREED UPON PROJECT SCHEDULES. THERE WILL BE NO CHANGE ORDERS ACCEPTED FOR THE CONTRACTOR'S FULLY CODE COMPLIANT COMMISSIONING EXECUTION.
   - G. SEE 2015 SEC FOR ALL REQUIREMENTS.
   - H. IN ADDITION TO THE REQUIREMENTS OF C408 AND CHAPTER 5 OF THE 2015 SEC, AT A MINIMUM THE SYSTEMS LISTED IN THE BMS DESCRIPTION OF OPERATIONS SHALL BE COMMISSIONED.

LEED

1. THE PROJECT WILL BE LEED CERTIFIED UNDER LEED 2009 V3 CI.
2. LEED CHARRETTE HAS TAKEN PLACE BELOW ARE REQUIREMENTS FOR MEP LEED CREDITS BEING PURSUED.
3. MEP LEED CI CREDITS ANTICIPATED TO BE PURSUED:
   - A. WE PREREQ 1 WATER USE REDUCTION
   - B. WE CR1 WATER USE REDUCTION
   - C. EA PREREQ 1 FUNDAMENTAL COMMISSIONING OF BUILDING SYSTEMS
   - D. EA PREREQ 2 MINIMUM ENERGY PERFORMANCE
   - E. EA PREREQ 3 FUNDAMENTAL REFRIGERANT MANAGEMENT
   - F. EA CR1.1 OPTIMIZE ENERGY PERFORMANCE, LIGHTING POWER (LIGHTING)
   - G. EA CR1.3 OPTIMIZE ENERGY PERFORMANCE, HVAC
   - H. EA CR1.4 OPTIMIZE ENERGY PERFORMANCE, EQUIPMENT AND APPLIANCES
   - I. EA CR 2 ENHANCED COMMISSIONING
   - J. EA CR3 MEASUREMENT & VERIFICATION (PENDING)
   - K. EA CR4 GREEN POWER
   - L. IEQ PREREQ 1 MINIMUM INDOOR AIR QUALITY PERFORMANCE
   - M. IEQ PREREQ 2 ENVIRONMENTAL TOBACCO SMOKE
   - N. IEQ CR3.1 OUTDOOR AIR DELIVERY MONITORING (PENDING)
   - O. IEQ CR3.2 CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT PLAN: DURING CONSTRUCTION
   - P. IEQ CR4 CONSTRUCTION INDOOR AIR QUALITY MANAGEMENT PLAN: BEFORE OCCUPANCY
   - Q. IEQ CR5 INDOOR CHEMICAL AND POLLUTANT SOURCE CONTROL (MERV 13 FILTERS)
   - R. IEQ CR7.1 THERMAL COMFORT: DESIGN

2015 SEATTLE ENERGY CODE C409.1 ENERGY METERING AND ENERGY CONSUMPTION MANAGEMENT

1. SEC C409.1 GENERAL. BUILDINGS WITH A GROSS CONDITIONED FLOOR AREA OVER 20,000 SQUARE FEET SHALL COMPLY WITH SECTION C409. BUILDINGS SHALL BE EQUIPPED TO MEASURE, MONITOR, RECORD AND DISPLAY ENERGY CONSUMPTION DATA FOR EACH ENERGY SOURCE AND END USE CATEGORY PER THE PROVISIONS OF THIS SECTION, TO ENABLE EFFECTIVE ENERGY MANAGEMENT.
2. THE HOUSE HVAC, DOMESTIC WATER HEATING, LIGHTING, AND PLUG LOADS END USES WILL BE SEPARATELY METERED FOR ELECTRICAL ENERGY CONSUMPTION PER THE SEC.
3. C409.3.1 HVAC SYSTEM ENERGY USE. EXCEPTIONS: ALL 120 VOLT EQUIPMENT, 208/120 VOLT EQUIPMENT IN A BUILDING WHERE THE MAIN SERVICE IS 480/277 VOLT POWER, AND ELECTRICAL ENERGY FED THROUGH VARIABLE FREQUENCY DRIVES THAT ARE CONNECTED TO THE ENERGY METERING DATA ACQUISITION CENTER.
   - A. C409.3.2 WATER HEATING ENERGY USE.
   - B. C409.3.3 LIGHTING SYSTEM ENERGY USE.
   - C. C409.3.4 PLUG LOAD SYSTEM ENERGY USE.
4. C409.3.5 PROCESS LOAD SYSTEM ENERGY USE. METERS SHALLCOLLECT DATA FOR ENERGY USED BY ANY NONBUILDING PROCESS LOAD, INCLUDING BUT NOT LIMITED TO NONRESIDENTIAL REFRIGERATION AND COOKING EQUIPMENT, LAUNDRY EQUIPMENT, INDUSTRIAL EQUIPMENT AND STAGE LIGHTING. PROCESS LOAD ENERGY USE LESS THAN 50 KVA DOES NOT REQUIRE END-USE METERING.
5. THE EC SHALL PROVIDE ELECTRICAL METERS AS REQUIRED TO ACCOMPLISH THE END-USE METERING REQUIREMENT. THE METER OUTPUT DATA WILL BE ACQUIRED BY THE BMS PROVIDED BY THE MC.
6. EC TO PROVIDE AND INSTALL ALL REQUIRED ELECTRICAL METERS THAT WILL PROVIDE INFORMATION TO THE BMS. THE CC WILL CONNECT ALL METERS TO THE DDC CONTROLLERS. THE BMS WILL STORE DATA FROM ALL ELECTRICAL METERS FOR 36 MONTHS. THE DATA ACQUISITION SYSTEM SHALL PROVIDE REAL-TIME ENERGY CONSUMPTION DATA AS WELL AS LOGGED DATA FOR ANY HOUR, DAY, MONTH OR YEAR PER C409.4.2. THE INFORMATION SHALL BE DISPLAYED ON A BUILDING MANAGEMENT COMPUTER PROVIDED BY THE MC FOR THE BMS, AND IS REQUIRED TO DISPLAY CURRENT ENERGY CONSUMPTION FOR WHOLE BUILDING ENERGY, PLUS EACH END USE CATEGORY, AS WELL AS THE AVERAGE AND PEAK VALUES FOR ANY DAY, WEEK, OR YEAR.
   THE CENTRAL BOILERS' NATURAL GAS CONSUMPTION WILL BE MONITORED BY A PULSE OUTPUT GAS METER FURNISHED AND INSTALLED BY THE PC. GAS METER OUTPUT WILL BE MONITORED BY THE BMS PROVIDED BY THE MC.

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MUSEUM

Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Submittal
Construction Documents

Revisions
No. Date Description

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Sheet Title
COORDINATION NOTES

Sheet Number
M001

HVAC PIPING MATERIALS SPECIFICATION MATRIX

SERVICE ID	SERVICE DESCRIPTION	OPERATING PRESSURE RANGE (PSIG)	DESIGN PRESSURE (PSIG)	DESIGN TEMPERATURE (DEG F)	SIZE	MATERIAL	JOINT TYPE	LOCATION FOR USE	INSULATION (SEE PIPING INSULATION MATRIX)	REMARKS
HYDRONIC PIPING										
CHWS / CHWR	CHILLED WATER SUPPLY / RETURN	< 125 PSIG	150	40 - 80 °F	2" AND SMALLER	COPPER TUBE TYPE L	SOLDERED, PROPRESS MECHANICAL JOINTS	SEE SPECIFICATIONS	YES	1, 2
CHWS / CHWR	CHILLED WATER SUPPLY / RETURN	< 125 PSIG	150	40 - 80 °F	2-1/2" AND LARGER	CARBON STEEL SCH 40 A53B ERW	150# WELDNECK FLANGE, BUTTWELD, OR GROOVED	SEE SPECIFICATIONS	YES	1
HWS / HWR	HEATING WATER SUPPLY / RETURN	< 125 PSIG	150	75 - 160 °F	2" AND SMALLER	COPPER TUBE TYPE L	SOLDERED, PROPRESS MECHANICAL JOINTS	SEE SPECIFICATIONS	YES	1, 2
HWS / HWR	HEATING WATER SUPPLY / RETURN	< 125 PSIG	150	75 - 160 °F	2-1/2" AND LARGER	CARBON STEEL SCH 40 A53B ERW	150# WELDNECK FLANGE, BUTTWELD, OR GROOVED	SEE SPECIFICATIONS	YES	1
MISC. HVAC PIPING										
GEN EXH	GENERATOR EXHAUST		150		ALL	CARBON STEEL PIPE A53B ERW 2-1/2" TO 10" - SCH 40 12" - SCH 40S 14" TO 16" - SCH 30	BUTTWELD	-	YES	1
HUMIDIFIER STEAM	LOW PRESSURE STEAM PIPING BETWEEN HUMIDIFIER AND DISPERSION TUBE	< 5 PSIG	< 5 PSIG	180 - 212 °F	2-1/2" AND SMALLER	COPPER TUBE TYPE L, WHERE LESS THAN 10 FT AND AS INDICATED IN HUMIDIFER SCHEDULE HOSES BY FACTORY	SOLDERED, PROPRESS MECHANICAL JOINTS		YES	1
REFRIGERATION PIPING - PER UW FDI PIPE CODE P-7										
RS	REFRIGERATION SUCTION LINE	-	-	-	ALL	ACR COPPER TUBE - HARD DRAWN (RIGID) OR ANNEALED PER ASTM B280 AND B281	BRAZED	-	YES	1
RL	REFRIGERATION LIQUID LINE	-	-	-	ALL	ACR COPPER TUBE - HARD DRAWN (RIGID) OR ANNEALED PER ASTM B280 AND B281	BRAZED	-	YES	1
RS, RL, RRV	REFRIGERATION (EXPOSED PIPING INSTALLATION)	-	-	-	ALL	COPPER TUBING, TYPE L HARD DRAWN	BRAZED	-	YES	1
FUEL OIL PIPING (DIESEL)										
FUEL OIL	FUEL OIL FILL AND VENT		125	N/A	2" AND SMALLER	CARBON STEEL PIPE SCH 40 ASTM A-53	BUTTWELD	-		1

REMARKS:
1. THERMAL EXPANSION DESIGN AND SIZING FOR PIPING BY M.C.
2. TEE DRILLING ACCEPTABLE AS LONG AS IT IS PERFORMED PER MANUFACTURER SPECIFICATIONS AND INSTALLATION PROCEDURES USING MANUFACTURER CERTIFIED TOOLS.

HVAC DUCT MATERIALS SPECIFICATION MATRIX

DUCT SYSTEM OR SECTION	SMACNA PRESSURE CLASS	MATERIALS	FITTINGS	INSULATION	REMARKS
GENERAL EXHAUST SYSTEMS					
GENERAL EXHAUST DUCTWORK	SMACNA -2" PRESSURE SEAL ALL TRANSVERSE JOINTS, LONGITUDINAL SEAMS, BRANCH CONNECTIONS OVAL AND SPIRAL LOCK SEAMS DO NOT REQUIRE SEALING	UNLINED GALVANIZED DUCT FLEX: 4' MAX LENGTH, THERMAFLEX S-LP-10 OR APPROVED EQUAL. LISTED CLASS I AIR CONNECTOR UL 181 LISTED	MITERED 90S WITH VANES, SPIN-IN BRANCHES OK.	NA	
EXHAUST DUCTWORK ON FN-R-1	SMACNA -2" PRESSURE SEAL ALL TRANSVERSE JOINTS, LONGITUDINAL SEAMS, BRANCH CONNECTIONS OVAL AND SPIRAL LOCK SEAMS DO NOT REQUIRE SEALING	1" LINED DUCTWORK FIRST 25 FT UPSTREAM OF FAN, ALL ELSE UNLINED GALVANIZED DUCT AS INDICATED LISTED CLASS I AIR CONNECTOR UL 181 LISTED	MITERED 90S WITH VANES.	NA	
HVAC SUPPLY, MEDIUM PRESSURE					
AIR HANDLING UNIT TO VAV INLET ROUND	- UPSTREAM OF SHAFT S&F DAMPERS: SMACNA +4" PRESSURE. - DOWNSTREAM OF SHAFT S&F DAMPERS: SMACNA +3" PRESSURE - SEAL ALL TRANSVERSE JOINTS, LONGITUDINAL SEAMS, BRANCH CONNECTIONS, ETC. OVAL AND SPRIRAL LOCK SEAMS DO NOT REQUIRE SEALING. - FLEX CONNECTIONS TO DUCTS AND BOX COLLARS WILL BE SEALED.	- UNLINED GALVANIZED RECTANGULAR, ROUND, OR FLAT OVAL ONLY. - FLEX: 3 FT. MAX. LENGTH WITH NO OFFSETS, THERMAFLEX MKE OR EQUAL.	ELBOWS: CENTERLINE RADIUS OF 1.5Ø OR MITERED 90s WITH VANES. CL RADIUS OF 1.0Ø ON DUCTS LARGER THAN 24". TAPS: CONICAL OR BOOT STYLE	R-3.3 (INSTALLED) INSULATION WITH VAPOR BARRIER (APPROX 1")	
HVAC SUPPLY, LOW PRESSURE					
EQUIPMENT OUTLET TO DIFFUSER	- SMACNA +1" PRESSURE - SEAL ALL TRANSVERSE JOINTS, LONGITUDINAL SEAMS, BRANCH CONNECTIONS, ETC. OVAL AND SPRIRAL LOCK SEAMS DO NOT REQUIRE SEALING.	- UNLINED GALVANIZED DUCT - FLEX: 8' MAX. LENGTH, THERMAFLEX GKM OR EQUAL.	CENTERLINE RADIUS OF 1.0 DIAMETER OR MITERED 90s WITH VANES. SPIN-IN BRANCHES OK	R-3.3 (INSTALLED) INSULATION WITH VAPOR BARRIER (APPROX 1")	
OUTSIDE AIR DUCTWORK					
HVAC OA INTAKE LOUVER CAN/PLENUMS UPSTREAM OF MOTORIZED DAMPER	- SMACNA -2" PRESSURE - SEAL ALL TRANSVERSE JOINTS, LONGITUDINAL SEAMS, BRANCH CONNECTIONS, ETC. OVAL AND SPRIRAL LOCK SEAMS DO NOT REQUIRE SEALING.	- UNLINED GALVANIZED DUCT.	1.0 DIAMETER CENTERLINE RADIUS OR MITERED 90s WITH VANES	- R-7 (INSTALLED) INSULATION WITH VAPOR BARRIER (3")	
BOILER COMBUSTION AIR SUPPLY AND FLUE EXHAUST					
BOILER OUTSIDE AIR COMBUSTION AIR INTAKE	- SMACNA -2" PRESSURE - SEAL ALL TRANSVERSE JOINTS, LONGITUDINAL SEAMS, BRANCH CONNECTIONS, ETC. OVAL AND SPRIRAL LOCK SEAMS DO NOT REQUIRE SEALING.	UNLINED GALVANIZED DUCT	1.0 DIAMETER CENTERLINE RADIUS OR MITERED 90s WITH VANES	INSULATE WITH R-7 (INSTALLED) INSULATION WITH VAPOR BARRIER (~3" THICK)	
BOILER FLUE EXHAUST	FAN INLET: SMACNA -1" PRESSURE FAN OUTLET: SMACNA +2" PRESSURE SEAL ALL TRANSVERSE JOINTS, LONGITUDINAL SEAMS, BRANCH CONNECTIONS	ALL VENT MATERIALS INSTALLED PER FIREPLACE APPLIANCE MANUFACTURER REQUIREMENTS AND INSTALLATION DETAILS. FAN INLET: NEGATIVE PRESSURE, CATEGORY I VENT MATERIAL: AL29-4C FAN OUTLET: POSITIVE PRESSURE, CATEGORY III (NON-CONDENSING) VENT MATERIAL: SCHEBLER CHIMNEY SERIES PA (20 GA. 304 SS INNER PIPE, 1" AIR SPACE, 22 GA. ALUMINIZED STEEL OUTER SHELL) BOILER MANUFACTURER APPROVAL IS REQUIRED.	FAN INLET: LISTED B-VENT FITTINGS, DURAVENT B-VENT OR EQUAL FAN OUTLET: LISTED CATEGORY III FITTINGS, SCHEBLER CHIMNEY SERIES PA OR EQUAL	NA	

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SAM ASIAN ART MUSEUM

Submittal

Revisions

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1	9/1/17	PERMIT CORRECTIONS 1

Sheet Title

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Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect / Seattle, WA 98112

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MECHANICAL SPECIFICATIONS

M002

ISOLATION & TIEDOWN SCHEDULE - EQUIPMENT, PIPING, & DUCTWORK

TAG#	EQUIPMENT TYPE	GENERIC EQUIPMENT TYPE DESCRIPTION	ACCESSED FROM LEVEL	SUPPORTED FROM LEVEL	MOUNTING LOCATION	ATTACHMENT TYPE (REMARK 4)	EXTERNAL ISOLATION DESCRIPTION	EXTERNAL ISOLATION TYPE (REMARK 5)	INTERNAL ISOLATION TYPE (REMARK 12)	INERTIA BASE BY (REMARK 5)	CONCRETE FOR INERTIA BASE	DUCT FLEX CONNECTION REQUIRED (BY MC)	PIPING FLEX CONNECTION TYPE (REMARK 10)	SUPPORT TYPE (REMARK 7)	SEISMIC TIEDOWN CALCULATIONS BY (REMARKS 1,2,3,4)	REMARKS
AHU-L1-1,2,3	AIR HANDLING UNIT	CHW/HW AHU	L1	L1	FLOOR	BY MC	WAFFLE PAD	A	1" DEF. SPRING	NA	NA	YES	B	A	BY MC	1,2,4,5,7,11,12
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
AWHP-R-X	AIR TO WATER HP	HEATPUMP	ROOFTOP	ROOFTOP	ROOF	BY MC	SYLOMER PAD	I	-	NA	NA	NA	A	E	BY MC	1,2,4,5,11,12
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WWHP-X-X	WATER TO WATER HP	HEATPUMP	BASEMENT	BASEMENT	FLOOR	BY PC	1" DEF. SPRING	B	-	NA	NA	NA	B	B	BY MC	1,2,4,5,11,12
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
HU-X-X	HUMIDIFIER	HUMIDIFIER	SEE PLANS	SEE PLANS	WALL	BY MC	NA	NA	NA	NA	NA	NA	NA	NA	BY MC	1,2,4,5
HU-X-X	HUMIDIFIER	HUMIDIFIER	SEE PLANS	SEE PLANS	FLOOR PEDESTAL	BY MC	NA	NA	NA	NA	NA	NA	NA	F	BY MC	1,2,4,5,7
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
CU-X-X	CONDENSING UNIT	HEAT PUMP CU - FLOOR	SEE PLANS	SEE PLANS	PARKING/ROOF	BY MC	DOUBLE DEFLECTION NEOPRENE MOUNTS WITH .3" STATIC DEFLECTION	D	NA	NA	NA	NA	NA	NA	BY MC	1,2,4,5,9
DXFC-X-X	FAN COIL UNIT	SPLIT SYSTEM HEAT PUMP FCU	SEE PLANS	SEE PLANS	WALL	BY MC	NA	NA	NA	NA	NA	NA	NA	NA	BY MC	1,2,4,5
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
VAV	VAV BOX	SINGLE DUCT	SEE PLANS	SEE PLANS	HUNG	BY MC	NEOPRENE	E	NA	NA	NA	INLET	C	NA	BY MC	1,2,5,11
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
B-R-X	BOILER	BOILER	BASEMENT	BASEMENT	FLOOR	BY MC	0.3" DEF. NEOPRENE	D	NA	NA	NA	NA	B	B	BY MC	1,2,3,4,5,11
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
XXWP-X-X	PUMP	END SUCTION	-	-	FLOOR	BY MC	2" DEF. SPRING	F	NA	F, BY MC	BY MC	NA	B	B	BY MC	1,2,4,5,11
HWIP-X-X	PUMP	INLINE	-	-	HUNG	BY MC	1" DEF. SPRING	C	NA	NA	NA	NA	A	NA	BY MC	1,2,4,5,11,12
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ET-	EXPANSION TANK	-	-	-	FLOOR	BY MC	WAFFLE PAD	A	NA	NA	NA	NA	NA	B	BY MC	1,2,4,5,11
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
FN-X-X	FAN - HUNG	MOTOR = 0.5 HP OR SMALLER	SEE PLANS	SEE PLANS	HUNG	BY MC	NEOPRENE	E	NA	NA	NA	YES	NA	NA	BY MC	1,2,4,5,8,11
FN-X-X	FAN - HUNG	MOTOR = 0.75 HP OR LARGER	SEE PLANS	SEE PLANS	HUNG	BY MC	1" DEF. SPRING	C	NA	NA	NA	YES	NA	NA	BY MC	1,2,4,5,8,11
FN-R-1,2	FAN - HUNG	ROOF INLINE FAN	ROOFTOP	ROOFTOP	ROOF	BY MC	1" DEF. SPRING	G	NA	NA	NA	YES	NA	NA	BY MC	1,2,4,5,8,11
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
DUCTWORK	DUCTWORK - HUNG	ALL DUCTWORK WITHIN 5' OF AHU'S	SEE PLANS	SEE PLANS	HUNG	BY MC	1" DEF. SPRING	C	NA	NA	NA	NA	NA		BY MC	1,2,4,5,11
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
PIPING	FLOOR	PIPING 2" OR LARGER	SEE PLANS	SEE PLANS	HUNG	BY MC	1" DEF. SPRING	H	NA	NA	NA	NA	NA	NA	BY MC/PC	1,2,4,5,11
PIPING	FLOOR	PIPING LESS THAN 2"	SEE PLANS	SEE PLANS	HUNG	BY MC	NEOPRENE	H	NA	NA	NA	NA	NA	NA	BY MC/PC	1,2,4,5,11
PIPING	HUNG	PIPING 2" OR LARGER	SEE PLANS	SEE PLANS	HUNG	BY MC	NEOPRENE	C,H	NA	NA	NA	NA	NA	NA	BY MC/PC	1,2,4,5,11
PIPING	HUNG	PIPING LESS THAN 2"	SEE PLANS	SEE PLANS	HUNG	BY MC	NEOPRENE	D,H	NA	NA	NA	NA	NA	NA	BY MC/PC	1,2,4,5,11
-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

REMARKS:

1: SEE INDIVIDUAL EQUIPMENT SCHEDULES FOR UNIT SIZE AND WEIGHT. SEE MECHANICAL PLANVIEW DRAWINGS FOR EQUIPMENT LOCATIONS. SEE SPECIFICATION SECTION 230548 AND 230549 FOR ADDITIONAL REQUIREMENTS.

2: PROVIDE WASHINGTON STATE STAMPED SEISMIC TIEDOWN CALCULATIONS PER 2012 INTERNATIONAL BUILDING AND MECHANICAL CODES WITH SEATTLE AMENDMENTS AND SEATTLE DIRECTORS RULE 29-2005. ALL AREAS OF THE BUILDING ARE CONSIDERED CATEGORY III PER 2012 IBC WITH SEATTLE AMENDMENTS TABLE 1604.5 AND REQUIRE A SEISMIC FACTOR OF 1.0. ALL EQUIPMENT TO BE CONNECTED PER ASCE 7 AS REFERENCED BY SBC.

3: THE LIST OF EQUIPMENT BELOW IS A LIFE SAFETY COMPONENT AND REQUIRES AN IMPORTANCE (Ip) FACTOR = 1.5 FOR SEISMIC CALCULATIONS.
- A: HYDRONIC BOILER, & NATURAL GAS PIPING.

4: MC TO VERIFY WITH FIELD DETAILER AND/OR INSTALLER INSTALLATION DETAIL (TO VERIFY UNIT ATTACHMENT TYPE TO STRUCTURE) PRIOR TO ISOLATION VENDOR PERFORMING SEISMIC TIEDOWN CALCULATIONS AND PRIOR TO SEISMIC TIEDOWN PACKAGE BEING SUBMITTED FOR TEAM REVIEW. ALL TIEDOWN LOCATIONS AND DETAILS TO BE SUBMITTED TO AND APPROVED BY THE PROJECT STRUCTURAL ENGINEER. MC SHALL CONTRACT WITH THE STRUCTURAL ENGINEER FOR THIS SUPPORT WORK.

5: EXTERNAL ISOLATION BY MC/PC BASED ON EQUIPMENT TYPE. BASIS OF DESIGN FOR ISOLATOR PRODUCTS (MC MAY PROPOSE ON ALTERNATE MANUFACTURERS FOR TEAM REVIEW). ALL SPRINGS TO BE SEISMICALLY RESTRAINED:
- A: WAFFLE PAD - MASON M/N SUPER W WITH MINIMUM 0.15" STATIC DEFLECTION (NOTE: ALL EQUIPMENT MOUNTED ON WAFFLE PAD TO HAVE NEOPRENE WASHER GROMMETS AT TIEDOWN BOLTS)
- B: 1" OR 2" DEF SPRING - FLOOR MOUNTED - MASON M/N SLF OR SLR PER ACOUSTIC SPECIFICATIONS
- C: 1" OR 2" DEF SPRING - HUNG - MASON M/N 30N
- D: 0.15" OR 0.30" DEF NEOPRENE - FLOOR MOUNTED - MASON M/N ENGINEERED WAFFLE PAD
- E: NEOPRENE - HUNG - MASON M/N HD WITH MINIMUM 0.15" STATIC DEFLECTION
- F: PUMP INERTIA BASE WITH 2" SPRING - MASON M/N BMK (INERTIA BASE WEIGHT TO BE APPROXIMATELY TWO TIME THE EQUIPMENT WEIGHT)
- G: 1" OR 2" DEF SPRING - ROOF MOUNTED - MASON M/N SSLFH
- H: SEE ACOUSTICAL SPECIFICATION FOR DETAILS.
- I: SEE ACOUSTICAL SPECIFICATION FOR DETAILS. SYLOMER PAD, MODEL SYLODYN NB2S OR EQUAL (NOTE: ALL EQUIPMENT MOUNTED ON SYLOMER PAD TO HAVE NEOPRENE WASHER GROMMETS AT TIEDOWN BOLTS)

6: SUPPLY PLENUM SHIPS SEPARATE FROM EQUIPMENT, AND WILL BE REQUIRED TO BE FIELD MOUNTED AND SUPPORTED.

7: ALL LEVELING PADS AND CURBS TO BE STRUCTURALLY ATTACHED TO BUILDING CONCRETE SLAB BY OTHERS. DESIGN OF ATTACHMENT TO CONCRETE SLAB BY STRUCTURAL ENGINEER. MC TO COORDINATE FINAL SIZE AND LOCATION OF EQUIPMENT PADS IN FIELD SHOP DRAWINGS.
- A: NO CONCRETE HOUSEKEEPING PAD. FINAL FLOOR LEVELLING BY OTHERS, FLOOR SINK SIZES AND LOCATION TO BE COORDINATED BASED ON FINAL STATIC PRESSURE AND TRAP DEPTH REQUIREMENTS OF THE AHU.
- B: CONCRETE LEVELING PAD BY OTHERS, SEE PLANS FOR HEIGHT.
- C: CONCRETE LEVELING CURB BY OTHERS.
- D: WOOD LEVELING CURB BY OTHERS.
- E: STANCHION SUPPORT BY MC. MC TO COORDINATE STANCHION LOCATIONS IN FIELD SHOP DRAWINGS.
- F: STANCHION SUPPORT BY MC/PC. MC TO COORDINATE STANCHION LOCATIONS IN FIELD SHOP DRAWINGS.

8: FAN ISOLATION TO ALL FAN TYPES (RF, EF, TF, FN, ETC.)

9: UNIT TO SET ON SLEEPERS. SLEEPERS TO BE STRUCTURALLY ATTACHED TO BUILDING STRUCTURE BY OTHERS. DESIGN OF ATTACHMENT TO STRUCTURE BY STRUCTURAL ENGINEER.

10: PIPING FLEX CONNECTION BY MC. BASIS OF DESIGN FOR ISOLATOR PRODUCTS (MC MAY PROPOSE ON ALTERNATE MANUFACTURERS FOR TEAM REVIEW).
- A: NEOPRENE PIPE FLEXIBLE CONNECTIONS - SINGLE BELLOW - MASON M/N SFEJ (2" AND LARGER) OR MASON M/N SFU (AT 3/4" TO 2")
- B: VICTAULIC TYPE 77 - INTALL 3 FLEXIBLE COUPLING ARRANGMENT PER MANUFACTURER RECOMMENDATIONS
- C: BRAIDED STAINLESS STEEL HOSE - MASON M/N MN
- D: BRAIDED BRONZE HOSE - MASON M/N CPSB-NSF

11: REFER TO SPECIFICATION SECTION 23 05 48 AND 09 80 00 (WHEN PROVIDED) FOR ADDITIONAL VIBRATION ISOLATION REQUIREMENTS

12: INTERNAL ISOLATION BY EQUIPMENT MANUFACTURER

13: UNIT TO SET ON ROOFCURB (OR SPRING ROOFCURB) PROVIDED BY MC. MC TO TIEDOWN THE FACTORY ROOFCURB (OR SPRING ROOFCURB) TO THE WOODFRAMING AND COORDINATE THE INSTALLATION WITH GENERAL CONTACTOR. WOOD LEVELING CURB IS PROVIDED AND ATTACHED TO WOODFRAME STRUCTURE BY OTHERS. MC TO PROVIDE FINAL DETAIL OF ATTACHMENT AND SEISMIC TIEDOWN CALCULATIONS. MC TO PROVIDE SHEET METAL FLASHING AT ROOFCURB. (A)

14: PIPE AND DUCT WALL PENETRATIONS: SHEET METAL SLEEVE, CAULK, ACOUSTICAL INSULATION

HVAC PIPING INSULATION SCHEDULE

PIPING SYSTEM	TEMP RANGE	THERMAL CONDUCTIVITY	MEAN RATING TEMPERATURE	INSULATION MATERIAL	INSULATION THICKNESS BY PIPE SIZE					REMARKS
					1" AND LESS	1" TO <1-1/2"	1-1/2" TO <4"	4" TO <8"	OVER 8"	
HVAC PIPING SYSTEM INSULATION										
REFRIGERANT - ALL LINES	ALL	0.20-0.26	75	EPDM OR CLOSED CELL	0.5	1.0	1.0	1.0	1.5	1, 9
COOLING COIL CONDENSATE - METAL	<40	0.20-0.26	75	EPDM OR CLOSED CELL	0.5	1.0	1.0	1.0	1.5	
COOLING COIL CONDENSATE - NON-METAL	ALL	-	-	-	-	-	-	-	-	
HYDRONIC PIPING SYSTEMS										
CHILLED WATER	40-60	0.21-0.27	75	FIBERGLASS	0.5	0.5	1.0	1.0	1.5	1, 2, 3, 5, 6, 7, 8
HEATING HOT WATER	>350	0.32-0.34	250	FIBERGLASS	4.5	5.0	5.0	5.0	5.0	1, 2, 5, 6, 7, 8
HEATING HOT WATER	251-350	0.29-0.32	200	FIBERGLASS	3.0	4.0	4.5	4.5	4.5	1, 2, 5, 6, 7, 8
HUMIDIFIER STEAM PIPING	201-250	0.27-0.30	150	FIBERGLASS	2.5	2.5	2.5	3.0	3.0	1, 2, 5, 6, 7, 9
HEATING HOT WATER	141-200	0.25-0.29	125	FIBERGLASS	1.5	1.5	2.0	2.0	2.0	1, 2, 3, 5, 6, 7
HEATING HOT WATER	105-140	0.22-0.28	100	FIBERGLASS	1.0	1.0	1.5	1.5	1.5	1, 2, 3, 5, 6, 7
INSULATED SUPPORTS										
THERMAL SUPPORTS	ALL				TRYMER 2000 OR SNAPITZ	CAL-SIL OR SNAPITZ	CAL-SIL OR SNAPITZ	CAL-SIL OR SNAPITZ	CAL-SIL OR SNAPITZ	4, 5, 7, 8

REMARKS:

1: WASHINGTON STATE AND SEATTLE ENERGY CODE 2012 STANDARDS USED (TABLE C403.2.8).

2: ALL CHILLED WATER PIPING IS TO BE INSULATED INSIDE AND OUTSIDE BUILDING ENVELOPE UNLESS NOTED OTHERWISE. CHILLED WATER PIPING TO HAVE CONTINUOUS VAPOR BARRIER TO PREVENT CONDENSATION.

3: INSULATION REQUIRED BETWEEN THE CONTROL VALVE AND COIL ON ALL RUNOUTS FOR PERSONNEL PROTECTION. FOR HOT WATER PIPING INSULATION MAY BE OMITTED ON VALVES 1" AND SMALLER ON FINAL RUNNOUT TO HEATING COILS.

4: HOT WATER PIPES 2" AND SMALLER: NO RIGID INSERTS REQUIRED. INSULATION NOT CONTINUOUS THROUGH THE HANGER. NO SHEETMETAL SHIELD.

5: HOT AND COLD PIPES LARGER THAN 2": RIGID INSERTS. INSULATION CONTINUOUS THROUGH THE HANGER. SHEETMETAL SHIELD.

6: COLD PIPES 2" AND SMALLER: RIGID INSERTS. INSULATION CONTINUOUS THROUGH THE HANGER. SHEETMETAL SHIELD.

7: JACKETING: METAL JACKET (SEALED WEATHER TIGHT) WILL BE USED AT ALL EXTERIOR INSULATION EXPOSED TO WEATHER (I.E.ROOFTOP PIPING). PVC JACKET WITH RIGID RIGID CALCIUM SILICATE INSULATION WILL BE USED ON ALL HORIZONTAL PIPING AT OR NEAR THE FLOOR SUBJECT TO POTENTIAL FOOT TRAFFIC. PVC JACKET WILL BE UTILIZED ON ALL EXPOSED INSULATION WITHIN 6 FEET OF THE FLOOR ELEVATION (I.E. MECHANICAL ROOMS AND GARAGE HOSE BIBBS). PVC IS RECOMMENDED INSTEAD OF METAL IN EXPOSED AREAS DUE TO RESILIENCY (METAL JACKETS DENT).

8: CHILLED WATER PIPING TO USE VERTICAL INSULATED RISER CLAMPS AT FLOOR PENETRATIONS. PROVIDE PIPING TECH M/N E10x0 OR E20x0, NATIONAL PIPE HANGER CORP M/N NR10 OR NR20, OR APPROVED EQUAL.

9: MINIMUM INSULATION REQUIRED IS PER PER ENERGY CODE MINIMUM VALUES OR PER MANUFACTUER INSTALLATION INSTRUCTIONS, WHICHEVER IS GREATER. OUTDOOR PIPING WILL HAVE AN INTEGRAL WEATHER PROOF JACKET.

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SDCI Use Only

SAM ASIAN ART MUSEUM

Submittal

Revisions

No.	Date	Description
A	9/1/17	PERMIT CORRECTIONS 1

Sheet Title

Sheet Number

Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect / Seattle, WA 98112

Construction Documents

Drawn	DD/DG
Checked	JL/RSR
LMN Proj No	16028.01
Date	6/23/17

MECHANICAL SPECIFICATIONS

M003

PROJECT OVERVIEW

Project Address: 1400 E Prospect St

The intent of this project is to upgrade the Volunteer Park Asian Art Museum facility to a present day world class conservation environment consistent with the preservation of valuable art pieces while offering presentations in an artful and safe manner. Improvements planned will include structural upgrades, building envelope insulation and moisture barrier, heating, cooling, humidity control, air distribution and electrical infrastructure upgrades. HVAC and Plumbing equipment will be demolished and replaced with new energy efficient systems compatible with maintaining a quality environment consistent with art preservation requirements.

DIVISION 23 – HEATING, VENTILATION, AND AIR CONDITIONING

230505 – Basis of Design Narrative for HVAC
General: Section includes Basis of design and performance criteria for mechanical systems.

Product:

2015 Seattle Energy Code Compliance: Determination of Conformance Requirements.
- The renovation and addition project is classified as a substantial alteration.
- The building has Landmark status.
- A presubmittal conference is scheduled with Seattle DCI to determine the extent of compliance required based on the building's landmark status and the substantial alteration classification.
- 2015 SEC C501.6 Historic Buildings – The code official may modify the specific requirements of this code for landmarks and require in lieu thereof alternate requirements that the code official determines will not have an adverse effect on the designated historic features of the building and will result in a reasonable degree of energy efficiency.
- 2015 SEC C503.8 Substantial alterations or repairs. In addition to meeting the applicable requirements of this code, any building or structure to which substantial alterations or repairs are made shall comply with the requirements of this section. 2015 SEC C503.8 Exceptions: 1. Alterations and repairs to landmark buildings shall comply with this section to the extent that the code official determines that such compliance does not have an adverse effect on the designated historic features of the building. The energy use allowed by subsections 2, 3 or 4 of Section C503.8.3 is permitted to be increased in proportion to the additional energy use required for preservation of such designated features
- 2015 SEC C503.8.3 Energy Efficiency. Compliance pathway for Substantial Alteration portion of the building. Option 3. Total building performance within 10 percent of code. Demonstrate that the building energy consumption will be less than 10 percent higher than that of the standard reference design (SRD) using the Total Building Performance methodology in Section C407 of the Seattle Energy Code, as follows.
1. It shall comply with less than 97 percent of SRD, because no C406 options are included in the SRD.

2015 Seattle Energy Code Compliance C409 Metering:
- C409.1 General. Buildings with a gross conditioned floor area over 20,000 square feet shall comply with Section C409. Buildings shall be equipped to measure, monitor, record and display energy consumption data for each energy source and end use category per the provisions of this section, to enable effective energy management.
- The meter data procurement is by the BMS. The EC shall provide a single point of connection at each panel for connection to the BMS by the MC. The BMS will store data from all electrical meters for 36 months. The data acquisition system shall provide real-time energy consumption data as well as logged data for any hour, day, month or year per C409.4.2. The information shall be displayed on a building management computer provided by the MC for the BMS, and is required to display current energy consumption for whole building energy, plus each end use category, as well as the average and peak values for any day, week, or year.
- The PC will provide a gas meter for the gas fired HVAC Boiler plant. The data acquisition system will capture data direct from the gas meter.

2015 Seattle Energy Code Compliance C411 Renewable Energy:
- The heat recovery chiller will be utilized as a primary heating source during the extended periods of simultaneous heating and cooling. The C407 study will be utilized to demonstrate compliance with Exception 2: Additional heat recovery systems beyond those required by this code are permitted to be provided in lieu of on-site renewable energy systems, where the calculated net annual energy savings from the heat recovery systems exceed the calculated net annual energy production of the required on-site renewable energy systems.

2015 Seattle Energy Code Compliance C406 Additional Efficiency Package Options: Because no C406 Options have been included for the Addition portion of the building, in lieu of complying with C406, the C407 model shall comply with less than 87 percent of the SRD, because no C406 options are included in the SRD.

Design Criteria – Weather Conditions
- Weather conditions are based upon ASHRAE Fundamentals Handbook, 2005 edition. ASHRAE data is taken from Seattle Boeing Field weather station data compiled from 1982 through 2001.
  - Summer: 0.4% DB / MCWB :
    Design dry bulb: 86°F
    Design wet bulb: 66°F
  - Winter:
    Design dry bulb: 12°F (19°F + 15% SF)
    Relative Humidity 49%

Indoor Environmental Requirements
- General criteria are per the following table. Additional specific spaces will be added as needed throughout BOD development.

Space	Temperature				Humidity		
	Winter	Summer	Unoccupied Mode	Maximum Rate of Change	Winter	Summer	Maximum Rate of Change
Spaces with Limited Temp Control	>50°F	<85°F	50-105°F	NA	NA	NA	NA
Interior Spaces without Art	70°F±2°F	75°F±2°F	Equal to or above adjacent space temp	NA	NA	NA	NA
Occupied Spaces without Art	70°F±2°F	75°F±2°F	75-85°F	NA	NA	NA	NA
Unoccupied Spaces without Art	70°F±2°F	75°F±2°F	75-85°F	NA	NA	NA	NA
Spaces with Art	70°F±2°F	70°F±2°F	70°F±2°F	±2°F /24hr	50%±5%	50%±5%	5%/24hr

Requirements for Ventilation Air Quality
- Gas Phase filtration shall be provided for the full supply air quantity of HVAC systems serving spaces with art.
- The ideal location for gas filtration is in a mixed air position and, to achieve maximum protection, the media should be positively pressurized by locating it downstream of the supply fan. Due to space constraints the media may be on the negative side of the fan given strict cabinet leakage criteria.
- OUTSIDE AIR: Treatment of the outside air is usually to remove inorganic acid-gases, such as sulfur dioxide and oxides of nitrogen; this is usually done with reaction with a caustic base, such as potassium permanganate or carbon with potassium hydroxide. Outside air must also be treated to remove ozone; ozone is usually catalyzed to oxygen with contact with carbon.
- RECIRCULATED AIR: Treatment of recirculated air is usually to remove volatile organic compounds (VOCs) and ozone. Depending on the compounds to be removed, this indicates the possible need for carbon, treated carbon, and/or again, a caustic base, such as potassium permanganate.
- The results of product research work done for the downtown museum expansion project will be utilized in the SAAM. Filter model to be provided is Aerostar HEGA Filters Series 3651. The HEGA shedding cube cover will be provided and installed in the same face loaded filter frame.
- Relative Humidity of Filtered Air – Media should be located in the air stream where they can be expected to be at 30 to 60% RH.
- Protecting Gaseous Media from Humidification Drift of Cooling Coil Carryover – The humidifier and cooling coil should preferably be located downstream of the gaseous media, or well upstream
- An air quality sampling station such as that provided for the downtown museum will be provided. Performance of the downtown installation will be evaluated prior to finalizing this approach.

- The following table defines contaminant control limits.

Type Use	Allowable Gas Concentration (ug/m³/ppb)			VOC Removal # Required (%)
	SO_2	NO_2	O_3	
Spaces without Art	NR	NR	NR	NR
Spaces with Art	1 / 0.38	5 / 2.5	2 / 1.0	95%

Interior Load Basis
- Anticipated interior loads will be provided for as follows.

Space Type	Occupants (per 1000 sq ft)	Lighting (W/sf)	Equipment Load (W/sf)
Admin Offices	7	1.0	1.5
Admin Workroom	50	1.0	1.5
Art Storage	2	1.0	0.5
Textile Storage	2	1.0	0.5
Library	20	1.0	1.5
Library Stacks	2	1.0	0.5
Auditorium	220 People	1.0	1.0
Shipping	2	1.0	1.0
Shop	2	1.0	1.0
Ground Floor Lobby	33	1.0	0.5
Meeting Spaces	50	1.0	1.0
Kitchen	20	1.0	2.5
Art Exhibit Galleries	33	3.0	0.5
Museum Circulation	16	1.0	0.5
Conservation Lab	10	3.5	2.5
Garden Court	210 People	3.0	1
Main Entry Lobby	33	1.0	1

Ventilation Requirements by Space
- The following table is intended to document minimum ventilation requirements to which load factors will be added to determine what the final rates will be. Columns are provided to allow for use of Code Alternate ASHRAE 62.1-2010, and 2015 Washington Mechanical Ventilation Rate Procedure. Rates are minimums, additional ventilation air will be provided to maintain spaces positive or make-up for exhaust flow rates, as required.

Space Type	Min Outside Air (CFM per sq ft)	Min Outside Air (CFM per person)
Art Exhibit Galleries	.06	**7.5**
Conservation Lab	.18	**10**
Kitchen	.12	**7.5**
Receiving	.12	**0**
Art Storage	.12	**0**
Auditorium	.06	**5**
Main Entry Lobby	.06	**7.5**
Other spaces	.06	**5**

Usage and Special Requirements
- This table is intended to identify any special uses or requirements that need to be accounted for in sizing, specifying equipment, and zoning of the HVAC systems.
- OFFENDING SPACES & ACTIVITIES, OFFICES. Activities, processes or equipment posing threat of damage to the institute's collection should be kept in spaces and served by systems separated from art space systems. Art HVAC systems may serve these spaces if the space is fully exhausted so that pollutants are not recirculated into art spaces.
  - Ozone from office equipment
  - Food stuffs & service
  - Fresh office supplies
  - Loading dock outside air load and fumes
  - Workshops/Kitchen areas
  - Conservation Lab fumes

Space Type	Temp / RH Control for Art	Food in Area	Chemical Store/Use	Acoustical Requirements (1)	UV Restrictions
Basement					
North Offices	No	Yes	No	TBD	No
Conference	No	Yes	No	TBD	No
South Offices	No	No	No	TBD	No
Basement Storage	Yes	No	No	TBD	Yes
Mechanical Rooms	No	No	TBD	TBD	No
BOH	Yes	No	No	TBD	Yes
Circulation Corridor	Yes	No	No	TBD	Yes
Receiving	Yes	No	No	TBD	YES
Electrical Rooms	No	No	No	TBD	No
Ground Floor					
Library	Yes	No	No	TBD	Yes
Library Stacks	Yes	No	No	TBD	Yes
Auditorium	No	No	No	TBD	No
Loading	Yes	No	No	TBD	Yes
Textile Storage	Yes	No	No	TBD	Yes
Workshop	Yes	No	Yes(2)	TBD	No
Public Corridor	Yes	No	No	TBD	Yes
Toilet Rooms	No	No	Yes	TBD	No
Education	No (4)	No	No	TBD	No?
Meeting Room	Yes	Yes (2)	No	TBD	Yes
Conservation Lab	Yes	No	Yes (2)	TBD	Yes
Kitchen	No	Yes	No	TBD	No
Gardner Center	Yes	No?	No	TBD	Yes
Ground Floor Storage	Yes	No	No	TBD	Yes
Education	No (4)	No	No	TBD	No
Meeting Room	Yes	No	No	TBD	No
Main Floor					
Art Exhibit Galleries	Yes	No	No	TBD	Yes

Space Type	Temp / RH Control for Art	Food in Area	Chemical Store/Use	Acoustical Requirements (1)	UV Restrictions
Garden Court	Yes	Yes (3)	No	TBD	Yes
Circulation Corridor	Yes	No	No	TBD	Yes
Main Entry Lobby	Yes	No	No	TBD	Yes

1) Refer to Acoustical Reports for NC criteria.
2) These spaces will be exhausted to outside directly in order to avoid recirculation of food or other odor into other art spaces.
3) The Garden Court air is shown as being recirculated in the 6/20/08 drawing set. This is to be revisited to determine if the Garden Court should be fully exhausted to avoid recirculation of food odor into other art spaces.
4) Art in this area, but no temp or RH requirements.

Redundancy and Back-up Capacity Requirements by System
- The following table is intended to document redundant or emergency power requirements for critical systems. Critical systems are intended to maintain design conditions, fire protection and security during power failures. Sufficient emergency generator capacity and associated fuel capacity shall be available to allow continuous operation of critical systems for a minimum of 36 hours.

System	Stand-by Power	Capacity (%)	Redundancy	Reserve Time (Hours)
Security	Yes			36
Fire Alarm	Yes			36
Exit Lighting	Battery			36
Display Lighting	No			36
Art Space AHU	Yes	Lights Off, People Evacuated	Multiple Fans, VFD Bypass	36
Spaces without Art	No		No	36
Boiler Plant	Yes		Dual boilers, minimum 60% capacity each	36
AWHPS	Yes, 1 Module		5 Modules. Total capacity = 120%	36
Pumps	Yes		N+1	36
Humidifiers*	Yes		No	36

*Humidifiers in circulation spaces are not on standby power

Water Risk Control:
- General – No water is allowed directly over galleries except for in approved water containment assemblies.
- Roof Drains and rain leaders – Double walled containment will be provided. Reference drawings for details.
- Pressurized piping and plumbing water lines - Double walled containment will be provided. Reference drawings for details.
- Water Alarms – All containment will be set up with alarm capability through the BMS.

- Rooms with piping over art spaces will be provided with floor membranes that wrap up the wall a minimum of 6" and shall include raised doorways. See architectural drawings.

230923 - Direct-Digital Control System for HVAC
General: Section includes the building automation system.

Product:

BMS Controls
- A fully communicating BACnet compatible BMS system is to be provided. Provide a front end PC with Microsoft's Office Professional suite, BMS system software license, for facilities staff use and full custom graphics interface package.
- The BMS will be utilized for SEC metering data acquisition.
- Full BMS control is required for all the central hot water and chilled water plant equipment including extensive temperature monitoring.
- Full BMS control is to be provided for all scheduled plumbing and HVAC systems with extensive monitoring and sequencing capabilities. Full points lists and sequences to follow.
- Provide building static pressure sensor in lobby
- Factory controller with BACnet gateway will be utilized where available. Regardless, critical control functions will all be hard wired points.
- Fire Life Safety system monitoring point
- BMS to provide general alarm with signal from the fire life safety system (FLS provided by EC).
- The BMS will not control any equipment associated with the fire life safety system
- The generator panel will be monitored through an Ethernet connection. A general alarm monitoring point will be hard wired. The BMS will be configured to perform load sheading of the HVAC systems so as not to overload the generator.
- Provide (2) alarm points from the fuel fill station to the BMS
- All BMS sensors to have gages and PT ports adjacent.
- Additional miscellaneous scope items appear in following sections.

231000 – Generator and Facility Fuel Systems
General: Section includes the generator and fuel systems

Product: Materials

Combustion Exhaust System
- Provide generator exhaust pipe, fully lagged with 3" Calsil and terminate at building perimeter at approved location and approved distance from the wall. The MC will provide expansion calculations and appropriate anchoring and guides in shop drawing submittal. Provide zero-clearance wall thimble at penetration of exterior wall.
- Muffler furnished with generator by EC will be installed by MC. Muffler to be low profile, critical grade.

Radiator Airflow
- Provide sheetmetal discharge ductwork with flex connection to the radiator.
- Assume 3' soundtraps are required on all inlet ducts and the exhaust duct. Acoustician to finalize requirements.

Fuel Vents
- Install fuel vents from tank locations to perimeter adjacent to combustion pipe.

Fuel fill station
- To be provided by EC. Installation is by MC. Low voltage wiring is by MC. Fuel fill piping system is by MC.

Provide BMS monitoring of a general emergency generator alarm point.
Fuel system day tanks, pumps, and piping system complete between day tanks and generator will be provided by the MC. In accordance with SFC 603.3.2 the fuel tank will be 660 gallons and protected per UL142.

232000 - HVAC Piping and Pumps
General: Section includes hydronic piping and pumps

Product:

Materials
- See drawing schedules

Water Risk Control:
- General – No water is allowed directly over galleries except for in approved water containment assemblies.
- Pressurized piping and plumbing water lines - Double walled containment will be provided. Reference drawings for details.
- Water Alarms – All containment will be set up with alarm capability through the BMS

System requirements:
- The system will include 25% propylene glycol.
- Distribution pumps to be provided with VFD's and controlled by differential pressure sensing.
- All pressure gages are to be liquid filled.
- Provide P/T ports with adjacent temperature indicator at all BMS sensors and as required in locations for thorough troubleshooting. See piping schematic locations for minimum requirements.
- All pumps are to be provided with gages set up to read pump inlet, outlet, and strainer inlet pressures
- The central pumps are to be mounted on inertia bases with seismic springs and snubbers (minimum 2" deflection).
- Provide Mason double bellow flex connections at pumps.
- All HVAC water piping shall use the Holdrite Silencer clamp and hanger system (or equal) to isolate the piping from the building structure, hangers, and framing. Additional neoprene tape shall be used where necessary to prevent rigid contact with the building.
- Distribution pumps will control riser differential pressure by the BMS. Provide an accessible differential pressure sensor with gages and PT ports.
- Minimum pump flow provision: a bypass will be provided. It will be BMS controlled to assure minimum flow rate as measured by the flow meter (provided with the system BTU meter).

