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December 8, 2017

NOTICE OF ADDENDUM
ADDENDUM NO. 3

CONTRACT NO. 8027, PROJECT NO. 17451
MADISON FIRE STATION 14

Revise and amend the contract document(s) for the above project as stated in this addendum, otherwise, the original document shall remain in effect.

This addendum consists of the following documents:

1. **GENERAL CONTRACT CONDITIONS**
   No Changes

2. **GENERAL QUESTIONS AND ANSWERS**

   Q1: Is there a detail for the handicap parking area or is it the same as the driveway?
   A1: Yes, the handicap areas are the same as the rest of the concrete pavement. This is noted by the same hatch colors as the rest of the pavement.

   Q2: I think your detail numbers are wrong on the site plan for the sidewalk and the thickened edge sidewalk?
   A2: Yes, there is a numbering error (should be 3, but it is 8 for thickened edge). Drawing will be updated.

   Q3: There are not any unit prices for EBS (excavation below subgrade). How will this be handled/paid for if poor soils are encountered and undercutting is required?
   A3: Unit pricing for pavement and slab on grade undercut were added to the proposal page. Unit pricing for sidewalk or pervious pavement unit pricing for undercut was deemed to not be necessary at this time. Since the foundation will be supported by piers/piles unit pricing for undercut was deemed to not be necessary at this time.

   Q4: We are to use a 50 ft depth for bidding purposes but the loads on some columns and on the foundation footers are so light that 50 ft is going to be way too deep before we would achieve actual loads called for on the drawings. I would assume then that as far as installation goes we are simply trying to achieve twice the design load no matter what that depth is or are we required to install to 50 ft?
   A4: The 50-ft depth is for bidding purposes only (as indicated in note 3 on S002), in order to get consistency between bidders. See spec section 31 26 00 for details on how this will work on the contract side. Proposal page was updated and now includes unit pricing for helical piles.

Q5. Are the loads shown on Sheet S002 individual pier loads or a total for the column location?
A5. Total column loads, not individual pier loads. Has been clarified via Addendum 3

Q6. If the loads shown on Sheet S002 are individual pier loads, the shear loads may be high. Can the shear load be resisted using battered piers? If so, provide the shear direction.
A6. See answer above.

Q7. Can shorter pier lengths (i.e., less than 50') be used if load tests are performed and confirm an adequate Factor of safety?
A7. Per specification 31 2600, section 1.5, A, the safety factor can be revised if load tests are performed. Refer to section 1.6 and the drawings for length of pier required for bidding purposes.

Q8: Can you provide the roof slope?
A8: Run is ~225' (ignoring the wing wall at the north end). Rise is ~12'. Slope is ~3 degrees or approximately 1/2" / 1'-0".

Q9. Are the washer and dryers OFCI?
A9. No, they are Owner Furnished Owner Installed.

Q10. Please provide a spec for cubicle track and curtain per note 31 on A101.B
A10. Specification 10 21 23 was added to Addendum 3.

Q11. Is the ice machine per note 52 on A101.B and shown on 2/A401 OFCI?
A11. No, it is Owner Furnished Owner Installed.

Q12. There is a spec for sanitary napkin holders but they're not shown on the drawings. Please advise on quantities. 1 per bathroom?
A12. Sanitary Napkin Holders were removed from project. Specification has also now been removed.

Q13. Mop/Broom holders are shown in the drawings but there's no spec provided in 10 28 00. Please include.
A13. Specification 10 28 00 revised to include Mop/Broom information.

Q14. There appears to be a shower seat and a shower grab bar in the shower in Unisex ADA 135 but no spec on those. Is this part of the project? If so, please add a spec if we're to provide.
A14. Specification 10 28 00 revised