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Construction Documents

Submittal

Revisions

No.	Date	Description
9	9/1/17	PERMIT CORRECTIONS 1

Drawn DD/DG
Checked JL/RSR
LMN Proj No 16028.01
Date 6/23/17

Sheet Title: MECHANICAL BASIS OF DESIGN

Sheet Number: **M004**

233000 - HVAC Air Distribution

General: Section includes ductwork and accessories

Product:

System inclusions

- A complete engineered seismic restraint, hangars, and vibration isolation package will be provided by the MC as required for shop drawing as-installed conditions.
- Supply air ductwork to be all new.
- Duct sizing criteria to be reviewed with acoustical engineer.
- External insulation to be applied throughout on all supply air ductwork.
- Ductwork shall be fully protected from exterior condensation by appropriate vapor barrier material and detailing.
- In general, air will be supplied from the ceiling via new linear slot diffusers integrated into the existing architectural finishes.
- Diffuser layout will attempt to accommodate the possibility of relocating gallery partitions.
- Air distribution will attempt to prevent drafts at vertical glazing.
- Air distribution system shall generate room air velocities no higher than 50 fpm in occupied gallery spaces and at gallery artifacts.
- Supply ducts shall contain access doors adequate for duct cleaning.
- Supply diffusers should provide proper diffusion of supply air for conditioning the environment and protecting the collections. Target is Air Diffusion Performance Index (ADPI) of no less than 80, preferably 90. An air change rate of no less than six air changes per hour is recommended regardless of any thermal load requirements. This criteria will be evaluated in light of energy impacts.
- Supply air volumes, diffusers and return grills should be designated and located to prevent air stagnation and stratification.
- In no case should supply air be blown directly on the collections in display or storage. This includes avoiding the practice of delivering supply air across walls where collections might be displayed.
- The liberal use of open "through the room" return air for collection spaces should be avoided. Wherever possible, ducted return air should be provided to general areas.
- Avoid locating equipment requiring service above any collection areas.
- Select air grille locations to ensure proper air flow and diffusion, to avoid stagnant air pockets, and to avoid blowing supply air or drawing return air over collections.
- Do not use return air plenums at exterior walls if not fully contained within the building envelope.
- Avoid internally-lined ducts and equipment. Encapsulated lining w/ perf inner duct wall is allowed if alternate attenuation approaches cannot be accommodated.

AHU-L1-1, AHU-L1-2 Supply Air Constant Air Volume Boxes (CAV's)

- While referred to as CAV's, the boxes will be fully capable of VAV operation allowing the use of airflow reduction control strategies as developed by the team.
- Each CAV will be provided with a hot water coil and BMS controlled HW control valve.
- CAVs will be located in the existing mechanical room where possible to minimize the need for water containment.

- CAVs serving main floor galleries will be located in the attic mechanical rooms. Full water containment will be required.
- Each zone will be provided with duct mounted Viasala temperature and RH sensors.
- Each zone will be controlled via space mounted Viasala temperature and RH sensors.
- Control valve redundancy will not be provided.
- Provide two CO2 sensors per humidification control zone.
- See drawings for humidification and temperature zone diagrams.

AHU-L1-1, AHU-L1-2 Return / Relief Air System

- Spaces with food odors will be exhausted direct to outdoors without recirculation. The Garden court is an exception at this time.
- In general, the existing low wall supply air grilles will be utilized as return air openings.
- In general, the existing uninsulated supply air ducts connected to the existing low wall supply grilles will be reutilized as return air ductwork.
- Return air ductwork replacement extent is shown in the drawings. The replacement of all return air ductwork may be required and is under evaluation.
- The existing ductwork sizing and integrity will continue to be investigated to assure reuse in place is appropriate.
- The existing relief fans located in the attic fan room will be fully demolished.
- A central return fan will be installed in the basement air handler room for AHU-L1-2. Relief will be directed to the east perimeter exhaust well as shown in the plans.
- AHU-L1-1 Relief air will be routed to the relief fan located on the south roof.
- Return air will be routed from each space individually where possible. Transferring air between gallery spaces will be avoided.
- If air is transferred between gallery spaces through existing openings, air velocities through such openings will be limited to 70 fpm.
- A method of balancing the return system will be provided.
- Negatively pressurized return air plenums on exterior walls will be avoided.
- Negatively pressurized ceiling plenums will be isolated from exterior wall cavities.

AHU-L1-1, AHU-L1-2, AHU-L1-3 Outside Air Intake

- Provide bird screening at exterior louvers. Insect screen mesh is too fine.
- Install a MERV 8 filtration bank behind the intake louver.
- The outside air intake tunnel provides air to AHU-L1-2. The tunnel surfaces will be treated as required to insulate and prevent moisture condensation enclosure will be built to replace the existing horizontal grating. This will allow for installation of a vertical weatherproof intake louver.
- OSA ductwork will be insulated and vapor barriers provided per the Seattle Energy Code.

235200 – Heating Boilers

General: Section includes the HVAC heating boilers

Product: Materials

- Boiler are provided as a supplement to the AWHP system. They are sized to provide heating to allow for two of the AWHP's to be in defrost mode simultaneously during the winter.

- Factory packaged controller to control multiple boiler staging
- BACnet interface to be provided.
- The boiler control package shall be a MTI Heat-Net or equivalent, integrated boiler management system. The control system must be integral to each boiler, creating a control network that eliminates the need for a "wall mount" stand-alone boiler system control. Additional stand-alone control panels, independent of a Building Management System (BMS), shall not be allowed to operate the boiler network.
- Combustion air intake is to be galvanized steel. Combustion exhaust to be aisi29-4c. Venting will run horizontally to rooftop termination. The venting is by the MC.
- Condensate neutralization required.
- Dual Fuel investigation: Dual fuel will not be required. Boilers serve as a backup to the electrical heating system meaning that the two fuel sources are gas and electric.
- Variable volume hot water distribution pumping will be utilized.
- Eliminate existing steam radiators. The radiators may present a problem from overheating and drying of the collection exhibited nearby. They should not be reused for heating; heating should be with forced hot air with concurrent humidification. Glazing condensation control will be provided by window installation upgrades.
- Provide (2) gas-fired hot water heating boilers operated in a primary/secondary piping configuration and all associated hydronic system components. Boilers will be provided with a circulating pump in order to ensure flow through the boiler at all times.
- Boilers to be controlled by factory control package that includes outside air temperature reset for supply water temperature. BMS to control distribution pumps, monitor boilers, and write setpoints to boilers. Provide BACNet or other interface.

236400 - Packaged Water Chillers

General: Chilled Water System Equipment

Product:

Air to Water Heat Pump (AWHP) Multistack model ARA-Airstack Reversing heat pump Auxiliary condenser (reversing heat pump with heat recovery condenser).

- Utilized to create heating hot water and chilled water for building heating and cooling.
- AWHP's to have 4-pipe connections for chilled water and heating hot water operation. AWHP modules to have a minimum of (2) compressors per module and be capable of the following modes of operation:
  - Operating both compressors in cooling with heat rejection via airsource condenser section and chilled water supplied CHWS/R connections.
  - Operating both compressors in heating with heat extraction via airsource condenser section and heating hot water supplied HWS/R connections compressors in heating.
  - Operating one compressor in heating supplying HWS/R connections and one compressor in cooling supply CHWS/R connections with the airsource condenser section disabled.
- Compressor wraps and fan discharge silencers are required.
- Stainless Steel Heat Exchenger
- Lead Compressor Sequencing (24 hrs)
- Automatic Internal Rescheduling If Fault Occurs
- Automatic Logging Of Any Fault Condition

- Electronic Load Water Control
- Quick Interconnect Modular Design
- Dual Condenser Fans Per Module Designed For Quiet Operation
- Pressure Controlled 1150 RPM Fan Motors
- Filters In Load Water Supply Headers
- Stainless Steel Inlet Header
- R-410A Refrigerant
- VFDs On Fans
- Multiple, independent refrigeration systems
- Var. Flow Evap (Mol. Valve Supply,Man. Valve Return)
- Al/Cu Condenser Coils
- Single Point Power Connection
- Brazed Plate Evaporator
- 4 Condenser Fans per module
- External Master Controller Box
- SkA SCCR
- Electrical Connection Type - Junction Box
- Carbon Steel Painted Lifting Frame
- Warranty: Compressor (5 Year)
- Warranty: All Parts (1 Year)

System and equipment.

- Module quantity provides N+1 capacity
- Variable volume primary pumps included with n+1 redundancy
- A chilled water storage tank to provide adequate system volume is not required. System volume calculates to approximately 1000 gallons which exceeds minimum recommendations of system volume = twice the evaporator flow rate.
- BMS controls interface capability.
- Route Chilled Water to all AHU's. Insulate per Seattle Energy Code. Refer to plans for connection details.
- Route Heating water to all AHU's, CAV's and VAV's. Insulate per Seattle Energy Code. Refer to plans for connection details.
- BMS to control distribution pumps, monitor boilers, and write setpoints to boilers. Provide BACNet or other interface.

237300 Indoor Central Station Air Handling Units (AHU-L1-1, AHU-L1-2, AHU-L1-3)

General: Air handling Units

Product:

Art AHU's will include:

- Mixing box with motorized dampers.
- Merv 8 pre filtration
- Merv 15 filtration upstream of gas phase filtration (Merv 13 for AHU-L1-3)
- Carbon bonded media filtration. Model HEGA Series 3651 with downstream dusting bag (NA for AHU-L1-3).
- Cooling coils with stainless steel casings
- Heating Coils with stainless steel casings
- Air velocities through coils not to exceed 450 fpm

- Coils shall include multiple sections which shall be piped separately with independent control valves, isolation valves, controls, etc
- IAQ style drain pans.
- Direct drive Plug fan or Fan Wall supply fans
- Internally isolated fans with spring vibration isolation mounts and flexible fan connections.
- Internal supply and return sound attenuators per acoustical report.
- Fan wall pressure relief damper
- Multiple fan wheels
- Supply fan VFD's and Relief fan VFD's factory installed with automatic and manual bypass.
- VFD's and supply fans shall be sized for 110% of the design air volume.
- Fan isolation dampers to allow for continued operation while one fan is down.
- Supply, Return, and Radiated sound criteria to be developed with acoustical engineer.
- No exposed fiberglass in the airstream
- Alternatives to solid inner wall will be investigated if required for attenuation purposes.
- Factory installed supply cfm measurement station
- Magnahelics with electronic differential pressure outputs to be installed across each filter bank. This includes the gas phase filters to detect any anomalies such as failure of upstream filters.
- Flexible connections on all duct and piping connections to AHU.
- Art AHU's will be designed to be brought into the museum in sections. Sections will be brought in through the outside air intake tunnel or through new mechanical room wall penetrations on the east wall of the existing boiler room.
- All access doors must swing against the air pressure (i.e. positive pressure plenums doors must swing in). Door's opening into fan section shall include safety shutoff switch hardware interlocked with the supply fan operation.
- Provide view ports in all access doors.
- Select fan, motor and VFD to perform at 115% of design airflow at 110% of design static pressure.
- All filter frames shall be Type 8 front loading.
- Provide a P-cone or full-flow transverse flow measuring station located in the filter or coil section with external gauge showing airflow in cfm. Devices at the fan inlet are not acceptable. Transmitter shall be provided by the EMCS Contractor.
- Provide a second flow measuring station in the outside air section(s). Transmitter shall be provided by the EMCS Contractor
- Provide corrosion sensing device for installation in occupied space for each AHU for monitoring effectiveness of gas phase filters. Real time corrosion sensors shall be provided that can accurately gage media effectiveness without requiring periodic air sampling. These shall be provided with an automatically monitored DDC input so the building operators can be alarmed automatically if effectiveness drops.

AHU-L1-1, AHU-L1-2, AHU-L1-3 Economizer

- Outside air economizer is required as the gas phase filtration exception was eliminated in the 2009 code cycle.
- Outside air intake and relief air sizing are to allow for 100% outside air usage for the 1/13/2017 set.

- If economizer is utilized, the gas phase filtration is expected to load more rapidly. Reliable air quality monitoring and differential pressure sensing will be required in order to establish a reliable filter change out schedule.
- Since the building is to be provided with humidification control, airside economizer control will be based on both dry bulb and humidity ratio.
- Outdoor sensor reliability is of high importance and so sensor redundancy is required.
- Relative Humidity of Filtered Air – Media should be located in the air stream where they can be expected to be at 30 to 60% RH.
- Space temperature and RH stability is of primary importance.

239400 - Humidification

General: Electric Steam humidifiers

Product: Materials

Duct Requirements

- Duct sections containing humidifier elements shall be stainless steel for up to 6 feet or 6 times the absorption distance, whichever is greater.
- Duct sections containing humidifier elements shall have drain connections and piping, trapped and routed to indirect waste receptacle.
- Duct access doors with viewports shall be provided at all duct humidifier elements.
- Provide dispersion tube type that will accommodate short dissipation distances with multi tube dispersion manifolds.

Water requirements

- A minimum water pressure of 35 psi should be maintained to provide the proper water level within the humidifier. Maximum pressure allowed is 60 psi.
- Humidifier non potable water will include 10 micron filtration, and a water softener.

Dri-Steem Vapormist humidifiers

- Steam created in the evaporating chamber flows through steam hose, tubing, or piping to the dispersion assembly, where it is discharged into the airstream using insulated high-efficiency stainless steel dispersion tubes. The DI/RO units feature a mechanical float for water level control and a low water stainless steel probe and cutoff switch. Use of the mechanical float in lieu of a level probes will reduce the frequency drain cycles, and create more stable humidity control. Field testing of the museum's water quality will be performed by the humidifier vendor and will confirm whether the DI/DO units can be used.
- A control panel with a microprocessor controller mounted on the panel door constantly monitors the humidifier cycle for efficient operation. The microprocessor controller also provides a LED display to indicate the status of the humidifier. High efficiency immersion electric water heater elements heat the water to provide steam.
- A real-time clock schedules automatic draining and flushing, thus reducing mineral build-up within the reservoir.
- The humidifier shall have an evaporating reservoir with a gasket-sealed cover that is capable of operating at pressures of at least 19" (48 cm W.C.) without steam or water leaks. The reservoir shall be made of type 304 stainless steel with welded joints.
- A brass body, solenoid operated water fill valve shall be factory-mounted on the cover of the humidifier reservoir. The fill valve shall be located to allow a minimum air gap of

1-1/2" (3.81 cm). An inline strainer shall be factory-mounted on the fill valve to remove any water-born particulate matter before the humidifier fill valve. The water strainer shall have a removable screen to permit periodic inspection and cleaning.

- A Vapor-logic Version 6 microprocessor control module shall be factory-mounted on the cover and shall the following capabilities: communication with building automation systems via BACnet®, Web interface, direct or remote set up, monitoring, and control, USB port, PID control allows, real-time clock, programmable outputs, enhanced diagnostics, and an auxiliary temperature sensor for temperature compensation to prevent condensation at locations e.g. windows and/or ducts.
- SCR Modulation. Provides 0-100% power modulation of the heater outputs down to a one-second cycle rate. A compatible humidity sensor shall be shipped loose for field installation (±1-2% RH).
- Air Flow Proving Switch. A diaphragm-operated air flow proving switch with adjustable control range of .05" W.C. to 12.0" W.C. shall be provided for field installation. Switch rating shall be 2.5 amps at 120V. Duct High-Limit. A high-limit humidistat shall be provided for duct installation. The high-limit shall be field set to prevent over saturation within the supply duct.

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No.	Date	Description

Drawn DD/DG
Checked JL/RSR
LMN Proj No 16028.01
Date 6/23/17

Sheet Title: MECHANICAL BASIS OF DESIGN

Sheet Number: **M005**

DETAILED VENTILATION CALCULATIONS

Calculations for the System as a Whole

Air Handling Unit: **AHU-1-1**
Calculation (All Cooling, All Heating): **Heating** — WORST CASE
Used to Calc Voz & Vou

	Design System Maximum Cooling Supply Airflow	System Population	Occupant Diversity	Uncorrected OA requirement for system	Outside Air Temperature	Return Air Temperature	Additional Ventilation for LEED	Ez - Alt for Heating Mode Global Calculations	System Mixed Air Temperature	Table 6-3 Method Outdoor Air Intake Airflow	Primary supply air flow to system (current)	Maximum System Exhaust Airflow (Outdoor Air Required)		System Mixed Air Temperature	Table 6-3 Method Outdoor Air Intake Airflow (with Exhaust Make-up Air)	Primary supply air flow to system (current)
Description	Max Design Airflows: AHU-B-1: SA = 14,080 cfm															
Variable Name	**Vps_max**	**Ps**	**D**	**Vou**	**°F**	**°F**	**LEED_Add'l**	**Ez**	**MA**	**Vot**	**Vps**	**Voz_Exh**		**MA**	**Vot**	**Vps**
Totals	**25390**	**555**	1.0	**3775**	**19.0**	**70.0**	No	0.8	**49.0**	**6295**	**15280**	**6000**	7240	**2.6**	**6295**	**16710**
Value	CFM	People		cfm			0%		°F	cfm	cfm	cfm		°F	cfm	cfm
ASHRAE 62.1-2007 Equation or Table Number			Eq 6-7	Eq 6-6						Eq 6-8					Eq 6-8	
Formula			D = Ps/Sum_All(Pz)	Vou = D*Sum_All(Rp*Pz) + Sum_All(Ra*Az)						Vot = Vou/Ev	Vps = Vpz for min. anticipated SA limited by design SA				Vot = Vou/Ev	Vps = Vpz for min. anticipated SA limited by design SA

Calculations for Individual Zones

VAV Tag (from Zonebud)	VAV Tag for Calculations	AHU Tag (from Zonebud)	Zone Name	Room Area from Zonebud	Room Vent Occupancy Category (from Zonebud)	Room Population (from Zonebud)	Zone Population	Outdoor Airflow Rate per Person (from Zonebud)	Outdoor Airflow Rate per Unit Area (from Zonebud)	People Outdoor Airflow Rate for Population Diversity Calculation	Area Outdoor Rate per Unit Area for Population Diversity Calculation	Room Unused OA req'd to breathing zone (from Zonebud)	Unused OA req'd to breathing zone	Ez - Room by Room (from Zonebud)	Unused OA req'd to breathing zone (Calculated)	Unused OA requirement for zone (from VAV Schedules)	Calculation vs Schedule Check	Zone air distribution effectiveness at condition analyzed
		AHU-1-1	**Totals**	**14627**		**553**	**555**			**2641**	**905**	**3846**	**3855**		**4850**	**4985**		**0.8**
Single Duct		Single Duct																
VAV-L1-2	VAV-L1-2	AHU-1-1	CONFERENCE	640	Office-Conference	18	18	5.0	0.06	90	38	128	129	0.8	165	165	OK	0.8
VAV-L1-3	VAV-L1-3	AHU-1-1	CORNER OFFICE	159	Office-Office	2	2	5.0	0.06	10	10	20	20	0.8	25	25	OK	0.8
VAV-L1-4	VAV-L1-4	AHU-1-1	OPEN OFFICE	810	Office-Office	4	5	5.0	0.06	20	49	69	69	0.8	90	90	OK	0.8
VAV-L1-5	VAV-L1-5	AHU-1-1	SOUTH OFFICES	367	Office-Office	6	6	5.0	0.06	30	22	52	53	0.8	70	70	OK	0.8
VAV-L1-6	VAV-L1-6	AHU-1-1	BREAK	252	Food-Kitchen	6	6	7.5	0.12	45	30	75	76	0.8	95	95	OK	0.8
VAV-L2-1	VAV-L2-1	AHU-1-1	EDUCATION	1040	Ed-ClassroomLecture	68	68	7.5	0.06	508	63	571	572	0.8	715	715	OK	0.8
VAV-L2-2	VAV-L2-2	AHU-1-1	KITCHEN	277	Food-Kitchen	5	5	7.5	0.12	38	33	71	71	0.8	90	90	OK	0.8
VAV-L2-3	VAV-L2-3	AHU-1-1	MEETING	1503	Public-AuditoriumSeating	220	220	5.0	0.06	1100	90	1190	1191	0.8	1490	1490	OK	0.8
VAV-L1-10	VAV-L1-10	AHU-1-1	CIRCULATION L1	735	Public-Corridors	12	13	0.0	0.06	0	44	44	53	0.8	70	85	OK	0.8
	VAV-L1-10	AHU-1-1	HALLWAY 115 S	143	General-Corridors	1	-	0.0	0.06	0	9	9	-	0.8	-	0	-	-
VAV-L2-14	VAV-L2-14	AHU-1-1	HALLWAY 223	583	General-Corridors	5	25	0.0	0.06	0	35	35	88	0.8	110	115	OK	0.8
	VAV-L2-14	AHU-1-1	CIRCULATION L2	873	General-Corridors	20	-	0.0	0.06	0	52	52	-	0.8	-	70	-	-
VAV-L2-15	VAV-L2-15	AHU-1-1	HALLWAY 216	607	General-Corridors	4	9	0.0	0.06	0	36	36	83	0.8	105	150	OK	0.8
	VAV-L2-15	AHU-1-1	GREEN ROOM 220	77	Retail-Dressing	2	-	0.0	0.00	0	0	0	-	0.8	-	0	-	-
	VAV-L2-15	AHU-1-1	HALLWAY 80H	203	General-Corridors	1	-	0.0	0.06	0	12	12	-	0.8	-	0	-	-
	VAV-L2-15	AHU-1-1	STORAGE 224A	246	Office-StorageOccDry	0	-	5.0	0.06	2	15	17	-	0.8	-	0	-	-
	VAV-L2-15	AHU-1-1	STORAGE 226B	237	Office-StorageOccDry	0	-	5.0	0.06	2	14	17	-	0.8	-	0	-	-
VAV-L3-18	VAV-L3-18	AHU-1-1	CIRCULATION L3	553	General-Corridors	14	14	0.0	0.06	0	33	33	34	0.8	45	45	OK	0.8
VAV-L3-19	VAV-L3-19	AHU-1-1	CIRCULATION L3 EAST	884	General-Corridors	18	18	0.0	0.06	0	53	53	54	0.8	70	70	OK	0.8
VAV-L3-20	VAV-L3-20	AHU-1-1	EXHIBIT S7	1855	Public-Museums-Galleries	61	61	7.5	0.06	458	111	569	569	0.8	715	715	OK	0.8
VAV-L3-21	VAV-L3-21	AHU-1-1	EXHIBIT S8	2584	Public-Museums-Galleries	85	85	7.5	0.06	638	155	793	793	0.8	995	995	OK	0.8

Table 6-3 Method: System Minimum Outdoor Air Required / **Table 6-3 Method: System Minimum Outdoor Air Required for Exhaust**

VAV Tag for Calculations	Unused OA requirement for zone	Minimum Expected Primary Airflow (Prim Min Assumes no Reset based on 100% OA)	Zone Primary Outdoor Air Fraction	Table 6-3 Method System Ventilation Efficiency	Table 6-3 Method Outdoor Air Intake Airflow	Table 6-3 Method OA intake req'd as a fraction of primary SA	Ventilation Override Device	Unused OA requirement for zone	System Exhaust Airflow Prim Min Setpoint (Outdoor Required)	Exhaust On/Off	Minimum Expected Primary Airflow (Prim Min Assumes no Reset based on 100% OA)	Zone Primary Outdoor Air Fraction	Table 6-3 Method System Ventilation Efficiency	Table 6-3 Method Outdoor Air Intake Airflow	Table 6-3 Method OA intake req'd as a fraction of primary SA
Totals	**4850**	**15280**	**0.52**	**0.6**	**6295**	**0.41**		**4850**	**22075**		**16710**	**0.52**	**0.6**	**6295**	**0.38**
VAV-L1-2	165	435	0.38				CO2 SENSOR	165	650	Off	435	0.38			
VAV-L1-3	25	70	0.36				NA	25	90	Off	70	0.36			
VAV-L1-4	90	240	0.38				NA	90	290	Off	240	0.38			
VAV-L1-5	70	185	0.38				NA	70	185	Off	185	0.38			
VAV-L1-6	95	250	0.38				NA	95	250	Off	250	0.38			
VAV-L2-1	715	1885	0.38				CO2 SENSOR	715	1885	Off	1885	0.38			
VAV-L2-2	90	240	0.38				EXHAUST STATUS	90	500	On	500	0.18			
VAV-L2-3	1490	3925	0.38				CO2 SENSOR	1490	3925	Off	3925	0.38			
VAV-L1-10	70	600	0.12				NA	70	600	On	600	0.12			
VAV-L1-10	-	0					NA	-	0	On	0				
VAV-L2-14	110	800	0.14				NA	110	1600	On	1600	0.07			
VAV-L2-14	-	1200					NA	-	1200	On	1200				
VAV-L2-15	105	370	0.28				NA	105	740	On	740	0.14			
VAV-L2-15	-	0					NA	-	0	On	0				
VAV-L2-15	-	0					NA	-	0	On	0				
VAV-L2-15	-	0					NA	-	0	On	0				
VAV-L2-15	-	0					NA	-	0	On	0				
VAV-L3-18	45	630	0.07				NA	45	1260	Off	630	0.07			
VAV-L3-19	70	1050	0.07				NA	70	2100	Off	1050	0.07			
VAV-L3-20	715	1500	0.48				NA	715	3000	Off	1500	0.48			
VAV-L3-21	995	1900	0.52				NA	995	3800	Off	1900	0.52			

Appendix A Calculations for Individual Zones

VAV Tag for Calculations	Terminal Unit Type (Series, Parallel, Pinch)	Zone discharge airflow (VAV supply diffuser airflow)	Zone Primary Minimum Airflow	Zone Primary Maximum Airflow	Zone Fan Airflow	Zone Fan Airflow	Global Zone Clg Load % (0% = heating, >1% equal cooling)	Manual Override for Zone Cooling Load %	Zone Cooling Load % (0% = heating, >1% equal cooling)	Zone primary airflow	Primary air fraction of supply air at zone condition analyzed
Totals		**14080**	**15280**	**25190**	**0**	**0**				**14080**	
VAV-L1-2	Single Duct	435	435	1300		-	0%		0%	435	1.00
VAV-L1-3	Single Duct	70	70	180		-	0%		0%	70	1.00
VAV-L1-4	Single Duct	240	240	580		-	0%		0%	240	1.00
VAV-L1-5	Single Duct	185	185	330		-	0%		0%	185	1.00
VAV-L1-6	Single Duct	250	250	400		-	0%		0%	250	1.00
VAV-L2-1	Single Duct	1885	1885	2800		-	0%		0%	1885	1.00
VAV-L2-2	Single Duct	240	240	500		-	0%		0%	240	1.00
VAV-L2-3	Single Duct	3925	3925	4800		-	0%		0%	3925	1.00
VAV-L1-10	Single Duct	600	600	600		-	0%		0%	600	1.00
VAV-L1-10	Single Duct		0	0		-					
VAV-L2-14	Single Duct	800	800	1600		-	0%		0%	800	1.00
VAV-L2-14	Single Duct		1200	1200		-					
VAV-L2-15	Single Duct	370	370	740		-	0%		0%	370	1.00
VAV-L2-15	Single Duct		0	0		-					
VAV-L2-15	Single Duct		0	0		-					
VAV-L2-15	Single Duct		0	0		-					
VAV-L2-15	Single Duct		0	0		-					
VAV-L3-18	Single Duct	630	630	1260		-	0%		0%	630	1.00
VAV-L3-19	Single Duct	1050	1050	2100		-	0%		0%	1050	1.00
VAV-L3-20	Single Duct	1500	1500	3000		-	0%		0%	1500	1.00
VAV-L3-21	Single Duct	1900	1900	3800		-	0%		0%	1900	1.00

DETAILED VENTILATION CALCULATIONS *(CONTINUED)*

Calculations for the System as a Whole

	Primary supply air flow to system (current)	System Mixed Air Temperature	Appendix A Outdoor Air Intake Airflow	Maximum System Exhaust Airflow (Outdoor Air Required)	Primary supply air flow to system (current)	System Mixed Air Temperature	Appendix A Outdoor Air Intake Airflow	Outdoor Air Required for Exhaust Make-up	Additional Outdoor Air Required for System
Variable Name	**Vps**	**MA**	**Vot**	**Voz_Exh**	**Vps**	**MA**	**Vot**	**Voz_Exh**	**Vot_Exh**
Totals	**14080**	**51.6**	**5075**		**14340**	**-8.5**	**5075**	**22075**	**17000**
Value	cfm	°F	cfm	cfm	cfm	°F	cfm	cfm	cfm
Equation			Eq 6-8				Eq 6-8		
Formula	Vps = Vpz for min. anticipated SA limited by design SA		Vot = Vou/Ev		Vps = Vpz for min. anticipated SA limited by design SA		Vot = Vou/Ev	Voz_Exh	Vot_Exh = Voz_Exh - Vot

Calculations for Individual Zones / **Appendix A: System Minimum Outdoor Air Required**

Row	Prelim. Fraction of air recirculated locally at the zone that represents average RA	Manual Override Fraction of air recirculated locally at the zone that represents average RA	Fraction of air recirculated locally at the zone that represents average RA	Fraction of zone supply not directly recirc. from zone	Fraction of zone supply from fully mixed primary air	Fraction of zone OA not directly recirc. from zone	Unused OA fraction required in supply air to zone	Unused OA fraction required in primary air to zone	Uncorrected OA req'd as a fraction of primary SA	Zone Ventilation Efficiency (App A Method)	System Ventilation Efficiency (App A Method)	Unused OA fraction required in primary air to critical zone	Outdoor Air Intake Flow required to System	OA intake req'd as a fraction of primary SA	Unused OA in Primary SA (Fresh OA + Recirc OA)	Effective OA Fraction (System Critical Vent Ratio)
Totals							**0.52**	**0.52**	**0.27**		**0.74**	**0.52**	**5075**	**0.36**	**7,375**	**0.52**
VAV-L1-2	1.00		1.00	1.00	1.00	1.00	0.38	0.38		0.89						
VAV-L1-3	1.00		1.00	1.00	1.00	1.00	0.36	0.36		0.91						
VAV-L1-4	1.00		1.00	1.00	1.00	1.00	0.38	0.38		0.89						
VAV-L1-5	1.00		1.00	1.00	1.00	1.00	0.38	0.38		0.89						
VAV-L1-6	1.00		1.00	1.00	1.00	1.00	0.38	0.38		0.89						
VAV-L2-1	1.00		1.00	1.00	1.00	1.00	0.38	0.38		0.89						
VAV-L2-2	1.00		1.00	1.00	1.00	1.00	0.38	0.38		0.89						
VAV-L2-3	1.00		1.00	1.00	1.00	1.00	0.38	0.380		0.89						
VAV-L1-10	1.00		1.00	1.00	1.00	1.00	0.12	0.12		1.15						
VAV-L1-10																
VAV-L2-14	1.00		1.00	1.00	1.00	1.00	0.14	0.14		1.13						
VAV-L2-14																
VAV-L2-15	1.00		1.00	1.00	1.00	1.00	0.28	0.28		0.98						
VAV-L2-15																
VAV-L2-15																
VAV-L2-15																
VAV-L2-15																
VAV-L3-18	1.00		1.00	1.00	1.00	1.00	0.07	0.07		1.20						
VAV-L3-19	1.00		1.00	1.00	1.00	1.00	0.07	0.07		1.20						
VAV-L3-20	1.00		1.00	1.00	1.00	1.00	0.48	0.48		0.79						
VAV-L3-21	1.00		1.00	1.00	1.00	1.00	0.52	0.524		0.74						

Appendix A Calculations for Individual Zones (Exhaust Mode Analysis)

Row	Terminal Unit Type (Series, Parallel, Pinch)	Zone discharge airflow (VAV supply diffuser airflow)	Prelim Zone Primary Minimum Airflow	Ventilation Override Device	Unused OA requirement for zone	System Exhaust Airflow Prim Min Setpoint (Outdoor Required)	Exhaust On/Off	Zone Primary Minimum Airflow	Zone Primary Maximum Airflow	Zone Fan Airflow	Zone Fan Airflow	Global Zone Clg Load % (0% = heating, >1% equal cooling)	Manual Override for Zone Cooling Load %	Zone Cooling Load % (0% = heating, >1% equal cooling)	Zone primary airflow
Totals		**14340**	**15280**		**4850**	**22075**		**15540**	**25190**	**0**	**0**				**14340**
VAV-L1-2	Single Duct	435	435	CO2 SENSOR	165	650		435	1300		-	0%		0%	435
VAV-L1-3	Single Duct	70	70	NA	25	90		70	180		-	0%		0%	70
VAV-L1-4	Single Duct	240	240	NA	90	290		240	580		-	0%		0%	240
VAV-L1-5	Single Duct	185	185	NA	70	185		185	330		-	0%		0%	185
VAV-L1-6	Single Duct	250	250	NA	95	250		250	400		-	0%		0%	250
VAV-L2-1	Single Duct	1885	1885	CO2 SENSOR	715	1885		1885	2800		-	0%		0%	1885
VAV-L2-2	Single Duct	500	240	EXHAUST STATUS	90	500	On	500	500		-	0%		0%	500
VAV-L2-3	Single Duct	3925	3925	CO2 SENSOR	1490	3925		3925	4800		-	0%		0%	3925
VAV-L1-10	Single Duct	600	600	NA	70	600	On	600	600		-	0%		0%	600
VAV-L1-10	Single Duct		0	NA	-	0	On	0	0		-				
VAV-L2-14	Single Duct	800	800	NA	110	1600		800	1600		-	0%		0%	800
VAV-L2-14	Single Duct		1200	NA	-	1200		1200	1200		-				
VAV-L2-15	Single Duct	370	370	NA	105	740		370	740		-	0%		0%	370
VAV-L2-15	Single Duct		0	NA	-	0	On	0	0		-				
VAV-L2-15	Single Duct		0	NA	-	0	On	0	0		-				
VAV-L2-15	Single Duct		0	NA	-	0	On	0	0		-				
VAV-L2-15	Single Duct		0	NA	-	0		0	0		-				
VAV-L3-18	Single Duct	630	630	NA	45	1260		630	1260		-	0%		0%	630
VAV-L3-19	Single Duct	1050	1050	NA	70	2100		1050	2100		-	0%		0%	1050
VAV-L3-20	Single Duct	1500	1500	NA	715	3000		1500	3000		-	0%		0%	1500
VAV-L3-21	Single Duct	1900	1900	NA	995	3800		1900	3800		-	0%		0%	1900

Appendix A Calculations for Individual Zones (Exhaust Mode Analysis), continued / **Appendix A: System Min. Outdoor Air (Exhaust Mode Analysis)**

Row	Primary air fraction of supply air at zone condition analyzed	Prelim. Fraction of air recirculated locally at the zone that represents average RA	Manual Override Fraction of air recirculated locally at the zone that represents average RA	Fraction of air recirculated locally at the zone that represents average RA	Fraction of zone supply not directly recirc. from zone	Fraction of zone supply from fully mixed primary air	Fraction of zone OA not directly recirc. from zone	Unused OA fraction required in supply air to zone	Unused OA fraction required in primary air to zone	Uncorrected OA req'd as a fraction of primary SA	Zone Ventilation Efficiency (App A Method)	System Ventilation Efficiency (App A Method)	Unused OA fraction required in primary air to critical zone	Outdoor Air Intake Flow required to System	OA intake req'd as a fraction of primary SA	Unused OA in Primary SA (Fresh OA + Recirc OA)	Effective OA Fraction (System Critical Vent Ratio)
Totals								**0.52**	**0.52**	**0.26**		**0.74**	**0.52**	**5075**	**0.35**	**7,510**	**0.52**
VAV-L1-2	1.00	1.00		1.00	1.00	1.00	1.00	0.38	0.38		0.89						
VAV-L1-3	1.00	1.00		1.00	1.00	1.00	1.00	0.36	0.36		0.91						
VAV-L1-4	1.00	1.00		1.00	1.00	1.00	1.00	0.38	0.38		0.89						
VAV-L1-5	1.00	1.00		1.00	1.00	1.00	1.00	0.38	0.38		0.89						
VAV-L1-6	1.00	1.00		1.00	1.00	1.00	1.00	0.38	0.38		0.89						
VAV-L2-1	1.00	1.00		1.00	1.00	1.00	1.00	0.38	0.38		0.89						
VAV-L2-2	1.00	1.00		1.00	1.00	1.00	1.00	0.18	0.18		1.09						
VAV-L2-3	1.00	1.00		1.00	1.00	1.00	1.00	0.38	0.38		0.89						
VAV-L1-10	1.00	1.00		1.00	1.00	1.00	1.00	0.12	0.12		1.15						
VAV-L1-10																	
VAV-L2-14	1.00	1.00		1.00	1.00	1.00	1.00	0.14	0.14		1.13						
VAV-L2-14																	
VAV-L2-15	1.00	1.00		1.00	1.00	1.00	1.00	0.28	0.28		0.98						
VAV-L2-15																	
VAV-L2-15																	
VAV-L2-15																	
VAV-L2-15																	
VAV-L3-18	1.00	1.00		1.00	1.00	1.00	1.00	0.07	0.07		1.20						
VAV-L3-19	1.00	1.00		1.00	1.00	1.00	1.00	0.07	0.07		1.20						
VAV-L3-20	1.00	1.00		1.00	1.00	1.00	1.00	0.48	0.48		0.79						
VAV-L3-21	1.00	1.00		1.00	1.00	1.00	1.00	0.52	0.52		0.74						

CONSTANT VOLUME SYSTEM VENT CALCULATIONS

UNIT	ROOM NAME	SQUARE FOOTAGE	HVAC SYSTEM CFM	"Z"	OCCUPANCY CLASSIFICATION	LOOKUP OA (CFM / SF)	LOOKUP OA (CFM / PERSON)	ALTERNATE OA (CFM)	LOOKUP OCC. DENSITY (#/1000 SF)	DEFAULT OCC. QTY	ACTUAL OCC. QTY	USE MAX OCC.	OCC. QTY USED	USE MAX OA CFM	Zone Air Distribution Effectiveness (Ez)	Ra*Az (CFM)	Rp*Pz (CFM)	CALC OA MIN (CFM)
						VENTILATION RATE CALCULATION												
AHU-1-3	AUDITORIUM	2,380	5,000	35%	Public-AuditoriumSeating	0.06	5.0		150	357.0	250.0	-	250.0	-	0.8	142.8	1,250.0	1,745

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Sheet Title: VENTILATION CALCULATIONS

Sheet Number: **M006**

DETAILED VENTILATION CALCULATIONS

Calculations for the System as a Whole

Air Handling Unit: **AHU-1-2**
Calculation (All Cooling, All Heating): **Cooling** WORST CASE

Description: Design System Maximum Cooling Supply Airflow — Max Design Airflows: AHU-B-1: SA = 14,000 cfm
Variable Name: **Vps_max**
Totals: **42680**
Value: CFM
ASHRAE 62.1-2007 Equation or Table Number

System Population: **Ps** 619 People
Occupant Diversity: **D** 1.0, Eq 6-7; Formula: D = Ps/Sum_All(Pz)
Uncorrected OA requirement for system: **Vou** 5770 cfm, Eq 6-6; Formula: Vou = D*Sum_All(Rp*Pz) + Sum_All(Ra*Az)
Outside Air Temperature: 19.0 °F
Return Air Temperature: 70.0 °F

Used to Calc Voz & Vou
Additional Ventilation for LEED: **LEED_Add'l** No, 0%

Ez - All for Heating Mode Global Calculations: **Ez** 0.8

System Mixed Air Temperature: **MA** 52.6 °F
Table 6-3 Method Outdoor Air Intake Airflow: **Vot** 8245 cfm, Eq 6-8; Vot = Vou/Ev
Primary supply air flow to system (current): **Vps** 24120 cfm; Vps = Vpz for min. anticipated SA limited by design SA
Maximum System Exhaust Airflow (Outdoor Air Required): **Voz_Exh** 4810 cfm
System Mixed Air Temperature: **MA** -15.5 °F
Table 6-3 Method Outdoor Air Intake Airflow (with Exhaust Make-up Air): **Vot** 8245 cfm, Eq 6-8; Vot = Vou/Ev
Primary supply air flow to system (current): **Vps** 25240 cfm; Vps = Vpz for min. anticipated SA limited by design SA
Primary supply air flow to system (current): **Vps** 42680 cfm; Vps = Vpz for min. anticipated SA limited by design SA

Calculations for Individual Zones

VAV Tag (From Zonelaod)	AHU Tag (From Zonelaod)	Zone Name	Room Area from Zonelaod	Room Vent Occupancy Category (From Zonelaod)	Room Population (From Zonelaod)	Zone Population	Outdoor Airflow Rate per Person (From Zonelaod)	Outdoor Airflow Rate per Unit Area (From Zonelaod)	People Outdoor Airflow Rate for Population Diversity Calculation	Area Outdoor Rate per Unit Area for Population Diversity Calculation	Room Unused OA req'd to breathing zone (From Zonelaod)	Unused OA req'd to breathing zone	Ez - Room by Room (From Zonelaod)	Unused OA req'd to breathing zone (Calculated)	Unused OA requirement for zone (from VAV Schedules)	Calculation vs Schedule Check	Zone air distribution effectiveness at condition analyzed
	AHU-1-2	Totals	32837		614	619			4261	2317	6578	6589		8305	8335		1.0
Single Duct	Single Duct																
VAV-L1-1	AHU-1-2	FACILITY OFFICES	562	Office-Office	8	15	5.0	0.06	40	34	74	129	0.8	165	170	OK	1.0
	AHU-1-2	HALLWAY 115N	610	Public-Corridors	4	-	0.0	0.06	0	37	37	-	0.8	-	0	-	-
	AHU-1-2	HALLWAY 108	308	General-Corridors	2	-	0.0	0.06	0	18	18	-	0.8	-	0	-	-
VAV-L1-7	AHU-1-2	RECEIVING 180	772	Retail-ShippingReceiving	5	6	0.0	0.12	0	93	93	105	0.8	135	145	OK	1.0
	AHU-1-2	STORAGE 135	175	Office-StorageDocDry	0	-	5.0	0.06	2	11	12	-	0.8	-	0	-	-
VAV-L1-8	AHU-1-2	BOH/STORAGE 105	1589	Office-StorageDocDry	3	4	5.0	0.06	16	95	111	112	0.8	140	140	OK	1.0
VAV-L1-9	AHU-1-2	ART STORAGE B11	1333	Office-StorageDocDry	3	3	5.0	0.06	13	80	93	94	0.8	120	120	OK	1.0
VAV-L2-4	AHU-1-2	LOADING RECEIVING L2	825	Retail-ShippingReceiving	6	7	0.0	0.12	0	99	99	109	0.8	140	150	OK	1.0
	AHU-1-2	SECURITY 202B	108	Office-Office	1	-	5.0	0.06	3	6	9	-	0.8	-	0	-	-
VAV-L2-5	AHU-1-2	CONSERVATION LAB	1018	Ed-ScienceLab	6	9	10.0	0.18	60	183	243	381	0.8	388	385	OK	1.0
	AHU-1-2	OFFICE 208A	135	Office-Office	1	-	5.0	0.06	5	8	13	-	0.8	-	0	-	-
	AHU-1-2	WET LAB 204	132	Ed-ScienceLab	2	-	10.0	0.18	20	24	44	-	0.8	-	0	-	-
VAV-L2-6	AHU-1-2	GARDENER CENTER	378	Office-Office	2	2	5.0	0.06	10	23	33	33	0.8	45	45	OK	1.0
VAV-L2-7	AHU-1-2	LIBRARY 206	1052	Public-Libraries	11	11	5.0	0.12	53	126	179	179	0.8	225	225	OK	1.0
VAV-L2-8	AHU-1-2	LIBRARY STACKS 207	368	Public-Libraries	4	4	5.0	0.12	18	44	63	63	0.8	80	80	OK	1.0
VAV-L2-9	AHU-1-2	HALLWAY 201	833	General-Corridors	6	6	0.0	0.06	0	50	50	50	0.8	65	65	OK	1.0
VAV-L2-10	AHU-1-2	HALLWAY 200	1424	General-Corridors	10	10	0.0	0.06	0	85	85	86	0.8	110	110	OK	1.0
VAV-L2-11	AHU-1-2	WORKSHOP 212A	457	Workrooms-PhotoStudios	5	5	5.0	0.12	25	55	80	80	0.8	100	100	OK	1.0
VAV-L2-12	AHU-1-2	ART STORAGE STACKS N	2426	Office-StorageDocDry	5	5	5.0	0.06	24	146	170	170	0.8	215	215	OK	1.0
VAV-L2-13	AHU-1-2	ART STORAGE STACKS S	2330	Office-StorageDocDry	5	5	5.0	0.06	23	140	164	164	0.8	205	205	OK	1.0
VAV-L3-1	AHU-1-2	MAIN ENTRY LOBBY WEST	726	HotelDorm-LobbiesPrefunction	22	22	7.5	0.06	163	44	207	207	0.8	260	260	OK	1.0
VAV-L3-2	AHU-1-2	MAIN ENTRY LOBBY EAST	726	HotelDorm-LobbiesPrefunction	22	22	7.5	0.06	163	44	207	207	0.8	260	260	OK	1.0
VAV-L3-3	AHU-1-2	EXHIBIT N1	1525	Public-Museums-Galleries	50	50	7.5	0.06	375	92	467	467	0.8	585	585	OK	1.0
VAV-L3-4	AHU-1-2	EXHIBIT N2	567	Public-Museums-Galleries	19	19	7.5	0.06	143	34	177	177	0.8	225	225	OK	1.0
VAV-L3-5	AHU-1-2	EXHIBIT N3	875	Public-Museums-Galleries	29	29	7.5	0.06	218	53	270	270	0.8	340	340	OK	1.0
VAV-L3-6	AHU-1-2	EXHIBIT N4	875	Public-Museums-Galleries	29	29	7.5	0.06	218	53	270	270	0.8	340	340	OK	1.0
VAV-L3-7	AHU-1-2	EXHIBIT N5	840	Public-Museums-Galleries	28	28	7.5	0.06	210	50	260	261	0.8	330	330	OK	1.0
VAV-L3-8	AHU-1-2	EXHIBIT N6	806	Public-Museums-Galleries	28	28	7.5	0.06	210	48	258	259	0.8	325	325	OK	1.0
VAV-L3-9	AHU-1-2	EXHIBIT N7	875	Public-Museums-Galleries	29	29	7.5	0.06	218	53	270	270	0.8	340	340	OK	1.0
VAV-L3-10	AHU-1-2	GARDEN COURT NORTH	1235	Public-Museums-Galleries	41	41	7.5	0.06	308	74	382	382	0.8	480	480	OK	1.0
VAV-L3-11	AHU-1-2	GARDEN COURT SOUTH	1235	Public-Museums-Galleries	41	41	7.5	0.06	308	74	382	382	0.8	480	480	OK	1.0
VAV-L3-12	AHU-1-2	EXHIBIT S6	993	Public-Museums-Galleries	33	33	7.5	0.06	248	60	307	308	0.8	385	385	OK	1.0
VAV-L3-13	AHU-1-2	EXHIBIT S3	875	Public-Museums-Galleries	29	29	7.5	0.06	218	53	270	270	0.8	340	340	OK	1.0
VAV-L3-14	AHU-1-2	EXHIBIT S4	875	Public-Museums-Galleries	29	29	7.5	0.06	218	53	270	270	0.8	340	340	OK	1.0
VAV-L3-15	AHU-1-2	EXHIBIT S5	875	Public-Museums-Galleries	29	29	7.5	0.06	218	53	270	270	0.8	340	340	OK	1.0
VAV-L3-16	AHU-1-2	EXHIBIT S1	1525	Public-Museums-Galleries	50	50	7.5	0.06	375	92	467	467	0.8	585	585	OK	1.0
VAV-L3-17	AHU-1-2	EXHIBIT S2	567	Public-Museums-Galleries	19	19	7.5	0.06	143	34	177	177	0.8	225	225	OK	1.0

Table 6-3 Method: System Minimum Outdoor Air Required / Table 6-3 Method: System Minimum Outdoor Air Required for Exhaust

Zone Name	Unused OA requirement for zone	Minimum Expected Primary Airflow (Prim Min Assumes no Reset based on 100% OA)	Zone Primary Outdoor Air Fraction	Table 6-3 Method System Ventilation Efficiency	Table 6-3 Method Outdoor Air Intake Airflow	Table 6.3 Method OA intake req'd as a fraction of primary SA	Ventilation Override Device	Unused OA requirement for zone	System Exhaust Airflow Prim Min Setpoint (Outdoor Required)	Exhaust On/Off	Minimum Expected Primary Airflow (Prim Min Assumes no Reset based on 100% OA)	Zone Primary Outdoor Air Fraction	Table 6-3 Method System Ventilation Efficiency	Table 6-3 Method Outdoor Air Intake Airflow	Table 6.3 Method OA intake req'd as a fraction of primary SA
Totals	6705	24120	0.41	0.7	8245	0.34		6705	42330		25240	0.41	0.7	8245	0.33
FACILITY OFFICES	135	680	0.20				NA	135	680	Off	680	0.20			
HALLWAY 115N	-	0					NA	-	0	Off	0				
HALLWAY 108	-	0					NA	-	0	Off	0				
RECEIVING 180	110	610	0.18				NA	110	610	Off	610	0.18			
STORAGE 135	-	0					NA	-	0	On	0				
BOH/STORAGE 105	115	600	0.19				NA	115	600	Off	600	0.19			
ART STORAGE B11	100	560	0.18				NA	100	560	Off	560	0.18			
LOADING RECEIVING L2	115	720	0.16				NA	115	720	Off	720	0.16			
SECURITY 202B	-	0					NA	-	0	On	0				
CONSERVATION LAB	305	1120	0.27				EXHAUST STATUS	305	2240	On	2240	0.14			
OFFICE 208A	-	0					EXHAUST STATUS	-	0	On	0				
WET LAB 204	-	0					EXHAUST STATUS	-	0	On	0				
GARDENER CENTER	40	240	0.17				NA	40	480	Off	240	0.17			
LIBRARY 206	180	600	0.30				NA	180	1200	Off	600	0.30			
LIBRARY STACKS 207	65	200	0.33				NA	65	400	Off	200	0.33			
HALLWAY 201	55	155	0.35				NA	55	310	Off	155	0.35			
HALLWAY 200	90	220	0.41				NA	90	440	Off	220	0.41			
WORKSHOP 212A	80	500	0.16				EXHAUST STATUS	80	500	On	500	0.16			
ART STORAGE STACKS N	175	1120	0.16				NA	175	1120	Off	1120	0.16			
ART STORAGE STACKS S	165	1120	0.15				NA	165	1120	Off	1120	0.15			
MAIN ENTRY LOBBY WEST	210	1050	0.20				NA	210	2100	Off	1050	0.20			
MAIN ENTRY LOBBY EAST	210	750	0.28				NA	210	1500	Off	750	0.28			
EXHIBIT N1	470	1320	0.36				NA	470	2640	Off	1320	0.36			
EXHIBIT N2	180	520	0.35				NA	180	1040	Off	520	0.35			
EXHIBIT N3	275	700	0.39				NA	275	1400	Off	700	0.39			
EXHIBIT N4	275	700	0.39				NA	275	1400	Off	700	0.39			
EXHIBIT N5	265	700	0.38				NA	265	1400	Off	700	0.38			
EXHIBIT N6	260	1030	0.25				NA	260	2060	Off	1030	0.25			
EXHIBIT N7	275	735	0.37				NA	275	1470	Off	735	0.37			
GARDEN COURT NORTH	385	1630	0.24				NA	385	3260	Off	1630	0.24			
GARDEN COURT SOUTH	385	1630	0.24				NA	385	3260	Off	1630	0.24			
EXHIBIT S6	310	800	0.39				NA	310	1600	Off	800	0.39			
EXHIBIT S3	275	700	0.39				NA	275	1400	Off	700	0.39			
EXHIBIT S4	275	700	0.39				NA	275	1400	Off	700	0.39			
EXHIBIT S5	275	800	0.34				NA	275	1600	Off	800	0.34			
EXHIBIT S1	470	1320	0.36				NA	470	2640	Off	1320	0.36			
EXHIBIT S2	180	590	0.31				NA	180	1180	Off	590	0.31			

Appendix A Calculations for Individual Zones

Zone Name	Terminal Unit Type (Series, Parallel, Pinch)	Zone discharge airflow (VAV supply diffuser airflow)	Zone Primary Minimum Airflow	Zone Primary Maximum Airflow	Zone Fan Airflow	Manual Override for Zone Cooling Load %	Zone Cooling Load % (0% = heating, >1% equal cooling)	Zone primary airflow	Primary air fraction of supply air at zone condition analyzed	Prefer. Fraction of air recirculated locally at the zone that represents average RA	Manual Override Fraction of air recirculated locally at the zone that represents average RA	Fraction of air recirculated locally at the zone that represents average RA	Fraction of zone supply not directly recirc. from zone	Fraction of zone supply from fully mixed primary air	Fraction of zone OA not directly recirc. from zone	Unused OA fraction required in supply air to zone	Unused OA fraction required in primary air to zone	Uncorrected OA req'd as a fraction of primary SA	Zone Ventilation Efficiency (App A Method)
Totals		42680	24120	42680	0			42680								0.20	0.20	0.14	
FACILITY OFFICES	Single Duct	1030	680	1030	-		100%	1030	1.00	1.00		1.00	1.00	1.00	1.00	0.13	0.13		1.00
HALLWAY 115N	Single Duct		0	0	-														
HALLWAY 108	Single Duct		0	0	-														
RECEIVING 180	Single Duct	610	610	610	-		100%	610	1.00	1.00		1.00	1.00	1.00	1.00	0.18	0.18		0.95
STORAGE 135	Single Duct		0	0	-														
BOH/STORAGE 105	Single Duct	600	600	600	-		100%	600	1.00	1.00		1.00	1.00	1.00	1.00	0.19	0.19		0.94
ART STORAGE B11	Single Duct	560	560	560	-		100%	560	1.00	1.00		1.00	1.00	1.00	1.00	0.18	0.18		0.96
LOADING RECEIVING L2	Single Duct	720	720	720	-		100%	720	1.00	1.00		1.00	1.00	1.00	1.00	0.16	0.16		0.98
SECURITY 202B	Single Duct		0	0	-														
CONSERVATION LAB	Single Duct	2240	1120	2240	-		100%	2240	1.00	1.00		1.00	1.00	1.00	1.00	0.14	0.14		1.00
OFFICE 208A	Single Duct		0	0	-														
WET LAB 204	Single Duct		0	0	-														
GARDENER CENTER	Single Duct	480	240	480	-		100%	480	1.00	1.00		1.00	1.00	1.00	1.00	0.08	0.08		1.05
LIBRARY 206	Single Duct	1200	600	1200	-		100%	1200	1.00	1.00		1.00	1.00	1.00	1.00	0.15	0.15		0.99
LIBRARY STACKS 207	Single Duct	400	200	400	-		100%	400	1.00	1.00		1.00	1.00	1.00	1.00	0.16	0.16		0.97
HALLWAY 201	Single Duct	310	155	310	-		100%	310	1.00	1.00		1.00	1.00	1.00	1.00	0.18	0.18		0.96
HALLWAY 200	Single Duct	440	220	440	-		100%	440	1.00	1.00		1.00	1.00	1.00	1.00	0.20	0.20		0.93
WORKSHOP 212A	Single Duct	500	500	500	-		100%	500	1.00	1.00		1.00	1.00	1.00	1.00	0.16	0.16		0.98
ART STORAGE STACKS N	Single Duct	1120	1120	1120	-		100%	1120	1.00	1.00		1.00	1.00	1.00	1.00	0.16	0.16		0.98
ART STORAGE STACKS S	Single Duct	1120	1120	1120	-		100%	1120	1.00	1.00		1.00	1.00	1.00	1.00	0.15	0.15		0.99
MAIN ENTRY LOBBY WEST	Single Duct	2100	1050	2100	-		100%	2100	1.00	1.00		1.00	1.00	1.00	1.00	0.10	0.10		1.04
MAIN ENTRY LOBBY EAST	Single Duct	1500	750	1500	-		100%	1500	1.00	1.00		1.00	1.00	1.00	1.00	0.14	0.14		1.00
EXHIBIT N1	Single Duct	2640	1320	2640	-		100%	2640	1.00	1.00		1.00	1.00	1.00	1.00	0.18	0.18		0.96
EXHIBIT N2	Single Duct	1040	520	1040	-		100%	1040	1.00	1.00		1.00	1.00	1.00	1.00	0.17	0.17		0.96
EXHIBIT N3	Single Duct	1400	700	1400	-		100%	1400	1.00	1.00		1.00	1.00	1.00	1.00	0.20	0.20		0.94
EXHIBIT N4	Single Duct	1400	700	1400	-		100%	1400	1.00	1.00		1.00	1.00	1.00	1.00	0.20	0.20		0.94
EXHIBIT N5	Single Duct	1400	700	1400	-		100%	1400	1.00	1.00		1.00	1.00	1.00	1.00	0.19	0.19		0.95
EXHIBIT N6	Single Duct	2060	1030	2060	-		100%	2060	1.00	1.00		1.00	1.00	1.00	1.00	0.13	0.13		1.01
EXHIBIT N7	Single Duct	1470	735	1470	-		100%	1470	1.00	1.00		1.00	1.00	1.00	1.00	0.19	0.19		0.95
GARDEN COURT NORTH	Single Duct	3260	1630	3260	-		100%	3260	1.00	1.00		1.00	1.00	1.00	1.00	0.12	0.12		1.02
GARDEN COURT SOUTH	Single Duct	3260	1630	3260	-		100%	3260	1.00	1.00		1.00	1.00	1.00	1.00	0.12	0.12		1.02
EXHIBIT S6	Single Duct	1600	800	1600	-		100%	1600	1.00	1.00		1.00	1.00	1.00	1.00	0.19	0.19		0.94
EXHIBIT S3	Single Duct	1400	700	1400	-		100%	1400	1.00	1.00		1.00	1.00	1.00	1.00	0.20	0.20		0.94
EXHIBIT S4	Single Duct	1400	700	1400	-		100%	1400	1.00	1.00		1.00	1.00	1.00	1.00	0.20	0.20		0.94
EXHIBIT S5	Single Duct	1600	800	1600	-		100%	1600	1.00	1.00		1.00	1.00	1.00	1.00	0.17	0.17		0.96
EXHIBIT S1	Single Duct	2640	1320	2640	-		100%	2640	1.00	1.00		1.00	1.00	1.00	1.00	0.18	0.18		0.96
EXHIBIT S2	Single Duct	1180	590	1180	-		100%	1180	1.00	1.00		1.00	1.00	1.00	1.00	0.15	0.15		0.98

DETAILED VENTILATION CALCULATIONS *(CONTINUED)*

Calculations for the System as a Whole

Primary supply air flow to system (current): **Vps** 42680 cfm; Vps = Vpz for min. anticipated SA limited by design SA
System Mixed Air Temperature: **MA** 63.6 °F
Appendix A Outdoor Air Intake Airflow: **Vot** 6200 cfm, Eq 6-8; Vot = Vou/Ev
Maximum System Exhaust Airflow (Outdoor Air Required): **Voz_Exh** 27250 cfm
Primary supply air flow to system (current): **Vps** 42680 cfm; Vps = Vpz for min. anticipated SA limited by design SA
System Mixed Air Temperature: **MA** 19.4 °F
Appendix A Outdoor Air Intake Airflow: **Vot** 6200 cfm, Eq 6-8; Vot = Vou/Ev
Outdoor Air Required for Exhaust Make-up: **Voz_Exh** 42330 cfm; Voz_Exh
Additional Outdoor Air Required for System: **Vot_Exh** 36130 cfm; Vot_Exh = Voz_Exh - Vot

Appendix A: System Minimum Outdoor Air Required / Appendix A Calculations for Individual Zones (Exhaust Mode Analysis) / Appendix A: System Min. Outdoor Air (Exhaust Mode Analysis)

Fraction of zone OA not directly recirc. from zone	Unused OA fraction required in supply air to zone	Unused OA fraction required in primary air to zone	Uncorrected OA req'd as a fraction of primary SA	Zone Ventilation Efficiency (App A Method)	System Ventilation Efficiency (App A Method)	Unused OA fraction required in primary air to critical zone	Outdoor Air Intake Flow required to System	OA intake req'd as a fraction of primary SA	Unused OA in Primary SA (Fresh OA + Recirc OA)	Effective OA Fraction (System Critical Vent Ratio)	Terminal Unit Type (Series, Parallel, Pinch)	Zone discharge airflow (VAV supply diffuser airflow)	Prefer Zone Primary Minimum Airflow	Ventilation Override Device	Unused OA requirement for zone	System Exhaust Airflow Prim Min Setpoint (Outdoor Required)	Exhaust On/Off	Zone Primary Minimum Airflow	Zone Primary Maximum Airflow	Zone Fan Airflow	Zone Fan Airflow	Global Zone Clg Load % (0% = heating, >1% equal cooling)	Manual Override for Zone Cooling Load %	Zone Cooling Load % (0% = heating, >1% equal cooling)	Zone primary airflow	Primary air fraction of supply air at zone condition analyzed	Prefer. Fraction of air recirculated locally at the zone that represents average RA	Manual Override Fraction of air recirculated locally at the zone that represents average RA	Fraction of air recirculated locally at the zone that represents average RA	Fraction of zone supply not directly recirc. from zone	Fraction of zone supply from fully mixed primary air	Fraction of zone OA not directly recirc. from zone	Unused OA fraction required in supply air to zone	Unused OA fraction required in primary air to zone	Uncorrected OA req'd as a fraction of primary SA	Zone Ventilation Efficiency (App A Method)	System Ventilation Efficiency (App A Method)	Unused OA fraction required in primary air to critical zone	Outdoor Air Intake Flow required to System	OA intake req'd as a fraction of primary SA	Unused OA in Primary SA (Fresh OA + Recirc OA)	Effective OA Fraction (System Critical Vent Ratio)
	0.20	0.20	0.14		0.93	0.20	6200	0.15	8,730	0.20		42680	24120		6705	42330		35710	42680	0	0				42680								0.20	0.20	0.14		0.93	0.20	6200	0.15	8,730	0.20
1.00	0.13	0.13		1.00							Single Duct	1030	680	NA	135	680	On	680	1030		-	100%		100%	1030	1.00	1.00		1.00	1.00	1.00	1.00	0.13	0.13		1.00						
											Single Duct		0	NA	-	0	On	0	0		-																					
											Single Duct		0	NA	-	0	On	0	0		-																					
1.00	0.18	0.18		0.95							Single Duct	610	610	NA	110	610	Off	610	610		-	100%		100%	610	1.00	1.00		1.00	1.00	1.00	1.00	0.18	0.18		0.95						
											Single Duct		0	NA	-	0	On	0	0		-																					
1.00	0.19	0.19		0.94							Single Duct	600	600	NA	115	600		600	600		-	100%		100%	600	1.00	1.00		1.00	1.00	1.00	1.00	0.19	0.19		0.94						
1.00	0.18	0.18		0.96							Single Duct	560	560	NA	100	560	On	560	560		-	100%		100%	560	1.00	1.00		1.00	1.00	1.00	1.00	0.18	0.18		0.96						
1.00	0.16	0.16		0.98							Single Duct	720	720	NA	115	720	On	720	720		-	100%		100%	720	1.00	1.00		1.00	1.00	1.00	1.00	0.16	0.16		0.98						
											Single Duct		0	NA	-	0		0	0		-																					
1.00	0.14	0.14		1.00							Single Duct	2240	1120	EXHAUST STATUS	305	2240	On	2240	2240		-	100%		100%	2240	1.00	1.00		1.00	1.00	1.00	1.00	0.14	0.14		1.00						
											Single Duct		0	EXHAUST STATUS	-	0	On	0	0		-																					
											Single Duct		0	EXHAUST STATUS	-	0	On	0	0		-																					
1.00	0.08	0.08		1.05							Single Duct	480	240	NA	40	480		240	480		-	100%		100%	480	1.00	1.00		1.00	1.00	1.00	1.00	0.08	0.08		1.05						
1.00	0.15	0.15		0.99							Single Duct	1200	600	NA	180	1200	On	1200	1200		-	100%		100%	1200	1.00	1.00		1.00	1.00	1.00	1.00	0.15	0.15		0.99						
1.00	0.16	0.16		0.97							Single Duct	400	200	NA	65	400		200	400		-	100%		100%	400	1.00	1.00		1.00	1.00	1.00	1.00	0.16	0.16		0.97						
1.00	0.18	0.18		0.96							Single Duct	310	155	NA	55	310	On	310	310		-	100%		100%	310	1.00	1.00		1.00	1.00	1.00	1.00	0.18	0.18		0.96						
1.00	0.20	0.20		0.93							Single Duct	440	220	NA	90	440	On	440	440		-	100%		100%	440	1.00	1.00		1.00	1.00	1.00	1.00	0.20	0.20		0.93						
1.00	0.16	0.16		0.98							Single Duct	500	500	EXHAUST STATUS	80	500		500	500		-	100%		100%	500	1.00	1.00		1.00	1.00	1.00	1.00	0.16	0.16		0.98						
1.00	0.16	0.16		0.98							Single Duct	1120	1120	NA	175	1120	On	1120	1120		-	100%		100%	1120	1.00	1.00		1.00	1.00	1.00	1.00	0.16	0.16		0.98						
1.00	0.15	0.15		0.99							Single Duct	1120	1120	NA	165	1120		1120	1120		-	100%		100%	1120	1.00	1.00		1.00	1.00	1.00	1.00	0.15	0.15		0.99						
1.00	0.10	0.10		1.04							Single Duct	2100	1050	NA	210	2100	On	2100	2100		-	100%		100%	2100	1.00	1.00		1.00	1.00	1.00	1.00	0.10	0.10		1.04						
1.00	0.14	0.14		1.00							Single Duct	1500	750	NA	210	1500	On	1500	1500		-	100%		100%	1500	1.00	1.00		1.00	1.00	1.00	1.00	0.14	0.14		1.00						
1.00	0.18	0.18		0.96							Single Duct	2640	1320	NA	470	2640		1320	2640		-	100%		100%	2640	1.00	1.00		1.00	1.00	1.00	1.00	0.18	0.18		0.96						
1.00	0.17	0.17		0.96							Single Duct	1040	520	NA	180	1040	On	1040	1040		-	100%		100%	1040	1.00	1.00		1.00	1.00	1.00	1.00	0.17	0.17		0.96						
1.00	0.20	0.20		0.94							Single Duct	1400	700	NA	275	1400		700	1400		-	100%		100%	1400	1.00	1.00		1.00	1.00	1.00	1.00	0.20	0.20		0.94						
1.00	0.20	0.20		0.94							Single Duct	1400	700	NA	275	1400	On	1400	1400		-	100%		100%	1400	1.00	1.00		1.00	1.00	1.00	1.00	0.20	0.20		0.94						
1.00	0.19	0.19		0.95							Single Duct	1400	700	NA	265	1400	On	1400	1400		-	100%		100%	1400	1.00	1.00		1.00	1.00	1.00	1.00	0.19	0.19		0.95						
1.00	0.13	0.13		1.01							Single Duct	2060	1030	NA	260	2060		1030	2060		-	100%		100%	2060	1.00	1.00		1.00	1.00	1.00	1.00	0.13	0.13		1.01						
1.00	0.19	0.19		0.95							Single Duct	1470	735	NA	275	1470	On	1470	1470		-	100%		100%	1470	1.00	1.00		1.00	1.00	1.00	1.00	0.19	0.19		0.95						
1.00	0.12	0.12		1.02							Single Duct	3260	1630	NA	385	3260		1630	3260		-	100%		100%	3260	1.00	1.00		1.00	1.00	1.00	1.00	0.12	0.12		1.02						
1.00	0.12	0.12		1.02							Single Duct	3260	1630	NA	385	3260	On	3260	3260		-	100%		100%	3260	1.00	1.00		1.00	1.00	1.00	1.00	0.12	0.12		1.02						
1.00	0.19	0.19		0.94							Single Duct	1600	800	NA	310	1600	On	1600	1600		-	100%		100%	1600	1.00	1.00		1.00	1.00	1.00	1.00	0.19	0.19		0.94						
1.00	0.20	0.20		0.94							Single Duct	1400	700	NA	275	1400		700	1400		-	100%		100%	1400	1.00	1.00		1.00	1.00	1.00	1.00	0.20	0.20		0.94						
1.00	0.20	0.20		0.94							Single Duct	1400	700	NA	275	1400	On	1400	1400		-	100%		100%	1400	1.00	1.00		1.00	1.00	1.00	1.00	0.20	0.20		0.94						
1.00	0.17	0.17		0.96							Single Duct	1600	800	NA	275	1600		800	1600		-	100%		100%	1600	1.00	1.00		1.00	1.00	1.00	1.00	0.17	0.17		0.96						
1.00	0.18	0.18		0.96							Single Duct	2640	1320	NA	470	2640	On	2640	2640		-	100%		100%	2640	1.00	1.00		1.00	1.00	1.00	1.00	0.18	0.18		0.96						
1.00	0.15	0.15		0.98							Single Duct	1180	590	NA	180	1180	On	1180	1180		-	100%		100%	1180	1.00	1.00		1.00	1.00	1.00	1.00	0.15	0.15		0.98						

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Sheet Title
VENTILATION CALCULATIONS

Sheet Number
M007

SPECIAL BALANCE NOTES:

GENERAL

THE FOLLOWING NOTES ARE PROVIDED AS PLUMBING, MECHANICAL AND MECHANICAL PIPING SCOPE REQUIRED FOR SPECIAL TEST AND BALANCE REQUIREMENTS. PLEASE NOTE THAT THIS IS NOT A COMPLETE TEST AND BALANCE PROCEDURE. THE TESTING ADJUSTING AND BALANCING (TAB) CONTRACTOR SHALL SUBMIT A TESTING PROCEDURES DRAFT REPORT, DECRIBING IN GREATER DETAIL WHO THEY WILL WORK WITH AND HOW THEY WILL ACCOMPLISH THE REQUIREMENTS INCLUDED HEREIN.

SEE THE DESCRIPTION OF OPERATIONS, SPECIFICATIONS, AND 2015 SEC FOR FURTHER INFORMATION ON TEST AND BALANCE REQUIREMENTS.

AHU'S:

1. SEE DESCRIPTION OF OPERATIONS FOR OUTSIDE AIR BALANCING PROCEDURE.
2. THE DESIGN HERTZ FOR THE AHU VFDS ARE ABOVE 60 HERTZ (~60-100 HERTZ) SO NEED TO MAKE SURE THESE DRIVES ARE NOT LIMITED TO 60 HERTZ.
3. AIRFLOW MONITORING STATIONS:·REPORT CALIBRATION MULTIPLIER OR K-FACTOR FOR EACH AIR MEASURING STATION. AFTER CALIBRATION MULTIPLIER IS INPUT INTO THE BMS, RETURN TO VERIFY THE MAX AND VERIFY MIN SETPOINT.·REPORT AIR MEASURING UNITS THAT ARE ABNORMAL. INSPECT AIR MEASURING UNIT AND DAMPER INSTALLATIONS.
4. TAB CONTRACTOR TO DETERMINE MINIMUM FAN SPEED, AND PRESSURE SETTING THAT CORRESPONDS TO MINIMUM REQUIRED AIRFLOW PER THE SUM OF THE MIN PRIMARY AIRFLOWS FOR THE VAVS ON EACH CORRESPONDING AHU.

OPERATIONAL MODES FOR BUILDING PRESSURIZATION:

1. GO THROUGH ALL FIVE SCENARIOS ON THE AIR BALANCE SCHEDULE: ECONOMIZER ON/OFF IN OCCUPIED MODE, ECONOMIZER ON/OFF IN UNOCCUPIED MODE, AND EMERGENCY POWER SETBACK MODE AND PRIOR TO THE FINAL REPORT SEND A DEFICIENCIES REPORT DETAILING PROPOSED SETTING AND BUILDING PRESSURES. WORK WITH THE CONTROL CONTRACTOR AND COMMISSIONING AGENT TO MODIFY LIMITS TO THE VARIOUS FAN SPEEDS AND DAMPER POSITION LIMITS. TESTING FOR THE FINAL REPORT SHALL INCLUDE BUILDING PRESSURES AND FINAL LIMITS FOR ALL FIVE SCENARIOS.
2. TAB CONTRACTOR TO DETERMINE MINIMUM AND MAXIMUM FAN SPEEDS THAT CORRESPONDS TO MINIMUM REQUIRED AIRFLOW PER RELIEF AND RETURN FAN SCHEDULES.

VAV BOXES:

1. FOR SINGLE DUCT VAV BOXES:·BALANCE DIFFUSERS AT MAXIMUM AIRFLOW.·REPORT CALIBRATION MULTIPLIER OR K-FACTOR FOR EACH VAV. AFTER CALIBRATION MULTIPLIER IS INPUT INTO THE BMS, RETURN TO VERIFY THE MAX AND VERIFY MIN SETPOINT.·REPORT VAV TERMINAL UNITS THAT ARE ABNORMAL. RECOMMEND INSPECTING FLOW RINGS AND DAMPER INSTALLATIONS.

HYDRONIC BALANCING:

1. ON HW AND CHW VERIFY REQUIRED DP SETPOINT FOR ADEQUATE FLOW TO THE AIR HANDLING UNITS AND VAV COILS. DETERMINE THE DP IN THE LOOP PRESSURE THAT PROVIDES MINIMUM FLOW FOR THE PUMP (APPROXIMATELY 10% FULL FLOW), WHILE ALSO ALLOWING MAXIMUM FLOW THROUGH THE AIR HANDLING UNITS.
2. ON HW AND CHW DETERMINE THE MINIMUM PUMP SPEED TO PROVIDE THE DP AT AWHP, THE WWHP, AND EACH OF THE BOILERS SEE THE CONTROL DECRIPTION OF OPERATIONS FOR ADDITIONAL REQUIREMENTS. NOTE A SEPARATE MINIMUM PUMP SPEED IS EXPECTED TO BE NECESSARY EACH OF THE FOUR MODULES IN THE AWHP.

PLUMBING DHWR BALANCING:

1. BALANCE DOMESTIC HOT WATER SYSTEM INITALLY ADJUSTING CIRCUIT SETTERS TO DESIGN FLOW.
2. BALANCE ALL DOMESTIC HOT WATER RECIRCULATION PUMPS.

TERMINAL SYSTEM BALANCING:

1. ALL LINEAR SLOT DIFFUSERS (AND A FEW MODULAR CORE DIFFUSERS) HAVE A DIRECTIONAL COMPONENT INDICATED ON THE PLANS. VERIFY AND SET DIRECTIONAL COMPONNENTS PRIOR TO AIR BALANCING.
2. THE EXISTING SUPPLY DUCT SYSTEM IS BECOMING THE RETURN AIR SYSTEM. NOTE RETURN AIRFLOW IS LESS THAN THE SUPPLY AIRFLOW TO ACCOUNT FOR PRESSURIZATION OF THE BUILDING. THE EXISTING RETURN DUCT GRILLES MUST BE INDIVIDUALLY BALANCED AT MAX FLOW. WHEN WALLS ARE OPEN ENSURE THAT THE EXISTING DAMPERS ARE FIXED 100% OPEN (OR HAVE BEEN PROPORTIONALLY BALANCED AS RECOMMENDED BY TAB CONTRACTOR) PRIOR TO THEM BECOMING INACCESSIBLE.
3. RETURN AIRFLOW IS LESS THAN THE SUPPLY AIRFLOW TO ACCOUNT FOR PRESSURIZATION OF THE BUILDING IN NEW PORTIONS OF THE BUILDING WHERE INDIVIDUAL SPACES ARE OPEN ABOVE CEILINGS, BALANCING OPENINGS VIA A DUCT TRAVERSE.

SOUND TRAP SCHEDULE

TAG #	ST-L1-1	ST-L1-2	ST-L1-3	ST-L1-4	ST-AT-1	ST-AT-2	ST-AT-3	ST-AT-4
PROJECT	SAAM	SAAM	SAAM	SAAM	SAAM	SAAM	SAAM	SAAM
BASIS OF DESIGN								
MANUFACTURER	VIBRO-ACOUSTICS	VIBRO-ACOUSTICS	VIBRO-ACOUSTICS	VIBRO-ACOUSTICS	VIBRO-ACOUSTICS	VIBRO-ACOUSTICS	VIBRO-ACOUSTICS	VIBRO-ACOUSTICS
MODEL	RD-LV-F1	RD-LV-F1	RD-LV-F1	RD-LV-F1	RD-ULV-F1	RD-ULV-F1	RD-ULV-F1	RD-ULV-F1
DESIGN PARAMETERS								
ASSOCIATED SYSTEM(S)	GENERATOR	GENERATOR	GENERATOR	GENERATOR	EXIST EF-05	EXIST EF-05	EXIST EF-05	EXIST EF-05
SYSTEM DESCRIPTION	EXHAUST	OUTDOOR AIR	OUTDOOR AIR	OUTDOOR AIR	EXHAUST	EXHAUST	EXHAUST	EXHAUST
LOCATION	OUTLET	INLET	INLET	INLET	INLET	INLET	INLET	INLET
CFM (OPERATING)	17551	6147	6147	6147	850	850	850	850
PHYSICAL DIMENSIONS								
OVERALL LENGTH (INCHES)	36"	36"	36"	36"	36"	36"	36"	36"
OVERALL WIDTH (INCHES)	112"	48"	48"	48"	36"	36"	36"	36"
OVERALL HEIGHT (INCHES)	72"	52"	52"	52"	12"	12"	12"	12"
TOTAL WEIGHT	-	-	-	-	-	-	-	-
PERFORMANCE DATA								
FACE AREA (SQ. FT.)	-	-	-	-	-	-	-	-
ENTERING VELOCITY (FPM - OPERATING)	313	342	342	342	283	283	283	283
STATIC PRESSURE DROP (OPERATING)	0.05	0.05	0.05	0.05	0.09	0.09	0.09	0.09
STATIC PRESSURE DROP (SMOKE CONTROL)	NA	NA	NA	NA	NA	NA	NA	NA
SOUND DIRECTION IN RELATION TO AIRFLOW	POSITIVE	POSITIVE	POSITIVE	POSITIVE	POSITIVE	POSITIVE	POSITIVE	POSITIVE
INSERTION LOSSES								
SOUND POWER REDUCTION	AT + 500 FPM	AT + 500 FPM	AT + 500 FPM	AT + 500 FPM	AT + 500 FPM	AT + 500 FPM	AT + 500 FPM	AT + 500 FPM
63	7	7	7	7	7	7	7	7
125	11	11	11	11	16	16	16	16
250	17	17	17	17	20	20	20	20
500	18	18	18	18	19	19	19	19
1000	21	21	21	21	26	26	26	26
2000	15	15	15	15	20	20	20	20
4000	15	15	15	15	17	17	17	17
8000	13	13	13	13	14	14	14	14
SPECIFICATIONS								
OUTER CASING	MIN. 22 GA GALV.	MIN. 22 GA GALV.	MIN. 22 GA GALV.	MIN. 22 GA GALV.	MIN. 22 GA GALV.	MIN. 22 GA GALV.	MIN. 22 GA GALV.	MIN. 22 GA GALV.
INTER CASING	MIN. 26 GA. GALVANIZED, PERFORATED BAFFLES	MIN. 26 GA. GALVANIZED, PERFORATED BAFFLES	MIN. 26 GA. GALVANIZED, PERFORATED BAFFLES	MIN. 26 GA. GALVANIZED, PERFORATED BAFFLES	MIN. 26 GA. GALVANIZED, PERFORATED BAFFLES	MIN. 26 GA. GALVANIZED, PERFORATED BAFFLES	MIN. 26 GA. GALVANIZED, PERFORATED BAFFLES	MIN. 26 GA. GALVANIZED, PERFORATED BAFFLES
SEAM TYPE	LOCKED FORMED, MASTIC FILLED SEAMS	LOCKED FORMED, MASTIC FILLED SEAMS	LOCKED FORMED, MASTIC FILLED SEAMS	LOCKED FORMED, MASTIC FILLED SEAMS	LOCKED FORMED, MASTIC FILLED SEAMS	LOCKED FORMED, MASTIC FILLED SEAMS	LOCKED FORMED, MASTIC FILLED SEAMS	LOCKED FORMED, MASTIC FILLED SEAMS
SPECIAL LINERS	MOISTURE CONTROL LINING REQUIRED	MOISTURE CONTROL LINING REQUIRED	MOISTURE CONTROL LINING REQUIRED	MOISTURE CONTROL LINING REQUIRED	MOISTURE CONTROL LINING REQUIRED	MOISTURE CONTROL LINING REQUIRED	MOISTURE CONTROL LINING REQUIRED	MOISTURE CONTROL LINING REQUIRED
MISC DATA								
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	1 YEAR	1 YEAR	1 YEAR	1 YEAR	1 YEAR	1 YEAR	1 YEAR	1 YEAR
FREIGHT	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES	YES	YES	YES	YES	YES	YES	YES
ELECTRONIC SUBMITTAL	YES	YES	YES	YES	YES	YES	YES	YES
ELECTRONIC INSTALL/O&M MANUAL	YES	YES	YES	YES	YES	YES	YES	YES
-	-	-	-	-	-	-	-	-

REMARKS:

AIR BALANCE SCHEDULE

ZONE	EQUIPMENT TAG	EMERGENCY MODE		UNOCCUPIED MIN OA MODE		UNOCCUPIED ECONO MODE		OCCUPIED MIN OA		OCCUPIED ECONO MODE	
		EA CFM	OACFM	EA CFM	OACFM	EA CFM	OA CFM	EA CFM	OA CFM	EA CFM	OA CFM
SOUTH EAST ADDITION	AHU-L1-3	-	500	-	2500	-	13545	-	6300	-	25390
ADMIN BREAK	FN-L1-8	0	-	0	-	0	-	520	-	520	-
KITCHEN EXHAUST	FN-L2-3	0	-	0	-	0	-	610	-	610	-
SOUTH EAST ADDITION RELIEF	FN-R-1	0	-	0	-	6700	-	-	-	16500	-
MEETING ROOM	FN-R-2	0	-	0	-	4320	-	4320	-	5280	-
PRESSURIZATION		500	CFM	2500	CFM	2525	CFM	850	CFM	2480	CFM
CENTER EXISTING SF	AHU-L1-2 (SF)	-	3000	-	4300	-	25,020	-	8250	-	42,880
CENTER EXISTING RF	AHU-L1-2 (RF)	-	-	-	-	18850	-	0	-	33550	-
LOCKER ROOMS	FN-L1-4	-	-	-	-	-	-	400	-	400	-
WORKSHOP/GLUE ROOM	FN-L1-9	700	-	700	-	700	-	700	-	700	-
CONSERVATION LAB	FN-L2-1	1230	-	1230	-	1230	-	2460	-	2460	-
PUBLIC TOILET	FN-L2-2	-	-	-	-	-	-	1470	-	1470	-
PRESSURIZATION		1070	CFM	2370	CFM	4240	CFM	3220	CFM	4300	CFM
AUDITORIUM	AHU-L1-3	-	-	-	-	-	-	-	2,270	-	6,200
AUDITORIUM RELIEF	AHU-L1-2 (RF)	-	-	-	-	-	-	2270	-	6200	-
PRESSURIZATION		0	CFM	0	CFM	0	CFM	0	CFM	0	CFM
WHOLE BUILDING PRESSURIZATION		1,570	CFM	4,870	CFM	6,765	CFM	4,070	CFM	6,780	CFM

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Revisions

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Sheet Title: MECHANICAL SCHEDULES - AIR BALANCE

Sheet Number: **M010**

AIR HANDLING UNIT SCHEDULE (SUPPLY & EXHAUST)

TAG #		AHU-L1-1	AHU-L1-2	AHU-L1-3
QUANTITY		1	1	1
BASIS OF DESIGN				
MANUFACTURER		CLIMATECRAFT	CLIMATECRAFT	CLIMATECRAFT
MAKE		CUSTOM AHU	CUSTOM AHU	CUSTOM AHU
LOCATION / INDOOR / OUTDOOR		INDOOR	INDOOR	INDOOR
SERVICE		ART SPACES	ART SPACES	AUDITORIUM
SUPPLY FAN				
SUPPLY FAN TYPE		PLUG	PLUG	PLUG
SUP. FAN CONFIG.(BLOW THRU/DRAW THRU)		DRAW THRU	DRAW THRU	DRAW THRU
TOTAL SUPPLY CFM (AT THE TERMINAL)		25390 CFM	42880 CFM	6200 CFM
SUPPLY E.S.P. (DOES NOT INCLUDE FILTER LOADING)		3.4"	3.4"	1.4"
FILTER LOADING STATIC PRESSURE		EQUAL TO INITIAL FOR EACH (MIN 0.25)	EQUAL TO INITIAL FOR EACH (MIN 0.25)	EQUAL TO INITIAL FOR EACH (MIN 0.25)
SUPPLY FAN T.S.P. (ESP + INT. LOSSES)		5.82	6.03"	3.06"
SUPPLY FAN MOTOR DIRECT DRIVE / BELT DRIVE		DIRECT	DIRECT	DIRECT
QUANTITY OF SUPPLY FANS		4	4	2
SUPPLY BHP		33.7	58.9	4.5
SUPPLY HP		40	80	6
SUPPLY FAN DESIGN RPM / MAX RPM		1885 / 2080	1938 / 2183	1817 / 2614
SUPPLY WHEEL SIZE		22.25	24.5	20
SUPPLY FAN SPRING ISO. W/ SEIS. SNUBBER		YES - 1" SPRING	YES - 1" SPRING	YES - 1" SPRING
ECONOMIZER		100% OSA / TBD	100% OSA / TBD	100% OSA / TBD
ULTRA LOW LEAK DAMPERS (OSA & SUPPLY)		YES	YES	YES
SUPPLY AIR FLOW MEASUREMENT STATION		FAN INLET CONE	FAN INLET CONE	FAN INLET CONE
DISCHARGE CONFIGURATION HOOD / LOUVER		NO	NO	NO
SUPPLY SMOKE DETECTOR (PROVIDED AND INSTALLED) (1)		BY EC	BY EC	BY EC
SUPPLY FAN ELECTRICAL				
SUPPLY MOTOR VOLTAGE/PHASE		460 / 3	460 / 3	460 / 3
SUPPLY MOTOR EFFICIENCY		CODE MIN.	CODE MIN.	CODE MIN.
MAGNETIC STARTERS		NO	NO	NO
SUPPLY MOTOR VFD (FACTORY PROVIDED AND INSTALLED)		YES	YES	YES
WIRING FROM VFD TO FAN MOTORS		BY FACTORY	BY FACTORY	BY FACTORY
SPARE SUPPLY MOTOR VFD		NO	NO	NO
INVERTER DUTY RATED MOTORS		YES	YES	YES
DISCONNECTS		BY FACTORY	BY FACTORY	BY FACTORY
120/1 SERVICE OUTLET WITHIN 25 FEET		BY FACTORY	BY FACTORY	BY FACTORY
EMERGENCY POWER		NO	NO	NO
E-POWER CFM		-	-	-
E-POWER BHP		-	-	-
STANDBY POWER		YES	YES	NO
STANDBY POWER CFM		8,000	20,000	-
STANDBY POWER BHP		10	25	-
STANDBY POWER MHP		30	40	-
SUPPLY SOUND POWER LEVELS BY OCTAVE BAND (DB)				
AHU SOUND POWER LEVELS INCLUDING MINIMUM AHU INSERTION LOSSES				
TOTAL DISCHARGE / CASING RADIATED	63	88/73	93/80	82/70
TOTAL DISCHARGE / CASING RADIATED	125	86/71	92/80	80/65
TOTAL DISCHARGE / CASING RADIATED	250	88/62	93/69	84/59
TOTAL DISCHARGE / CASING RADIATED	500	87/50	90/54	82/45
TOTAL DISCHARGE / CASING RADIATED	1000	87/36	87/39	80/31
TOTAL DISCHARGE / CASING RADIATED	2000	79/23	85/28	78/25
TOTAL DISCHARGE / CASING RADIATED	4000	79/23	82/27	72/23
TOTAL DISCHARGE / CASING RADIATED	8000	72/23	80/28	68/25
TOTAL DISCHARGE / CASING RADIATED	LwA	90/58	93/66	85/54
TOTAL DISCHARGE / CASING RADIATED	Lw	95/75	99/83	89/71
OUTSIDE AIRFLOW				
MINIMUM OUTSIDE AIR CFM		6300 CFM	8250 CFM	2270 CFM
OUTSIDE AIR FLOW MEASUREMENT STATION		YES	YES	YES
ENERGY CODE REQUIRED OUTSIDE AIR DAMPER		YES	YES	YES
SEPARATE OUTSIDE AIR MINIMUM DAMPER		NO	NO	NO
INTAKE HOOD / LOUVER		NO	NO	NO
LOUVER BY OTHERS		NA	NA	NA
RETURN / RELIEF / EXHAUST FAN				
RETURN / RELIEF FAN TYPE			RETURN	-
RET / REL FAN CONFIG.(BLOW THRU/DRAW THRU)			DRAW	-
TOTAL RETURN / RELIEF CFM (AT TERMINAL)			37,400	-
TOTAL RETURN / RELIEF CFM			40,200	-
RETURN / RELIEF E.S.P.			2.25"	-
RETURN / RELIEF FAN T.S.P. (ESP + INT. LOSSES)			2.55"	-
RETURN RELIEF MOTOR DIRECT DRIVE / BELT DRIVE			DIRECT	-
QUANTITY OF RETURN / RELIEF FANS ASSUMED			2	
RETURN / RELIEF BHP			23	
RETURN / RELIEF HP			30	
RETURN / RELIEF FAN DESIGN RPM / MAX RPM			924 / 1365	-
RETURN / RELIEF WHEEL SIZE			36	-
RET / REL FAN SPRING ISO. W/ SEIS. SNUBBER			1" SEISMIC	-
ULTRA LOW LEAK DAMPERS (EXHAUST INLET & DISCHARGE)			YES	-
DISCHARGE HOOD / LOUVER			-	-
LOUVER BY OTHERS		-	-	-
RETURN/RELIEF AIR FLOW MEASUREMENT STATION			NO	-
RETURN / RELIEF SMOKE DETECTOR (FIELD PROVIDED AND INSTALLED) (REMARK 1)			YES	-
TEMPERATURE RATING		-	-	-
RETURN / RELIEF / EXHAUST FAN ELECTRICAL				
RETURN / RELIEF VOLTAGE/PHASE			460 / 3	-
RETURN / RELIEF MOTOR EFFICIENCY			CODE MINIMUM	-
MAGNETIC STARTERS			NO	-
RETURN / RELIEF MOTOR VFD (FACTORY PROVIDED & INSTALLED)			YES	-
WIRING FROM VFD TO FAN MOTORS			BY FACTORY	-
SPARE RETURN / RELIEF MOTOR VFD			NO	-
INVERTER DUTY RATED MOTORS			YES	-
DISCONNECTS			BY FACTORY	-
120/1 SERVICE OUTLET WITHIN 25 FEET			BY EC	-
EMERGENCY POWER			NO	-
E-POWER CFM			-	-

AIR HANDLING UNIT SCHEDULE (SUPPLY & EXHAUST)

TAG #		AHU-L1-1	AHU-L1-2	AHU-L1-3
E-POWER BHP			-	-
STANDBY POWER			YES	-
STANDBY POWER CFM			20,000	-
STANDBY POWER BHP			10	-
AHU RETURN INLET SOUND POWER LEVELS BY OCTAVE BAND				
AHU SOUND POWER LEVELS INCLUDING MINIMUM AHU INSERTION LOSSES				
TOTAL INLET	63	76	84	66
TOTAL INLET	125	76	90	52
TOTAL INLET	250	81	90	49
TOTAL INLET	500	78	77	40
TOTAL INLET	1000	70	73	34
TOTAL INLET	2000	66	69	44
TOTAL INLET	4000	64	66	38
TOTAL INLET	8000	62	63	42
TOTAL INLET	LwA	78	84	49
TOTAL INLET	Lw	85	94	66
COOLING				
COOLING COIL TYPE		CHILLED WATER	CHILLED WATER	CHILLED WATER
CHILLED WATER COIL EWT/LWT		40°F / 52°F	40°F / 52°F	40°F / 52°F
COOLING COIL EAT (DB/WB)		75.4°F / 61.6°F	74.5°F / 61.2°F	76.8°F / 62.2°F
COOLING COIL LAT (DB/WB)		50.5°F / 50°F	50.5°F / 50°F	55°F / 53.9°F
LEAVING AHU TEMPERATURE (AFTER REHEAT)		55°F	55°F	55°F
COOLING MBH SENSIBLE/TOTAL		695/822	1150/1370	159/175
CHILLED WATER PROPYLENE GLYCOL %		25%	25%	25%
CHILLED WATER COIL GPM (SUM OF ALL COILS)		135	240	30
MIN QUANTITY OF CHILLED WATER COILS		2	3	1
MAX CHILLED WATER COIL WPD (FT HEAD)		13.4	12	18.1
MAX. COOLING COIL APD (IN W.C.)		.5	.6	.55
COOLING COIL ROWS/FPI		6/10	6/10	4/10.5
COOLING COIL FACE VELOCITY		435	482	350
DRAIN PAN (LOWER AND INTERMEDIATE)		STAINLESS	STAINLESS	STAINLESS
DRAIN PAN SLOPE (LOWER AND INTERMEDIATE)		2 WAY	2 WAY	2 WAY
HEATING				
HEATING COIL TYPE		HOT WATER	HOT WATER	HOT WATER
HOT WATER COIL EWT / LWT (DEG F)		120/105	120/105	120/105
HEATING COIL EAT (DB)		48°F	48°F	45°F
HEATING COIL LAT (DB)		60°F	60°F	85°F
HEATING COIL MBH		354	588	275
HEATING WATER PROPYLENE GLYCOL %		25%	25%	25%
HOT WATER COIL GPM (SUM OF ALL COILS)		50	60	40
MAX HOT WATER COIL WPD		8	2.2	7.9
MAX. HOT WATER COIL APD		0.05	0.07	0.12
QUANTITY OF HOT WATER COILS		2	3	2
HEATING COIL ROWS/FPI		1/6	1/8	2/12
HEATING COIL FACE VELOCITY		435	477	350
PRE-FILTER SPECIFICATIONS				
PRE-FILTER EFF. (%)		MERV 8	MERV 8	MERV 8
PRE-FILTER INITIAL DP / FINAL DP		.2/.4	.2/.4	.2/.4
PRE-FILTER SECTION(FLAT OR V-BANK)		FLAT	FLAT	FLAT
PRE-FILTER DEPTH (IN.)		2	2	2
PRE-FILTER FACE VELOCITY				
EXTRA SET OF PRE-FILTERS (SHIP NEAR END OF CONSTRUCTION)		YES	YES	YES
PRE-FILTER EFF. (%)-CONSTRUCTION		MERV 8	MERV 8	MERV 8
FILTER FRAME FACE CLIPS UPSTREAM LOAD		YES (FACE CLIP DIRECT TO 2ND FILTER OK)	YES (FACE CLIP DIRECT TO 2ND FILTER OK)	YES (FACE CLIP DIRECT TO 2ND FILTER OK)
PRE-FILTER MAGNEHELIC		-	-	-
PRE-FILTER PHOTOHELIC		YES	YES	YES
SECOND FILTER SPECIFICATIONS				
SECOND FILTER EFF. (%)		MERV 15	MERV 15	MERV 13
SECOND FILTER INITIAL DP / FINAL DP		.6/.9	.6/.9	.5/.8
SECOND FILTER SECTION(FLAT OR V-BANK)		FLAT	FLAT	FLAT
SECOND FILTER DEPTH (IN.)		12	12	6
SECOND FILTER FACE VELOCITY				
EXTRA SET OF SECOND FILTERS (SHIP NEAR END OF CONSTRUCTION)		NO	NO	NO
SECOND FILTER EFF. (%)-CONSTRUCTION		>95%	>95%	85-90%
FILTER FRAME FACE CLIPS UPSTREAM LOAD		YES	YES	YES
SECOND FILTER MAGNEHELIC		-	-	-
SECOND FILTER PHOTOHELIC		YES	YES	YES
THIRD FILTER SPECIFICATIONS				
THIRD FILTER EFF. (%) / TYPE		CARBON	CARBON	-
THIRD FILTER INITIAL DP / FINAL DP		.4/.4	.4/.4	-
THIRD FILTER SECTION(FLAT OR V-BANK)		AEROSTAR HEGA 3651	AEROSTAR HEGA 3651	-
THIRD FILTER DEPTH (IN.)		WITH DUSTING FILTER	WITH DUSTING FILTER	-
THIRD FILTER FACE VELOCITY		-	-	-
EXTRA SET OF THIRD FILTERS (SHIP NEAR END OF CONSTRUCTION)		NO	NO	-
THIRD FILTER EFF. (%)-CONSTRUCTION		-	-	-
FILTER FRAME FACE CLIPS UPSTREAM LOAD		YES	YES	-

AIR HANDLING UNIT SCHEDULE (SUPPLY & EXHAUST)

TAG #	AHU-L1-1	AHU-L1-2	AHU-L1-3
THIRD FILTER MAGNEHELIC	-	-	-
THIRD FILTER PHOTOHELIC	NO	NO	-
SOUND ATTENUATOR SPECIFICATION			
ASTM E477 CERTIFIED SOUND ATTENUATOR	NO	NO	YES
MINIMUM SOUND ATTENUATOR BASIS - MAKE & MODEL			CA 3HP-LF
DEDUCTIVE ALTERNATE FOR NON-ASTM E477 CERTIFIED SOUND ATTENUATOR			
CONSTRUCTION			
DOOR SWINGS	DOORS OPEN AGAINST PRESSURE	DOORS OPEN AGAINST PRESSURE	DOORS OPEN AGAINST PRESSURE
FACTORY WIRED DOOR SAFETY SWITCH	YES	YES	YES
OUTDOOR UNIT WITH WEATHER PROOFING	INDOOR	INDOOR	INDOOR
WALL THICKNESS	2" INSULATED	2" INSULATED	2" INSULATED
INSULATION DENSITY (LB./CU. FT.)	3	3	3
INNER LINE GAUGE	22	22	22
MIXING SECTION INNER WALL	NA	NA	NA
FILTER SECTION INNER WALL	SOLID GALVANIZED	SOLID GALVANIZED	SOLID GALVANIZED
CHW COIL INNER WALL PLUS FAN WALL	SOLID STAINLESS INNER	SOLID STAINLESS INNER	SOLID STAINLESS INNER
OTHER COIL SECTION(S) INNER WALL	SOLID GALVANIZED	SOLID GALVANIZED	SOLID GALVANIZED
SUPPLY FAN SECTION INNER WALL	SOLID GALVANIZED	PERFORATED METAL	PERFORATED METAL
DISCHARGE SECTION INNER WALL	SOLID GALVANIZED	PERFORATED METAL	PERFORATED METAL
CONICAL OUTLET FITTING	YES	YES	YES
ACCESS DOORS UPSTREAM AND DOWNSTREAM OF ALL COILS	YES	YES	YES
CHW & HR COIL CONNECTIONS OPPOSITE OF UNIT DOORS	YES	YES	YES
FLEX CONNECTION BETWEEN FAN AND FAN WALL	YES	YES	YES
QUANTITY OF ACCESS DOORS			
QUANTITY OF VIEW WINDOWS	ALL DOORS	ALL DOORS	ALL DOORS
QUANTITY OF MARINE LIGHTS	ALL SECTIONS	ALL SECTIONS	ALL SECTIONS
QUANTITY OF SHIPPING SECTIONS	TBD	TBD	TBD
CASINGS (BOLTED, SCREWED)	BOLTED	BOLTED	BOLTED
EXTERIOR PANEL GAUGE	16	16	16
BASE GAUGE	DIAMOND PLATE	DIAMOND PLATE	16
FACTORY CURB	NO	NO	NO
FACTORY BASE RAIL	YES	YES	YES
PHYSICAL DIMENSIONS			
OVERALL LENGTH	294"	479"	234"
OVERALL WIDTH	123"	135"	87"
HEIGHT (INCLUDING BASE RAIL)	105"	141"	44"
FACTORY CURB HEIGHT			
ADDITIONAL DISCHARGE PLENUM HEIGHT			
TOTAL WEIGHT (LESS SITE BUILT CURB)	14800	31060	5440
BASE / MOUNTING TYPE	8" BASE RAIL	8" BASE RAIL	4" BASE RAIL
UNIT VIBRATION ISOLATION FROM STRUCTURE	WAFFLE PAD MOUNT	WAFFLE PAD MOUNT	WAFFLE PAD MOUNT
UNIT COMPONENT LAYOUT (IN DIRECTION OF AIRFLOW)			
COMPONENT 1	MA PLENUM	OSA DAMPER	OSA DAMPER
COMPONENT 2	PRE-FILTER	PRE-FILTER	PRE-FILTER
COMPONENT 3	FINAL FILTER	FINAL FILTER	FINAL FILTER
COMPONENT 4	HEGA FILTER	HEGA FILTER	SOUND TRAP
COMPONENT 5	HW COIL	HW COIL	HW COIL
COMPONENT 6	CHW COIL	CHW COIL	CHW COIL
COMPONENT 7	FAN INLET DAMPERS	FAN INLET DAMPERS	FAN INLET DAMPERS
COMPONENT 8	SUPPLY FANS	SUPPLY FANS	SUPPLY FANS
COMPONENT 9	SOUND TRAP	SOUND TRAP	DISCHARGE DAMPER
COMPONENT 10	DISCHARGE DAMPER	DISCHARGE DAMPER	-
COMPONENT 11	-	-	-
MISCELLANEOUS			
FACTORY MOUNTED CONTROLS	YES	YES	YES
FACTORY CONDUIT FOR CONTROLS	YES	YES	YES
UL OR ETL AS AN ASSEMBLY	YES	YES	YES
AMCA 300 CERTIFIED TESTING	YES (ADD ALT)	YES (ADD ALT)	YES (ADD ALT)
FACTORY ACOUSTICAL TEST INCLUDING TRAVEL	YES	YES	YES
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	1 YEAR	1 YEAR	1 YEAR
FREIGHT	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES	YES	YES
ELECTRONIC SUBMITTAL	YES	YES	YES
ELECTRONIC INSTALL/O&M MANUAL	YES	YES	YES
-	-	-	-

1: SMOKE DETECTOR QUANTITY INDICATED IN SCHEDULE IS NOT ALL-INCLUSIVE. WHERE INDICATED IS BY E.C.
THIS IS TO REFERENCE WHERE SMOKE DETECTORS MAY BE REQUIRED BY SMC SECTION 607.
DESIGN OF SMOKE DETECTION SYSTEM IS BY E.C. ALL SMOKE DETECTORS PROVIDED BY E.C.
INSTALLATION OF DUCT DETECTORS IS BY E.C. UNDER THE SUPERVISION OF M.C.
ALL WIRING AND FIRE LIFE SAFETY INTERLOCKS ARE BY E.C.
FOR FURTHER INFORMATION SEE THE FOLLOWING SBC AND SMC CODE SECTIONS: SBC 716, SMC 607.

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SAM ASIAN ART MUSEUM

Asian Art Museum Expansion & Renovation

Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Construction Documents

Submittal

Revisions

No.	Date	Description
1	9/1/17	PERMIT CORRECTIONS 1

Drawn DD/DG
Checked JL/RSR
LMN Proj No 16028.01
Date 6/23/17

Sheet Title: MECHANICAL SCHEDULES - AHU

Sheet Number: M011

FAN SCHEDULE

TAG #	FN-L1-1	FN-L1-2	FN-L1-3	FN-L1-4	FN-L1-5	FN-L1-6	FN-L1-7	FN-L1-8	FN-L2-1	FN-L2-2	FN-L2-3	FN-L2-4	FN-L2-5	FN-L2-6	FN-L2-7	FN-L3-1	FN-R-1	FN-R-2	EF-05	EF-06
EXISTING/NEW/FUTURE	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	NEW	EXISTING	EXISTING
QUANTITY OF FANS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
BASIS OF DESIGN																				
MANUFACTURER	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	GREENHECK	AIRFLOW SYSTEMS	AIRFLOW SYSTEMS	US DRAFT CO	GREENHECK	GREENHECK	GREENHECK	
MODEL	LDP-120-VG	SQ-100-VG	SQ-90-VG	CSP-A710-VG	SQ-99-VG	SQ-90-VG	SQ-90-VG	CSP-A710-VG	SQ-140-VG	SQ-130-VG	SQ-99-VG	CSP-A510-VG	SP-A200	E-Z ARM II 4808	E-Z ARM II 4808	TRV-11	QEI-36-II	QEI-20-I	BDF-180-1-BM-X	
DESIGN DATA																				
AREA SERVED	TRANSFORMER	ELECTRICAL	PUMP ROOM	LOCKER RMS	WORKSHOP/ GLUE RM	MECHANICAL	MECHANICAL	ADMIN BREAK	CONSERVATION	PUBLIC TOILET RMS	KITCHEN	ELECTRICAL	ELECTRICAL	WETLAB	CONSERVATION LAB	BOILER FLUE VENT	AHU-L1-1 RELIEF	MEETING EXHAUST	ATTIC	ATTIC
EXHAUST / SUPPLY / RELIEF	EXHAUST	EXHAUST	EXHAUST	EXHAUST	EXHAUST	EXHAUST	EXHAUST	EXHAUST	EXHAUST	EXHAUST	EXHAUST	TRANSFER	TRANSFER	EXHAUST	EXHAUST	DRAFT INDUCER	RELIEF	EXHAUST	EXHAUST	EXHAUST
LOCATION	ROOF	ELECTRICAL RM 104	PUMP RM 103	STOR 114B	MECH N. 402	MECH CENTRAL 121	MECH SOUTH 118	CEILING	CEILING	MECH N. 402	CEILING	AV RM 222A	EVENT AV RM	WETLAB	CONSERVATION LAB	LEVEL 3 SOUTH MECH ROOM	ROOF	ROOF	ATTIC	GARDEN COURT ATTIC
QUANTITY OF FANS	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
FAN PROVIDED BY	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	EXISTING	EXISTING
FAN TYPE / SIZE DETAILS																				
FAN TYPE	CENTRIFUGAL	CABINET	CABINET	CABINET	CABINET	CABINET	CABINET	CABINET	CABINET	CABINET	CABINET	CABINET	CEILING	CENTRIFUGAL	CENTRIFUGAL	INLINE	MIXED-AXIAL	MIXED-AXIAL	CENTRIFUGAL	PROPELLER
CFM	1,600	750	400	400	700	400	400	520	2,240	1,470	610	340	110	200	200	870	19,150	5,280	850	3,600
AIR TEMPERATURE - NORMAL OPERATION	70°F	70°F	70°F	70°F	70°F	70°F	70°F	70°F	70°F	70°F	70°F	70°F	70°F	70°F	70°F	70°F	70°F	70°F	70° F	70° F
MAXIMUM OPERATING TEMPERATURE	85°F	85°F	85°F	85°F	85°F	85°F	85°F	85°F	85°F	85°F	85°F	85°F	85°F	85°F	85°F	85°F	85°F	85°F	85° F	85° F
SMOKE CONTROL CFM	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
AIR TEMPERATURE - SMOKE CONTROL OPERATION	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MINIMUM CFM FOR VFD OPERATION	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
E.S.P.	0.25	0.5	0.5	0.5	1.0	0.5	0.5	0.25	0.5	1.0	0.625	0.25	0.25	0.5	0.5	1	1.5	1	1	0.1
T.S.P.														3.5	3.5				-	
FAN RPM			1626	1012 (A)												1800				
BHP		0.11	0.08		0.35	0.08	0.08		0.52	0.47	0.20	0.02	-	-	-		6.46	1.19		
MHP (OR WATTS)	1/2	1/4	1/10	325 W	3/4	1/10	1/10	325 W	3/4	3/4	1/4	224 W	17 W	1.5	1.5	3/4	7.5	2	0.33	0.75
VOLTAGE/PHASE	120/1	120/1	120/1	120/1	120/1	120/1	120/1	120/1	120/1	120/1	120/1	120/1	120/1	208/1	208/1	208/1	460/3	460/3	208/1	208/1
MOTOR EFFICIENCY	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	-	CODE MIN.	CODE MIN.	-	-
MOTOR RPM																				
TWO SPEED MOTOR/PONY MOTOR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
MOTOR VFD RATED (INVERTER DUTY)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES		
MOTOR TYPE (ODP/TEFC/EXPLOSION PROOF/OTHER)	ECM	ECM	ECM	ECM	ECM	ECM	ECM	ECM	ECM	ECM	ECM	ECM	ODP	ODP	ODP	ECM	ODP	ODP		
ELECTRICAL DATA																				
DISCONNECT	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	INTEGRAL W/ VFD	INTEGRAL W/ VFD		
MANUAL STARTER (PROVIDED & INSTALLED BY EC)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
MAGNETIC STARTER (PROVIDED & INSTALLED BY EC)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
MAGNETIC STARTER MODEL GREENHECK MS-1P (FURNISH BY MC, INSTALL BY EC)	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	NO	NO		
VFD/MS-1P MOUNTED AND WIRED BY TO MOTORS	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC		
VFD (PROVIDED BY M.C. & INSTALLED BY EC)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES		
VFD FUSED DISCONNECT BY (E.C./FACTORY)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	FACTORY	FACTORY		
VFD/MS-1P MOUNTED AND WIRED BY TO MOTORS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	BY EC	BY EC		
VFD MANUFACTURER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	DANFOSS GRAHAM	DANFOSS GRAHAM		
VFD MODEL	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	VLT FC 100	VLT FC 100		
VFD BYPASS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
VFD INPUT LINE REACTOR	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
VFD OUTPUT L.C. FILTER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
VFD NEMA ENCLOSURE OPTION	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
VFD OUTPUT L.C. FILTER	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
VFD BMS INTERFACE CARD	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	YES	YES		
120/1 SERVICE OUTLET WITHIN 25 FEET	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC		
EMERGENCY POWER	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
STANDBY POWER	NO (B)	YES	NO	NO	YES	NO	NO	NO	YES	NO	NO	NO	NO	NO	NO	YES	NO	NO		
SMOKE DETECTOR (REMARK 1)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
CONTROL DATA																				
TYPE OF CONTROL	STAND ALONE	STAND ALONE	STAND ALONE	BMS	BMS	STAND ALONE	STAND ALONE	BMS	BMS	BMS	BMS	BMS	BMS	BMS	BMS	BOILER	BMS	BMS		
PART OF SMOKE CONTROL SYSTEM	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
WALL SWITCH & WIRING	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES BY BMS	YES BY BMS	NO	NO	NO		
LINE VOLTAGE T-STAT (MC PROVIDE, EC INSTALL)	T-STAT (2)	T-STAT	T-STAT	-	-	T-STAT	T-STAT		-	-	-	-	-	-	-	-	-	-		
BMS ROOM TEMPERATURE SENSOR (BMS SENSOR, NO)	NO	NO	NO	BMS SENSOR	BMS SENSOR	NO	NO	BMS SENSOR	BMS SENSOR	BMS SENSOR	BMS SENSOR	BMS SENSOR	BMS SENSOR	NO	NO	NO	BMS SENSOR	BMS SENSOR		
SPEED CONTROL (CONTROLLER BY MC, BY BMS, BY BOILER)	BY MC	BY MC	BY MC	NO	BY MC	BY MC	BY MC	BY MC	BY BMS	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BOILER	NO	NO		
BACKDRAFT DAMPER IN FAN	NO	NO	YES	YES	NO	YES	YES	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
BACKDRAFT DAMPER/MOTORIZED DAMPER	NO	MD INTERLOCK	MD INTERLOCK	MD INTERLOCK	MD INTERLOCK	MD INTERLOCK	MD INTERLOCK	MD INTERLOCK	MD INTERLOCK	MD INTERLOCK	MD INTERLOCK	NO	NO	NO	NO	NO	MD INTERLOCK	MD INTERLOCK		
CO SENSOR/NO2 SENSOR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
EC TO INSTALL 120V PRESSURE SWITCH (BY MC)	YES	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
TIMECLOCK OR BMS START/STOP	NO	NO	NO	BY C.C.	BY C.C.	NO	NO	BY C.C.	BY C.C.	BY C.C.	BY C.C.	BY C.C.	BY C.C.	BY C.C.	BY C.C.	BY C.C.	BY C.C.	BY C.C.		
SAIL SWITCH AND TIME DELAY	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
WARNING LIGHT	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
SPECIFICATION DATA																				
DIRECT DRIVE/BELT DRIVE	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	DIRECT	-	DIRECT	DIRECT	DIRECT	BELT	BELT		
DUAL BELT (1.5 X MIN)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
ADJUSTABLE PITCH/FIXED PITCH SHEAVE	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	ADJUSTABLE	ADJUSTABLE		
FAN CLASS	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA		
SITE BUILT CURB OR SLEEPERS BY OTHERS	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES		
WALL HOUSING	YES	NO										NO	NO	NO	NO					
INLET BELL	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
OSHA INLET SCREEN	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	NO		
INLET HOOD WITH SCREEN (FIELD BUILT)	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO		
FAN MOUNTING LOCATION (INDOOR, OUTDOOR, ETC.)	OUTDOOR	INDOOR	INDOOR	INDOOR	INDOOR	INDOOR	INDOOR	INDOOR	INDOOR	INDOOR	INDOOR	INDOOR	INDOOR	INDOOR	INDOOR	INDOOR	OUTDOOR	OUTDOOR		
VERTICAL OR HORIZONTAL DISCHARGE ORIENTATION	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL	HORIZONTAL		
MOUTING CONFIGURATION (HUNG, CURB, FLOOR, ETC.)	CURB	HUNG	HUNG	HUNG	HUNG	HUNG	HUNG	HUNG	HUNG	HUNG	HUNG	HUNG	HUNG	HUNG	HUNG	HUNG	CURB	CURB		
MOTOR MOUNTING LOCATION	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	SIDE	TOP	TOP		
ISOLATION TYPE (NEOPRENE, SPRING)	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX	SEE TIEDOWN MATRIX		
FLEX CONNECTOR	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	NO	YES	YES		
BELT GUARD / MOTOR COVER / INSPECTION DOOR	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	YES	YES		
PHYSICAL DATA																				
OVERALL HEIGHT	21	17	15	15	15	15	15	15	23	21	15	15	29"	29"	29"		63	31		
OVERALL HEIGHT ABOVE ROOF	35	-	-	-	-	-	-	-	-	-	-	-	-	-	-		75	43		
OVERALL WIDTH	28	17	15	18	15	15	15	18	23	21	15	17	43"	43"	43"		78	51		
OVERALL LENGTH	28	19	24	20	24	19	19	20	25	24	24	20	31"	31"	31"		66	38		
FAN WEIGHT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-		
MOTOR WEIGHT	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-		
TOTAL WEIGHT (LESS SITE BUILT CURB)	80	50	50	50	60	50	50	50	100	70	60	50	35	35	35		1632	384		
ACOUSTICAL DATA (AT NORMAL OPERATING CFM WITH SOUND LEVELS @ 5 FT FROM FAN)																				
63	80	65	76	58	79	76	76	58	75	74	80	-	-				78	71		
125	88	69	76	62	87	76	76	61	74	79	84	-	-				82	72		
250	83	58	64	45	71	64	64	44	76	73	66	-	-				74	65		
500	76	58	57	35	75	57	57	33	68	67	66	-	-				70	58		
1000	73	56	54	33	65	54	54	29	59	60	57	-	-				64	55		
2000	73	50	50	33	58	50	50	26	50	58	52	-	-				59	50		
4000	66	42	47	30	57	47	47	27	44	54	52	-	-				51	44		
8000	59	42	42	26	56	42	42	24	43	51	48	-	-				42	37		
LwA	81	61	64	48	76	64	64	46	70	70	71	-	-				72	62		
dBA	69	50	52	33	64	52	52	32	59	59	59	-	-				61	51		
SONES	18.6	5.2	7	1.2	14.3	7	7	1	9	9.9	11.1	0.6	1.1				11	5.9		
MISC. DETAILS																				
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		
FREIGHT	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE		
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		
ELECTRONIC SUBMITTAL	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		
ELECTRONIC INSTALL/O&M MANUAL	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES		
-																				

REMARKS:
1: SMOKE DETECTOR QUANTITY INDICATED IN BMS IS NOT ALL-INCLUSIVE. WHERE INDICATED IS BY E.C. THIS IS TO REFERENCE WHERE SMOKE DETECTORS MAY BE REQUIRED BY SMC SECTION 607.
DESIGN OF SMOKE DETECTION SYSTEM IS BY E.C. ALL SMOKE DETECTORS PROVIDED BY E.C.
INSTALLATION OF DUCT DETECTORS IS BY E.C. UNDER THE SUPERVISION OF M.C.
ALL WIRING AND FIRE LIFE SAFETY INTERLOCKS ARE BY E.C.
FOR FURTHER INFORMATION SEE THE FOLLOWING SBC AND SMC CODE SECTIONS: SBC 716, SMC 607.
2: DRAFT INDUCER SHALL BE FURNISHED BY THE BOILER MANUFACTURER AND SHALL BE BASED ON THE APPROVED SHOP DRAWINGS FOR THE BOILER FLUE.
3: FN-L2-6 AND FN-L2-7 SNORKEL ARMS SHALL INCLUDE BLOWER, BOOM, LIGHT, DAMPER, EXTRATOR ADAPTER, SWIVEL, RAG GUARD, ADM MOUNTING BRACKET, SUBMIT FOR OWNER APPROVAL.

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SAM ASIAN ART MUSEUM

Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Submittal: Construction Documents

Revisions

No	Date	Description
A	9/1/17	PERMIT CORRECTIONS 1
B	9/1/17	PERMIT CORRECTIONS 1

Drawn DD/DG
Checked JL/RSR
LMN Proj No 16028.01
Date 6/23/17

Sheet Title: MECHANICAL SCHEDULES - FANS

Sheet Number: **M012**

HUMIDIFIER SCHEDULE

TAG #	HU-L1-1 DT-L1-1	HU-L1-2 DT-L1-2	HU-L1-3 DT-L1-3	HU-L2-1 DT-L2-1	HU-L2-2 DT-L2-2	HU-L2-3 DT-L2-3	HU-L2-4 DT-L2-4	HU-L2-5 DT-L2-5	HU-L2-6 DT-L2-6	HU-L2-7 DT-L2-7	HU-L2-8 DT-L2-8	HU-L2-9 DT-L2-9
PRESENT/FUTURE	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT
SYSTEM	AHU-L1-2	AHU-L1-2	AHU-L1-1	AHU-L1-2	AHU-L1-2	AHU-L1-2	AHU-L1-2	AHU-L1-2	AHU-L1-2	AHU-L1-2	AHU-L1-1	AHU-L1-1
ZONE	VAV-L1-7/8	VAV-L1-9	VAV-L1-10	VAV-L2-4	VAV-L2-5	VAV-L2-6/7/8	VAV-L2-9	VAV-L2-10	VAV-L2-11	VAV-L2-12/13	VAV-L2-14/15	VAV-L2-3
BASIS OF DESIGN												
MANUFACTURER	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST
MODEL NUMBER- STEAM GENERATOR	VM-4	VM-2	VM-6	VM-4	VM-8	VM-6	VM-2	VM-2	VM-2	VM-8	VM-12	VM-25
TYPE - DISPERSION	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE
SPECIFICATIONS												
LOCATION	BASEMENT	BASEMENT	BASEMENT	L1 MECH ROOM	L1 MECH ROOM	L1 MECH ROOM	L1 MECH ROOM	L1 MECH ROOM	L1 MECH ROOM	L1 MECH ROOM	L1 MECH ROOM	L1 MECH ROOM
SERVICE	RECEIVING	ART STORAGE	CORRIDOR	RECEIVING 202	CONSERVATION	LIB/STACKS/GC	HALLWAY 201	HALLWAY 200	WORKSHOP	ART STORAGE	CIRCULATION L2	MEETING ROOM
CONFIGURATION (SHELL & TUBE, PLATE & FRAME)												
AIR SIDE												
PRIMARY CFM	1210	560	1260	720	2240	2080	310	440	500	2240	2340	4800
DUCT SIZE (H X W)	12 X 12	10 X 10	14 X 14	12 x 12	14 X 20	14 X 20	10 X 10	10 X 10	10 X 10	14 X 20	14 X 20	16 X 32
ENTERING AIR DB	55F	60F	55F	60F	60F	55F	60F	55F	60F	55F	60F	55F
ENTERING AIR GRAINS LBA	48.5	48.5	40.0	48.5	48.5	48.5	48.5	48.5	48.5	48.5	40.0	40.0
LEAVING AIR DB	55.8	55.8	56.0	55.9	55.6	55.6	55.8	56.0	55.6	55.6	56.3	55.9
LEAVING AIR RELATIVE HUMIDITY	55.8	55.8	56.0	55.9	55.6	55.6	55.8	56.0	55.6	55.6	56.3	55.9
DESIRED SPACE CONDITION	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH
DESIGN LOAD	9.1	4.2	16.4	5.4	16.9	15.7	2.3	3.3	3.8	16.9	30.5	62.6
LOSS (30FT EQUIV LENGTH)	1.18	1.1	1.2	1.1	1.2	1.2	1.0	1.1	1.1	1.2	1.2	1.6
TOTAL LOAD	10.3	5.3	17.6	6.5	18.1	16.9	3.3	4.4	4.9	18.1	31.7	64.2
DESIGN STEAM PIPING LENGTH (FT)	30	30	30	30	30	30	30	30	30	30	30	30
MAX ABSORPTION DISTANCE (in)	32	32	32	32	32	32	32	32	32	32	32	32
ACTUAL ABSORPTION DISTANCE (in)	23	11	27	13	23	23	11	11	11	23	23	36
DISPERSION TUBE AND DRAIN PAN ARRANGEMENT												
DISPERSION TUBE TYPE	SINGLE TUBE W/ CD	SINGLE TUBE W/ CD	SINGLE TUBE	SINGLE TUBE W/ CD	SINGLE TUBE	SINGLE TUBE W/ CD	SINGLE TUBE	SINGLE TUBE W/ CD	SINGLE TUBE	SINGLE TUBE W/ CD	SINGLE TUBE	SINGLE TUBE
DRAIN PAN SIZE (L X W)	48 X 12	48 X 10	48 X 14	48 x 12	48 X 20	48 X 20	48 X 10	48 X 10	48 X 10	48 X 20	48 X 20	48 X 32
STEAM												
STEAM SOURCE	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC
GENERATOR CONTROL	SCR	SCR	SCR	SCR	SCR	SCR	SCR	SCR	SCR	SCR	SCR	SCR
CAPACITY LBS/HR	12.0	6.0	18.0	6.0	18.0	18.0	6.0	0.0	6.0	18.0	18.0	63.0
ELECTRICAL DATA												
DISCONNECT	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC
POWER	460/3	277/1	460/3	277/1	460/3	460/3	277/1	277/1	277/1	460/3	460/3	460/3
KW	4	2	6	2	6	6	2	2	2	6	6	21
FULL LOAD AMPS	7.2*	7.2	10.8*	7.2*	14.4*	10.8*	7.2	7.2	7.2	14.4*	14.4	30.1
EMERGENCY POWER	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
STANDBY POWER	NO	YES	NO	NO	YES	YES	NO	NO	YES	YES	NO	NO
PHYSICAL DIMENSIONS												
SOFTENED WATER INLET SIZE & CONNECTION TYPE	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT
DISPERSION TUBE DRAIN SIZE & CONNECTION TYPE	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.
STEAM PIPING SIZE & CONNECTION TYPE	1 1/2" HOSE	1 1/2" C.U.	1 1/2" C.U.	1 1/2" HOSE	1 1/2" HOSE	1 1/2" C.U.	1 1/2" HOSE	1 1/2" C.U.	1 1/2" HOSE	1 1/2" C.U.	1 1/2" C.U.	2" C.U.
HUMIDIFIER DRAIN SIZE & CONNECTION TYPE	3/4" DN20	3/4" DN20	3/4" DN20	3/4" DN20	3/4" DN20	3/4" DN20	3/4" DN20	3/4" DN20	3/4" DN20	3/4" DN20	3/4" DN20	3/4" DN21
DRAIN MATERIAL TYPE	C.U.	C.U.	C.U.	C.U.	C.U.	C.U.	C.U.	C.U.	C.U.	C.U.	C.U.	C.U.
MIN. CLEARANCE, IN. (BOTTOM/LEFT/RIGHT/TOP/FRONT)	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")
DRAIN COOLER	YES	NO	YES	YES	NO	NO	YES	NO	NO	YES	NO	YES
WATER VOLUME (GALLONS)												
SUPPORT TYPE	FLOOR PEDESTAL	FLOOR PEDESTAL	WALL	WALL	WALL	WALL	FLOOR PEDESTAL	WALL	FLOOR PEDESTAL	WALL	WALL	WALL
HUMIDIFIER LENGTH x WIDTH x HEIGHT	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19
SHIP WEIGHT	82	82	90	82	90	90	82	82	82	90	90	97
OPERATING WEIGHT	97	97	124	97	124	124	97	97	97	124	124	154
MISC DATA												
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
FREIGHT	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
ELECTRONIC SUBMITTAL	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
ELECTRONIC INSTALL/O&M MANUAL	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

TAG #	HU-L3-1 DT-L3-1	HU-L3-2 DT-L3-2	HU-L3-3 DT-L3-3	HU-L3-4 DT-L3-4	HU-L3-5 DT-L3-5	HU-L3-6 DT-L3-6	HU-L3-7 DT-L3-7	HU-L3-8 DT-L3-8	HU-L3-9 DT-L3-9	HU-L3-10 DT-L3-10	HU-L3-11 DT-L3-11
PRESENT/FUTURE	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT	PRESENT
SYSTEM	AHU-L1-2	AHU-L1-2	AHU-L1-2	AHU-L1-2	AHU-L1-2	AHU-L1-2	AHU-L1-2	AHU-L1-2	AHU-L1-1	AHU-L1-1	AHU-L1-1
ZONE	VAV-L3-1/2	VAV-L3-3/4	VAV-L3-5/6/7/9	VAV-L3-8	VAV-L3-10	VAV-L3-11	VAV-L3-12/13/14/15	VAV-L3-16/17	VAV-L3-18/19	VAV-L3-20	VAV-L3-21
BASIS OF DESIGN											
MANUFACTURER	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST	VAPORMIST
MODEL NUMBER- STEAM GENERATOR	VM-12	VM-10	VM-10	VM-6	VM-10	VM-10	VM-16	VM-10	VM-16	VM-14	VM-21
TYPE - DISPERSION	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE
SPECIFICATIONS											
LOCATION	L1 MECH ROOM	MEZZANINE	MEZZANINE	MEZZANINE	MEZZANINE	MEZZANINE	MEZZANINE	MEZZANINE	L3 MECH ROOM	L3 MECH ROOM	L3 MECH ROOM
SERVICE	MAIN LOBBY	EXHIBIT N1,2	EXHIBIT N3,4,5,7	EXHIBIT N6	GARDEN COURT	GARDEN COURT	EXHIBIT S3,4,5,6	EXHIBIT S1,2	CORRIDOR	EXHIBIT S7	EXHIBIT S8
CONFIGURATION (SHELL & TUBE, PLATE & FRAME)											
AIR SIDE											
PRIMARY CFM	4000	3680	3600	2060	3260	3260	5800	3520	3260	3000	3800
DUCT SIZE (H X W)	16 X 32	16 X 24	16 X 24	14 X 20	16 X 24	16 X 24	18 X 36	16 X 24	16 X 24	16 X 24	16 X 24
ENTERING AIR DB	55F	55F	55F	60F	60F	60F	55F	55F	55F	55F	55F
ENTERING AIR GRAINS LBA	48.5	48.5	48.5	48.5	48.5	48.5	48.5	48.5	40.0	40.0	40.0
LEAVING AIR DB	55.5	55.5	55.5	55.5	55.5	55.5	55.5	55.5	55.8	55.8	55.8
LEAVING AIR RELATIVE HUMIDITY	55.5	55.5	55.5	55.5	55.5	55.5	55.5	55.5	55.8	55.8	55.8
DESIRED SPACE CONDITION	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH	70F/50%RH
DESIGN LOAD	30.2	27.8	27.2	15.6	24.6	24.6	43.8	26.6	42.5	39.1	49.5
LOSS (30FT EQUIV LENGTH)	1.4	1.4	1.6	1.2	1.3	1.3	1.6	1.4	1.4	1.3	1.3
TOTAL LOAD	31.6	29.2	28.8	16.8	25.9	25.9	45.4	28.0	43.9	40.4	50.8
DESIGN STEAM PIPING LENGTH (FT)	30	30	30	30	30	30	30	30	30	30	30
MAX ABSORPTION DISTANCE (in)	32	32	32	32	32	32	32	32	32	32	32
ACTUAL ABSORPTION DISTANCE (in)	18	18	21	16	18	18	21	18	32	32	32
DISPERSION TUBE AND DRAIN PAN ARRANGEMENT											
DISPERSION TUBE TYPE	SINGLE TUBE W/ CD	SINGLE TUBE W/ CD	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE W/ CD	SINGLE TUBE	SINGLE TUBE	SINGLE TUBE
DRAIN PAN SIZE (L X W)	48 X 32	48 X 24	48 X 24	48 X 20	48 X 24	48 X 24	48 X 36	48 X 24	48 X 24	48 X 24	48 X 24
STEAM											
STEAM SOURCE	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC	ELECTRIC
GENERATOR CONTROL	SCR	SCR	SCR	SCR	SCR	SCR	SCR	SCR	SCR	SCR	SCR
CAPACITY LBS/HR	24.0	24.0	38.0	12.0	24.0	24.0	36.0	24.0	36.0	30.0	36.0
ELECTRICAL DATA											
DISCONNECT	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC	BY ELEC
POWER	460/3	460/3	460/3	460/3	460/3	460/3	460/3	460/3	460/3	460/4	460/3
KW	8	8	12	4	8	8	12	8	12	10	12
FULL LOAD AMPS	14.4	12.6*	12.6*	10.8*	12.6*	12.6*	19.2	12.6*	19.2	16.8	25.3
EMERGENCY POWER	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
STANDBY POWER	NO	YES	YES	YES	NO	NO	YES	YES	NO	NO	YES
PHYSICAL DIMENSIONS											
SOFTENED WATER INLET SIZE & CONNECTION TYPE	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT	1/4" C.U. NPT
DISPERSION TUBE DRAIN SIZE & CONNECTION TYPE	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.	3/4" C.U.
STEAM PIPING SIZE & CONNECTION TYPE	1 1/2" C.U.	1 1/2" HOSE	1 1/2" HOSE	1 1/2" HOSE	1 1/2" HOSE	1 1/2" HOSE	1 1/2" C.U.	1 1/2" C.U.	1 1/2" C.U.	1 1/2" C.U.	2" C.U'
HUMIDIFIER DRAIN SIZE & CONNECTION TYPE	3/4" DN22	3/4" DN23	3/4" DN24	3/4" DN25	3/4" DN26	3/4" DN27	3/4" DN28	3/4" DN29	3/4" DN30	3/4" DN31	3/4" DN32
DRAIN MATERIAL TYPE	C.U.	C.U.	C.U.	C.U.	C.U.	C.U.	C.U.	C.U.	C.U.	C.U.	C.U.
MIN. CLEARANCE, IN. (BOTTOM/LEFT/RIGHT/TOP/FRONT)	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")	(18"/12"/42"/12"/36")
DRAIN COOLER	YES	YES	YES	NO	YES	NO	NO	YES	NO	YES	NO
WATER VOLUME (GALLONS)											
SUPPORT TYPE	WALL	FLOOR PEDESTAL	FLOOR PEDESTAL	FLOOR PEDESTAL	FLOOR PEDESTAL	FLOOR PEDESTAL	FLOOR PEDESTAL	FLOOR PEDESTAL	WALL	WALL	WALL
HUMIDIFIER LENGTH x WIDTH x HEIGHT	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19	24 X 17 X 19
SHIP WEIGHT	90	90	95	82	90	90	95	90	95	95	95
OPERATING WEIGHT	124	124	141	97	124	124	141	124	141	141	141
MISC DATA											
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
FREIGHT	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
ELECTRONIC SUBMITTAL	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
ELECTRONIC INSTALL/O&M MANUAL	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

REMARKS:
*FOR WIRE SIZING THE HIGHEST LEG DRAW IS SHOWN DUE TO CURRENT IMBALANCE

GENERATORS CONFIGURED TO RECEIVE DI/RO WATER (MECH FLOAT)

ASSUMES INSULATED INTERCONNECTING PIPING FOR LOSS CALCULATION

STEAM PRESSURE GENERATED IS NEAR ATMOSPHERIC (only at several inches of water column)

DRISTEEM 'DRANEKOOLER' REQUIRED TO TEMPER HOTGENERATOR WATER UPON DRAIN CYCLES. A SINGLE DRANEKOOLER CAN TAKE 6GPM & MIXES 1:1 WITH BUILDING SUPPLY WATER. MAX CAPACITY IS 6GPM + 6GPM = 12GPM TO DRAIN
DRANEKOOLER CAN TAKE SEVERAL DRAINS INPUT AS LONG AS COMBINED FLOW DOESN'T EXCEED 6GPM

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SAM ASIAN ART MUSEUM

Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Construction Documents

Submittal

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Sheet Title
MECHANICAL SCHEDULES - HUMIDIFIERS

Sheet Number
M013

BOILER SCHEDULE

TAG #	B-1	B-2
BASIS OF DESIGN		
MANUFACTURER	HYDROTHERM	HYDROTHERM
MODEL NUMBER	KN10	KN10
DESIGN PARAMETERS		
SERVICE	HEATING HW	HEATING HW
LOCATION	BASEMENT MECH RM	BASEMENT MECH RM
ENTERING WATER TEMPERATURE	105°F	105°F
LEAVING WATER TEMPERATURE	145°	145°
NATURAL GAS/ELECTRIC	NATURAL GAS	NATURAL GAS
BOILER RATED HORSEPOWER	30	30
INPUT, MBH	1000	1000
OUTPUT, MBH	930	930
EFFICIENCY	93%	93%
CODE MINIMUM EFFICIENCY	75%	75%
DESIGN LOAD REQUIRED, MBH		0
SPECIFICATION DATA		
LISTED IN CERTIFICATION PROGRAM	YES	YES
HEAT EXCHANGER TYPE	CAST IRON	CAST IRON
HEAT EXCHANGER MAXIMUM WORKING PRESSURE	150 PSIG	150 PSIG
PRESSURE RELIEF VALVE PROVIDED WITH BOILER	YES	YES
PRESSURE RELIEF VALVE SETTING	TBD	TBD
GAS PRESSURE - NOMINAL	7" WG	7" WG
GAS PRESSURE - MINIMUM	4" WG	4" WG
GAS PRESSURE - MAXIMUM	14" WG	14" WG
CONDENSATE DRAIN & TRAP	NA	NA
PROVIDE CONDENSATE NEUTRALIZATION KIT	YES	YES
CONDENSATE NEUTRATIZATION KIT MAKE/MODEL	JM-20	JM-20
CONDENSATE NEUTRATIZATION KIT INLET x OUTLET SIZE	1/2"	1/2"
ISOLATION	SEE ISOLATION SCHEDULE	SEE ISOLATION SCHEDULE
ELECTRICAL DATA		
BOILER VOLTS/PHASE	120/1	120/1
BOILER CIRCUIT (AMPS)	5.5 FLA	5.5 FLA
BOILER BLOWER CIRCUIT (AMPS)	NA	NA
BOILER ASME CSD-1 SHUTDOWN WIRING	BY EC	BY EC
BOILER ASME CSD-1 SHUTDOWN PUSHBUTTONS	BY EC (TYP. 1)	BY EC (TYP. 1)
EMERGENCY POWER	NO	NO
STANDBY POWER	YES	YES
UNIT MOUNTED PUMP	NO	NO
PUMP TAG	CP-HW-5	CP-HW-6
PUMP HP	SEE PUMP SCHEDULE	SEE PUMP SCHEDULE
PUMP VOLTS/PHASE	SEE PUMP SCHEDULE	SEE PUMP SCHEDULE
PUMP CIRCUIT (AMPS)	SEE PUMP SCHEDULE	SEE PUMP SCHEDULE
SINGLE POINT POWER FOR BOILER & PUMP	SEE PUMP SCHEDULE	SEE PUMP SCHEDULE
DISCONNECT	SEE PUMP SCHEDULE	SEE PUMP SCHEDULE
120/1 SERVICE OUTLET WITHIN 25 FEET	SEE PUMP SCHEDULE	SEE PUMP SCHEDULE
CONTROL DATA		
BOILER TYPE	LOW PRESSURE	LOW PRESSURE
BOILER CONTROL TYPE	AUTOMATIC	AUTOMATIC
BOILER CATEGORY (SEATTLE CODE)	MAX INPUT 2500 KBTUH	MAX INPUT 2500 KBTUH
ASME CSD-1 GAS TRAIN PROVIDED WITH BOILER	YES	YES
BOILER STAGES OR CONTROL TYPE	5:1 TURNDOWN	5:1 TURNDOWN
UNIT MOUNTED CONTROLS	YES	YES
CONTROL WIRING (SEE DESCRIPTION OF OPERATIONS)	BY CC	BY CC
MODBUS INTERFACE	NO	NO
BACNET OR LON INTERFACE	YES	YES
ENABLE HARDWIRED CONTACT	BY CC	BY CC
PUMP START/STOP	FACTORY PROVIDED	FACTORY PROVIDED
GENERAL ALARM HARDWIRED CONTACT	BY CC	BY CC
TEMPERATURE SENSOR PROVIDED WITH BOILER	PROVIDED WITH BOILER - FIELD INSTALLED BY CC	PROVIDED WITH BOILER - FIELD INSTALLED BY CC
HWS OUTLET MOTORIZED ISOLATION VALVE (FACTORY OR FIELD INSTALLED AND WIRED)	NA	NA
FLOW SWITCH (FACTORY OR FIELD INSTALLED)	FACTORY INSTALLED	FACTORY INSTALLED
LOW WATER CUTOUT (FACTORY OR FIELD INSTALLED)	FACTORY INSTALLED	FACTORY INSTALLED
MINIMUM INLET TEMPERATURE CONTROL REQUIRED	YES	YES
COMBUSTION AIR & EXHAUST FLUE ARRANGEMENT		
COMBUSTION AIR INTAKE ARRANGEMENT	FROM EXTERIOR	FROM EXTERIOR
COMBUSTION AIR DUCT MATERIAL TYPE	AL-29-4C, BY MC	AL-29-4C, BY MC
COMBUSTION AIR MAKE-UP INLET SIZE (IN. DIAMETER)	6" RD	6" RD
EXHAUST FLUE ARRANGEMENT	ROOF VENT	ROOF VENT
EXHAUST FLUE CODE DESCRIPTION	DIRECT VENT, POSITIVE PRESSURE, CATEGORY IV, UL 1738 SYSTEM	DIRECT VENT, POSITIVE PRESSURE, CATEGORY IV, UL 1738 SYSTEM
FLUE SIZE (IN. DIAMETER)	6" RD	6" RD
FLUE INSTALLATION	ROOF OUTLET WITH DRAIN SLOPE TO BOILER	ROOF OUTLET WITH DRAIN SLOPE TO BOILER
FLUE DUCT MATERIAL TYPE	CPVC, BY MC	CPVC, BY MC
PHYSICAL DIMENSIONS		
HW INLET SIZE & CONNECTION TYPE	(2) 2" NPT	(2) 2" NPT
HW OUTLET SIZE & CONNECTION TYPE	3" NPT	3" NPT
GAS CONNECTION SIZE & CONNECTION TYPE	1-1/2" NPT	1-1/2" NPT
CONDENSATE DRAIN SIZE & CONNECTION TYPE	1/2"	1/2"
CONDENSATE DRAIN MATERIAL TYPE	PVC OR CPVC	PVC OR CPVC
LENGTH x WIDTH x HEIGHT	53" x 35" x 75"	53" x 35" x 75"
MIN. CLEARANCE, IN. (REAR/LEFT/RIGHT/TOP/FRONT)	36"/24"/0"/24"/30"	36"/24"/0"/24"/30"
WEIGHT - SHIPPING	1300	1300
WATER VOLUME (GALLONS)	14	14
WEIGHT - OPERATING	1400	1400
MISC DATA		
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	5 YEAR	5 YEAR
FREIGHT	FOB JOBSITE	FOB JOBSITE
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES	YES
ELECTRONIC SUBMITTAL	YES	YES
ELECTRONIC INSTALL/O&M MANUAL	YES	YES
-	-	-

REMARKS:

SPLIT SYSTEM SCHEDULE

TAG #	FCHP-L1-1 CU-R-1	FCU-L1-2 CU-R-2	FCU-L1-3 CU-R-3
BASIS OF DESIGN			
MANUFACTURER	MITSUBISHI	MITSUBISHI	MITSUBISHI
INDOOR UNIT MODEL	PKA-A36KA	PKA-A24KA	PKA-A24KA
OUTDOOR UNIT MODEL	PUY-A36NHA4	PUZ-A24NHA3	PUZ-A24NHA3
OUTDOOR NOMINAL TONNAGE	3 TONS	2 TONS	2 TONS
AREA SERVED	BASEMENT SERVER ROOM	ELEV MACHINE 131	ELEV MACHINE 107
DESIGN PARAMETERS			
CFM	920 CFM	635 CFM	635 CFM
MINIMUM OSA CFM	-	-	-
FAN ESP	-	-	-
AMBIENT CONDENSER DB TEMPERATURE	95°F	95°F	95°F
COOLING ENTERING AIR (DB/WB)	80°F /67°F	80°F /67°F	80°F /67°F
COOLING INDOOR AIR TEMPERATURE (DB)	70 °F	80°F	80°F
OUTDOOR AIR (DB)	86°F	82°F	82°F
EQUIPMENT SENSIBLE BTUH COOLING CAPACITY			
EQUIPMENT TOTAL BTUH COOLING CAPACITY	34.2 MBH	24.0 MBH	24.0 MBH
HEATING INDOOR AIR TEMPERATURE (DB)	-	70°F	70°F
HEATING OUTDOOR AIR TEMPERATURE (DB)	-	22°F	22°F
EQUIPMENT TOTAL MBH HEATING CAPACITY	-	26.0 MBH	26.0 MBH
REFRIGERATION PIPING LINE LENGTH (FT)			
ELECTRICAL DATA - INDOOR UNIT			
FAN MOTOR HP			
MCA (NOTE 4)	POWERED FROM OUTDOOR UNIT (NOTE 10)	POWERED FROM OUTDOOR UNIT (NOTE 10)	POWERED FROM OUTDOOR UNIT (NOTE 10)
MAX. FUSE SIZE			
VOLTAGE/PHASE			
AUXILIARY HEAT KW	N/A	N/A	N/A
HEATER PART #	N/A	N/A	N/A
SINGLE POINT POWER CONNECTION FAN + HEAT OPTION	YES	YES	YES
DISCONNECT	BY E.C.	BY E.C.	BY E.C.
120/1 SERVICE OUTLET WITHIN 25 FEET	BY E.C.	BY E.C.	BY E.C.
RETURN AIR SMOKE DETECTOR (NOTE 2)	NO	NO	NO
ELECTRICAL DATA - OUTDOOR UNIT			
MCA (NOTE 4)	25 MCA	18 MCA	18 MCA
MAX. FUSE SIZE	30	25	25
VOLTAGE/PHASE	208/1	208/1	208/1
DISCONNECT	BY E.C.	BY E.C.	BY E.C.
120/1 SERVICE OUTLET WITHIN 25 FEET	BY E.C.	BY E.C.	BY E.C.
CONTROLS			
CONTROL	PROGRAMMABLE T-STAT	PROGRAMMABLE T-STAT	PROGRAMMABLE T-STAT
EMERGENCY POWER	NO	NO	NO
STANDBY POWER	YES	YES	NO
SPECIFICATIONS			
LISTED IN CERTIFICATION PROGRAM	YES - AHRI	YES - AHRI	YES - AHRI
AHRI CERTIFIED VS. RATED IN ACCORDANCE	CERTIFIED	CERTIFIED	CERTIFIED
CODE MIN COOLING EFFICIENCY	11 SEER	11 SEER	11 SEER
UNIT COOLING EFFICIENCY	14 SEER	17 SEER	17 SEER
CODE MIN HEATING EFFICIENCY	-	7.7 HSPF	7.7 HSPF
UNIT HEATING EFFICIENCY	-	10.8 HSPF	10.8 HSPF
OSA ECONOMIZER (NOTE 7)	NO - NOTE 9	NO - NOTE 9	NO - NOTE 9
LOW AMBIENT CONTROL	NO	NO	NO
CRANKCASE HEATER	NO	NO	NO
CONDENSATE PUMP (NOTE 1 & 6)	YES (NOTE 6)	YES (NOTE 6)	YES (NOTE 6)
ISOLATION	SEE ISOLATION SCHEDULE	SEE ISOLATION SCHEDULE	SEE ISOLATION SCHEDULE
FILTER SIZE			
FILTRATION RATING (MERV)	MERV 4	MERV 4	MERV 4
PHYSICAL DATA - INDOOR UNIT			
EQUIPMENT WEIGHT (LBS)	46 LBS	46 LBS	46 LBS
LENGTH x WIDTH x HEIGHT (INCHES)	12x46x15	12x46x15	12x46x15
PHYSICAL DATA - OUTDOOR UNIT			
EQUIPMENT WEIGHT (LBS)	165	165	165
LENGTH x WIDTH x HEIGHT (INCHES)	14x38x37	14x38x37	14x38x37
MISC DATA			
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	YES	YES	YES
FREIGHT	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES	YES	YES
ELECTRONIC SUBMITTAL	YES	YES	YES
ELECTRONIC INSTALL/O&M MANUAL	YES	YES	YES
-			

REMARKS:

1: FAN COIL IS EQUIPPED WITH A FACTORY INSTALLED CONDENSATE LIFT PUMP (27") THAT IS ALSO CAPABLE OF SHUTTING OFF THE FAN COIL IF MOISTURE IS DETECTED. IF SHUTOFF SWITCH IS NOT PROVIDED WITH FAN COIL, MC TO PROVIDE CONDENSATE OVERFLOW SWITCH THAT SHALL SHUT DOWN THE FAN COIL IF MOISTURE IS DETECTED.

2: SMOKE DETECTOR QUANTITY INDICATED IN SCHEDULE IS NOT ALL-INCLUSIVE. WHERE INDICATED IS BY E.C. THIS IS TO REFERENCE WHERE SMOKE DETECTORS MAY BE REQUIRED BY IMC SECTION 606. DESIGN OF SMOKE DETECTION SYSTEM IS BY E.C. ALL SMOKE DETECTORS PROVIDED BY E.C. INSTALLATION OF DUCT DETECTORS IS BY E.C. UNDER THE SUPERVISION OF M.C. ALL WIRING AND FIRE LIFE SAFETY INTERLOCKS ARE BY E.C. FOR FURTHER INFORMATION SEE THE FOLLOWING SBC AND SMC CODE SECTIONS: SBC 716 AND SMC 607.

3: AUXILIARY HEATER KW REFERS TO KW REQUIRED TO MEET THE HEATING CAPACITY.HEAT. PROVIDE HEATER MODEL EQUAL TO OR GREATER THAN AUXILIARY KW REQUIRED.

4: MCA REFERS TO OVERALL UNIT MCA, INCLUDING AUXILIARY HEAT REQUIRED.

5: FAN COIL ECONOMIZER MIXING BOXES ARE TO BE FACTORY ASSEMBLED WITH CONTROLS, MANUFACTURED BY MICROMETL (OR EQUIV)

6: FAN COIL UNIT DOES NOT COME WITH FACTORY MOUNTED CONDENSATE PUMP. PROVIDE ASPEN MINI AQUA CONDENSATE PUMP WITH RESOURCE CONSERVATION TECHNOLOGIES AG-9300-LG SECONDARY CONDENSATE SENSOR. CONDENSATE PUMP IS POWERED DIRECTLY FROM THE FAN COIL AND DOES NOT REQUIRE A SEPARATE POWER CONNECTION.

7: PROVIDE AFTERMARKET ECONOMIZER MIXING BOX COMPLETE WITH FACTORY CONTROLS MANUFACTURED BY MICROMETL (OR EQUIV)

8: ALL REFRIGERANT PIPING SHALL BE SIZED BY THE MANUFACTURER

9: ECONOMIZER NOT REQUIRED PER 2015 WSEC SECTION C403.3.1, EXCEPTION 10 OPTION A. (B)

10: INDOOR UNIT IS POWERED DIRECTLY FROM OUTDOOR UNIT. EC TO PROVIDE LINE VOLTAGE WIRING BETWEEN THE INDOOR AND OUTDOOR UNIT.

11: ALL LOW VOLTAGE CONTROL WIRING IS PROVIDED BY THE MC. LINE VOLTAGE POWER PROVIDED TO THE INDOOR AND OUTDOOR UNIT SEPARATELY BY EC.

EXPANSION TANK SCHEDULE

TAG #	ET-DW-1	ET-CHW-1	ET-HW-1
PROJECT	AAM RENOVATION	AAM RENOVATION	AAM RENOVATION
BASIS OF DESIGN			
MANUFACTURER	B & G	B & G	B & G
MODEL			
SPECIFICATIONS			
SERVICE	DOMESTIC HW	CHILLED WATER	HEATING HW
LOCATION	JAN CLOSET G20	MECH RM B18	MECH RM B18
ANTICIPATED SYSTEM VOLUME (GALLONS)	500 GALLONS	2000 GALLONS	2000 GALLONS
TANK FILL PRESS. (PSIG)	20 PSIG	20 PSIG	20 PSIG
MAXIMUM PRESSURE ASSUMED FOR TANK SIZING	45 PSIG	45 PSIG	45 PSIG
RELIEF VALVE SETTING (PSIG)	50 PSIG	50 PSIG	50 PSIG
TANK VOLUME (GALLONS)	10	68	68
ACCEPTANCE (GALLONS)	5	34	34
CONNECTION SIZE	1"	1"	1"
MAX WORKING PRESSURE (PSIG)	125 PSIG	125 PSIG	125 PSIG
MAX OPERATING TEMP. (°F)	240°F	240°F	240°F
HEIGHT	44"	44"	44"
DIAMETER	18"	24"	24"
SHIP WEIGHT (LBS)	25	250	250
WET WEIGHT (LBS)	75	850	850
ASME RATED	YES	YES	YES
MISC DATA			
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	1 YEAR	1 YEAR	1 YEAR
FREIGHT	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES	YES	YES
ELECTRONIC SUBMITTAL	YES	YES	YES
ELECTRONIC INSTALL/O&M MANUAL	YES	YES	YES
-	-	-	-

REMARKS:

HOT WATER COIL SCHEDULE

TAG #	HC-VAV-L2-3
PROJECT	AAM
PROVIDED BY	MC-WET
BASIS OF DESIGN	
MANUFACTURER	COLMAC COIL
MODEL NUMBER	BWL
SPECIFICATIONS	
LOCATION	LEVEL 2 - EVENT/MEETING
SERVICE	HYDRONIC HEATING COIL VAV-L2-3
CONFIGURATION (SHELL & TUBE, PLATE & FRAME)	PLATE AND FRAME
PLATE MATERIAL	AL 1100
ASME RATED	YES
FLUID SIDE	
FLUID DESCRIPTION	HOT WATER
FLUID EWT/LWT	120.0°F/101.6°F
FLUID MAXIMUM TEMPERATURE	120°F
FLUID MAXIMUM PRESSURE	125 PSIG
FLUID GLYCOL %	25% P.G.
FLUID FOULING FACTOR	-
FLUID GPM	16
FLUID PRESSURE DROP	13.77
FLUID INLET & OUTLET ID	1.25"/1.25"
AIR SIDE	
AIR DESCRIPTION	OUTSIDE AIR
AIR EAT/LAT	55.0°F/82.1°F
AIR MAXIMUM TEMPERATURE	85°F
AIR MAXIMUM PRESSURE	-
AIR FLOW	4800
AIR PRESSURE DROP	0.26 inWC
AIR DUCT SIZE	38x30
HEATING SELECTION	
HEAT EXCHANGED (MBH)	140.8 MBH
PHYSICAL DIMENSIONS	
NUMBER OF ROWS	2
FIN SPACING	10
FEEDS	4
PASSES	10
LENGTH x WIDTH x HEIGHT	46" x 6" x 33"H
SHIP WEIGHT	120 LBS
OPERATING WEIGHT	75 LBS
MISC.	
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	1 YEAR
FREIGHT	FOB JOBSITE
FILTER	YES
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES
ELECTRONIC SUBMITTAL	YES
ELECTRONIC INSTALL/O&M MANUAL	YES
-	-

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B	9/1/17	PERMIT CORRECTIONS 1

Drawn	DD/DG
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Sheet Title: MECHANICAL SCHEDULES - BOILER, SS, ET

Sheet Number: **M014**

VARIABLE AIR VOLUME TERMINAL BOX SCHEDULE (ART SPACES)

VAV ZONE NUMBER	AREA SERVED (ROOM WITH TEMP. SENSOR)	VAV BOX TYPE	MAKE	MODEL, SIZE, & SPECIFICATIONS				VALVE CFM VALUES						VENT	SOUND		HEATING HW COIL											ASSOCIATED	
				MODEL NUMBER	UNIT SIZE	HEATER TYPE	VAV BOX OPTIONS	CLG PRIM MAX (1)	PRIM MIN (2)	HTG PRIM MAX (1)	VALVE MIN (3)	MIN VENT (4)	MAX VENT (5)	MODULATION DEVICE (6,7)	ZONE NC CRITERIA	VAV NC LEVEL	AIR EDB (F)	DESIGN AIR LDB (F)	AIR LDB (F)	AIR DP (IN)	DESIGN MBH	ACTUAL MBH	COIL GPM	PIPE SIZE	WATER EWT (F)	WATER LWT (F)	WATER DP (FT)	COIL ROWS	AC UNIT OR AHU	REMARKS
VAV-L1-7	RECEIVING 100	SINGLE DUCT	NAILOR	D30HQW	8	HOT WATER COIL	STERI-LINER	610	610	610	180	145	-	NA	25	15	55.0	84.1	84.1	0.60	19.3	19.3	3.0	3/4"	120.0	101.8	0.55	3	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L1-8	BOH/STORAGE 105	SINGLE DUCT	NAILOR	D30HQW	8	HOT WATER COIL	STERI-LINER	600	600	600	180	140	-	NA	25	15	55.0	77.9	77.9	0.60	14.9	14.9	2.5	3/4"	120.0	104.6	0.79	2	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L1-9	ART STORAGE B11	SINGLE DUCT	NAILOR	D30HQW	7	HOT WATER COIL	STERI-LINER	560	560	560	125	120	-	NA	25	15	55.0	73.9	73.9	0.60	11.5	11.5	2.0	3/4"	120.0	95.1	0.19	2	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L1-10	CIRCULATION L1	SINGLE DUCT	NAILOR	D30HQW	8	HOT WATER COIL	STERI-LINER	600	600	600	180	85	-	NA	25	15	55.0	82.3	82.3	0.50	17.8	17.8	3.0	3/4"	120.0	113.1	5.29	2	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-4	LOADING RECEIVING L2	SINGLE DUCT	NAILOR	D30HQW	8	HOT WATER COIL	STERI-LINER	720	720	720	180	150	-	NA	25	15	55.0	85.7	85.7	0.60	24.0	24.0	4.0	1"	120.0	107.8	1.85	3	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-5	CONSERVATION LAB	SINGLE DUCT	NAILOR	D30HQW	16	HOT WATER COIL	STERI-LINER	2240	1120	2240	755	220	385	EXHAUST STATUS	25	21	55.0	90.8	82.8	1.15	87.0	67.6	11.0	1-1/4"	120.0	101.2	1.81	4	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-6	GARDENER CENTER	SINGLE DUCT	NAILOR	D30HQW	7	HOT WATER COIL	STERI-LINER	480	240	480	125	25	45	CO2 SENSOR	25	15	55.0	78.5	78.5	0.60	12.2	12.2	2.0	3/4"	120.0	101.5	0.38	2	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-7	LIBRARY 206	SINGLE DUCT	NAILOR	D30HQW	10	HOT WATER COIL	STERI-LINER	1200	600	1200	250	130	225	CO2 SENSOR	25	18	55.0	80.7	80.7	0.93	33.5	33.5	5.0	1"	120.0	105.5	2.72	3	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-8	LIBRARY STACKS 207	SINGLE DUCT	NAILOR	D30HQW	6	HOT WATER COIL	STERI-LINER	400	200	400	85	45	80	CO2 SENSOR	25	15	55.0	73.1	73.1	0.60	7.9	7.9	1.5	3/4"	120.0	98.5	0.08	2	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-9	HALLWAY 201	SINGLE DUCT	NAILOR	D30HQW	6	HOT WATER COIL	STERI-LINER	310	155	310	85	65	-	NA	25	15	55.0	77.1	77.1	0.50	7.4	7.4	1.5	3/4"	120.0	108.2	0.14	3	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-10	HALLWAY 200	SINGLE DUCT	NAILOR	D30HQW	7	HOT WATER COIL	STERI-LINER	440	220	440	125	110	-	NA	25	15	55.0	77.9	77.9	0.60	10.9	10.9	2.0	3/4"	120.0	98.7	0.23	2	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-11	WORKSHOP 212A	SINGLE DUCT	NAILOR	D30HQW	9	HOT WATER COIL	STERI-LINER	500	500	500	210	55	100	EXHAUST STATUS	25	15	55.0	103.3	103.3	0.60	26.2	26.2	4.0	1"	120.0	114.6	7.51	4	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-12	ART STORAGE STACKS N	SINGLE DUCT	NAILOR	D30HQW	12	HOT WATER COIL	STERI-LINER	1120	1120	1120	390	215	-	NA	25	15	55.0	87.1	87.1	0.60	39.0	39.0	6.0	1"	120.0	109.2	7.32	3	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-13	ART STORAGE STACKS S	SINGLE DUCT	NAILOR	D30HQW	12	HOT WATER COIL	STERI-LINER	1120	1120	1120	390	205	-	NA	25	15	55.0	89.7	89.7	0.70	42.1	42.1	7.0	1"	120.0	102.4	2.13	4	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-14	HALLWAY 223	SINGLE DUCT	NAILOR	D30HQW	14	HOT WATER COIL	STERI-LINER	1600	800	1600	490	90	115	CO2 SENSOR	25	15	55.0	89.2	89.2	0.80	59.4	59.4	9.0	1-1/4"	120.0	102.8	3.05	4	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-15	HALLWAY 216	SINGLE DUCT	NAILOR	D30RW	8	HOT WATER COIL	STERI-LINER	740	370	740	180	150	-	NA	25	15	55.0	84.0	84.0	0.60	23.3	23.3	3.5	3/4"	120.0	105.5	1.26	3	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-1	MAIN ENTRY LOBBY WEST	SINGLE DUCT	NAILOR	D30HQW	16	HOT WATER COIL	STERI-LINER	2100	1050	2100	755	45	260	CO2 SENSOR	25	18	55.0	96.7	96.7	1.03	95.0	95.0	15.0	1-1/2"	120.0	94.1	1.08	4	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-2	MAIN ENTRY LOBBY EAST	SINGLE DUCT	NAILOR	D30HQW	14	HOT WATER COIL	STERI-LINER	1500	750	1500	490	45	260	CO2 SENSOR	25	15	55.0	90.7	90.7	0.71	58.1	58.1	9.0	1-1/4"	120.0	104.1	3.4	4	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-3	EXHIBIT N1	SINGLE DUCT	NAILOR	D30HQW	24	HOT WATER COIL	STERI-LINER	2640	1320	2640	930	95	585	CO2 SENSOR	25	18	55.0	82.3	82.3	1.20	78.1	78.1	12.0	1-1/4"	120.0	113	11.48	4	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-4	EXHIBIT N2	SINGLE DUCT	NAILOR	D30HQW	9	HOT WATER COIL	STERI-LINER	1040	520	1040	210	35	225	CO2 SENSOR	25	19	55.0	83.6	83.6	0.92	32.3	32.3	5.0	1"	120.0	108.1	3.71	3	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-5	EXHIBIT N3	SINGLE DUCT	NAILOR	D30RW	12	HOT WATER COIL	STERI-LINER	1400	700	1400	390	55	340	CO2 SENSOR	25	15	55.0	73.8	73.8	1.06	28.6	28.6	5.0	1"	120.0	102.7	2.9	2	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-6	EXHIBIT N4	SINGLE DUCT	NAILOR	D30RW	12	HOT WATER COIL	STERI-LINER	1400	700	1400	390	55	340	CO2 SENSOR	25	15	55.0	73.8	73.8	0.60	28.6	28.6	5.0	1"	120.0	102.7	2.9	2	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-7	EXHIBIT N5	SINGLE DUCT	NAILOR	D30RW	12	HOT WATER COIL	STERI-LINER	1400	700	1400	390	55	330	CO2 SENSOR	25	15	55.0	74.5	74.5	0.60	29.6	29.6	5.0	1"	120.0	104.1	3.61	2	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-8	EXHIBIT N6	SINGLE DUCT	NAILOR	D30RW	16	HOT WATER COIL	STERI-LINER	2060	1030	2060	755	50	325	CO2 SENSOR	25	21	55.0	78.6	78.6	0.99	52.6	52.6	8.0	1-1/4"	120.0	94.2	1.57	3	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-9	EXHIBIT N7	SINGLE DUCT	NAILOR	D30RW	12	HOT WATER COIL	STERI-LINER	1470	735	1470	390	55	340	CO2 SENSOR	25	15	55.0	81.6	81.6	1.10	42.4	42.4	7.0	1"	120.0	104.6	4.35	3	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-10	GARDEN COURT NORTH	SINGLE DUCT	NAILOR	D30HQW	24x16	HOT WATER COIL	STERI-LINER	3260	1630	3260	1750	75	480	CO2 SENSOR	25	19	55.0	80.0	80.0	0.60	88.4	88.4	14.0	1-1/2"	120.0	103.7	4.63	3	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-11	GARDEN COURT SOUTH	SINGLE DUCT	NAILOR	D30HQW	24x16	HOT WATER COIL	STERI-LINER	3260	1630	3260	1750	75	480	CO2 SENSOR	25	19	55.0	80.0	80.0	0.60	88.4	88.4	14.0	1-1/2"	120.0	91.4	1.59	3	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-12	EXHIBIT S6	SINGLE DUCT	NAILOR	D30RW	14	HOT WATER COIL	STERI-LINER	1600	800	1600	490	60	385	CO2 SENSOR	25	15	55.0	77.9	77.9	0.80	39.7	39.7	6.0	1"	120.0	108	13.31	2	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-13	EXHIBIT S3	SINGLE DUCT	NAILOR	D30RW	12	HOT WATER COIL	STERI-LINER	1400	700	1400	390	55	340	CO2 SENSOR	25	15	55.0	73.8	73.8	0.78	28.6	28.6	5.0	1"	120.0	94.3	1.68	2	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-14	EXHIBIT S4	SINGLE DUCT	NAILOR	D30RW	12	HOT WATER COIL	STERI-LINER	1400	700	1400	390	55	340	CO2 SENSOR	25	15	55.0	73.8	73.8	0.78	28.6	28.6	5.0	1"	120.0	102.7	2.9	2	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-15	EXHIBIT S5	SINGLE DUCT	NAILOR	D30RW	12	HOT WATER COIL	STERI-LINER	1600	800	1600	390	55	340	CO2 SENSOR	25	16	55.0	79.8	79.8	0.98	43.1	43.1	7.0	1"	120.0	98.5	2.02	3	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-16	EXHIBIT S1	SINGLE DUCT	NAILOR	D30HQW	16	HOT WATER COIL	STERI-LINER	2640	1320	2640	755	95	585	CO2 SENSOR	25	24	55.0	82.3	82.3	1.52	78.1	78.1	12.0	1-1/4"	120.0	105.3	8.9	3	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-17	EXHIBIT S2	SINGLE DUCT	NAILOR	D30HQW	10	HOT WATER COIL	STERI-LINER	1180	590	1180	250	35	225	CO2 SENSOR	25	18	55.0	87.1	87.1	1.16	41.0	41.0	7.0	1"	120.0	106.4	2.95	4	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-18	CIRCULATION L3	SINGLE DUCT	NAILOR	D30HQW	10	HOT WATER COIL	STERI-LINER	1260	630	1260	250	35	45	CO2 SENSOR	25	19	55.0	82.6	82.6	1.01	37.7	37.7	6.0	1"	120.0	110.6	7.98	3	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-19	CIRCULATION L3 EAST	SINGLE DUCT	NAILOR	D30HQW	14	HOT WATER COIL	STERI-LINER	2100	1050	2100	490	55	70	CO2 SENSOR	25	17	55.0	83.8	83.8	0.71	65.7	65.7	10.0	1-1/4"	120.0	107.4	15.76	2	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-20	EXHIBIT S7	SINGLE DUCT	NAILOR	D30HQW	24x16	HOT WATER COIL	STERI-LINER	3000	1500	3000	1750	115	715	CO2 SENSOR	25	19	55.0	74.9	74.9	0.60	64.9	64.9	10.0	1-1/4"	120.0	95.4	2.92	2	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11
VAV-L3-21	EXHIBIT S8	SINGLE DUCT	NAILOR	D30HQW	24	HOT WATER COIL	STERI-LINER	3800	1900	3800	1750	160	995	CO2 SENSOR	25	20	55.0	75.7	75.7	0.69	85.4	85.4	13.0	1-1/2"	120.0	103.5	10.81	2	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11

1: "CLG PRIM MAX CFM" SCHEDULED VALUE EQUALS THE ZONE MAXIMUM COOLING AIR FLOW.
"HTG PRIM MAX CFM" SCHEDULED VALUE EQUALS THE ZONE MAXIMUM HEATING AIR FLOW.
2: "PRIM MIN CFM" SCHEDULED VALUE EQUALS THE ZONE MINIMUM COOLING AND HEATING MINIMUM AIR FLOW OR DEADBAND AIR FLOW.
3: "VALVE MIN CFM" SCHEDULED VALUES EQUALS THE ZONE MINIMUM COOLING AIR FLOW AND MINIMUM HEATING AIR FLOW.
THIS VALUE CORRESPONDS WITH THE PRESSURE TRANSDUCER LOWER LIMIT OF 0.03" WC OF "AMPLIFIED" VELOCITY PRESSURE
ACROSS THE FLOW MEASURING DEVICE AS DETERMINED FROM DATA PUBLISHED BY THE VAV BOX MANUFACTURER.
CONTROLS CONTRACTOR TO VERIFY THE MINIMUM DP THAT THEIR VAV CONTROLLER CAN ACCURATELY READ.
4: "MIN VENT CFM" SCHEDULED VALUE EQUALS THE ZONE MINIMUM OUTSIDE AIR FLOW. THIS IS THE MINIMUM QUANTITY OF OUTSIDE AIR REQUIRED DURING NORMAL OCCUPIED MODE.
5: "MAX VENT CFM" SCHEDULED VALUES EQUALS THE MINIMUM OUTSIDE AIR FLOW. THIS IS THE MINIMUM QUANTITY OF OUTSIDE AIR REQUIRED DURING EXHAUST STATUS "ON" OVERIDE PERIOD OR ZONE SPACE CO2 CONTROL SEQUENCE.
6: EXHAUST FAN STATUS WILL BE UTILIZED TO OVERIDE THE ZONE "PRIM MIN" AIRFLOW SETPOINT TO THE ALTERNATE EXHAUST MODE "PRIM MIN" OR "HTG PRIM MAX" SETPOINT WHEN THE ASSOCIATED EXHAUST FAN IS OPERATING. (SEE DESCRIPTION OF OPERATIONS FOR FURTHER DETAIL).
7: ROOM CO2 SENSOR IS PROVIDED BY THE C.C. AND SHALL BE UTILIZED TO MODULATE ZONE VENT SETPOINT FROM "MIN VENT" CFM TO "MAX VENT" CFM. (SEE DESCRIPTION OF OPERATIONS FOR FURTHER DETAIL).
8: CONTROLS CONTRACTOR TO PROVIDE VAV BOX CONTROLLER AND WIRING DIAGRAM. VAV CONTROLLERS TO BE FACTORY INSTALLED BY VAV MANUACTURER. VAV MANUFACTURER TO PROVIDE 24V TRANSFORMER FOR CONTROLS.
9: SEE DESCRIPTION OF OPERATIONS FOR DESIGN DAY CRITICAL VENT RATIO.
10: E.C. TO PROVIDE TWO 120VAC CONTROL CIRCUITS PER FLOOR. SEE MISC. POWER CIRCUIT SCHEDULE FOR FURTHER DETAILS.
11: PARTS & LABOR WARRANTY FOR 1 YEAR FROM SUBSTANTIAL COMPLETION. FREIGHT FOB JOBSITE. SHIPPING INSTRUCTIONS - SHRINK WRAP AND COVER ALL OPENINGS. PROVIDE ELECTRONIC SUBMITTALS AND INSTALL/O&M MANUALS.
12: OPTIONAL STANDBY POWER BY EC (NEC 702)
13: LEGALLY REQUIRED STANDBY POWER PROVIDED BY EC. (NEC 701)
14: EMERGENCY POWER PROVIDED BY EC (NEC 700)
15: PROVIDE ENERGY LABS AIR HANDLER SECTION WITH HEATING HOT WATER COIL (SIZED AT 750 FPM) AND INLET MOTORIZED DAMPER TO HANG IN CEILING PLENUM. MOTORIZED DAMPER TO BE GREENHECK M/N AMD-23 TO CONTROL AIRFLOW AND PROVIDE AIRFLOW MONITORING. DAMPER TO BE SIZED AT 800 FPM TO ALLOW TURNDOWN TO MINIMUM RECOMMENDED VELOCITY AT 300 FPM.

VARIABLE AIR VOLUME TERMINAL BOX SCHEDULE

VAV ZONE NUMBER	AREA SERVED (ROOM WITH TEMP. SENSOR)	VAV BOX TYPE	MAKE	MODEL, SIZE, & SPECIFICATIONS				VALVE CFM VALUES					VENT	SOUND		HEATING HW COIL											ASSOCIATED	
				MODEL NUMBER	UNIT SIZE	HEATER TYPE	VAV BOX OPTIONS	CLG PRIM MAX (1)	PRIM MIN (2)	HTG PRIM MAX (1)	MIN VENT (4)	MAX VENT (5)	MODULATION DEVICE (6,7)	ZONE NC CRITERIA	VAV NC LEVEL	AIR EDB (F)	DESIGN AIR LDB (F)	AIR LDB (F)	AIR DP (IN)	DESIGN MBH	ACTUAL MBH	COIL GPM	PIPE SIZE	WATER EWT (F)	WATER LWT (F)	WATER DP (FT)	COIL ROWS	AC UNIT OR AHU	REMARKS
VAV-L1-1	FACILITY OFFICES	SINGLE DUCT	NAILOR	D30RWQ	9	HOT WATER COIL	STERI-LINER	1030	680	680	170	-	NA	25	16	55.0	82.5	82.5	0.60	20.3	20.3	3.5	3/4"	120.0	112.4	6.2	2	AHU-1-2	1,2,3,4,5,6,7,8,9,10,11
VAV-L1-2	MEETING	SINGLE DUCT	NAILOR	D30RWQ	9	HOT WATER COIL	STERI-LINER	900	210	450	35	130	CO2 SENSOR	25	18	55.0	86.1	86.1	0.90	15.2	15.2	2.5	3/4"	120.0	87.3	0.19	4	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11
VAV-L1-3	CORNER OFFICE	SINGLE DUCT	NAILOR	D30RWQ	5	HOT WATER COIL	STERI-LINER	180	70	90	25	-	NA	25	15	55.0	105.0	105.0	0.60	4.9	4.9	0.8	3/4"	120.0	117.4	1.74	2	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11
VAV-L1-4	OPEN OFFICE	SINGLE DUCT	NAILOR	D30RWQ	8	HOT WATER COIL	STERI-LINER	800	395	400	150	-	NA	25	15	55.0	81.0	81.0	0.60	11.3	11.3	2.0	3/4"	120.0	95	0.09	2	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11
VAV-L1-5	SOUTH OFFICES	SINGLE DUCT	NAILOR	D30RWQ	6	HOT WATER COIL	STERI-LINER	330	185	185	70	-	NA	25	15	55.0	85.0	85.0	0.60	6.0	6.0	1.0	3/4"	120.0	105.5	0.11	2	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11
VAV-L1-6	BREAK	SINGLE DUCT	NAILOR	D30RWQ	6	HOT WATER COIL	STERI-LINER	400	250	250	95	-	NA	25	15	55.0	80.0	80.0	0.60	6.8	6.8	1.5	3/4"	120.0	103.4	0.11	2	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-1	EDUCATION	SINGLE DUCT	NAILOR	D30RWQ	24	HOT WATER COIL	STERI-LINER	2800	1750	1885	65	715	CO2 SENSOR	25	18	55.0	80.0	80.0	0.60	51.0	51.0	8.0	1-1/4"	120.0	97.3	2.12	2	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-2	KITCHEN	SINGLE DUCT	NAILOR	D30RWQ	7	HOT WATER COIL	STERI-LINER	500	240	500	35	90	EXHAUST STATUS	25	18	55.0	79.0	86.4	0.60	13.0	8.5	1.5	3/4"	120.0	115.1	2.53	3	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11
VAV-L2-3	EVENT	SINGLE DUCT	NAILOR	D30HQ	24	NO HEATER	STERI-LINER	4800	1750	3925	95	1490	CO2 SENSOR	25	21	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	AHU-1-1	1,2,3,4,5,6,7,8,9,10,11

1: "CLG PRIM MAX CFM" SCHEDULED VALUE EQUALS THE ZONE MAXIMUM COOLING AIR FLOW.
"HTG PRIM MAX CFM" SCHEDULED VALUE EQUALS THE ZONE MAXIMUM HEATING AIR FLOW.
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THIS VALUE CORRESPONDS WITH THE PRESSURE TRANSDUCER LOWER LIMIT OF 0.03" WC OF "AMPLIFIED" VELOCITY PRESSURE
ACROSS THE FLOW MEASURING DEVICE AS DETERMINED FROM DATA PUBLISHED BY THE VAV BOX MANUFACTURER.
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7: ROOM CO2 SENSOR IS PROVIDED BY THE C.C. AND SHALL BE UTILIZED TO MODULATE ZONE VENT SETPOINT FROM "MIN VENT" CFM TO "MAX VENT" CFM. (SEE DESCRIPTION OF OPERATIONS FOR FURTHER DETAIL).
8: CONTROLS CONTRACTOR TO PROVIDE VAV BOX CONTROLLER AND WIRING DIAGRAM. VAV CONTROLLERS TO BE FACTORY INSTALLED BY VAV MANUACTURER. VAV MANUFACTURER TO PROVIDE 24V TRANSFORMER FOR CONTROLS.
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10: E.C. TO PROVIDE TWO 120VAC CONTROL CIRCUITS PER FLOOR. SEE MISC. POWER CIRCUIT SCHEDULE FOR FURTHER DETAILS.
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12: OPTIONAL STANDBY POWER BY EC (NEC 702)
13: LEGALLY REQUIRED STANDBY POWER PROVIDED BY EC. (NEC 701)
14: EMERGENCY POWER PROVIDED BY EC (NEC 700)
15: PROVIDE ENERGY LABS AIR HANDLER SECTION WITH HEATING HOT WATER COIL (SIZED AT 750 FPM) AND INLET MOTORIZED DAMPER TO HANG IN CEILING PLENUM. MOTORIZED DAMPER TO BE GREENHECK M/N AMD-23 TO CONTROL AIRFLOW AND PROVIDE AIRFLOW MONITORING. DAMPER TO BE SIZED AT 800 FPM TO ALLOW TURNDOWN TO MINIMUM RECOMMENDED VELOCITY AT 300 FPM.

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Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Submittal: Construction Documents

Revisions
No. Date Description

Drawn DD/DG
Checked JL/RSR
LMN Proj No 16028.01
Date 6/23/17

Sheet Title: MECHANICAL SCHEDULES - VAV

Sheet Number: M015

ELECTRIC HEATER SCHEDULE

TAG #	IEH-L3-1	UH-L3-2	UH-L3-3	IEH-AT-01	IEH-AT-02	IEH-AT-03	IEH-AT-04	IEH-AT-05	IEH-AT-06	IEH-AT-07	IEH-AT-08	IEH-AT-09	IEH-AT-10
BASIS OF DESIGN													
MANUFACTURER	KING	KING	KING	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX
MODEL	OKH	KBP	KBP	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F
DESIGN DATA													
UNIT TYPE	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING
LOCATION	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC
AREA SERVED	ENTRY LOBBY	ATTIC 402	ATTIC 403	ATTIC NORTH	ATTIC NORTH	ATTIC NORTH	ATTIC NORTH	ATTIC NORTH	ATTIC NORTH	GARDEN COURT	GARDEN COURT	GARDEN COURT	GARDEN COURT
QUANTITY	1	1	1	1	1	1	1	1	1	1	1	1	1
FUNCTION (FREEZE PROTECTION, TEMP.)	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION
ELECTRICAL DATA													
UNIT PROVIDED BY	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.
INSTALLED BY	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.
WIRED BY	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.
ELECTRIC COIL KW	1.6	1.9	1.9	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
FAN MOTOR HORSEPOWER	-	-	-	-	-	-	-	-	-	-	-	-	-
UNIT VOLTAGE/PHASE	120/1	120/1	120/1	277/1	277/1	277/1	277/1	277/1	277/1	277/1	277/1	277/1	277/1
UNIT FLA													
EMERGENCY POWER	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
STANDBY POWER	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CONTROL DATA													
STEPS OF CONTROL	1	1	1	1	1	1	1	1	1	1	1	1	1
UNIT MOUNTED T-STAT	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
REMOTE MOUNTED T-STAT	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY
DISCONNECT	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.
PHYSICAL DIMENSIONS													
LENGTH x WIDTH x HEIGHT (INCHES)	7"x23.5"x5"	10.5"x11.5"x14"	10.5"x11.5"x14"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"
SURFACE MOUNT	TOP OF VEST	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RECESS MOUNT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MOUNTING BRACKET (WALL, CEILING)	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED
WEIGHT	11	2	2	25	25	25	25	25	25	25	25	25	25
MISC DATA													
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
FREIGHT	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
ELECTRONIC SUBMITTAL	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
ELECTRONIC INSTALL/O&M MANUAL	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

REMARKS:

ELECTRIC HEATER SCHEDULE

TAG #	IEH-AT-11	IEH-AT-12	IEH-AT-13	IEH-AT-14	IEH-AT-15	IEH-AT-16	IEH-AT-17	IEH-AT-18	IEH-AT-19	IEH-AT-20	IEH-AT-21	IEH-AT-22	IEH-AT-23	IEH-AT-24
BASIS OF DESIGN														
MANUFACTURER	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX	CHROMALOX
MODEL	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F	STAR-F
DESIGN DATA														
UNIT TYPE	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING	CEILING
LOCATION	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC	ATTIC
AREA SERVED	GARDEN COURT	GARDEN COURT	GARDEN COURT	GARDEN COURT	GARDEN COURT	GARDEN COURT	GARDEN COURT	GARDEN COURT	ATTIC SOUTH	ATTIC SOUTH	ATTIC SOUTH	ATTIC SOUTH	ATTIC SOUTH	ATTIC SOUTH
QUANTITY	1	1	1	1	1	1	1	1	1	1	1	1	1	1
FUNCTION (FREEZE PROTECTION, TEMP.)	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION	FREEZE PROTECTION
ELECTRICAL DATA														
UNIT PROVIDED BY	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.
INSTALLED BY	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.	BY M.C.
WIRED BY	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.
ELECTRIC COIL KW	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4	4.4
FAN MOTOR HORSEPOWER	-	-	-	-	-	-	-	-	-	-	-	-	-	-
UNIT VOLTAGE/PHASE	277/1	277/1	277/1	277/1	277/1	277/1	277/1	277/1	277/1	277/1	277/1	277/1	277/1	277/1
UNIT FLA														
EMERGENCY POWER	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
STANDBY POWER	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
CONTROL DATA														
STEPS OF CONTROL	1	1	1	1	1	1	1	1	1	1	1	1	1	1
UNIT MOUNTED T-STAT	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO	NO
REMOTE MOUNTED T-STAT	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY	YES, BAS RELAY
DISCONNECT	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.	BY E.C.
PHYSICAL DIMENSIONS														
LENGTH x WIDTH x HEIGHT (INCHES)	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"	16"x56"x12"
SURFACE MOUNT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
RECESS MOUNT	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
MOUNTING BRACKET (WALL, CEILING)	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED	SUSPENDED
WEIGHT	25	25	25	25	25	25	25	25	25	25	25	25	25	25
MISC DATA														
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
FREIGHT	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
ELECTRONIC SUBMITTAL	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES
ELECTRONIC INSTALL/O&M MANUAL	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES	YES

REMARKS:

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Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Submittal: Construction Documents

Revisions

No.	Date	Description
1	9/1/17	PERMIT CORRECTIONS 1

Drawn: DD/DG
Checked: JL/RSR
LMN Proj No: 16028.01
Date: 6/23/17

Sheet Title: MECHANICAL SCHEDULES - EH

Sheet Number: M016

PUMP SCHEDULE

TAG #	CP-CHW-1	CP-CHW-2	CP-CHW-3	CP-HW-1	CP-HW-2	CP-HW-3	CP-HW-4	CP-HW-5	CP-HW-6
BASIS OF DESIGN									
MANUFACTURER	BELL & GOSSET	BELL & GOSSET	BELL & GOSSET	BELL & GOSSET	BELL & GOSSET	BELL & GOSSET	BELL & GOSSET	BELL & GOSSET	BELL & GOSSET
MODEL	E-1510-3BD	E-1510-3BD	E-60 2X5.25	E-1510 3GB	E-1510 3GB	E-1510 3AD	E-60 2X5.25	SERIES 80 1-1/2X1-1/2X9	SERIES 80 1-1/2X1-1/2X9
DESIGN PARAMETERS									
SERVICE	CHW PUMP	CHW PUMP	CHW PUMP	HW PUMP	HW PUMP	HP HW PUMP	HP HW PUMP	BOILER HW PUMP	BOILER HW PUMP
LOCATION	SOUTH MECH 118	SOUTH MECH 118	SOUTH MECH 118	SOUTH MECH 118	SOUTH MECH 118	SOUTH MECH 118	SOUTH MECH 118	SOUTH MECH 118	SOUTH MECH 118
PUMP OPERATION	100% / 100%	100% / 100%	100% / 100%	100% / 100%	100% / 100%	100% / 100%	100% / 100%	100% / 100%	100% / 100%
PROVIDED WITH OTHER EQUIPMENT	NO	NO	NO	NO	NO	NO	NO	NO	NO
PUMP TYPE	END SUCTION	END SUCTION	INLINE	END SUCTION	END SUCTION	END SUCTION	INLINE	INLINE	INLINE
GPM	410	410	59	450	450	410	73	50	50
MINIMUM ALLOWABLE FLOW (GPM)	100	100	20	115	115	83	20	10	10
FT. TOTAL HEAD	67	67	22	77	77	25	22	10	10
FLUID TEMPERATURE - DESIGN OPERATING (°F)	42/54°F	42/54°F	42/54°F	100/120°F	100/120°F	100/120°F	100/120°F	110/130°F	110/130°F
FLUID TEMPERATURE - MAXIMUM (°F)	100°F	100°F	100°F	200°F	200°F	200°F	200°F	200°F	200°F
FT. NPSH REQUIRED BY PUMP	7.8	7.8	5.7	8	8	7.3	5.7		
% PROPYLENE GLYCOL	25%	25%	25%	25%	25%	25%	25%	25%	25%
MAXIMUM SYSTEM DESIGN PRESSURE (PSIG)	125 PSIG	125 PSIG	125 PSIG	125 PSIG	125 PSIG	125 PSIG	125 PSIG	125 PSIG	125 PSIG
IMPELLER DIAMETER (IN.)	8.63	8.63	5.25	10.62	10.62	6.62	5.25	7.25	7.25
MAXIMUM IMPELLER DIAMETER (IN.)	9.5	9.5	5.25	13.5	13.5	7	5.25	9.5	9.5
PUMP EFFICIENCY	81.5%	81.5%	66.5%	64.5%	64.5%	77.4%	66.5%	48.0%	48.0%
SUCTION SIZE	4	4	2	4	4	4	2	1.5	1.5
DISCHARGE SIZE	3	3	2	3	3	3	2	1.5	1.5
PIPE CONNECTION TYPE	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC	BY MC
SUCTION DIFFUSER	YES	YES	YES	YES	YES	YES	YES	YES	YES
SUCTION DIFFUSER SIZE (IN x OUT)		0			0				
DISCHARGE ELBOW PROVIDED WITH PUMP - (IN x OUT)	NO	NO	NO	NO	NO	NO	NO	NO	NO
ELECTRICAL DATA									
PUMP MOTOR RPM	1750	1750	1750	1750	1750	1750	1750	1750	1750
MOTOR BRAKE HP	8.8	8.8	0.55	14	14	3.4	0.63	1.18	1.18
MOTOR HP	15	15	1	15	15	5	1	2	2
MOTOR FRAME SIZE	254T	254T	143T	254T	254T	184T	143T	145JM	145JM
VOLTAGE/PHASE	460/3	460/3	460/3	460/3	460/3	460/3	460/3	460/3	460/3
MOTOR EFFICIENCY	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.	CODE MIN.
INVERTER DUTY MOTOR	YES	YES	YES	YES	YES	YES	YES	YES	YES
MANUAL STARTER (PROVIDED & INSTALLED BY EC)	NO	NO	NO	NO	NO	NO	NO	NO	NO
MAGNETIC STARTER (PROVIDED & INSTALLED BY EC)	NO	NO	BY EC	NO	NO	BY EC	BY EC	BY EC	BY EC
VFD (PROVIDED BY MC & INSTALLED BY EC)	YES	YES	YES	YES	YES	YES	YES	YES	YES
VFD MANUFACTURER	DANFOSS	DANFOSS	DANFOSS	DANFOSS	DANFOSS	DANFOSS	DANFOSS	DANFOSS	DANFOSS
VFD MODEL	VLT FC 100	VLT FC 100	VLT FC 100	VLT FC 100	VLT FC 100	VLT FC 100	VLT FC 100	VLT FC 100	VLT FC 100
VFD BYPASS	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC
DISCONNECT BY	INTEGRATED W/ VFD	INTEGRATED W/ VFD	INTEGRATED W/ VFD	INTEGRATED W/ VFD	INTEGRATED W/ VFD	INTEGRATED W/ VFD	INTEGRATED W/ VFD	INTEGRATED W/ VFD	INTEGRATED W/ VFD
VFD/MS-1P MOUNTED AND WIRED TO MOTORS	YES	YES	YES	YES	YES	YES	YES	YES	YES
120/1 SERVICE OUTLET WITHIN 25 FEET	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC	BY EC
SINGLE POINT BOILER AT BOILER FOR PUMP	N/A	N/A	NA	N/A	N/A	NA	NA	NA	NA
EMERGENCY POWER	NO	NO	NO	NO	NO	NO	NO	NO	NO
STANDBY POWER	YES	NO	NO	YES	NO	YES	NO	NO	NO
SPECIFICATIONS									
CASING (CAST IRON, BRONZE)	CAST IRON	CAST IRON	CAST IRON	CAST IRON	CAST IRON	CAST IRON	CAST IRON	CAST IRON	CAST IRON
IMPELLER (CAST IRON, BRONZE)	BRONZE	BRONZE	BRONZE	BRONZE	BRONZE	BRONZE	BRONZE	BRONZE	BRONZE
WEAR RING (CAST IRON, BRONZE)	BRONZE	BRONZE	BRONZE	BRONZE	BRONZE	BRONZE	BRONZE	BRONZE	BRONZE
SHAFT (STEEL, STAINLESS)	STEEL	STEEL	STEEL	STEEL	STEEL	STEEL	STEEL	STEEL	STEEL
SHAFT SLEEVE (STEEL, STAINLESS, BRONZE)	BRONZE	BRONZE	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL	STAINLESS STEEL
SEAL TYPE	BUNA-CARBON-CERAMIC	BUNA-CARBON-CERAMIC	BUNA-CARBON-CERAMIC	BUNA-CARBON-CERAMIC	BUNA-CARBON-CERAMIC	BUNA-CARBON-CERAMIC	BUNA-CARBON-CERAMIC	BUNA-CARBON-CERAMIC	BUNA-CARBON-CERAMIC
RECIRCULATION LINES	NO	NO	NO	NO	NO	NO	NO	NO	NO
BASE (STEEL, CAST IRON, OTHER)	STEEL	STEEL	STEEL	STEEL	STEEL	STEEL	STEEL	STEEL	STEEL
FIELD ALIGNMENT	NO	NO	NO	NO	NO	NO	NO	NO	NO
FACTORY ALIGNMENT	YES	YES	YES	YES	YES	YES	YES	YES	YES
PHYSICAL DIMENSIONS									
PUMP WEIGHT	460	460	78	610	610	220	78		
INERTIA BASE WEIGHT (TYP. 2x PUMP WEIGHT)		0	-	-	-	-	-	-	-
TOTAL WEIGHT (PUMP, MOTOR, INERTIA BASE)		0	-	-	-	-	-	-	-
MOUNTED ON INERTIA BASE WITH ISOLATORS	NO	NO	NO	NO	NO	NO	NO	NO	NO
POST MOUNTED ON PUMP BODY FROM FLOOR WITH NEO PAD	NO	NO	YES	NO	NO	NO	YES	YES	YES
HOUSEKEEPING PAD MOUNTED WITH NEO PADS	YES	YES	NO	YES	YES	YES	NO	NO	NO
MISC DATA									
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	1 YEAR	1 YEAR	1 YEAR	1 YEAR	1 YEAR	1 YEAR	1 YEAR	1 YEAR	1 YEAR
FREIGHT	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE	FOB JOBSITE
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES	YES	YES	YES	YES	YES	YES	YES	YES
ELECTRONIC SUBMITTAL	YES	YES	YES	YES	YES	YES	YES	YES	YES
ELECTRONIC INSTALL/O&M MANUAL	YES	YES	YES	YES	YES	YES	YES	YES	YES
-	-	-	-	-	-	-	-	-	-

AIR SEPARATOR SCHEDULE

TAG #	AS-01	AS-02
PROJECT	SAAM RENOVATION	SAAM RENOVATION
BASIS OF DESIGN		
MANUFACTURER	B&G	B&G
MODEL		
SPECIFICATIONS		
SERVICE	CHILLED WATER	HEATING HW
LOCATION	MECH RM B18	MECH RM B18
SYSTEM FLOW (GPM)	300 GPM	140 GPM
MAXIMUM AS RATED FLOW (GPM)	850 GPM	850 GPM
SYSTEM PIPE SIZE (IN.)	6"	6"
AIR SEPARATOR SIZE (IN.)	6"	6"
CONNECTION TYPE	FLANGED	FLANGED
MAX WORKING PRESSURE (PSIG)	125 PSIG	125 PSIG
MAX OPERATING TEMP. (°F)	350°F	350°F
DRAIN SIZE (IN.)	1"	1"
LENGTH	N/A	N/A
HEIGHT	44"	44"
DIAMETER	18"	18"
SHIP WEIGHT (LBS)	205	205
WATER WEIGHT (LBS)	350	350
WET WEIGHT (LBS)	555	555
ASME RATED	YES	YES
MISC DATA		
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	1 YEAR	1 YEAR
FREIGHT	FOB JOBSITE	FOB JOBSITE
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES	YES
ELECTRONIC SUBMITTAL	YES	YES
ELECTRONIC INSTALL/O&M MANUAL	YES	YES
-	-	-

REMARKS:

RELIEF HOOD SCHEDULE	
TAG #	RH-L1-1
BASIS OF DESIGN	
MANUFACTURER	GREENHECK
MODEL	WRH
QUANTITY	1
DESIGN PARAMETERS	
TYPE	RELIEF
AREA SERVED	LEVEL 1 BOH
CFM	1000
PHYSICAL DATA	
OVERALL LENGTH	26"
OVERALL WIDTH	26"
OVERALL HEIGHT	14.75"
THROAT LENGTH	16"
THROAT WIDTH	16"
CURB HEIGHT	12"
OVERALL HEIGHT ABOVE ROOF	26.75"
TOTAL WEIGHT PER UNIT (LBS)	150
PERFORMANCE DATA	
THROAT AREA (SQ. FT.)	1.4
THROAT VELOCITY (FPM)	404
STATIC PRESSURE DROP (IN WG)	0.05
SPECIFICATIONS	
SITE BUILT CURB BY GC	NO
FACTORY CURB	YES
BACKDRAFT DAMPER	NO
MOTORIZED DAMPER	YES
MISC DATA	
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	1 YEAR
FREIGHT	FOB JOBSITE
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES
ELECTRONIC SUBMITTAL	YES
ELECTRONIC INSTALL/O&M MANUAL	YES
-	-

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Seattle, WA 98112

Submittal: Construction Documents

Revisions
No. Date Description

Drawn DD/DG
Checked JL/RSR
LMN Proj No 160228.01
Date 6/23/17

Sheet Title: MECHANICAL SCHEDULES - PUMP, RELIEF HOOD

Sheet Number: **M017**

AIR TO WATER HEAT PUMP SCHEDULE (CHILLERS)

TAG #	AWHP-1,2,3,4
PROJECT	SAAM
PROVIDED BY	MC
BASIS OF DESIGN	
MANUFACTURER	MULTISTACK
MODEL #	(4) ARA-60X
CONDENSER FAN DATA (PER MODULE)	
CONDENSER FAN QUANTITY	4
CONDENSER FAN HORSEPOWER	2 HP
CONDENSER FAN AIRFLOW TOTAL (CFM)- ea	44,000 CFM
CONDENSER FAN MINIMUM REQ'D AIRFLOW TOTAL (CFM)	11,000 CFM
CONDENSER FAN CONTROL TYPE	ECM
COOLING DESIGN DATA (AIRSOURCE- PER MODULE)	
NOMINAL TONNAGE	60
COOLING CAPACITY (TONS) AT SPECIFIED CONDITIONS	56.00
AMBIENT AIR TEMPERATURE (°F)	95°F
LOWER AMBIENT TEMPERATURE LIMIT (°F)	40
CHILLER MINIMUM FLOW (GPM)	125 GPM
SYSTEM MINIMUM FLOW FOR BYPASS SIZING (GPM)	187 GPM
EVAPORATOR EWT (°F)	54°F
EVAPORATOR LWT (°F)	42°F
PERCENT PROPYLENE GLYCOL	25% P.G.
TYPE OF REFRIGERANT	HFC-410a
REFRIGERANT CHARGE (PER MODULE)	220 LBS
COOLING EFFICIENCY (AT OPERATING COND)	9.852
HEATING DESIGN DATA (AIRSOURCE- PER MODULE)	
HEATING CAPACITY (MBH) AT SPECIFIED CONDITIONS	567 MBH
AMBIENT AIR TEMPERATURE (°F)	31°F
HTG MIN FLOW (GPM)	83 GPM
SYSTEM MINIMUM FLOW FOR BYPASS SIZING (GPM)	204 GPM
COND EWT (°F)	105°F
COND LWT (°F)	120°F
HEATING COP	2.29 COP
SIMULTANEOUS HEATING AND COOLING DESIGN DATA (PER MODULE)	
HEATING CAPACITY (MBH) AT SPECIFIED CONDITIONS	888 MBH
HTG FLOW (GPM)	120 GPM
COND EWT (°F)	105°F
COND LWT (°F)	120°F
COOLING CAPACITY (MBH) AT SPECIFIED CONDITIONS	682 MBH
EVAP FLOW (GPM)	122 GPM
EVAPORATOR EWT (°F)	56°F
EVAPORATOR LWT (°F)	42°F
HEATING/COOLING COP	7.3 COP
COOLING ENERGY EFFICIENCY DATA	
AHRI CERTIFIED & LISTED IN AHRI CERTIFICATION PROGRAM	NOT REQUIRED - NOT COVERED UNDER AHRI STANDARD
IPLV - CODE MINIMUM (ARI 550/590) FOR CHILLER	12.5 IPLV
IPLV (in accordance with ARI 550/590)	-
EER - CODE MINIMUM (ARI 550/590) FOR CHILLER	9.852 EER
EER (in accordance with ARI 550/590)	10.3 EER
IPLV - AT OPERATING CONDITIONS	
EER - AT OPERATING CONDITIONS	9.9 EER
PART LOAD PERFORMANCE AT DESIGN CONDITIONS (KW/TON)	-
100%	1.218 KW/TON
75%	.877 KW/TON
50%	.678 KW/TON
25%	.587 KW/TON
ELECTRICAL DATA	
VOLTAGE/PHASE	460/3
ONE (1) ARA60X MODULE (ON STANDBY POWER)	
FLA (SINGLE POINT POWER)	156
MOP (SINGLE POINT POWER)	225
THREE (3) ARA60X MODULES	
FLA (SINGLE POINT POWER FOR EACH)	156
FLA (SINGLE POINT POWER FOR EACH)	225
(ONE 1) ARA60X MODULE (FUTURE)	
FLA (SINGLE POINT POWER)	156
MOP (SINGLE POINT POWER)	225
FACTORY MOUNTED STARTER	YES
STARTER SHORT CIRCUIT RATING	30000 AIC
UNIT DISCONNECT BY MANUFACTURER AT EACH PWR CONNECTION	YES
120/1 POWER (20 AMP) HEAT TRACING AT EVAP. BUNDLE	NA
DISCONNECT FOR HEAT TRACING AT EVAP. BUNDLE	NA
120/1 POWER (20 AMP) FOR UNIT CONTROLS	BY EC (REMARK 1)
DISCONNECT FOR UNIT CONTROLS	BY EC
120/1 SERVICE OUTLET WITHIN 25 FEET	BY EC
EMERGENCY POWER (NEC 700)	NO
LEGALLY REQUIRED STANDBY POWER (NEC 701)	NO
STANDBY POWER (NEC 702)	(1) MODULE, BY EC

AIR TO WATER HEAT PUMP SCHEDULE (CHILLERS)

TAG #	AWHP-1,2,3,4
CONTROLS DATA	
UNIT FACTORY CONTROLLER	YES, MASTER CONTROLLER FOR (5) MODULES
UNIT LOCAL CONTROL DISPLAY PANEL	YES
EVAP & COND 120/1 FLOW SWITCHES (PROVIDE THERMAL SWITCH INTERNAL TO EACH MODULE)	YES
120/1 WIRING FOR PUMP RUN REQUIRED STATUS (WIRED IN FIELD BY CC - SEE DESCRIPTION OF OPERATIONS)	YES
SUPPLY AND RETURN WATER TEMPERARATURE SENSORS - FACTORY PROVIDED AND INSTALLED IN FIELD, WIRED TO UNIT BY C.C.	YES
HARD-WIRED POINTS (SHOWN BELOW) - CHILLER PROVIDED WITH ALL POINTS BELOW (AT A MINIMUM):	-
CHW SUPPLY TEMP. SETPOINT (4-20mA OR 2-10 VDC)	WIRING BY CC
REMOTE CURRENT LIMIT SETPOINT (4-20mA OR 2-10 VDC)	WIRING BY CC
CIRCUIT A LOCKOUT INPUT	NO
CIRCUIT B LOCKOUT INPUT	NO
UNIT STOP/START	WIRING BY CC
EMERGENCY STOP	WIRING BY CC
GENERAL ALARM OUTPUT	WIRING BY CC
UNIT OPERATING INDICATION (STATUS)	WIRING BY CC
MAXIMUM UNIT CAPACITY INDICATOR	NO
LIMITED UNIT OPERATION INDICATOR	NO
BACNET OR LON INTERFACE	BACNET, WIRING BY CC
SPECIFICATIONS	
LISTED IN CERTIFICATION PROGRAM (2009 SEC 1411.1)	NA
UL OR ETL RATING?	UL
LOW AMBIENT OPERATION	YES
UNIT HOUSEKEEPING PAD	BY OTHERS
NUMBER OF COMPRESSORS	2
TYPE OF COMPRESSOR	SCROLL
EVAP/COND MOTORIZED ISOLATION VALVE	BY MANUF.
EVAPORATOR FOULING FACTOR	0.0001
EVAPORATOR BUNDLE ASME RATED	YES
HOT GAS BYPASS	NO
SOUND PRESSURE WITH PANELS ALL MODULES OPERATING	
SOUND PRESSURE LEVEL (dB re 20 μPa) at 30 ft- NOTE 2	(5) 60-TON MODULES
63	72
125	62
250	70
500	65
1000	57
2000	59
4000	48
8000	40
A-WTG	66
PHYSICAL DIMENSIONS	
MAX. LENGTH x WIDTH x HEIGHT	350" x 84" x 149"
SHIP WEIGHT (LBS)	39,225 LBS
OPERATING WEIGHT (LBS)	42,300 LBS
ISOLATION	SEE ISOLATION SCHED.
MISC. DATA	
FULL UNIT PARTS AND LABOR WARRANTY	2 YEAR
COMPRESSOR WARRANTY (PARTS)	5 YEAR
FREIGHT	FOB JOBSITE
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES
ELECTRONIC SUBMITTAL	YES
ELECTRONIC INSTALL/O&M MANUAL	YES
-	-

REMARKS:

1: CONTROL PANEL POWER IS 120/1. ONE CONTROL PANEL SERVES ALL MODULES. CONTROL PANEL TO BE PROVIED WITH STANDBY POWER (NEC 702).

2: AIR COOLED MACHINE WITH ULTRA QUIET FANS, DISCHARGE SILENCERS, COMPRESSOR WRAPS AND ACOUSTIC LOUVERS.

3: UNIT WEIGHT IS ESTIMATED DOES NOT INCLUDE CHILLER MODULES, STRUCTURAL STEEL, ACOUSTICAL OPTIONS, JUNCTION BOXES OR VFDS

4: MAIN POWER CONNECTION PANELS SHALL BE PROVIDED WITH ADDITIONAL LENGTH OF WIRE AND RELOCATED IN FIELD SO THAT THEY ARE MOUNTED TO MEET NEC REQUIREMENTS, INCLUDING 6 FT MAX HEIGHT FOR TOP OF PANEL.

WATER TO WATER HEAT PUMP SCHEDULE

TAG #	WWHP-L1-1
QUANTITY	1
BASIS OF DESIGN	
MANUFACTURER	MULTISTACK
MODEL	MS040XC2H2H2
UNIT TYPE	WATER-TO-WATER HEAT PUMP
AREA SERVED	HW & CHW SYSTEM
UNIT LOCATION	BOILER ROOM
DESIGN PARAMETERS - COOLING	
COOLING CAPACITY (MBH)	400 MBH
LOAD SIDE - SYSTEM	CHW
LOAD SIDE - COOLING - EWT (F)	52 °F
LOAD SIDE - COOLING - LWT (F)	40°F
LOAD SIDE - COOLING - GPM	54 GPM
LOAD SIDE - COOLING - PD (FT WATER)	8.4 FT
LOAD SIDE - FLUID	25% P.G.
SOURCE SIDE - SYSTEM	HW
SOURCE SIDE - COOLING - EWT (F)	105 °F
SOURCE SIDE - COOLING - LWT (F)	120 °F
SOURCE SIDE - COOLING - GPM	56 GPM
SOURCE SIDE - COOLING - PD (FT WATER)	8.3 FT
SOURCE SIDE - FLUID	25% P.G.
ELECTRICAL DATA	
VOLTS/PHASE	460/3
RLA	31 AMPS
MCA	65 AMPS
MOP	80 AMPS
SCCR RATING (AMPS)	42,000 AIC
DISCONNECT	BY E.C.
CONTROLS DATA	
COMPRESSOR STAGES	2
BACNET INTERFACE	YES
FACTORY DDC CONTROLLER	YES
ENABLE/DISABLE VIA FACTORY DDC CONTROLLER FOR EACH STAGE	YES
ENABLE/DISABLE VIA FACTORY DDC CONTROLLER FOR EACH STAGE	BY CC
SPECIFICATIONS	
REFRIGERANT	R-410A
REFRIGERANT CHARGE	12 LBS
ARI CERTIFIED VS. RATED IN ACCORDANCE	RATED
TEST PROCEDURE	AHRI 550/590
CODE MIN. EER/COP (REMARK 1)	NONE
COOLING KW/TON	1.169
HEATING COP	3.0 COP
SOUND LEVEL (DBA)	-
CONCRETE MAINTENANCE PAD	YES
WATER SIDE ECONOMIZER	NO
HEAD PRESSURE CONTROL	YES
PHYSICAL DATA	
EQUIPMENT WEIGHT (LBS)	1625 LBS
LENGTH x WIDTH x HEIGHT (INCHES)	36"x56"x67"H
MISC DATA	
PARTS AND LABOR WARRANTY FROM PROJECT SUBSTANTIAL COMPLETION DATE	YES
FREIGHT	FOB JOBSITE
SHIPPING INSTRUCTIONS - SHRINK WRAP & COVER ALL OPENINGS	YES
ELECTRONIC SUBMITTAL	YES
ELECTRONIC INSTALL/O&M MANUAL	YES
-	-

REMARKS:

1: EQUIPMENT HAS NO MINIMUM PERFORMANCE RATING IN THE 2015 SEC.

B

CHILLED WATER FCU SCHEDULE

TAG #	FCU-L1-1
BASIS OF DESIGN	
MANUFACTURER	NAILOR
MODEL	39LZ-8
NOMINAL TONAGE	1.25
LOCATION	ELEC. ROOM 116
SERVICE	ELEC. ROOM 116
CONFIGURATION (HORIZ./VERT.)	VERTICAL
SUPPLY FAN INFORMATION	
SUPPLY FAN TYPE	
SUPPLY FAN CONFIG. (COOLING)	DRAW THROUGH
SUPPLY CFM	500
MINIMUM OUTSIDE AIR	0
MINIMUM OUTSIDE AIR FOR PRESSURE CONTROL	-
MINIMUM OUTSIDE AIR FOR CO2 CONTROL	-
SUPPLY T.S.P.	
SUPPLY E.S.P.	0.25
SUPPLY HP	1/3
SUPPLY VFD	NO
SUPPLY FAN CONTROL (FACTORY WIRED TO VFD)	NA
FAN RPM	
SUPPLY MOTOR EFFICIENCY (NOTE 2)	
QUANTITY OF SUPPLY FANS	1
COOLING INFORMATION	
COOLING TYPE	CHILLED WATER
COOLING COIL EAT (DB)	95
UNIT LAT (DB)	75
COOLING EFT	45
COOLING MBH TOTAL	15.5 MBH
COOLING MBH SENS	13.0 MBH
CHILLED WATER FLOW (GPM)	5 GPM
CODE MIN EER (AT ARI CONDITIONS)	-
UNIT EER	-
ELECTRICAL INFORMATION	
VOLTAGE/PHASE (SEE NOTE 2)	208/1
UNIT MCA	2.4
UNIT MOP	15.0
STARTER	FACTORY
DISCONNECT	BY E.C.
POWER RELIEF ECONOMIZER	NA
UNIT REQUIRES NEUTRAL WIRE? (SEE NOTE 2)	NO
ECM MOTOR RATING	NA
POWER RELIEF MOTOR VOLTAGE/PHASE	-
EMERGENCY POWER	NO
STANDBY POWER	NO
KWH METERING (YES/NO) / BY	NO
SUPPLY SMOKE DETECTOR (NOTE 1)	NO
RETURN SMOKE DETECTOR (NOTE 1)	NA
UNIT MISC INFORMATION	
FACTORY ROOF CURB HEIGHT	NA
UNIT HEIGHT	82
OVERALL HEIGHT (INCLUDING SITE BUILT CURB)	-
OVERALL WIDTH	21
OVERALL LENGTH	21
TOTAL WEIGHT (LESS SITE BUILT CURB)	298 LBS
FILTER	1"
ISOLATION	-
LOW AMBIENT OPERATION	NO
100% OA ECONOMIZER (FULLY MODULATING)	NO
CONDENSER WATER CONTROL VALVE TYPE	TWO-WAY
CONDENSER WATER CONTROL VALVE PROVIDED BY	FACTORY
CONDENSER WATER CONTROL VALVE CONTROL	BY UNIT
UNIT CONTROL TYPE	BMS
SPACE CO2 CONTROL	NO
SUPPLY/RELIEF MOTORIZED DAMPER	NO
FACTORY CURB	NA
CONDENSER WATER GLYCOL %	25%
DISCHARGE	UPFLOW
CONDENSATE (NOTE 4)	NOTE 4

NOTES:

1: UNIT TO MEET 2015 SMC SECTION 307.2.3 FOR AUXILIARY AND SECONDARY CONDENSATE DRAIN SYSTEMS.

B

MISC. MECHANICAL POWER CIRCUIT SCHEDULE

TAG#	ROOM	EQUIPMENT SERVED	SYSTEM SERVED	CIRCUIT LOCATION	HEAT TRACE WATTS/LF	PIPING LINEAL FOOTAGE	TOTAL WATTS	HARD WIRED OR WALL OUTLET	DISCONNECT	VOLTAGE/PHASE	AMPS	EMERGENCY POWER	STANDBY POWER	REMARKS
MPC-L1-1	GENERATOR	FUEL POLISHER	FUEL TANK	TBD	-	-	-	HARD WIRED	BY E.C.	120/1	15	NO	YES	1, 2, 3, 4
MPC-L1-2	OFFICE 114	BMS CONTROLS	BMS COMPUTER	OFFICE 114	-	-	-	WALL OUTLET	BY E.C.	120/1	15	NO	YES	1, 2, 3, 4, 5
MPC-L1-3	MECH ROOM 121	BMS FRONTEND	BMS COMPUTER	TBD	-	-	-	HARD WIRED	BY E.C.	120/1	15	NO	YES	1, 2, 3, 4
MPC-L1-4	MECH ROOM 118	BMS CONTROLS	MISC HVAC CONTROLS POWER	TBD	-	-	-	HARD WIRED	BY E.C.	120/1	15	NO	YES	1, 2, 3, 4
MPC-L1-5	MECH ROOM 209A	BMS CONTROLS	MISC HVAC CONTROLS POWER	TBD	-	-	-	HARD WIRED	BY E.C.	120/1	15	NO	YES	1, 2, 3, 4
MPC-L1-6	MECH ROOM 402	BMS CONTROLS	MISC HVAC CONTROLS POWER	TBD	-	-	-	HARD WIRED	BY E.C.	120/1	15	NO	YES	1, 2, 3, 4

1: DISCONNECT & WIRING BY E.C.

2: BMS CONTROL SYSTEM CIRCUIT LOCATIONS AND QUANTITIES TO BE VERIFIED AND RECOORDINATED AS REQUIRED BY CONTROLS CONTRACTOR.

3: E.C. TO PROVIDE CIRCUIT FOR BMS CONTROLLERS AND DEVICES. C.C. TO PROVIDE AND INSTALL 24V TRANSFORMER AS REQUIRED TO POWER THEIR CONTROL DEVICES.

4: C.C. TO PROVIDE SURGE SUPPRESSORS TO PROTECT CONTROL DEVICES AS SPECIFIED.

5: OWNER TO PROVIDE (1) ANALOG PHONE LINE OR NETWORK IP ADDRESS WITH WEB ACCESS FOR THE BMS SYSTEM IN THIS ROOM. C.C. TO PROVIDE SURGE SUPPRESSOR AND UNINTERRUPTABLE POWER SUPPLY.

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Submittal: Construction Documents

Revisions
No.	Date	Description
B	9/1/17	PERMIT CORRECTIONS 1

Drawn: DD/DG
Checked: JL/RSR
LMN Proj No: 18028.01
Date: 6/23/17

Sheet Title: MECHANICAL SCHEDULES - HEAT PUMPS

Sheet Number: M018

MOTORIZED DAMPER SCHEDULE

TAG #	SYSTEM SERVED	EQUIPMENT SERVED	LOCATION	MAKE	MODEL	VELOCITY (HIGH/ LOW)	BLADE CONFIGURATION	DAMPER WIDTH (5)	DAMPER HEIGHT (5)	DUCT WIDTH	DUCT HEIGHT	DUCT SHAPE (4)	AIRFLOW (CFM)	RESULTANT VELOCITY (FPM)	PRESSURE DROP (IN.)	MOUNTING (VERT./ HORIZ.)	SLEEVE LENGTH	FAIL POSITION	END SWITCH?	VOLTAGE/PHASE	EMERGENCY POWER	STANDBY POWER	CONTROL BY	REMARKS
MD-L1-1	LEVEL 1 RELIEF	LEVEL 1 VAV	LEVEL 1	GREENHECK	VCD-23	LOW	OPPOSED BLADES	72	72	72	72	RE	-	-	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-L1-2	LEVEL 1 RELIEF	LEVEL 1 VAV	LEVEL 1	GREENHECK	VCD-23	LOW	OPPOSED BLADES	72	72	72	72	RE	-	-	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-L1-3	LEVEL 1 RELIEF	LEVEL 1 VAV	LEVEL 1	GREENHECK	VCD-23	LOW	OPPOSED BLADES	72	60	72	60	RE	-	-	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-L1-4	PUMP ROOM INTAKE	FN-L1-03	LEVEL 1	GREENHECK	VCD-23	LOW	OPPOSED BLADES	10	8	10	8	RE	350	630	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-L1-5	ELEC ROOM INTAKE	FN-L1-02	LEVEL 1	GREENHECK	VCD-23	LOW	OPPOSED BLADES	10	24	10	24	RE	750	450	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-L1-6	ELEC ROOM EXHAUST	FN-L1-02	LEVEL 1	GREENHECK	VCD-23	LOW	OPPOSED BLADES	24	12	24	12	RE	750	375	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-L1-7	ART SPACES RA	AHU-L1-1	LEVEL 1	GREENHECK	VCD-23	LOW	OPPOSED BLADES	60	42	60	42	RE	26150	1494	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-L1-8	ART SPACES OA	AHU-L1-1	LEVEL 1	GREENHECK	VCD-23	LOW	OPPOSED BLADES	60	42	24	12	RE	26150	1494	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-L1-9	MECH CENTRAL 121	FN-L1-6	LEVEL 1	GREENHECK	VCD-23	LOW	OPPOSED BLADES	6	6	6	6	RE	400	1600	0.01	HORIZONTAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-L2-1	LOCKER RELIEF	RH-L1-1	LEVEL 2	GREENHECK	VCD-23	LOW	OPPOSED BLADES	16	16	16	16	RE	1000	563	0.02	HORIZONTAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-L2-2	CONSERVATION EXHAUST	FN-L2-1	LEVEL 2	GREENHECK	VCD-23	LOW	OPPOSED BLADES	36	22	36	22	RE	2460	447	0.02	VERT. INTERNAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-AT-1	NORTH EXHIBIT SUPPLY	EF-05	ATTIC	GREENHECK	VCD-23	LOW	OPPOSED BLADES	36	12	36	12	RE	850	283	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-AT-2	NORTH EXHIBIT SUPPLY	EF-05	ATTIC	GREENHECK	VCD-23	LOW	OPPOSED BLADES	36	12	36	12	RE	850	283	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-AT-3	NORTH EXHIBIT SUPPLY	EF-05	ATTIC	GREENHECK	VCD-23	LOW	OPPOSED BLADES	36	12	36	12	RE	850	283	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-AT-4	NORTH EXHIBIT SUPPLY	EF-05	ATTIC	GREENHECK	VCD-23	LOW	OPPOSED BLADES	36	12	36	12	RE	850	283	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-AT-5	SOUTH EXHIBIT SUPPLY	EF-05	ATTIC	GREENHECK	VCD-23	LOW	OPPOSED BLADES	36	12	36	12	RE	850	283	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-AT-6	SOUTH EXHIBIT SUPPLY	EF-05	ATTIC	GREENHECK	VCD-23	LOW	OPPOSED BLADES	36	12	36	12	RE	850	283	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-AT-7	SOUTH EXHIBIT SUPPLY	EF-05	ATTIC	GREENHECK	VCD-23	LOW	OPPOSED BLADES	36	12	36	12	RE	850	283	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-AT-8	SOUTH EXHIBIT SUPPLY	EF-05	ATTIC	GREENHECK	VCD-23	LOW	OPPOSED BLADES	36	12	36	12	RE	850	283	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-AT-9	GARDEN COURT RELIEF	EF-06	ATTIC	GREENHECK	VCD-23	LOW	OPPOSED BLADES	24	58	24	58	RE	3600	372	0.01	VERTICAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-R-1	NORTH ATTIC RELIEF	EF-05	ROOF	GREENHECK	VCD-23	LOW	OPPOSED BLADES	96	48	96	48	RE	3300	103	0.01	HORIZONTAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-R-2	SOUTH ATTIC RELIEF	EF-05	ROOF	GREENHECK	VCD-23	LOW	OPPOSED BLADES	96	48	96	48	RE	3300	103	0.01	HORIZONTAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-R-3	AHU-L1-1 RELIEF	FN-R-1	ROOF	GREENHECK	VCD-23	LOW	OPPOSED BLADES	48	48	48	48	RE	19150	1197	0.01	HORIZONTAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-R-4	SOUTH EXHAUST	FN-L1-7, FN-L1-8, L2-3	ROOF	GREENHECK	VCD-23	LOW	OPPOSED BLADES	16	24	16	24	RE	1530	574	0.01	HORIZONTAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6
MD-R-5	EVENT EXHAUST	FN-R-2	ROOF	GREENHECK	VCD-23	LOW	OPPOSED BLADES	24	24	24	24	RE	5280	1320	0.01	HORIZONTAL	BY MC	CLOSE	BY MC	24/1	NO	YES	MC	1-6

REMARKS:

1: MOTORIZED DAMPER TO BE OPENED WHENEVER ASSOCIATED EQUIPMENT IS ENABLED AND OPERATING

2: 120/1 POWER TO BE PROVIDED BY E.C. (EITHER DIRECTLY TO THE DAMPER OR TO THE CONTROL SYSTEM 24V TRANSFORMER)

3: DAMPER TO BE PROVIDED WITH END SWITCH BY M.C. DAMPER AND ASSOCIATED EQUIPMENT SHALL BE INTERLOCKED VIA A HARDWIRE SWITCH. SEE DESCRIPTION OF OPERATIONS FOR MORE INFORMATION.

4: RO=ROUND, RE=RECTANGULAR, OR FO=FLAT OVAL.

5: APPROXIMATE DAMPER SIZE SHOWN. MC TO VERIFY ACTUAL SIZE PRIOR TO ORDERING DAMPER.

6: PARTS & LABOR WARRANTY FOR 1 YEAR FROM SUBSTANTIAL COMPLETION. FREIGHT FOB JOBSITE. SHIPPING INSTRUCTIONS - SHRINK WRAP AND COVER ALL OPENINGS. PROVIDE ELECTRONIC SUBMITTALS AND INSTALL/O&M MANUALS.

COMBINATION FIRE/SMOKE DAMPER SCHEDULE

TAG#	QTY.	SYSTEM SERVED	EQUIPMENT SERVED	LOCATION	MAKE	MODEL	VELOCITY (3) (HIGH/LOW)	STYLE (4) (EFL/SCO)	FUSIBLE LINK TEMP (°F)	DUCT WIDTH	DUCT HEIGHT	DUCT SHAPE (12)	AIRFLOW (CFM)	RESULTANT VELOCITY (FPM)	MOUNTING (VERT./HORIZ.)	SLEEVE LENGTH	ACTUATOR QUANTITY	FAIL POSITION	END SWITCH	VOLTAGE/PHASE	EMERGENCY POWER	REMARKS
FSD-L1-1	1	EAST ENTRY SUPPLY AIR	VAV-L1-10	FIRST FLOOR	GREEHNHECK	FSD-212	LOW	EFL	165 °F	12	12	RE	460	460	VERTICAL	16"	TBD	CLOSED	YES, BMS	120/1	NO	1 TO 14
FSD-L1-2	1	EAST ENTRY RETURN AIR	AHU-L1-1	FIRST FLOOR	GREEHNHECK	FSD-212	LOW	EFL	165 °F	24	12	RE	460	230	VERTICAL	16"	TBD	CLOSED	YES, BMS	120/1	NO	1 TO 14
FSD-L1-3	1	AHU OUTSIDE AIR	AHU-L1-1, 2, 3	FIRST FLOOR	GREEHNHECK	FSD-212	HIGH	EFL	165 °F	80	120	RE	77105	1157	VERTICAL	16"	TBD	CLOSED	YES, BMS	120/1	NO	1 TO 14

REMARKS:

1: ALL SMOKE DETECTION AND DAMPER WIRING BY E.C. AND FIRE LIFE SAFETY CONTRACTOR

2: SMOKE DETECTOR BY ELECTRICAL CONTRACTOR (SEE COORDINATION NOTES BELOW)
DESIGN OF SMOKE DETECTION SYSTEM IS BY E.C. ALL SMOKE DETECTORS PROVIDED BY E.C. INSTALLATION OF DUCT DETECTORS IS BY E.C. UNDER SUPERVISION OF M.C.
ALL WIRING AND FIRE LIFE SAFETY INTERLOCKS ARE BY E.C.
SMOKE DETECTORS SHALL BE INSTALLED PER ALL APPLICABLE CODE REQUIREMENTS INCLUDING BUT NOT LIMITED TO THE REQUIREMENTS OF THE FOLLOWING
UBC AND IMC CODE SECTIONS : UBC 716, UBC 403.3, IMC 607.

3: LOW VELOCITY: UP TO 1000 FPM; HI VELOCITY: GREATER THAN 1000 FPM.

4: SCO: SMOKE CONTROL OVERRIDE FOR USE WITH SMOKE MANAGEMENT SYSTEMS ONLY. FOR ALL OTHER APPLICATIONS USE EFL, ELECTRONIC FUSIBLE LINK.
ALL ACTUATORS TO BE 120V/1.

5: REFER TO MFGR'S LISTED INSTALLATION INSTRUCTIONS FOR MAXIMUM SINGLE AND MULITPLE SECTION DIMENSIONS TO MAINTAIN CLASS II LEAKAGE RATING.
FOR ROUND AND FLAT OVAL DUCT, DAMPER TO BE 2" LARGER THAN CONNECTING DUCT SIZE OVERALL.

6: SLEEVE TO BE GALVANIZED SHEET METAL, 16 GAGE. BREAKAWAY CONNECTION NOT REQUIRED UP TO 36" WIDE X 24" HIGH.

7: QUALIFICATIONS:
UL555 CLASSIFICATION AND LABELING AS A 1-1/2 HR FIRE DAMPER
UL555 LEAKAGE RATED (SMOKE) DAMPER CLASSIFICATION AND LABLE LEAKAGE CLASS II

8: DUCT ACCESS PANELS SHALL BE PROVIDED AT EACH FSD AND LOCATED SUCH THAT UL LABEL IS VISIBLE FOR INSPECTION, PER UBC 713.10, 713.12, & UL555.

9: SUBMITTAL TO INCLUDE ACTUATOR MODELS AND AMPS, WIRING DIAGRAMS, & SIZE RANGE.

10: ACCEPTABLE MAKES AND MODELS:
LOW VELOCITY: RUSKIN M/N FSD36 OR GREENHECK M/N FSD-212 OR M/N OFSD-212 OR APPROVED EQUAL
HIGH VELOCITY: RUSKIN M/N FSD60 OR GREENHECK M/N FSD-312 OR APPROVED EQUAL

11: OPTIONS TO INCLUDE 1-1/2" MOUNTING ANGLES BOTH SIDES.

12: RO=ROUND, RE=RECTANGULAR, OR FO=FLAT OVAL.

13: APPROXIMATE DAMPER SIZE SHOWN. MC TO VERIFY ACTUAL SIZE PRIOR TO ORDERING DAMPER.

14: PARTS & LABOR WARRANTY FOR 1 YEAR FROM SUBSTANTIAL COMPLETION. FREIGHT FOB JOBSITE. SHIPPING INSTRUCTIONS - SHRINK WRAP AND COVER ALL OPENINGS. PROVIDE ELECTRONIC SUBMITTALS AND INSTALL/O&M MANUALS.

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1 No. Date 9/1/17 Description PERMIT CORRECTIONS 1

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LMN Proj No 160228.01
Date 6/23/17

Sheet Title
MECHANICAL SCHEDULES - MOTORIZED DAMPERS

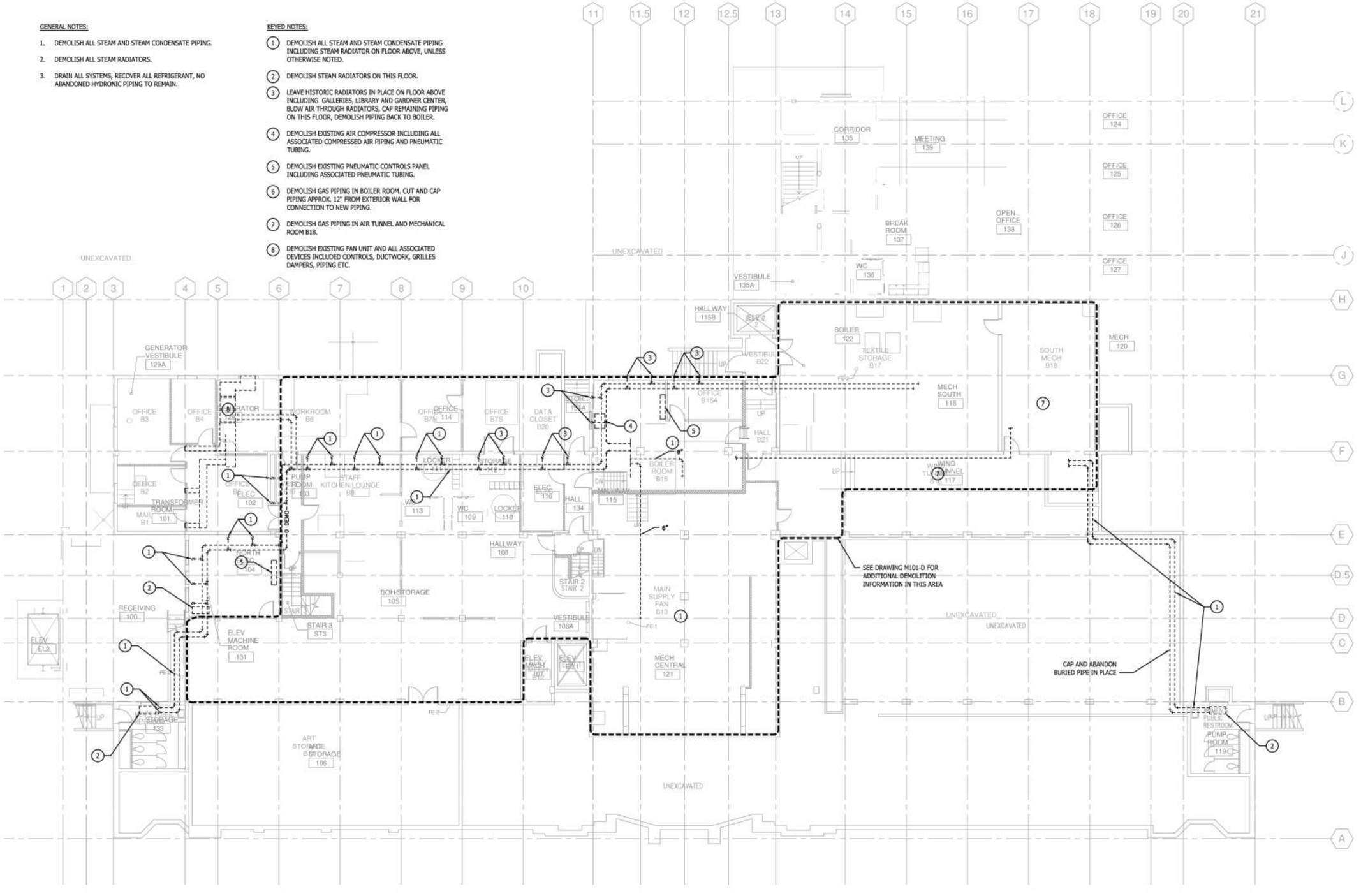
Sheet Number
M019

GENERAL NOTES:

1. DEMOLISH ALL STEAM AND STEAM CONDENSATE PIPING.
2. DEMOLISH ALL STEAM RADIATORS.
3. DRAIN ALL SYSTEMS, RECOVER ALL REFRIGERANT, NO ABANDONED HYDRONIC PIPING TO REMAIN.

KEYED NOTES:

1. DEMOLISH ALL STEAM AND STEAM CONDENSATE PIPING INCLUDING STEAM RADIATOR ON FLOOR ABOVE, UNLESS OTHERWISE NOTED.
2. DEMOLISH STEAM RADIATORS ON THIS FLOOR.
3. LEAVE HISTORIC RADIATORS IN PLACE ON FLOOR ABOVE INCLUDING GALLERIES, LIBRARY AND GARDNER CENTER, BLOW AIR THROUGH RADIATORS, CAP REMAINING PIPING ON THIS FLOOR, DEMOLISH PIPING BACK TO BOILER.
4. DEMOLISH EXISTING AIR COMPRESSOR INCLUDING ALL ASSOCIATED COMPRESSED AIR PIPING AND PNEUMATIC TUBING.
5. DEMOLISH EXISTING PNEUMATIC CONTROLS PANEL INCLUDING ASSOCIATED PNEUMATIC TUBING.
6. DEMOLISH GAS PIPING IN BOILER ROOM. CUT AND CAP PIPING APPROX. 12" FROM EXTERIOR WALL FOR CONNECTION TO NEW PIPING.
7. DEMOLISH GAS PIPING IN AIR TUNNEL AND MECHANICAL ROOM B18.
8. DEMOLISH EXISTING FAN UNIT AND ALL ASSOCIATED DEVICES INCLUDED CONTROLS, DUCTWORK, GRILLES DAMPERS, PIPING ETC.



1 M101-A HVAC DEMO PLAN - LEVEL 1
1/8" = 1'-0"

TRUE NORTH | PLAN NORTH | 0' 4' 8' 16' 32'

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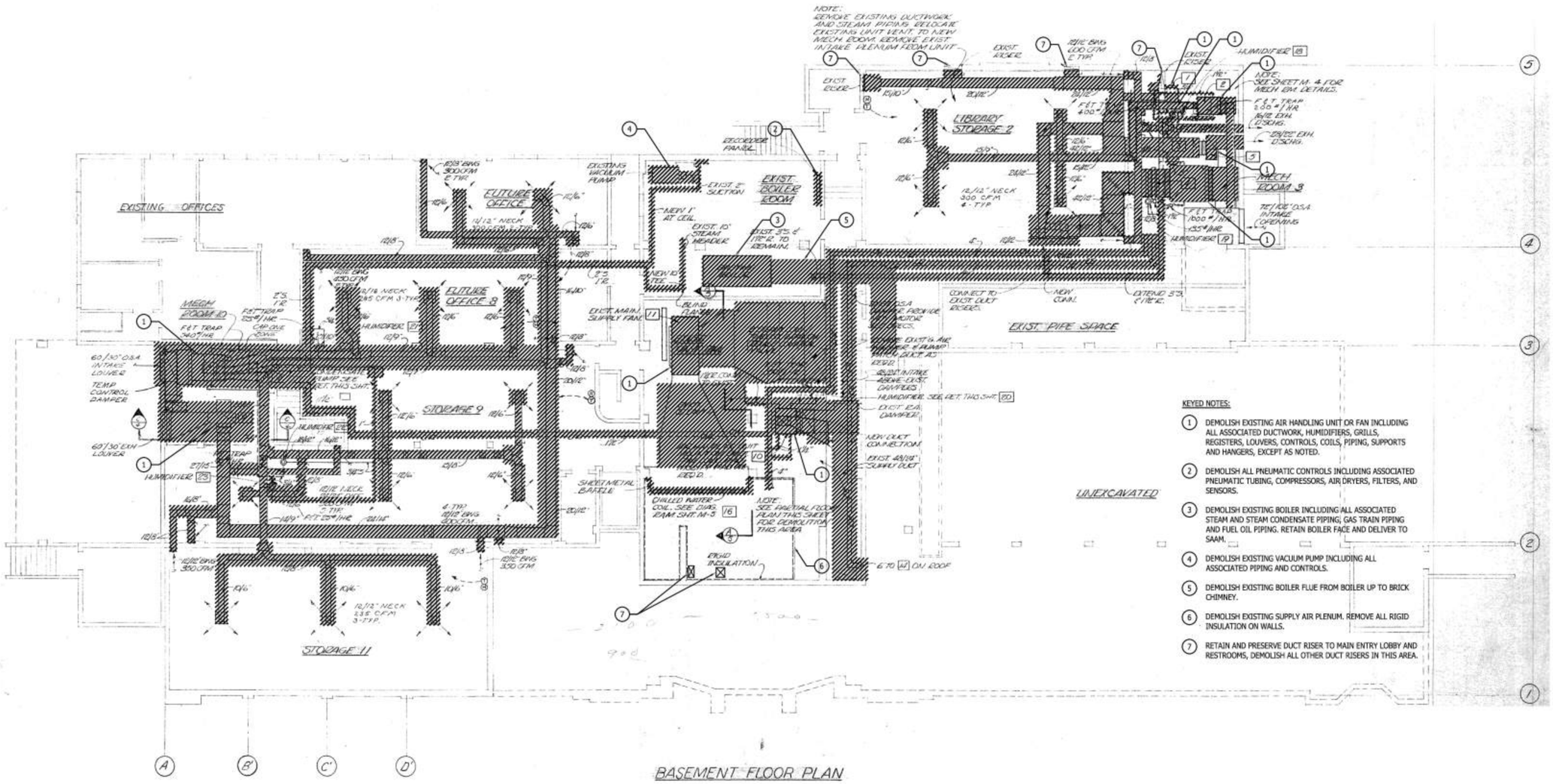
Sheet Title: HVAC DEMO PLAN - LEVEL 1

Sheet Number: **M101-A**



KEYED NOTES:

1. DEMOLISH EXISTING AIR HANDLING UNIT OR FAN INCLUDING ALL ASSOCIATED DUCTWORK, HUMIDIFIERS, GRILLS, REGISTERS, LOUVERS, CONTROLS, COILS, PIPING, SUPPORTS AND HANGERS, EXCEPT AS NOTED.
2. DEMOLISH ALL PNEUMATIC CONTROLS INCLUDING ASSOCIATED PNEUMATIC TUBING, COMPRESSORS, AIR DRYERS, FILTERS, AND SENSORS.
3. DEMOLISH EXISTING BOILER INCLUDING ALL ASSOCIATED STEAM AND STEAM CONDENSATE PIPING, GAS TRAIN PIPING AND FUEL OIL PIPING. RETAIN BOILER FACE AND DELIVER TO SAAM.
4. DEMOLISH EXISTING VACUUM PUMP INCLUDING ALL ASSOCIATED PIPING AND CONTROLS.
5. DEMOLISH EXISTING BOILER FLUE FROM BOILER UP TO BRICK CHIMNEY.
6. DEMOLISH EXISTING SUPPLY AIR PLENUM. REMOVE ALL RIGID INSULATION ON WALLS.
7. RETAIN AND PRESERVE DUCT RISER TO MAIN ENTRY LOBBY AND RESTROOMS, DEMOLISH ALL OTHER DUCT RISERS IN THIS AREA.

BASEMENT FLOOR PLAN

1 M101-B HVAC DEMO PLAN - PARTIAL LEVEL 1
1/8" = 1'-0"

TRUE NORTH | PLAN NORTH | 0' 4' 8' 16' 32'

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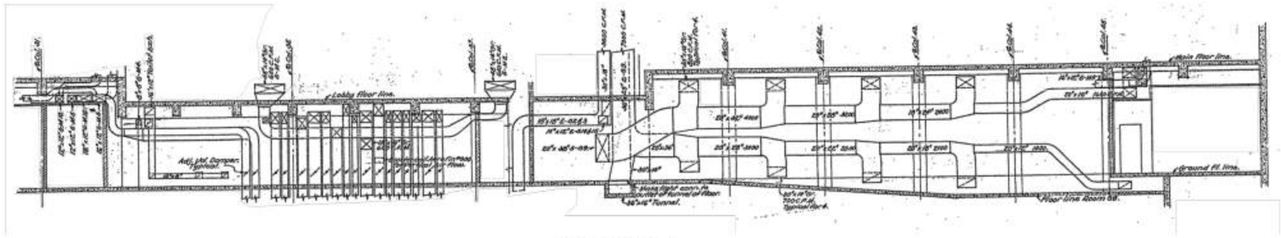
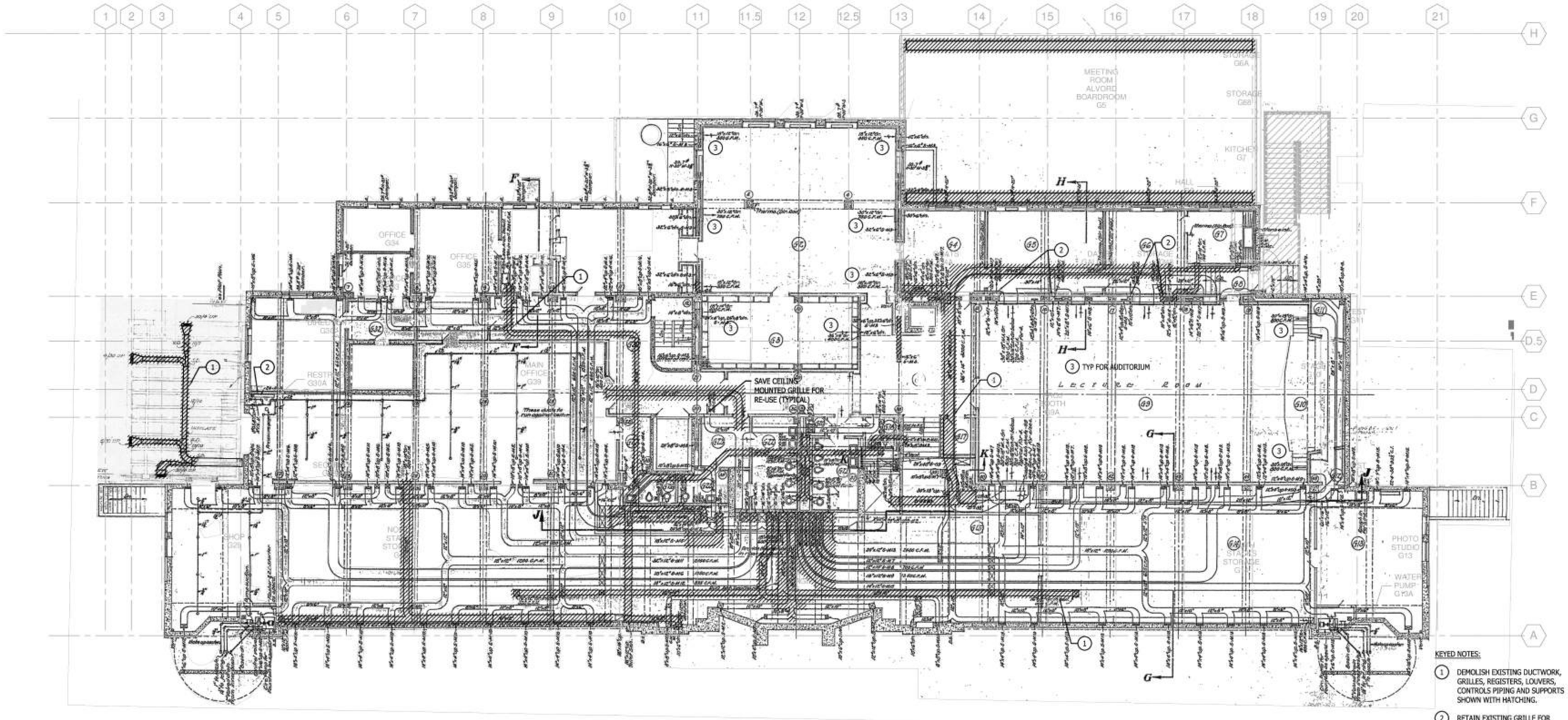
Sheet Title: HVAC DEMO PLAN - PARTIAL LEVEL 1

Sheet Number: **M101-B**



SECTION J-J
1/8" = 1'-0"



KEYED NOTES:

1. DEMOLISH EXISTING DUCTWORK, GRILLES, REGISTERS, LOUVERS, CONTROLS PIPING AND SUPPORTS SHOWN WITH HATCHING.
2. RETAIN EXISTING GRILLE FOR REUSE IN GARDENER CENTER.
3. RETAIN EXISTING GRILLE AND REUSE AS REQUIRED TO MAINTAIN WALL CONSTRUCTION REQUIREMENTS OF OTHER TRADES.

1 M102 HVAC DEMO PLAN - LEVEL 2
1/8" = 1'-0"

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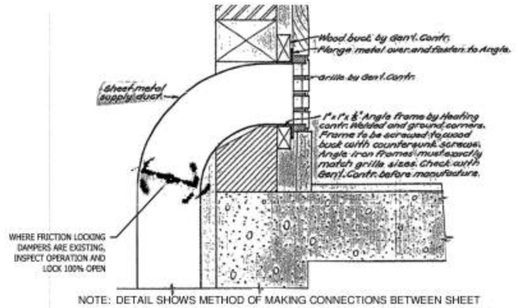
Sheet Title: HVAC DEMO PLAN - LEVEL 2

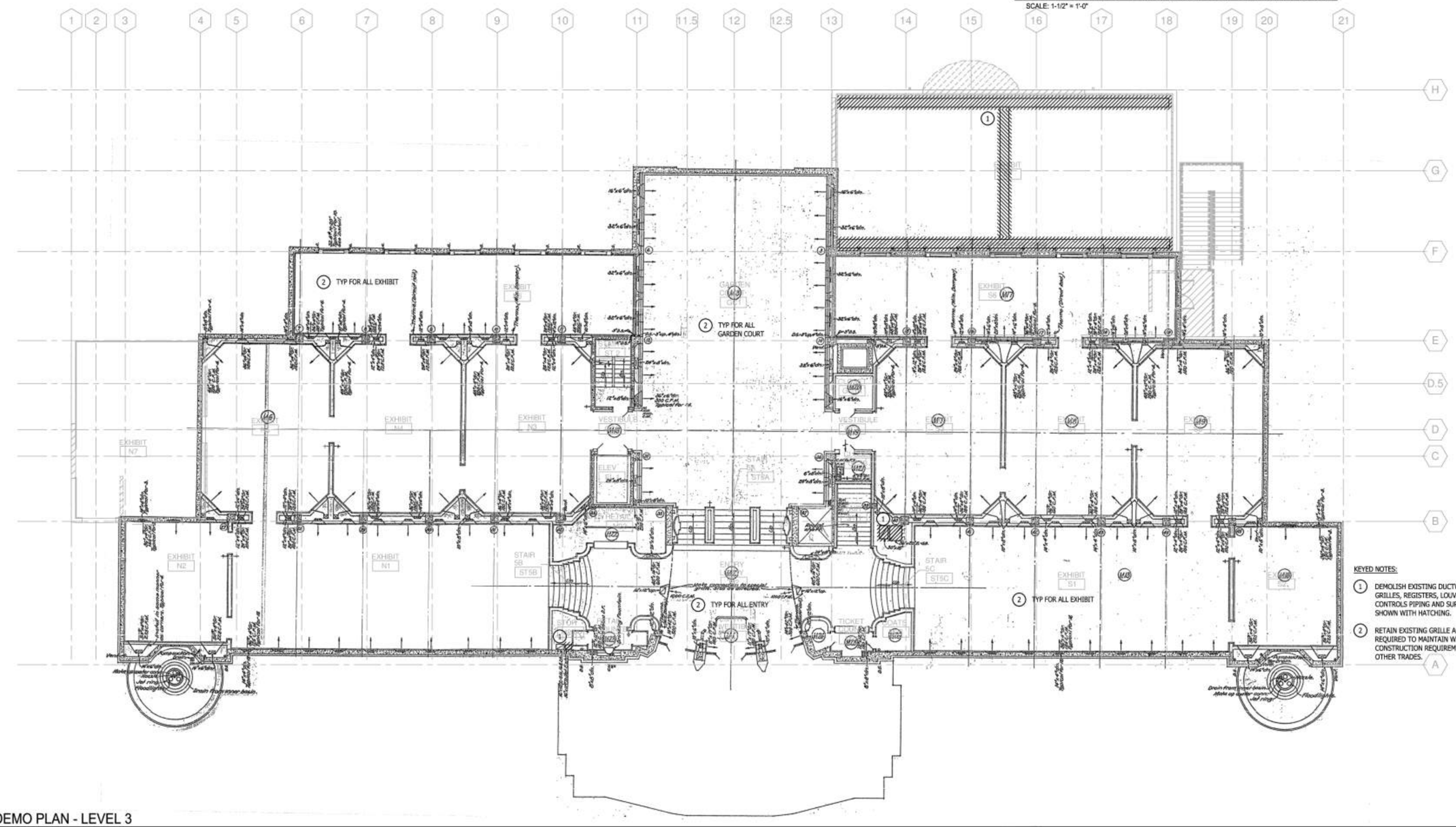
Sheet Number: **M102**



NOTE: DETAIL SHOWS METHOD OF MAKING CONNECTIONS BETWEEN SHEET METAL DUCTS AND GRILLES. TYPICAL FOR ALL SUPPLY GRILLES ON MAIN FLOOR.

SECTION THRU TYPICAL SUPPLY GRILL AT BASE

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



KEYED NOTES:

1. DEMOLISH EXISTING DUCTWORK, GRILLES, REGISTERS, LOUVERS, CONTROLS PIPING AND SUPPORTS SHOWN WITH HATCHING.
2. RETAIN EXISTING GRILLE AND REUSE AS REQUIRED TO MAINTAIN WALL CONSTRUCTION REQUIREMENTS OF OTHER TRADES.

1 M103 HVAC DEMO PLAN - LEVEL 3

1/8" = 1'-0"

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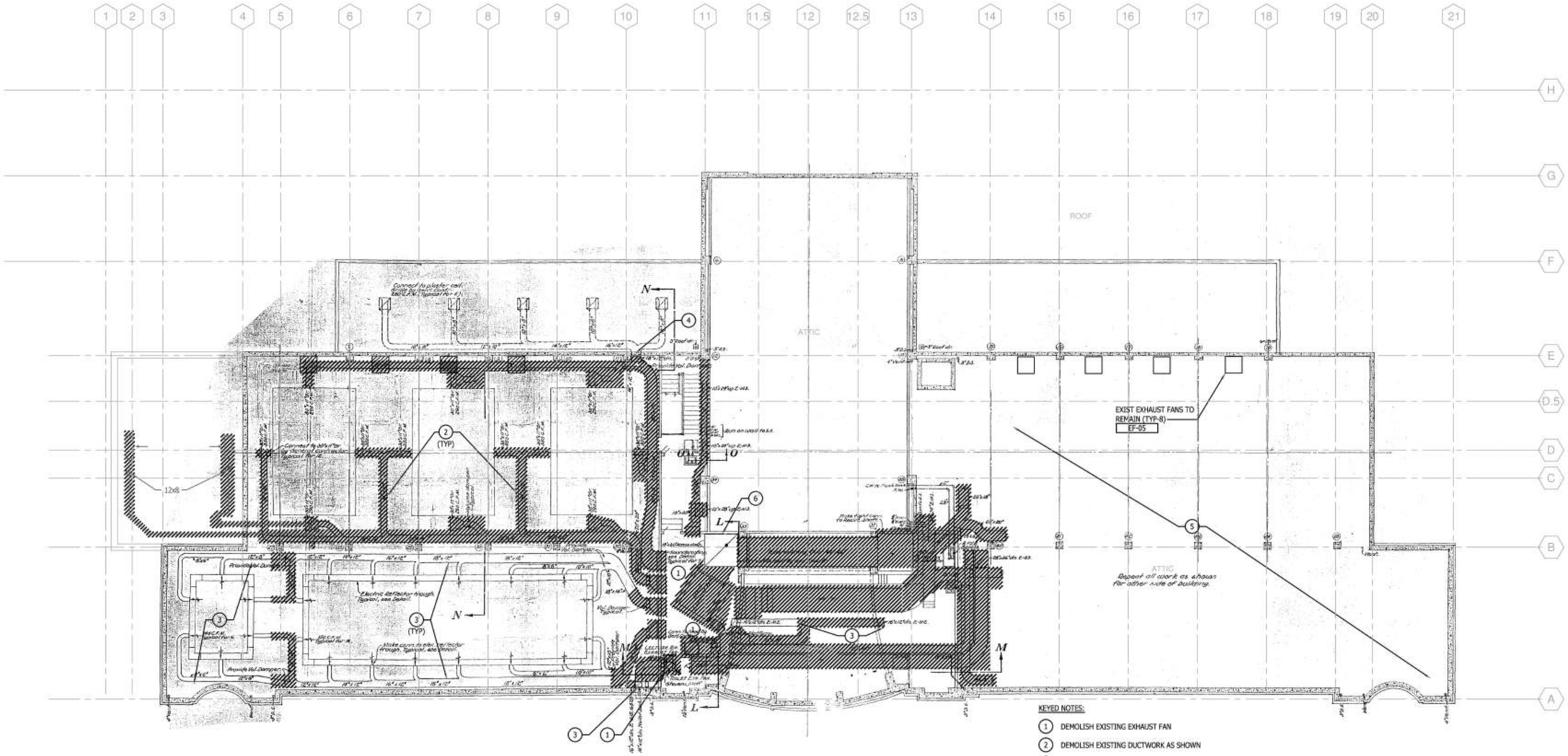
Sheet Title: HVAC DEMO PLAN - LEVEL 3

Sheet Number: **M103**



KEYED NOTES:

1. DEMOLISH EXISTING EXHAUST FAN
2. DEMOLISH EXISTING DUCTWORK AS SHOWN
3. PRESERVE EXISTING DUCTWORK, COVER OR PROTECT THE OPENINGS OF ALL THE EXISTING DUCTWORK TO REMAIN
4. CUT AND CAP EXISTING DUCTWORK. ABANDON IN PLACE
5. DEMOLITION OF DUCTWORK IN THIS AREA, GRID LINES C13 TO H21, IS SIMILAR TO DEOMLITION OF DUCTWORK IN GRIDLINES D1 TO H11
6. DEMOLISH PLENUM UP TO WITHIN 12" OF ROOF AND CAP

1 M104 HVAC DEMO PLAN - ATTIC
1/8" = 1'-0"

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Sheet Title: HVAC DEMO PLAN - ATTIC

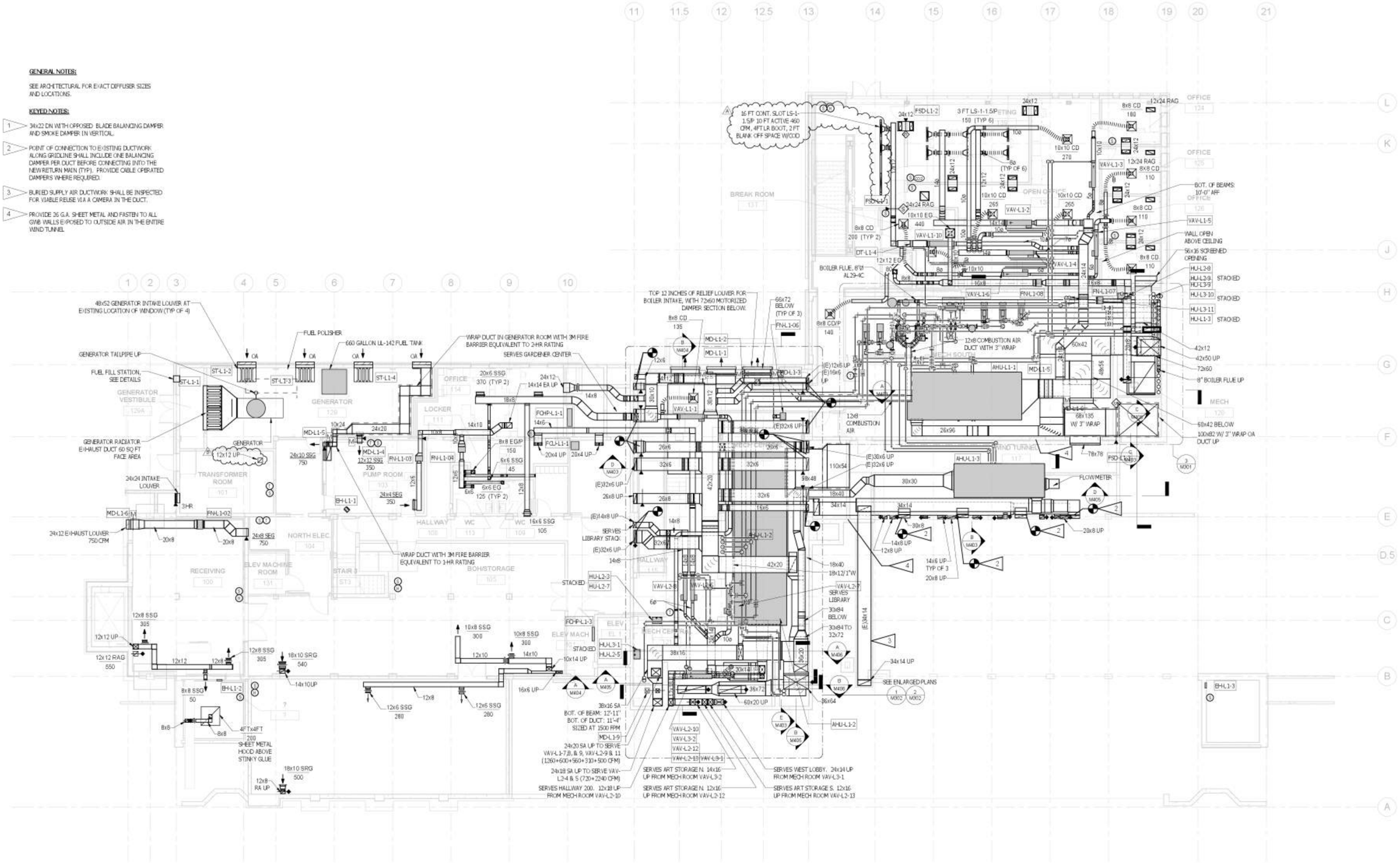
Sheet Number: **M104**

GENERAL NOTES:

SEE ARCHITECTURAL FOR EXACT DIFFUSER SIZES AND LOCATIONS.

KEYED NOTES:

1. 34x22 DN WITH OPPOSED BLADE BALANCING DAMPER AND SMOKE DAMPER IN VERTICAL.
2. POINT OF CONNECTION TO EXISTING DUCTWORK ALONG GRIDLINE SHALL INCLUDE ONE BALANCING DAMPER PER DUCT BEFORE CONNECTING INTO THE NEW RETURN MAIN (TYP). PROVIDE CABLE OPERATED DAMPERS WHERE REQUIRED.
3. BURIED SUPPLY AIR DUCTWORK SHALL BE INSPECTED FOR VIABLE REUSE VIA A CAMERA IN THE DUCT.
4. PROVIDE 26 G.A. SHEET METAL AND FASTEN TO ALL GWB WALLS EXPOSED TO OUTSIDE AIR IN THE ENTIRE WIND TUNNEL



HVAC PLAN - LEVEL 1

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

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Date	6/23/17

Sheet Title: HVAC PLAN - LEVEL 1

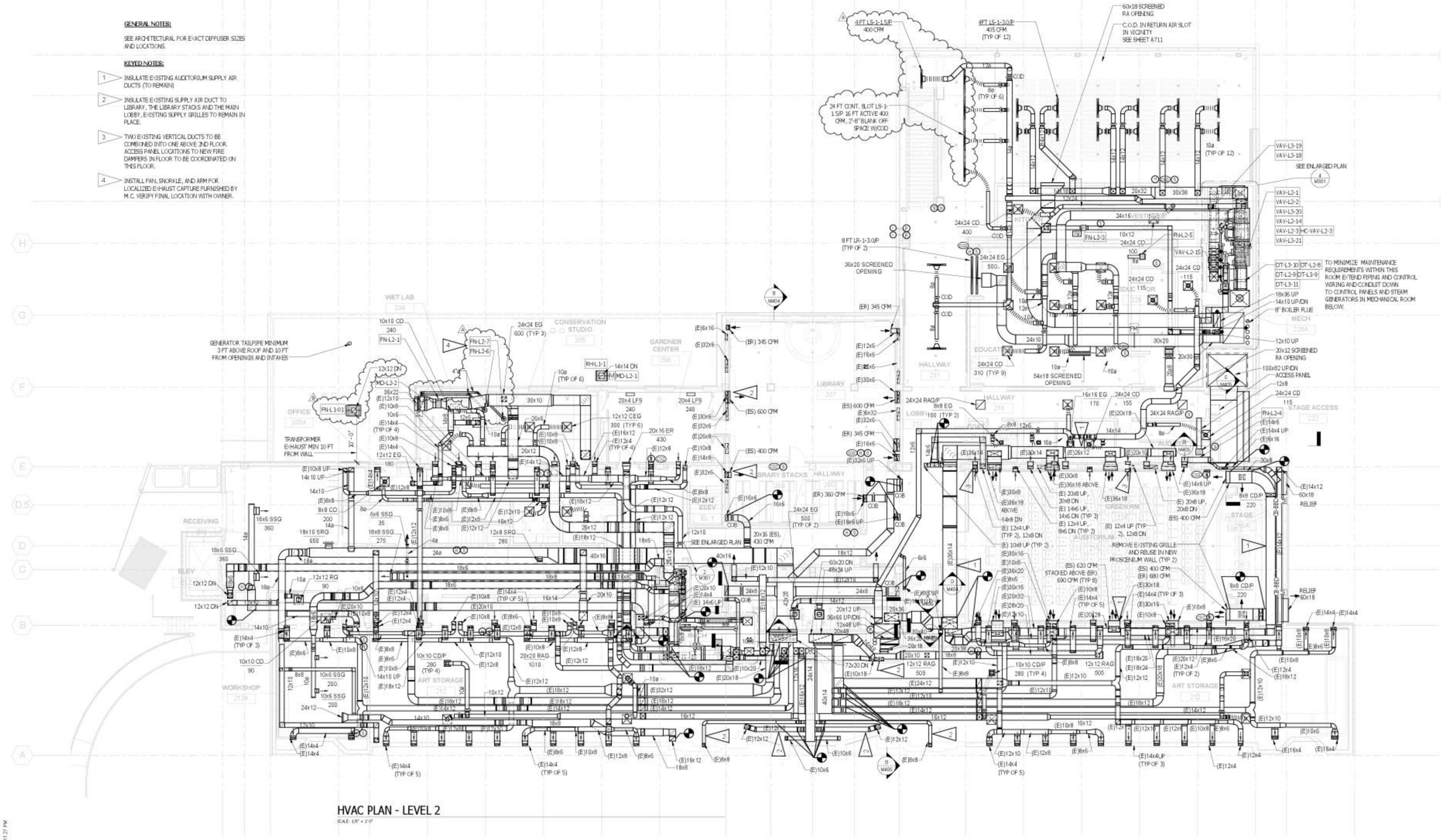
Sheet Number: **M201**

GENERAL NOTES:

SEE ARCHITECTURAL FOR EXACT DIFFUSER SIZES AND LOCATIONS.

KEYED NOTES:

1. INSULATE EXISTING AUDITORIUM SUPPLY AIR DUCTS (TO REMAIN)
2. INSULATE EXISTING SUPPLY AIR DUCT TO LIBRARY, THE LIBRARY STACKS AND THE MAIN LOBBY. EXISTING SUPPLY GRILLES TO REMAIN IN PLACE.
3. TWO EXISTING VERTICAL DUCTS TO BE COMBOINED INTO ONE ABOVE 2ND FLOOR. ACCESS PANEL LOCATIONS TO NEW FIRE DAMPERS IN FLOOR TO BE COORDINATED ON THIS FLOOR.
4. INSTALL FAN, SNORKLE, AND ARM FOR LOCALIZED EXHAUST CAPTURE FURNISHED BY M.C. VERIFY FINAL LOCATION WITH OWNER.



HVAC PLAN - LEVEL 2

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1	9/1/17	PERMIT CORRECTIONS 1

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LMN Proj No	16028.01
Date	6/23/17

Sheet Title: HVAC PLAN - LEVEL 2

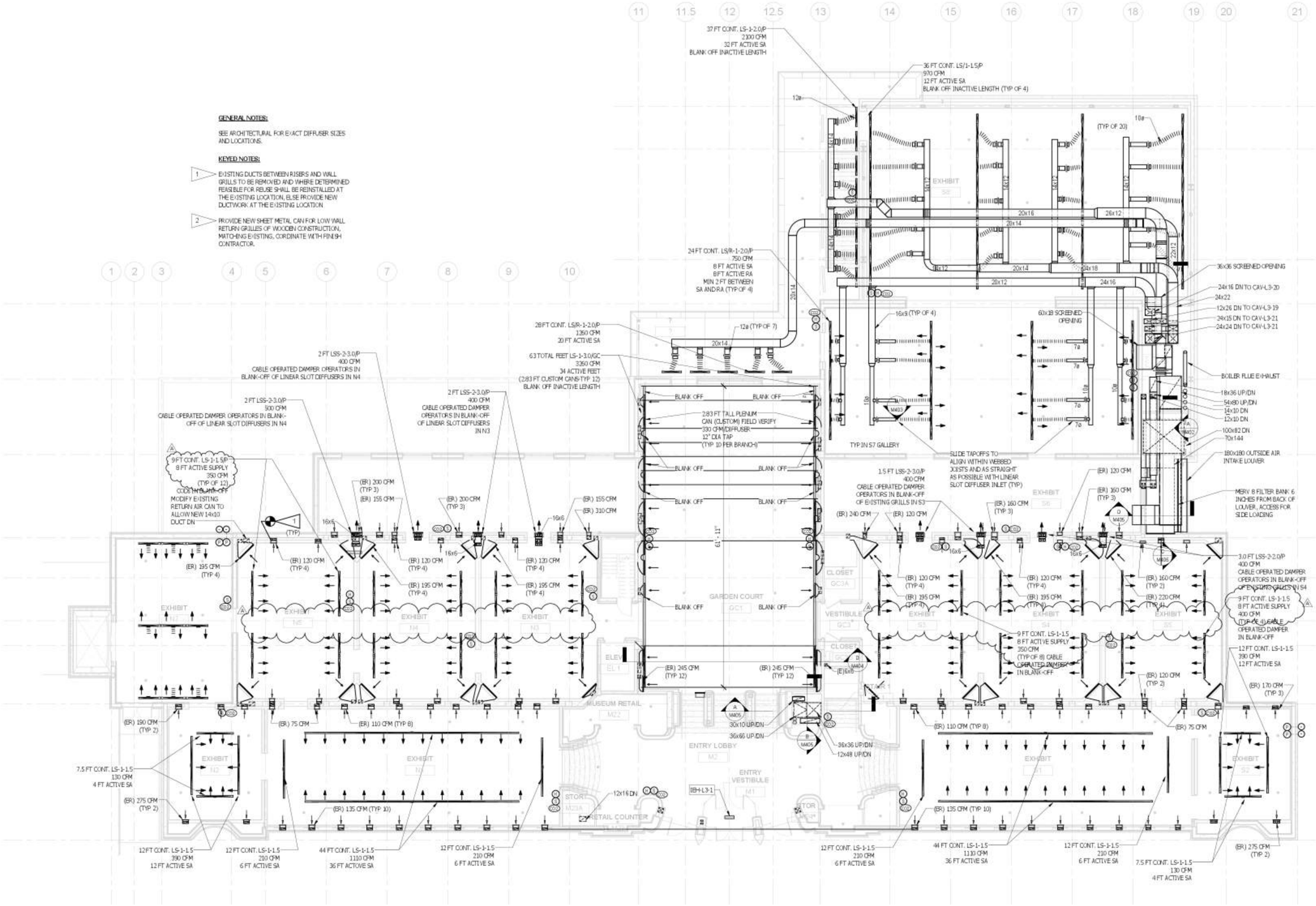
Sheet Number: **M202**

GENERAL NOTES:

SEE ARCHITECTURAL FOR EXACT DIFFUSER SIZES AND LOCATIONS.

KEYED NOTES:

1. EXISTING DUCTS BETWEEN RISERS AND WALL GRILLS TO BE REMOVED AND WHERE DETERMINED FEASIBLE FOR REUSE SHALL BE REINSTALLED AT THE EXISTING LOCATION, ELSE PROVIDE NEW DUCTWORK AT THE EXISTING LOCATION
2. PROVIDE NEW SHEET METAL CAN FOR LOW WALL RETURN GRILLES OF WOODEN CONSTRUCTION, MATCHING EXISTING, COORDINATE WITH FINISH CONTRACTOR.



TRUE NORTH PLAN NORTH 0' 4' 8' 16' 32'

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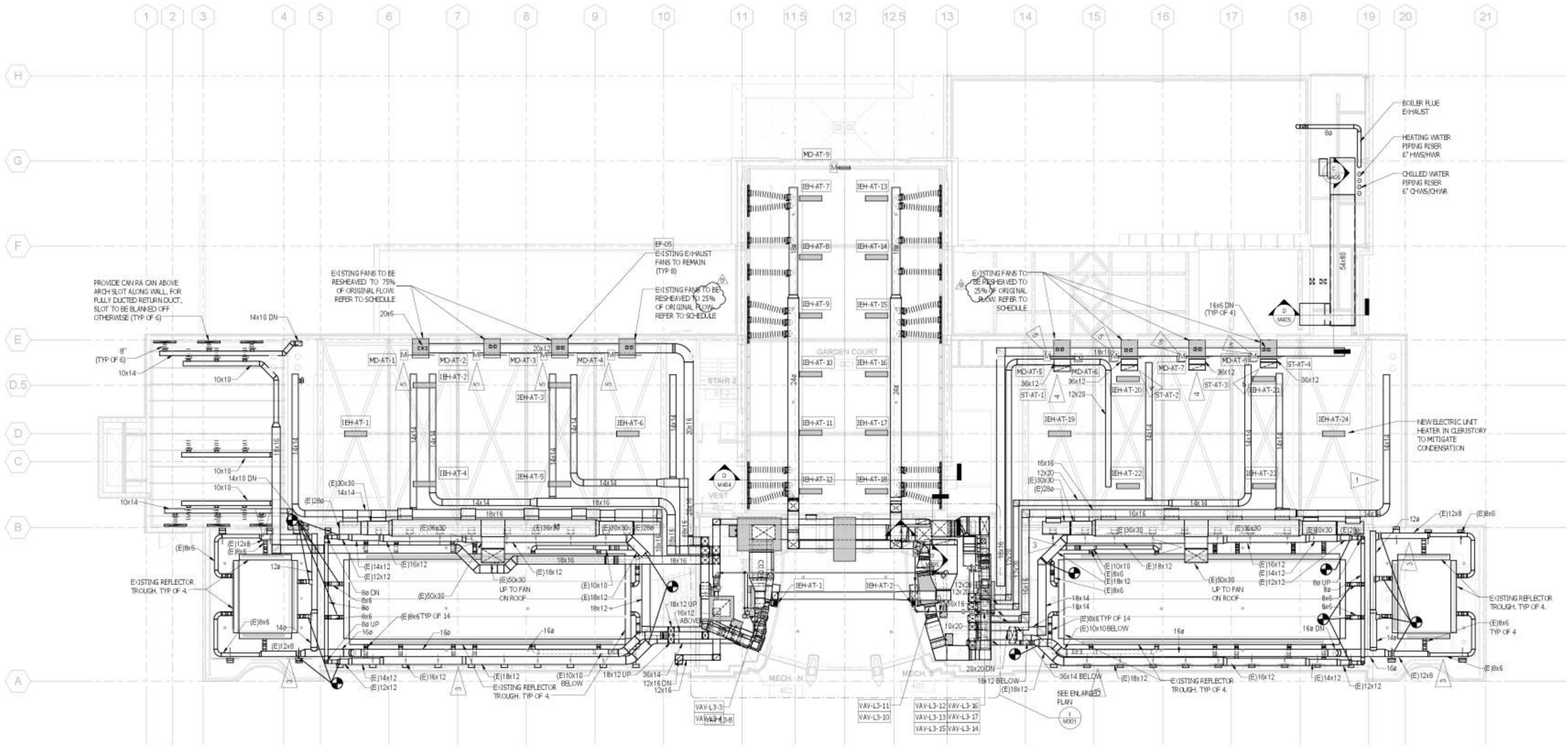
Sheet Title: HVAC PLAN - LEVEL 3

Sheet Number: **M203**

KEYED NOTES:

1. ROUTE DUCT BELOW ACCESS PLATFORM (TYP)
2. CONDENSATION MITIGATION SYSTEM IS TO REUSE EXISTING ROOF HOODS AND DUCTWORK FOR PASSIVE RELIEF OF MOISTURE
3. REUSE EXISTING DUCT AND TROUGH BELOW CATWALKS TO N1 AND S1 GALLERIES, ROUTE NEW DUCTWORK, MINIMIZING IMPACT TO CIRCULATION TRAFFIC ON CATWALKS. CLEAN AND INSULATE ALL REMAINING DUCT AND TROUGH, PROVIDE NEW OR BLANK-OFFS
4. INSTALL SOUND TRAP IN VERTICAL ORIENTATION, WITH SCREENED INLET AT TOP
5. TAP 36x12 INTO BOTTOM OF EXISTING FAN OPENING. PROVIDE 30x20 ACCESS DOOR IN BLANKOFF ABOVE.



HVAC PLAN - ATTIC

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

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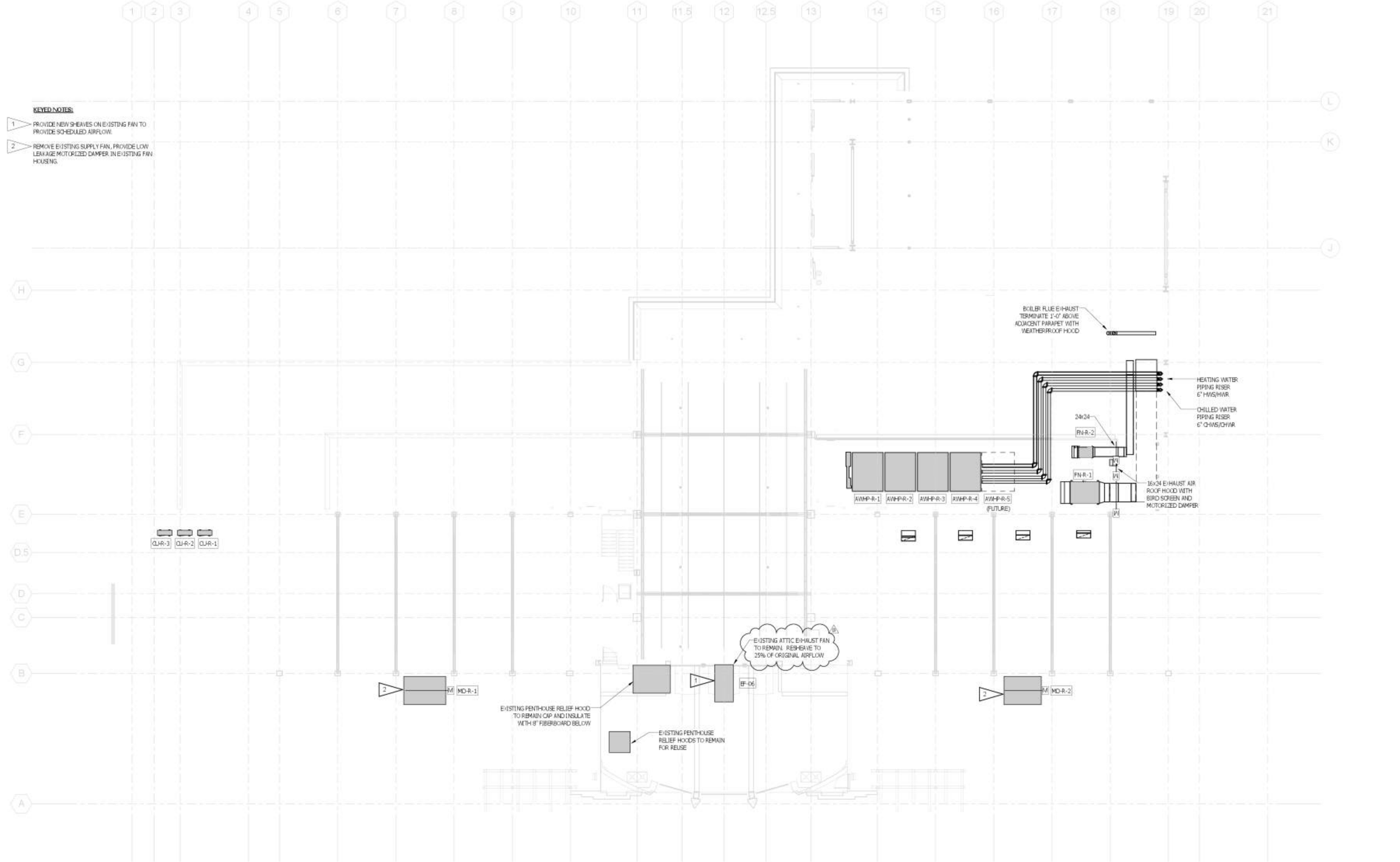
Sheet Title: HVAC PLAN - ATTIC

Sheet Number: **M204**

KEYED NOTES:

1 PROVIDE NEW SHEAVES ON EXISTING FAN TO PROVIDE SCHEDULED AIRFLOW.

2 REMOVE EXISTING SUPPLY FAN, PROVIDE LOW LEAKAGE MOTORIZED DAMPER IN EXISTING FAN HOUSING.



HVAC PLAN - ROOF

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

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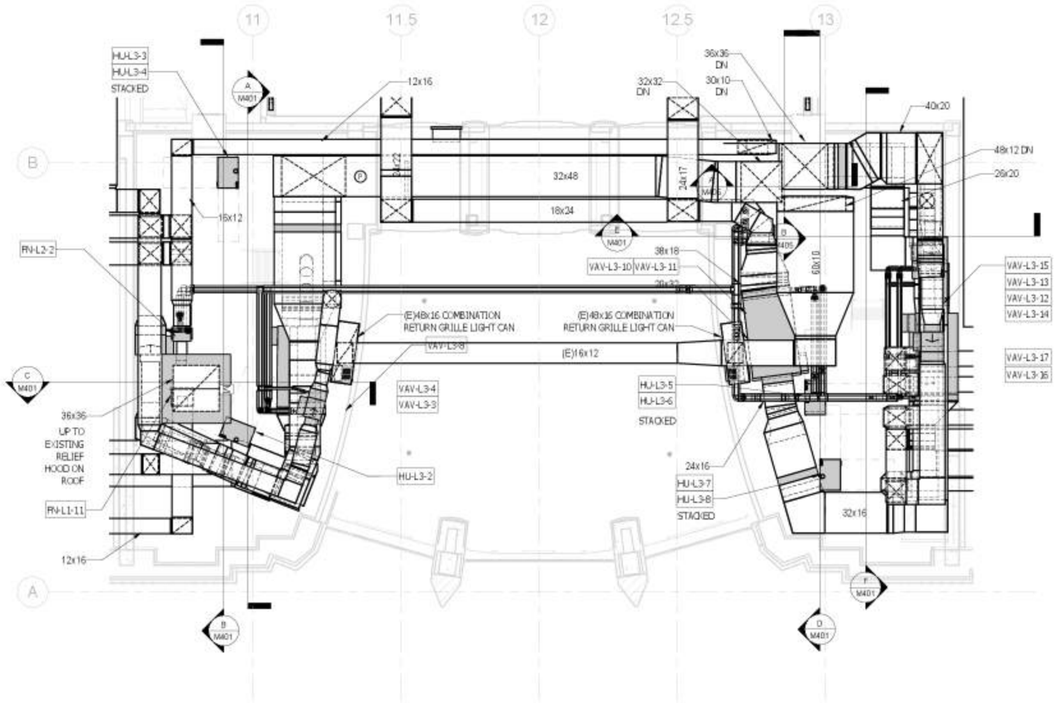
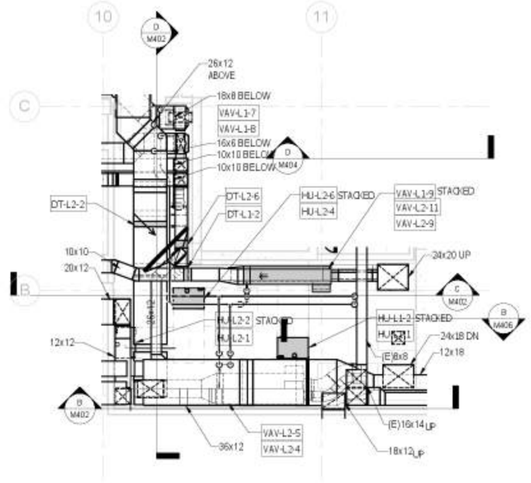
Sheet Title: HVAC PLAN - ROOF

Sheet Number: **M205**



1 M301 ENLARGED HVAC PLAN RM 402/403
SCALE: 1/4" = 1'-0"



2 M301 ENLARGED HVAC PLAN RM 209A
SCALE: 1/4" = 1'-0"

3 M301 ENLARGED HVAC PLAN RM 118
SCALE: 1/4" = 1'-0"

4 M301 ENLARGED HVAC PLAN RM 226A
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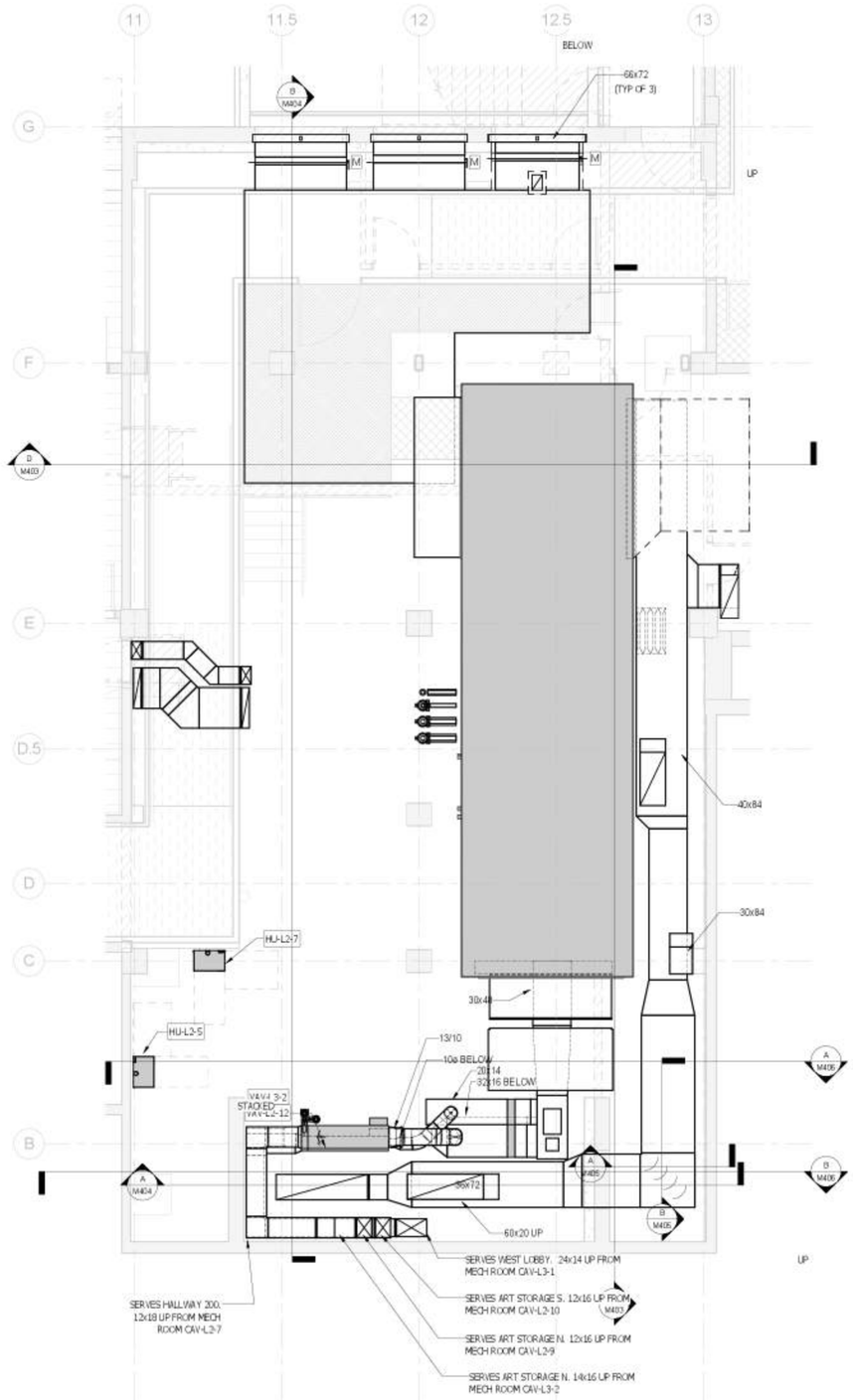
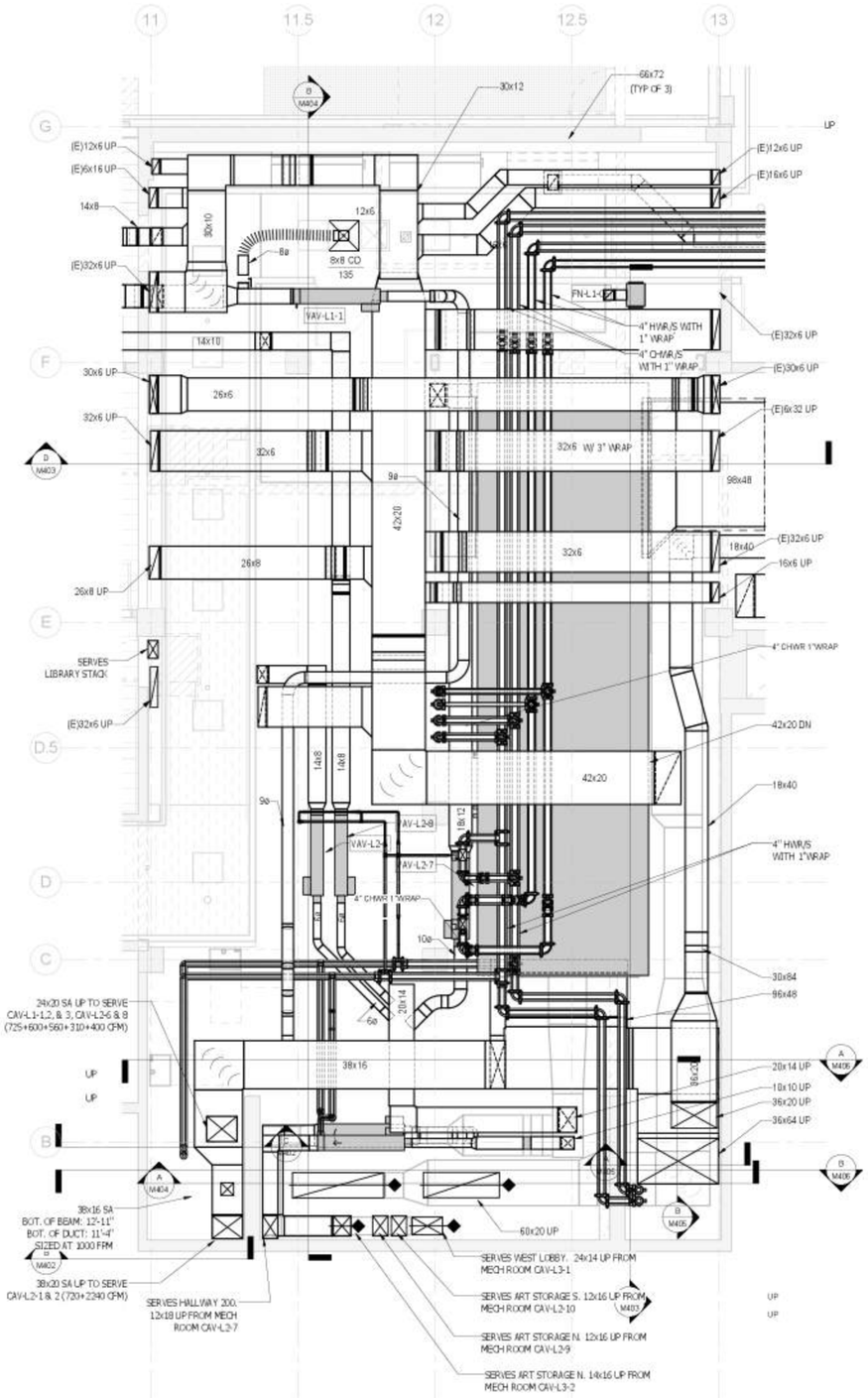
Sheet Number: **M301**



1 M302 ENLARGED HVAC PLAN - LEVEL 1 CENTRAL MECHANICAL ROOM - LOWER
SCALE: 1/4" = 1'-0"



2 M302 ENLARGED HVAC PLAN - LEVEL 1 CENTRAL MECHANICAL ROOM - UPPER
SCALE: 1/4" = 1'-0"

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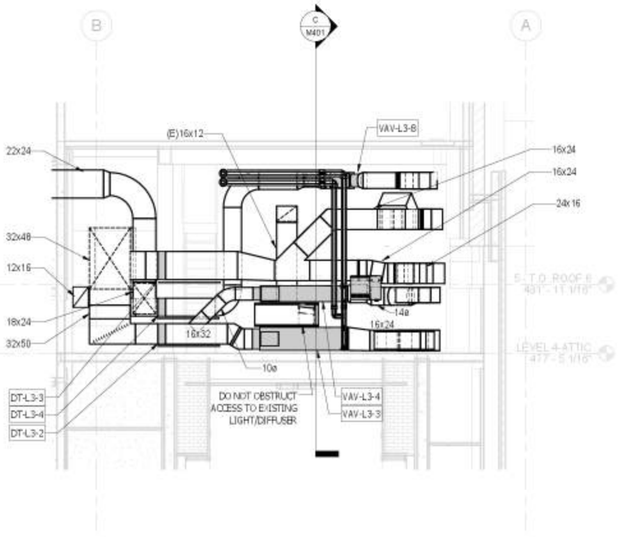
Revisions
No. Date Description

Drawn Author
Checked Checker
LMN Proj No 16028.01
Date 6/23/17

Sheet Title
ENLARGED MECHANICAL ROOMS

Sheet Number
M302



A M401 HVAC SECTION - ATTIC MECHANICAL ROOM 402 - SOUTH
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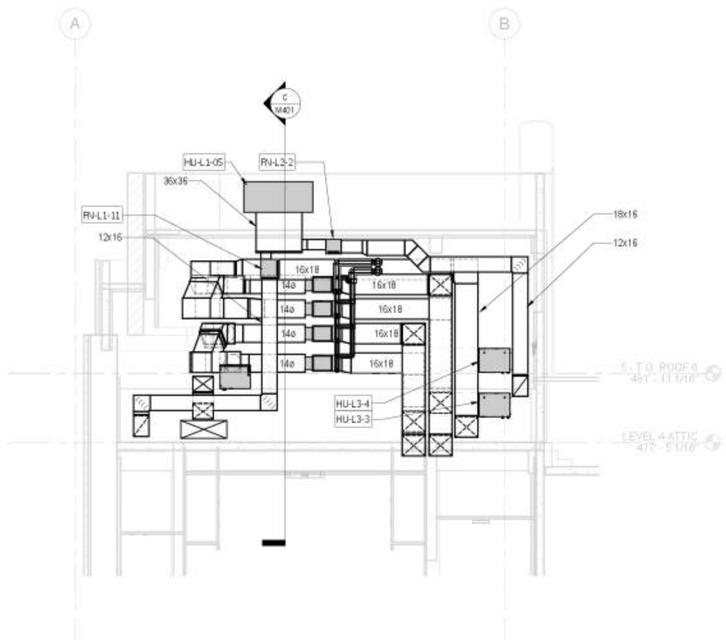
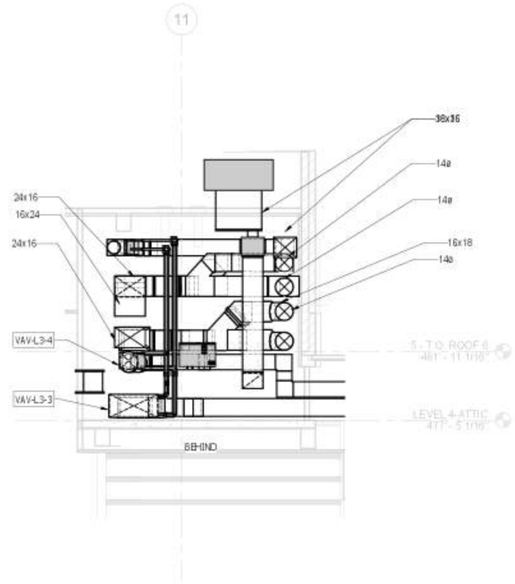
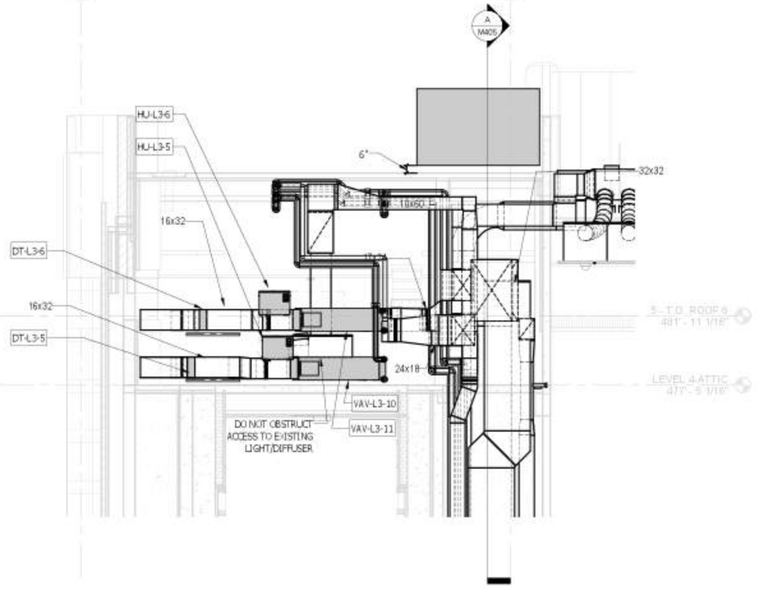


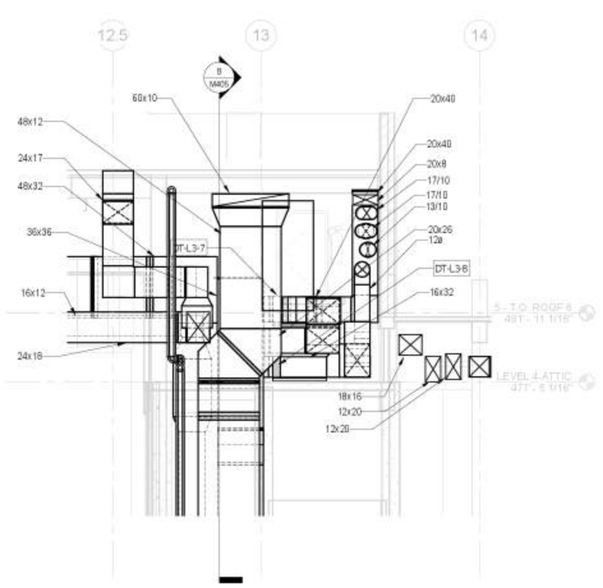
B M401 HVAC SECTION - ATTIC MECHANICAL ROOM 402 - NORTH
SCALE: 1/4" = 1'-0"



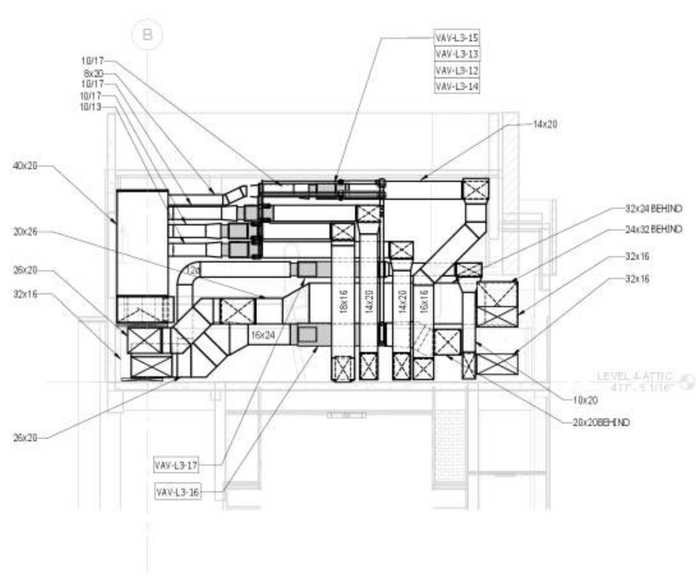
C M401 HVAC SECTION - ATTIC MECHANICAL ROOM 402 - WEST
SCALE: 1/4" = 1'-0"



D M401 HVAC SECTION - ATTIC MECHANICAL ROOM 403 - NORTH
SCALE: 1/4" = 1'-0"



E M401 HVAC SECTION - ATTIC MECHANICAL ROOM 403 - EAST
SCALE: 1/4" = 1'-0"



F M401 HVAC SECTION - ATTIC MECHANICAL ROOM 403 - SOUTH
SCALE: 1/4" = 1'-0"

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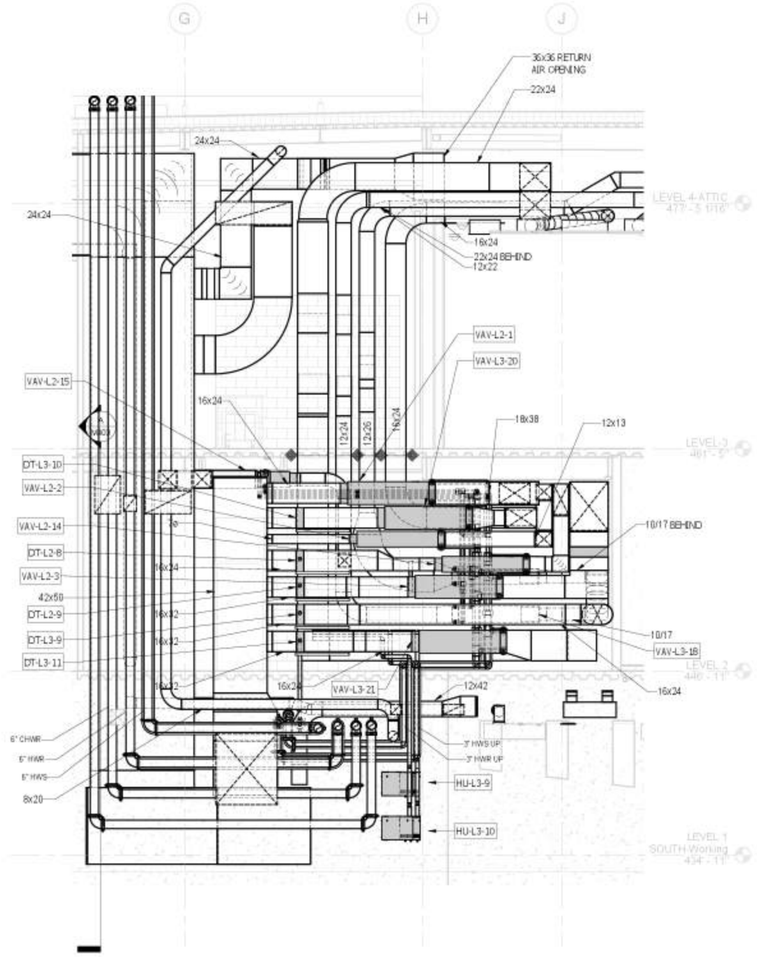
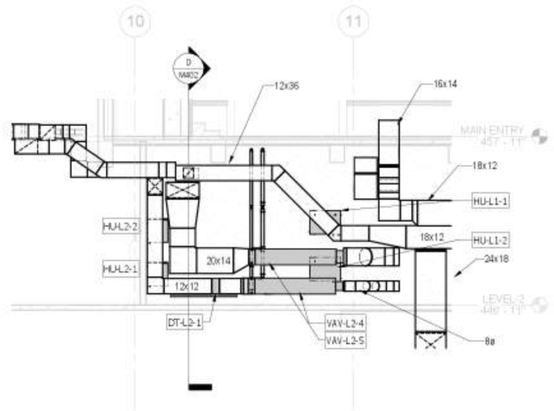
Sheet Title: HVAC SECTIONS

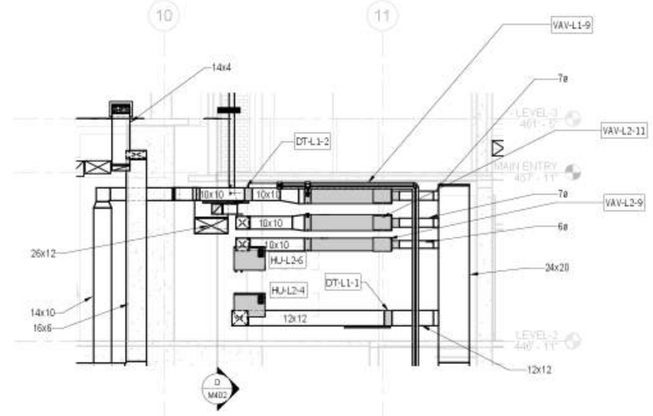
Sheet Number: **M401**



A M402 HVAC SECTION - MECHANICAL ROOM 226A
SCALE: 1/4" = 1'-0"



B M402 HVAC SECTION - MECHANICAL ROOM 209A - WEST
SCALE: 1/4" = 1'-0"



C M402 HVAC SECTION - MECHANICAL ROOM 209A - EAST
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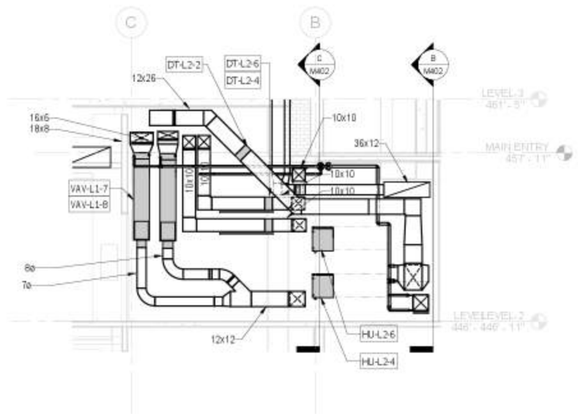

D M402 HVAC SECTION - MECHANICAL ROOM 209A - SOUTH
SCALE: 1/4" = 1'-0"

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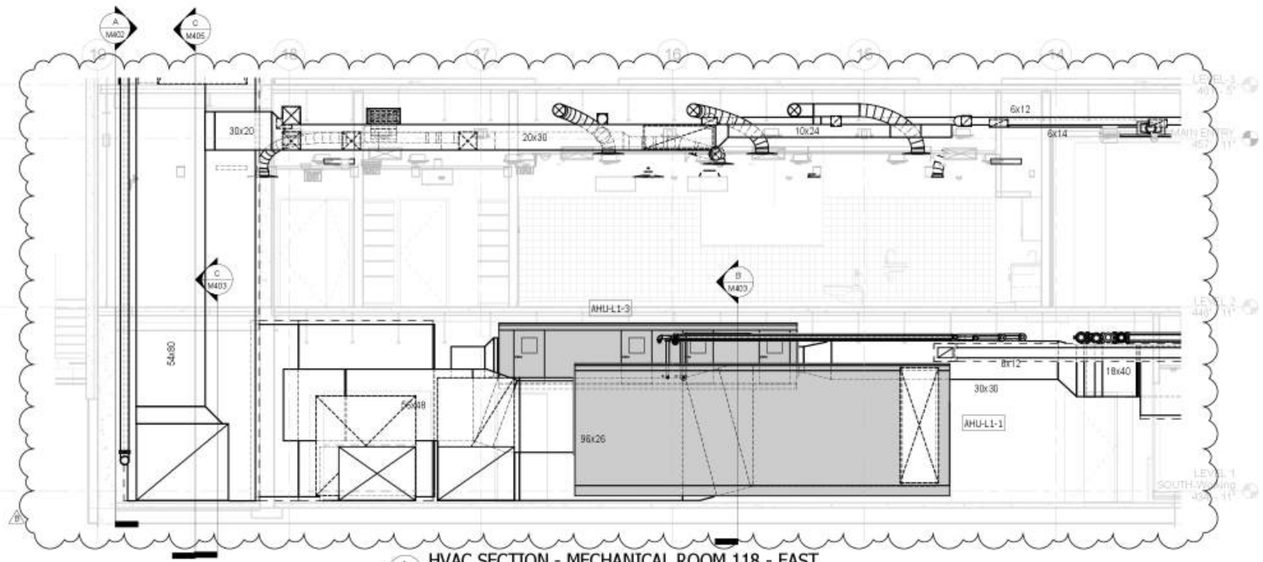
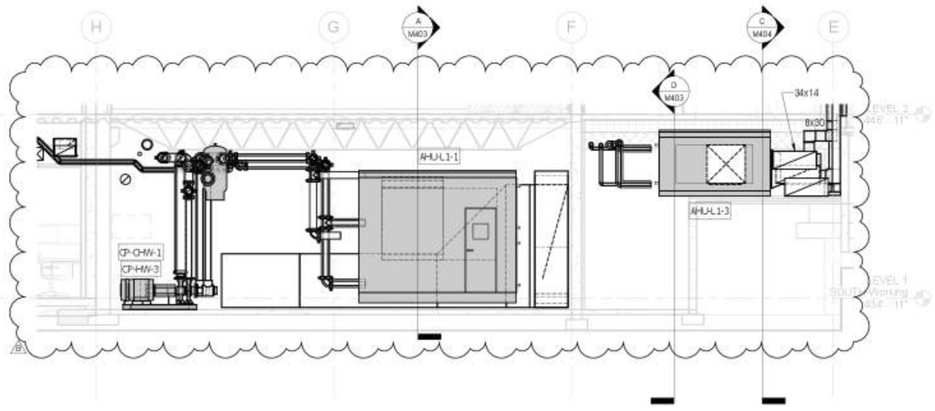
Sheet Title
HVAC SECTIONS

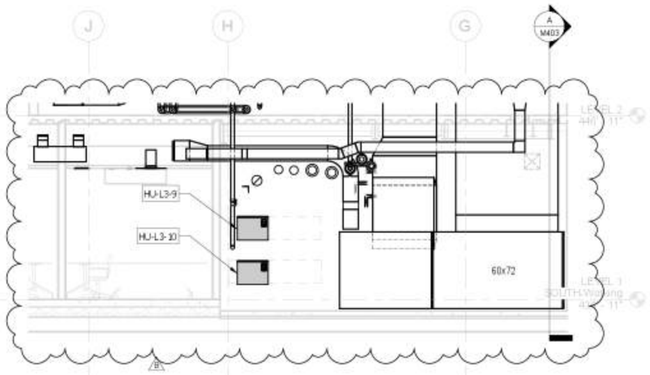
Sheet Number
M402



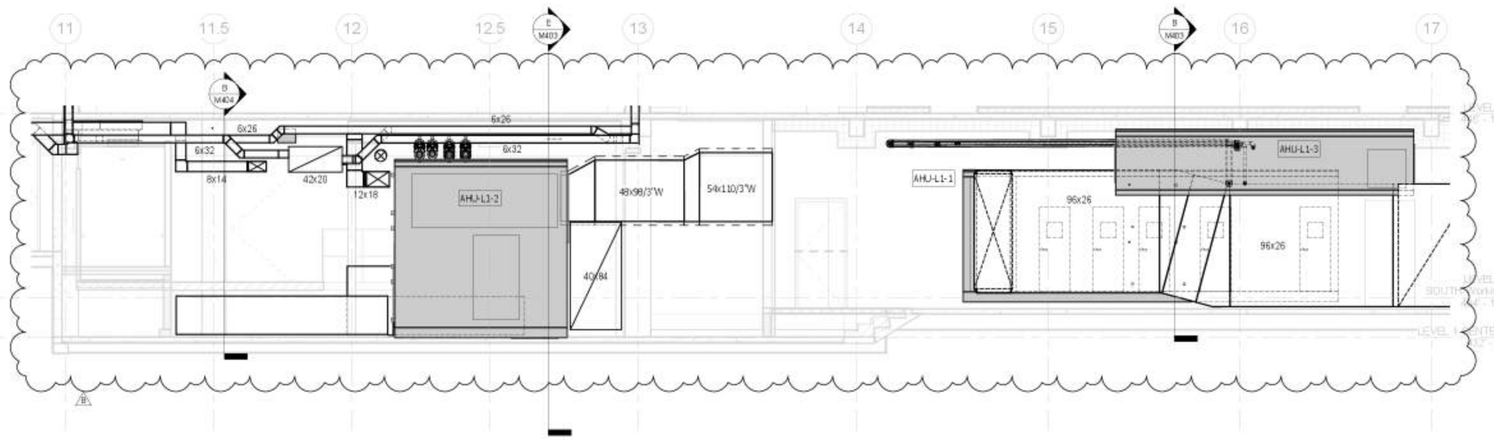
A M403 HVAC SECTION - MECHANICAL ROOM 118 - EAST
SCALE: 1/4" = 1'-0"



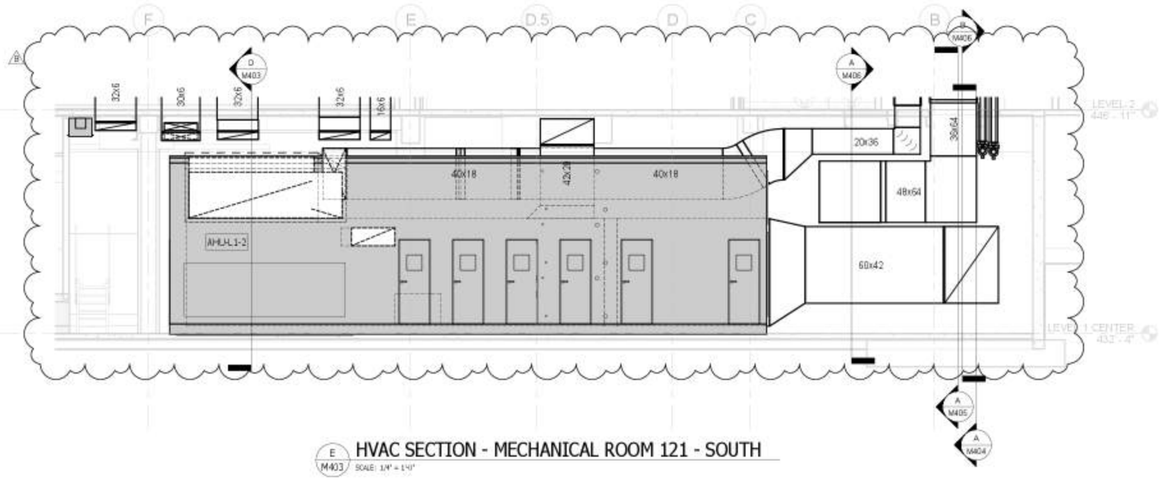
B M403 HVAC SECTION - MECHANICAL ROOM 118 -SOUTH
SCALE: 1/4" = 1'-0"



C M403 HVAC SECTION - MECHANICAL ROOM 118 - SOUTH CHASE
SCALE: 1/4" = 1'-0"



D M403 HVAC SECTION - MECHANICAL ROOM 121 - EAST
SCALE: 1/4" = 1'-0"



E M403 HVAC SECTION - MECHANICAL ROOM 121 - SOUTH
SCALE: 1/4" = 1'-0"

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Date 6/23/17
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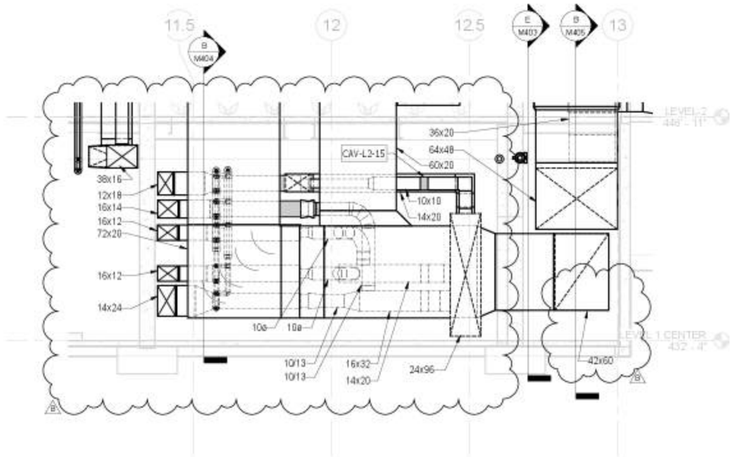
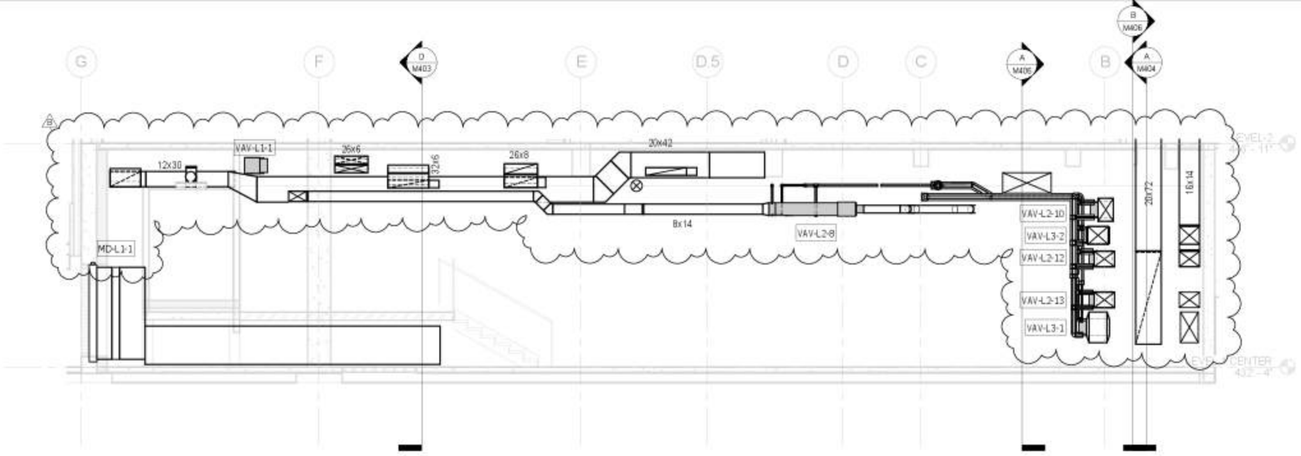
HVAC SECTIONS

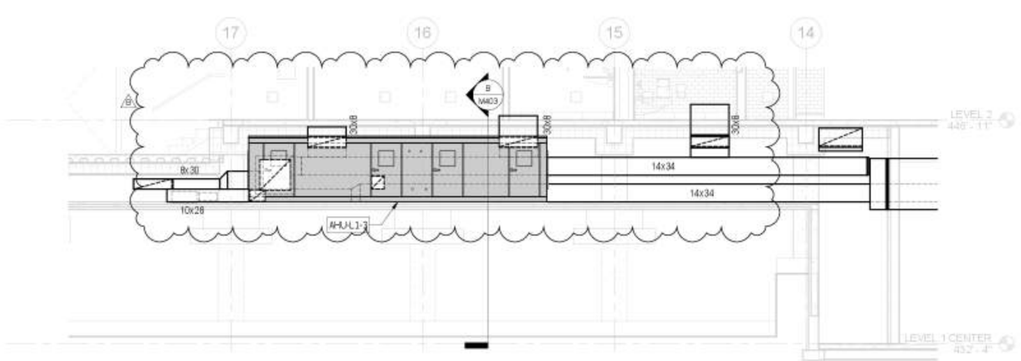
M403



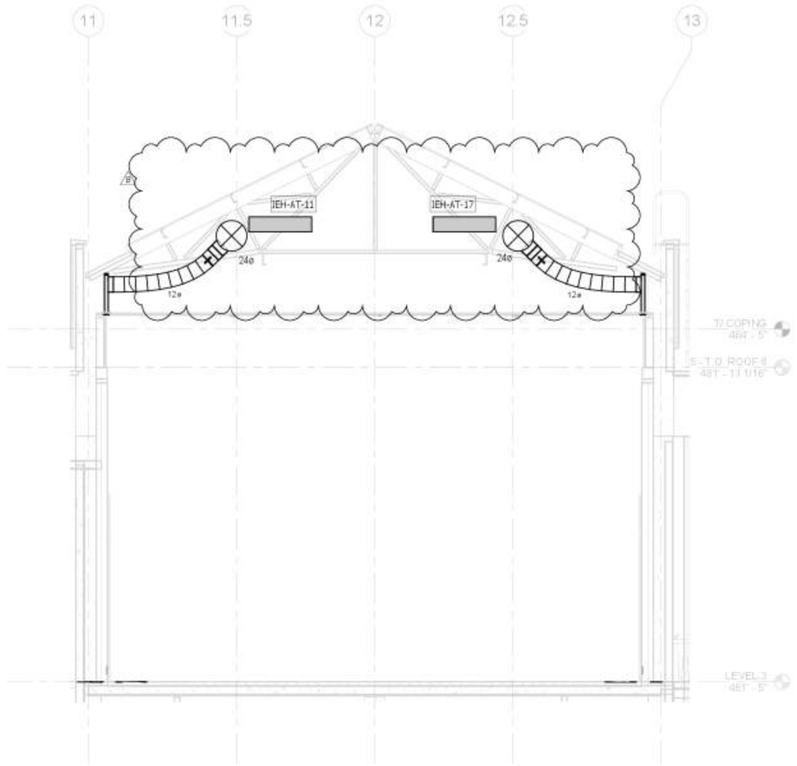
A M404 MECHANICAL ROOM 121 - VAV STACK
SCALE: 1/4" = 1'-0"



B M404 HVAC SECTION - MECHANICAL ROOM 121 VAV SECTION
SCALE: 1/4" = 1'-0"



C M404 HVAC SECTION - WIND TUNNEL 117
SCALE: 1/4" = 1'-0"



D M404 HAVC SECTION - GARDEN COURT
SCALE: 1/4" = 1'-0"

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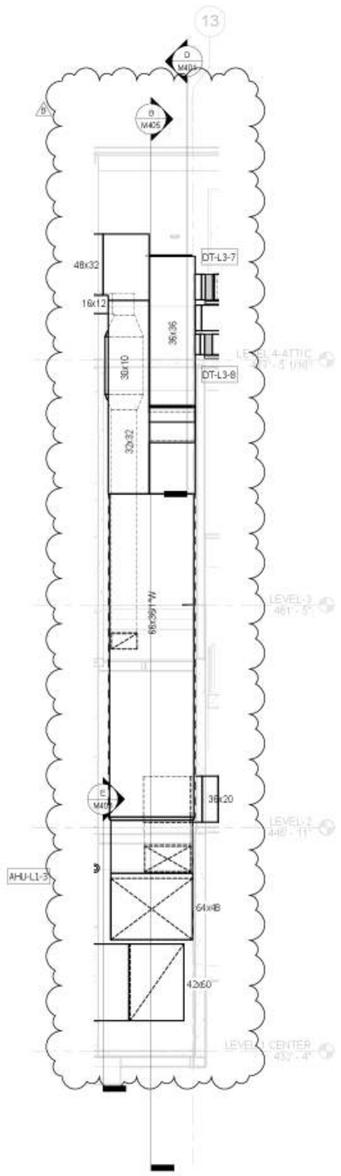
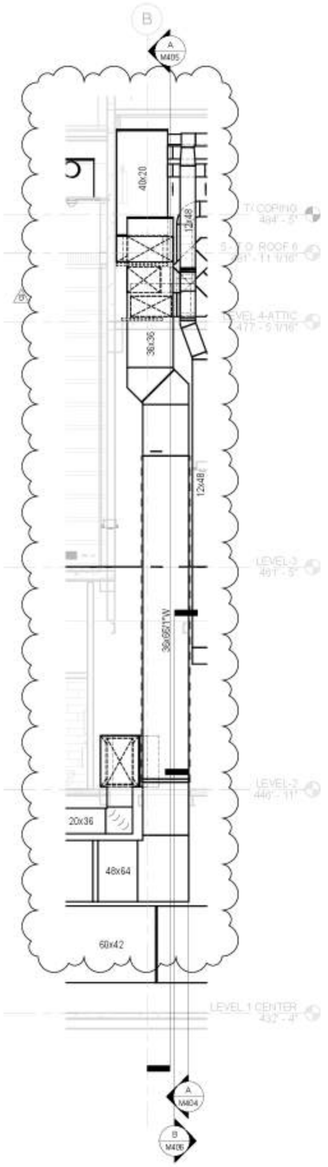
Sheet Title: HVAC SECTIONS

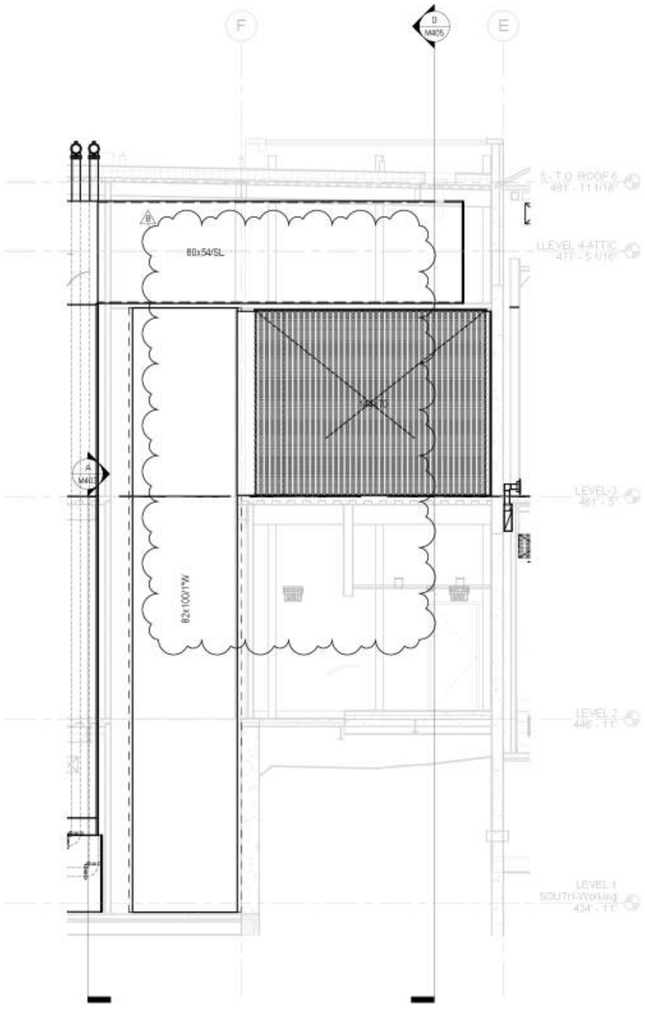
Sheet Number: M404



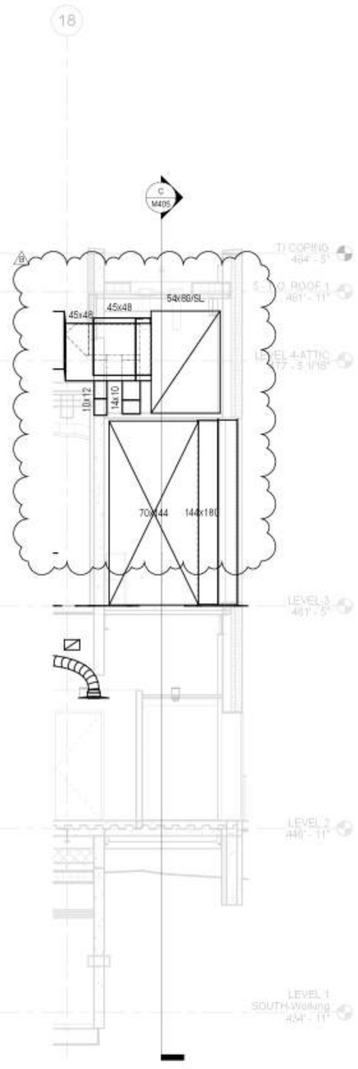
A M405 HVAC SECTION - GARDEN COURT CHASE - EAST
SCALE: 1/4" = 1'-0"



B M405 HVAC SECTION - GARDEN COURT CHASE - SOUTH
SCALE: 1/4" = 1'-0"



C M405 HVAC SECTION - OUTSIDE AIR INTAKE - SOUTH
SCALE: 1/4" = 1'-0"



D M405 HVAC SECTION - OUTSIDE AIR INTAKE - EAST
SCALE: 1/4" = 1'-0"

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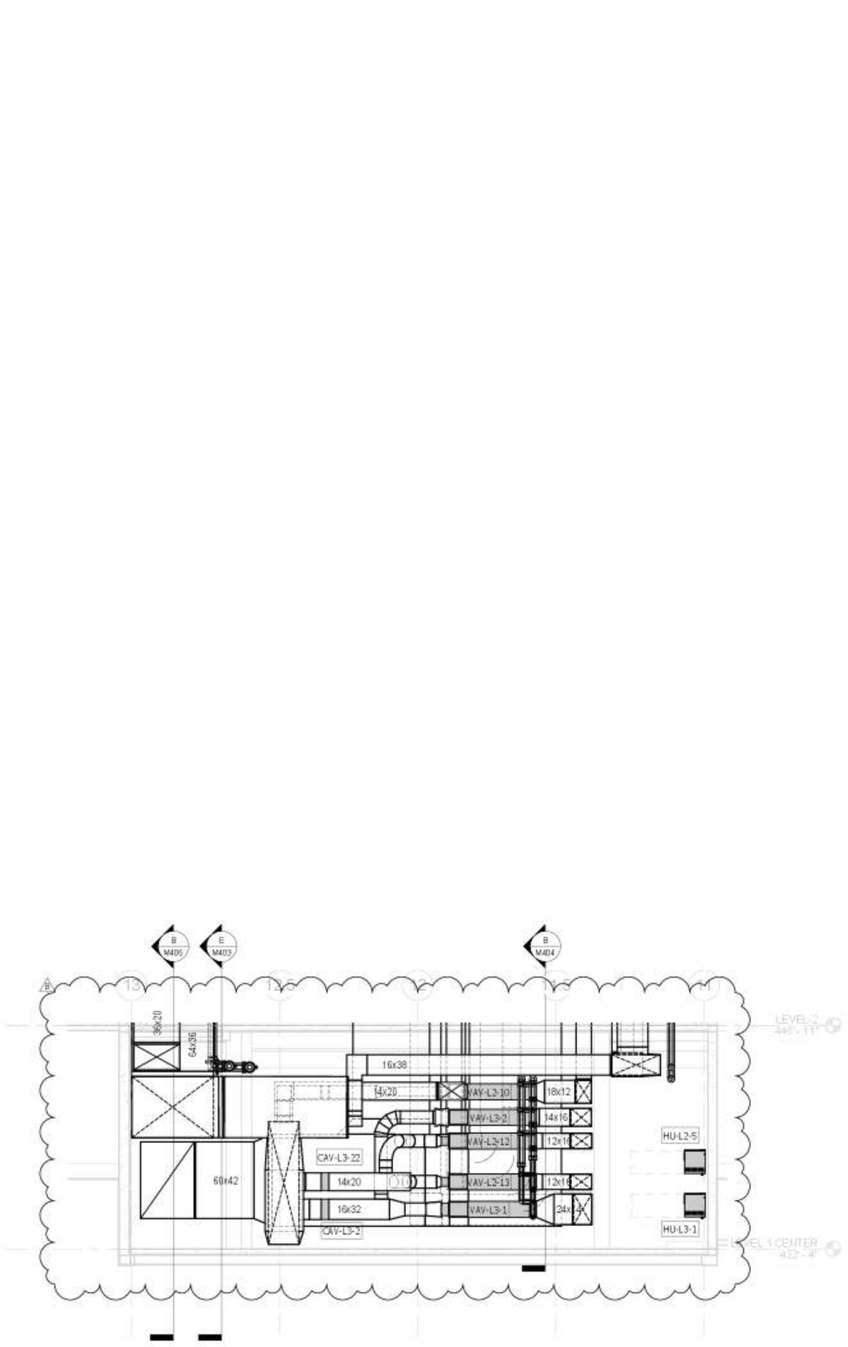
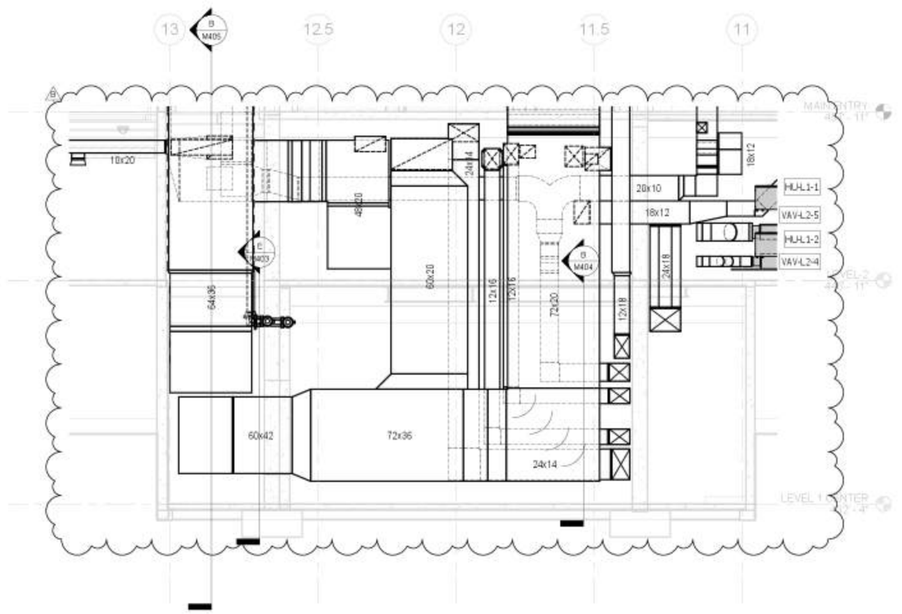
HVAC SECTIONS

Sheet Number
M405



A M406 HVAC SECTION - MECHANICAL ROOM 121 - 1ST FLOOR
SCALE: 1/4" = 1'-0"



B M406 HVAC SECTION - MECHANICAL ROOM 121 - 1ST AND 2ND FLOOR
SCALE: 1/4" = 1'-0"

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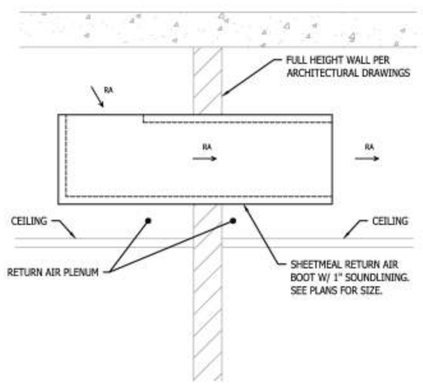
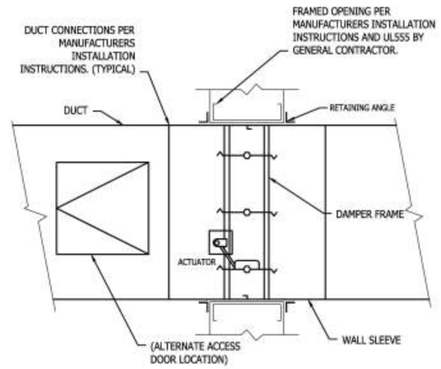
Sheet Number: **M406**



8 RETURN AIR BOOT DETAIL
SCALE: NOT TO SCALE

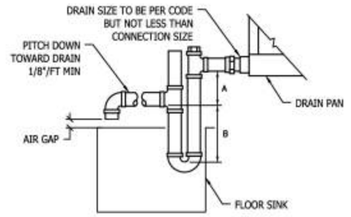


NOTES:
A. COMPLY WITH UL555 AND MANUFACTURERS INSTALLATION INSTRUCTIONS
B. MIN. SIZE 8Wx8H
C. ROUGH DIM. FOR COORD ONLY. SEE LATEST INTALLATION MANUAL.

FORMULA: SLEEVE LENGTH BASED ON WALL THICKNESS.

WALL THICKNESS	SLEEVE LENGTH
4"-6"	16"
7"-10"	21"
11"-13"	24"

6 FIRE/SMOKE DAMPER
SCALE: NOT TO SCALE



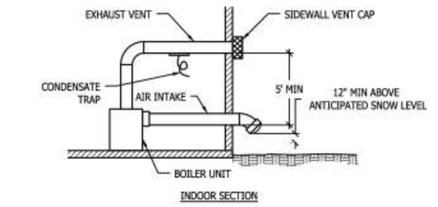
NOTES:

1. P.C. TO ROUTE CONDENSATE TO FLOOR SINK AND PLACE TRAP DOWN INTO IT AND PROVIDE CODE REQUIRED AIR GAP.

UNIT TYPE	A	B
DRAW THRU	2" (50 MM) PLUS X	X
BLOW THRU	1" (25 MM) MINIMUM	2X

WHERE X = STATIC PRESSURE IN PAN

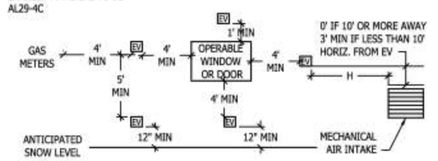
4 CONDENSATE DRAIN
SCALE: NOT TO SCALE



INDOOR SECTION

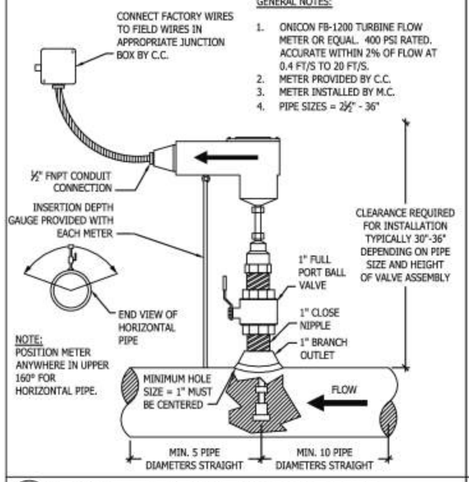
INTAKE MATERIAL TO BE GALV. STEEL, ABS, PVC, OR CPVC EXHAUST MATERIAL TO BE AL29-4C

EV = BOILER EXHAUST VENT CAP
AI = DUCTED BOILER AIR INLET



WALL ELEVATION

2 MECHANICAL DRAFT & DIRECT VENT VENTING CLEARANCES
SCALE: NOT TO SCALE



9 FLOW METER INSTALLATION - DUAL TURBINE
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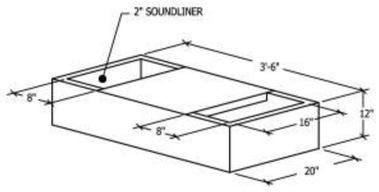
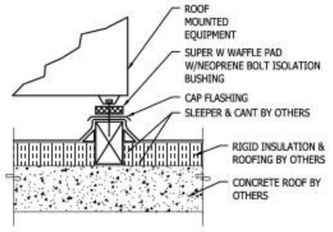


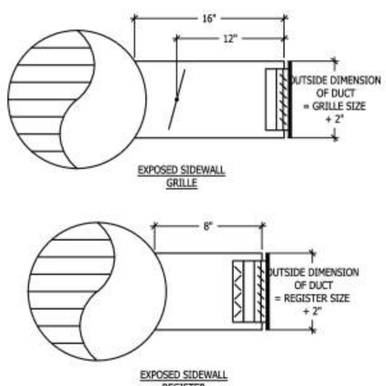
7 AIR TRANSFER BOOT
SCALE: NOT TO SCALE



NOTES:

CONFIRM EQUIPMENT MOUNTING METHODS WITH EQUIPMENT SUPPLIER PRIOR TO COORDINATION WITH GENERAL CONTRACTOR.

5 SLEEPER MOUNTED EQUIPMENT
SCALE: NOT TO SCALE



NOTES:

1. REGISTERS & GRILLES TO HAVE HORIZONTAL FRONT BLADES & VERTICAL REAR BLADES.
2. DO NOT SUBSTITUTE GRILLE & REGISTER DETAILS FOR EACH OTHER. INSTALL PER THE PLAN CALLOUTS.

3 SIDEWALL SUPPLY GRILLE WITHOUT OBD
SCALE: NOT TO SCALE

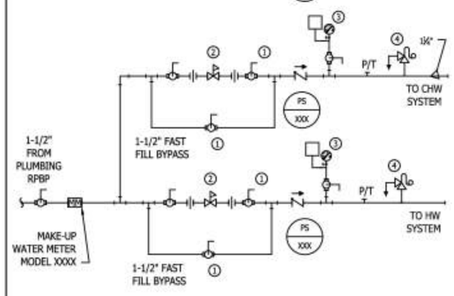
NOTES:

① PROVIDE LOCKING BALL VALVE. PROVIDE VALVE TAG STATING, "VALVE TO BE CLOSED DURING NORMAL OPERATION"

②③⑧ PRESSURE GAGES TO BE LIQUID FILLED. MODEL XXX RANGE XXX TO XXX PSI

③⑥⑨ PRV MODEL XXX SET TO XXX PSI

④⑦⑩ PSV MODEL XXX RELIEF PRESSURE TO BE A MINIMUM OF 15#s GREATER THAN PRV SETTING AND NOT GREATER THAN XXX



1 HYDRONIC FILL STATION
SCALE: NOT TO SCALE

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6/23/17

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SAM ASIAN ART MUSEUM

Asian Art Museum Expansion & Renovation
Volunteer Park / 1400 E Prospect /
Seattle, WA 98112

Submittal
Construction Documents

Revisions
No. Date Description

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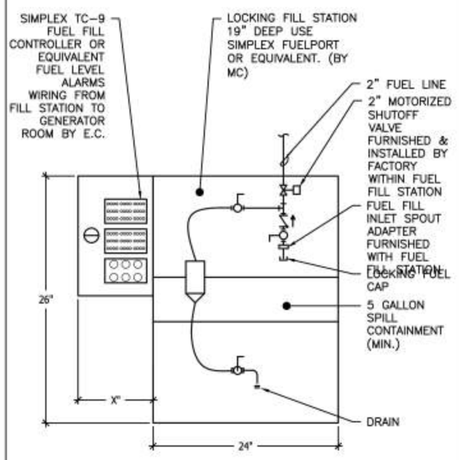
Date 6/23/17

Sheet Title
MECHANICAL DETAILS

Sheet Number
M501

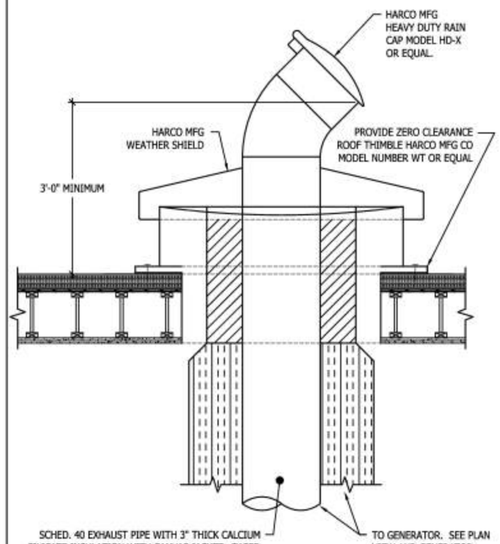


4 FUEL FILL STATION

SCALE: NOT TO SCALE

EXHAUST TERMINATION NOTES:

1. OUTLET TO BE DIRECTED TOWARD NE AND ANGLED UP AT 45°
2. EXHAUST TERMINATION TO BE LOCATED TO MAINTAIN MINIMUM CLEARANCES PER CODE SUMMARY - NOTE #9 AT RIGHT.



2 EXHAUST TERMINATION

SCALE: NOT TO SCALE

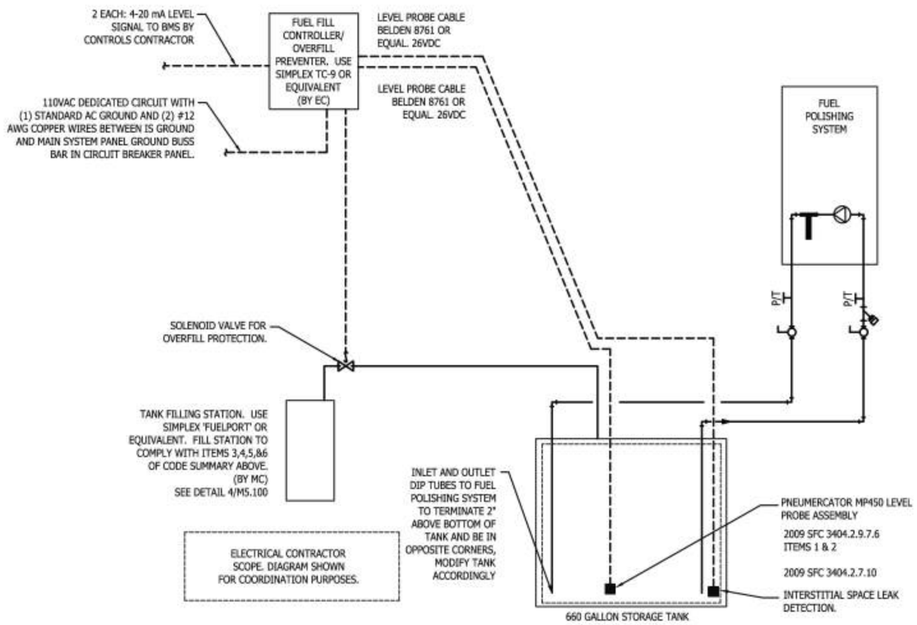
FUEL SYSTEM ALARM SEQUENCE

2012 SFC 5704.2.9.7.6

CRITICAL FUEL HIGH LEVEL SHUT-OFF:	CRITICAL FUEL HIGH LEVEL SHUT-OFF AND ALARM: AT 95% FUEL INDICATION, OVERFILL PREVENTION SOLENOID VALVE IS AUTOMATICALLY CLOSED AND ANNUNCIATES VISUAL AND AUDIBLE ALARM AT: 1. GENERATOR FUEL CONTROL PANEL, LOCATED AT REMOTE FUEL FILL STATION.
FUEL HIGH LEVEL ALARM:	ON 90% FUEL INDICATION, ANNUNCIATES VISUAL AND AUDIBLE ALARM AT: 1. GENERATOR FUEL CONTROL PANEL, LOCATED AT REMOTE FUEL FILL STATION.
FUEL LEVEL LOW ALARM:	SEND ALARM SIGNAL TO BMS AT 50% FUEL LEVEL.
FUEL LEAK ALARM:	ON PRIMARY TANK FUEL LEAK INDICATION, ANNUNCIATES VISUAL AND AUDIBLE ALARM ALARM AT: 1. GENERATOR FUEL CONTROL PANEL AT REMOTE FILL STATION. 2. ALARM SIGNAL TO BMS.

CODE SUMMARY

1) GOVERNING CODE
2015 INTERNATIONAL FIRE CODE WITH SEATTLE AMENDMENTS (SFC).
2015 INTERNATIONAL BUILDING CODE WITH SEATTLE AMENDMENTS (SBC).
2) DIESEL FUEL OIL CLASSIFICATION
   A. PER CRC ENGINEERING HANDBOOK, FLASHPOINT BETWEEN 100°F AND 140°F, THEREFORE CLASS II, (SFC CHAPTER 2).
3) SPILL CONTROL AND CONTAINMENT
   A. PROVIDE SECONDARY CONTAINMENT OR DIKING FOR ABOVE GROUND, STATIONARY TANKS. (SFC 5704.2.9.7.4, 5704.2.10)
   B. PROVIDE SPILL CONTAINER AT FUEL FILL CONNECTION WITH MINIMUM OF 5 GALLON CAPACITY AND WITH A MANUAL DRAIN VALVE THAT DRAINS INTO THE PRIMARY TANK. FOR TANKS WITH REMOTE FILL CONNECTIONS, A PORTABLE SPILL CONTAINER IS ALLOWED. (SFC 5704.2.9.7.8)
4) TANK FILL CONNECTION
   A. PROVIDE LIQUID-TIGHT FILL CONNECTION WHICH CAN BE CLOSED WHEN NOT IN USE. (SFC 5704.2.7.5.6)
   B. FUEL FILL STATION SHALL BE LOCATED A MINIMUM OF 5' FROM BUILDING OPENING (SFC 5704.2.7.5.6)
   C. PROVIDE METALLIC FILL TUBE WHICH TERMINATES WITHIN 6" OF BOTTOM OF TANK TO MINIMIZE THE GENERATION OF STATIC ELECTRICITY. (SFC 5704.2.7.5.5)
   D. FILL CONNECTIONS FOR DEISEL FUEL TANKS ATTACHED TO EMERGENCY GENERATORS MAY BE LOCATED WITHIN DEDICATED LOADING DOCKS OF BUILDINGS WHEN INSTALLED WITHIN 10' OF THE EXTERIOR OPENING OF THE LOADING DOCK. (SFC 5704.2.7.5.6, EXCEPTION 1.)
5) TANK OVERFILL PROTECTION
   A. PROVIDE OVERFILL PROTECTION SYSTEM FOR ABOVE GROUND TANKS WITHIN BUILDINGS. (SFC 5704.2.7.5.8 & SFC 5704.2.9.5.1)
   B. PROVIDE AUDIBLE AND VISUAL ALARM DURING FILLING INDICATING THAT TANK HAS REACHED 90% CAPACITY OR PROVIDE INDEPENDENT FUEL FILL GAUGE MARKED AT 90% TANK CAPACITY. (SFC 5704.2.9.7.6)
   C. PROVIDE AUTOMATIC FILL SHUT-OFF WHEN TANK HAS REACHED 95% CAPACITY. (SFC 5704.2.9.7.6)
   D. LIMIT TANK FILL FLOW RATE TO MAXIMUM OF 15 GPM. (SFC 5704.2.9.7.6)
   E. PROVIDE DOCUMENTED TANK FILLING PROCEDURE AND TANK CALIBRATION CHART AT FILL POINT OF TANK. (SFC 5704.2.9.7.6.1)
6) LABELING AND SIGNAGE
   A. PROVIDE WARNING SIGNS INDICATING "SMOKING AND OPEN FLAMES PROHIBITED" IN MINIMUM 3" HIGH RED LETTERING ON WHITE BACKGROUND. (SFC 5703.5)
   B. PROVIDE HAZARD "DIAMOND" PLACARD ON STORAGE TANK AND AT ENTRANCE TO FUEL STORAGE AREA INDICATING HEALTH, FLAMMABILITY, INSTABILITY AND SPECIAL HAZARDS OF FUEL STORED. FOR DIESEL FUEL, THESE DESIGNATIONS ARE 0-2-0, (NO SPECIAL HAZARD NUMBER). INSTALLING CONTRACTOR SHALL VERIFY WITH LOCAL FIRE MARSHAL. (SFC 5703.5, SFC 5704.2.3, NFPA 704)
7) TANK NORMAL VENTING
   A. VENT LINE FLAME ARRESTORS ARE NOT REQUIRED FOR CLASS II LIQUIDS. (SFC 5704.2.9.3)
   B. VENT LINE PIPE OUTLETS SHALL BE A MINIMUM OF 5 FEET FROM BUILDING OPENINGS AND A MINIMUM OF 12 FEET ABOVE ADJACENT GROUND LEVEL. TERMINATIONS SHALL ALSO BE LOCATED A MINIMUM OF 10 FEET HORIZONTALLY FROM MECHANICAL AIR INTAKES. VENT LINE PIPE OUTLETS SHALL BE LOCATED SUCH THAT FLAMMABLE VAPORS ARE NOT TRAPPED BY EAVES OR OTHER OBSTRUCTIONS. (SFC 5704.2.7.3.3, SMC 401.4 - ITEM 2)
   C. VENT LINES SHALL BE INSTALLED SUCH THAT HORIZONTAL RUNS ARE SLOPED TOWARD THE TANK WITHOUT SAGS OR DIPS IN WHICH LIQUID CAN COLLECT. (SFC 5704.2.7.3.4)
   D. VENT PIPE VERTICAL HEIGHT IS LIMITED TO 27 FEET FROM THE BOTTOM OF THE TANK. IF NOT POSSIBLE, THE TANK MUST BE DESIGNED TO WITHSTAND THE MAXIMUM STATIC HEAD GENERATED BY THE TANK HEIGHT. (SMC 1305.7)
8) TANK EMERGENCY VENTING
   A. TANKS SHALL BE EQUIPPED WITH ADDITIONAL (EMERGENCY) VENTING TO RELIEVE EXCESSIVE INTERNAL PRESSURE CAUSED BY EXPOSURE TO FIRES. (SFC 5704.2.7.4), VENT TERMINATIONS SHALL BE AS TANK NORMAL VENTS.
   B. ABOVE GROUND TANKS MEET UL 142 AND LOCATED INSIDE BUILDINGS CONTAINING CLASS II LIQUIDS FOR EMERGENCY GENERATORS ARE ALLOWED TO VENT INSIDE BUILDINGS. (SFC 5704.2.7.4)
9) GENERATOR EXHAUST
   A. COMBUSTION EXHAUST SHALL BE LOCATED 10' FROM PROPERTY LINES, 3' FROM EXTERIOR WALLS AND ROOFS, 10' FROM OPERABLE OPENINGS INTO BUILDINGS, AND 10' ABOVE ADJOINING GRADE (SMC 501.3.1)
   B. RADIATOR EXHAUST SHALL BE LOCATED 3' FROM PROPERTY LINES, 3' FROM OPERABLE OPENINGS INTO BUILDINGS, 10' FROM MECHANICAL AIR INTAKES (SMC 501.2.1) UNLESS AIR IS DRAWN THRU CLOSED PARKING GARAGE THEN 10' SEPERATION FROM PROPERTY LINES AND OPERABLE OPENINGS (SMC 4041.1.4)
   C. MAINTAIN MINIMUM 2" CLEARANCE FROM COMBUSTION EXHAUST FLUE TO COMBUSTIBLE MATERIAL OR AS RECOMMENDED BY FLUE MATERIAL MANUFACTURER, WHICHEVER IS GREATER.
10) GENERATOR FUEL STORAGE
   A. A GENERATOR SET WITH FUEL TANK SYSTEM NOT EXCEEDING 660 GALLONS IS NOT REQUIRED TO BE INSTALLED WITHIN A RATED ROOM WHEN INSTALLED IN A SPRINKLERED PARKING GARAGE, AND IS PERMITTED TO DRAW COMBUSTION AND COOLING INTAKE AIR FROM THE ADJACENT PARKING GARAGE. (SBC 403.4.9.2 EXCEPTION 1 & 2)
11) OVERFLOW PROTECTION
   A. OVERFLOW PROTECTION SHALL BE PROVIDED IN ACCORDANCE WITH SFC 5704.2.7.5.8
12) FUEL TANK LOCATION
   A. UL 142 FUEL TANKS IN BASEMENTS SHALL BE LOCATED NO MORE THAN TWO STORIES BELOW THE GRADE PLANE (SFC 603.3.2.5)
   B. FUEL OIL PIPING TESTED IN ACCORDANCE WITH NFPA 31

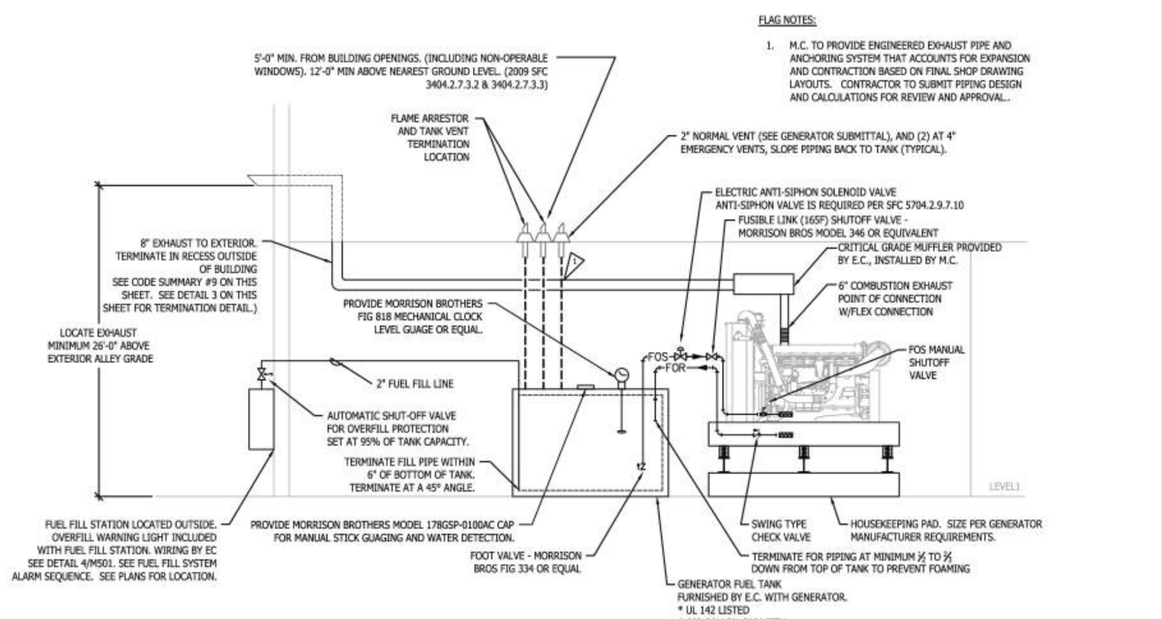


2 GENERATOR SET FUEL OIL SYSTEM WIRING DIAGRAM

SCALE: NOT TO SCALE

FLAG NOTES:

1. M.C. TO PROVIDE ENGINEERED EXHAUST PIPE AND ANCHORING SYSTEM THAT ACCOUNTS FOR EXPANSION AND CONTRACTION BASED ON FINAL SHOP DRAWING LAYOUTS. CONTRACTOR TO SUBMIT PIPING DESIGN AND CALCULATIONS FOR REVIEW AND APPROVAL..



1 EMERGENCY GENERATOR FUEL OIL PIPING SCHEMATIC

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ASIAN ART MUSEUM

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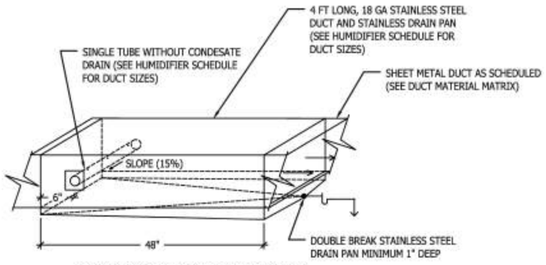
GENERATOR DETAILS

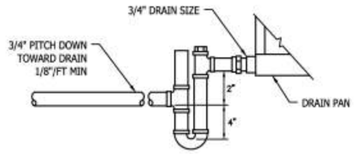
M502



DRAIN PAN AT DISPERSION TUBE (TYPICAL FOR ALL)

INSTALLATION NOTES

- Use a hose clamp to connect the steam outlet to steam hose. Use a hose cuff and clamps to connect the steam outlet to tubing.
- Tubing diameter must match Vapormist steam outlet size 1½" (DN40), 2" (DN50), or NPT connection.
- See the steam carrying capacity and steam loss tables on Pages 19 and 20.
- Orient dispersion tube with tubelets (steam orifices) pointing up.
- If mounting the humidifier above the level of dispersion tube, see "Drip tee installation" on Page 21.



CONDENSATE WASTE FROM DUCT WITH TRAP ROUTED BY GRAVITY TO APPROVED WASTE RECEPTACLE. IF NOT POSSIBLE TO DRAIN BY GRAVITY, PROVIDE CONDENSATE PUMP.

SINGLE DUCT WITH CONDENSATE DRAIN TUBE

NOTES:

1. SEE PLUMBING DETAILS FOR ADDITIONAL REQUIREMENTS.

1 DISPERSION TUBE AND DUCT DETAIL (DT-X-X)

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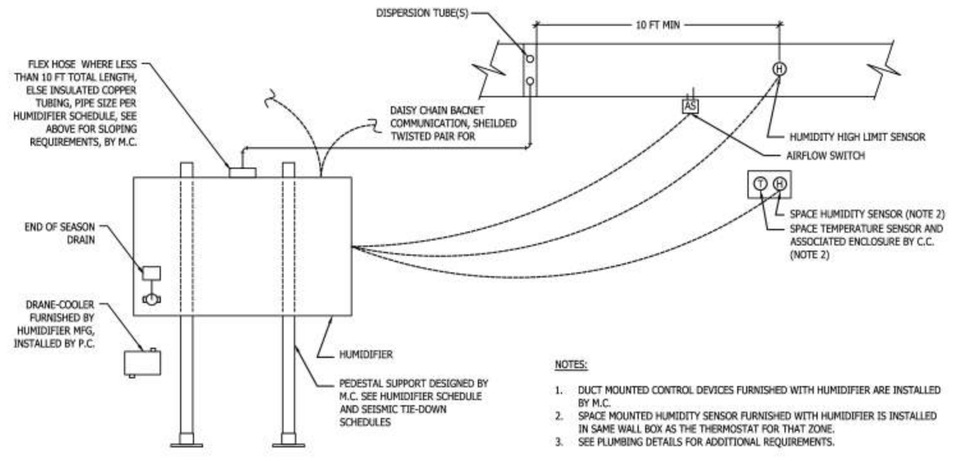

NOTES:

1. DUCT MOUNTED CONTROL DEVICES FURNISHED WITH HUMIDIFIER ARE INSTALLED BY M.C.
2. SPACE MOUNTED HUMIDITY SENSOR FURNISHED WITH HUMIDIFIER IS INSTALLED IN SAME WALL BOX AS THE THERMOSTAT FOR THAT ZONE.
3. SEE PLUMBING DETAILS FOR ADDITIONAL REQUIREMENTS.

2 HUMIDIFIER, AND DUCT MOUNTED CONTROL DETAIL (HU-X-X)

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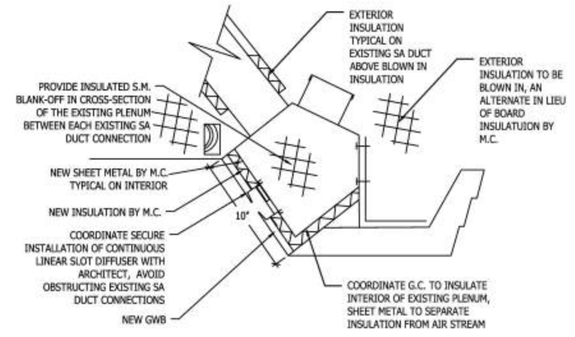

3 EXISTING TROUGH INSULATION DETAIL (N1, N2, S1, S2)

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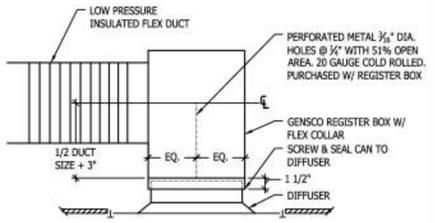

NOTES:

DIFFUSER CANS ARE BARE SHEETMETAL W/OUT LINING UNLESS NOTED OTHERWISE

6 DIFFUSER CAN

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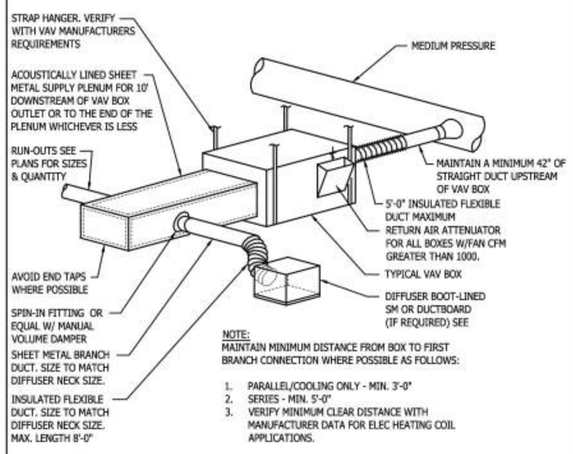

NOTE:
MAINTAIN MINIMUM DISTANCE FROM BOX TO FIRST BRANCH CONNECTION WHERE POSSIBLE AS FOLLOWS:

1. PARALLEL/COOLING ONLY - MIN. 3'-0"
2. SERIES - MIN. 5'-0"
3. VERIFY MINIMUM CLEAR DISTANCE WITH MANUFACTURER DATA FOR ELEC HEATING COIL APPLICATIONS.

4 TYPICAL VAV BOX INSTALLATION

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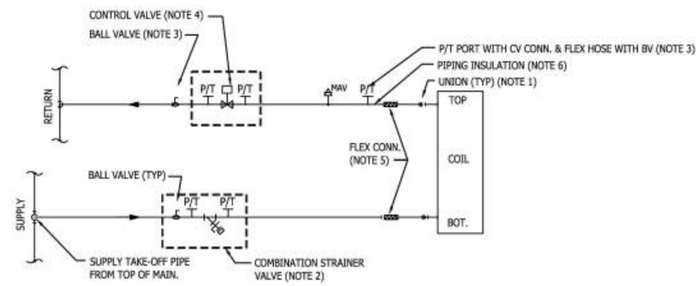

NOTES:

1. SEE SPECIFICATIONS FOR APPROVED PIPING MATERIALS AND CONNECTION TYPES. PROVIDE DIELECTRIC UNIONS AT JUNCTION OF DISSIMILAR METALS.
2. COMBINED ISOLATION VALVE, STRAINER, DRAIN VALVE WITH P/T PORTS, THREADED IN, THREADED OUT, FACTORY INSTALLED LINE SIZE FLEX HOSES TO OUTLET. (NOTE: COOLING COILS WITH 1.5" P/T PORTS AND VALVE HANDLE EXTENSIONS.) MC TO VERIFY CONNECTION TYPES. MC TO PROVIDE BALANCE VALVE SCHEDULE/SUBMITTAL FOR REVIEW.
3. ISOLATION BALL VALVE BY MC.
4. 2-WAY THREADED PRESSURE INDEPENDENT CONTROL VALVE WITH P/T PORTS FURNISHED BY CONTROLS CONTRACTOR AND INSTALLED BY PIPING CONTRACTOR. MECHANICAL ENGINEER OF RECORD AND CONTROLS CONTRACTOR ARE RESPONSIBLE FOR PROVIDING THE APPROPRIATE TYPE OF COIL FLOW CONTROL FOR STABLE VARIABLE PRIMARY CENTRAL HEATING & COOLING PLANT OPERATION. CONTROL VALVE AND UNIT CONTROLS TO COMPLY WITH SEATTLE ENERGY CODE REQUIREMENTS. MC/CC TO PROVIDE CONTROL VALVE SCHEDULE/SUBMITTAL FOR OWNER REVIEW.
5. PROVIDE 18" FLEX HOSES WITH PIPING HOOKUP KIT. ALL PIPING SUPPORT AND CONNECTIONS TO COMPLY WITH SEATTLE BUILDING CODE REQUIREMENTS AND ASCE 7.
6. INSULATION - PIPING TO BE INSULATED PER SEATTLE ENERGY CODE REQUIREMENTS. ALL COOLING COIL COMPONENTS EXCEPT P/T PORTS, VALVE HANDLES, AND DRAIN VALVE TO BE FULLY INSULATED INCLUDING CONTROL VALVE SHALL HAVE REMOVABLE BLANKET. ALL HOT WATER COIL COMPONENTS MAY BE LEFT UNINSULATED.

3 HW COIL PIPING HOOKUP (SINGLE COIL, 2-WAY CV, 2" & SMALLER) - CAV & VAV HW COILS (NOT 3-WAY)

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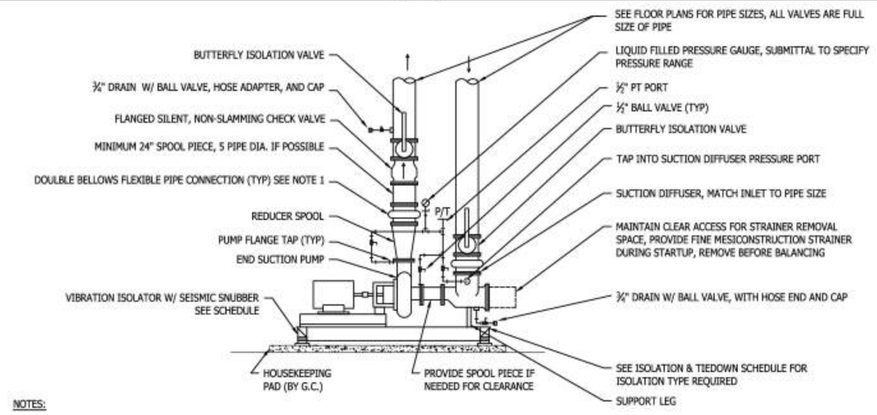

NOTES:

1. PUMP FLEX CONNECTORS SHALL BE INSTALLED PER MANUFACTURER'S INSTRUCTIONS. VERTICAL PIPES ABOVE THE FLEX CONNECTORS SHALL BE FULLY SUPPORTED AND ALIGNED ABOVE THE LOWER FLANGE CONNECTION PRIOR TO INSTALLATION OF THE FLEXIBLE CONNECTORS. FLEXIBLE CONNECTORS SHALL NOT BE INSTALLED WHERE THERE IS ⅛" OR MORE INITIAL MISALIGNMENT BETWEEN THE UPPER AND LOWER FLANGES. THE GAP BETWEEN THE UPPER AND LOWER FLANGE SHALL BE LARGE ENOUGH TO ACCOMMODATE FOR THE GROWTH OF THE CONNECTOR AS INDICATED IN THE MANUFACTURER'S OPERATING PRESSURE CHART. THE PIPING ALIGNMENT AND GAP LENGTH MUST BE DOCUMENTED WITH PHOTOGRAPHS BY THE INSTALLING CONTRACTOR PRIOR TO INSTALLATION OF THE FLEX CONNECTOR.

5 END SUCTION VARIABLE VOLUME PUMP DETAIL

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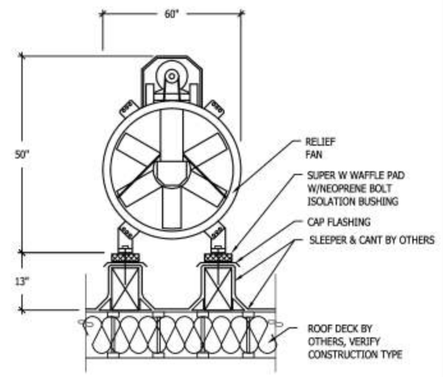

NOTES:

CONFIRM EQUIPMENT MOUNTING METHODS WITH EQUIPMENT SUPPLIER PRIOR TO COORDINATION WITH GENERAL CONTRACTOR.

2 SLEEPER MOUNTED RELIEF FAN

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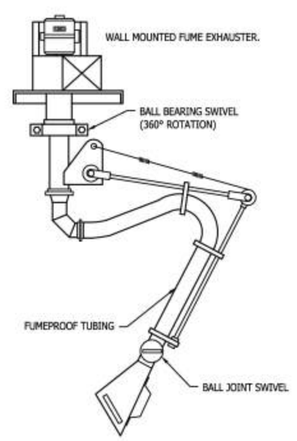

1 TYPICAL SNORKEL FUME EXHAUSTER DETAIL

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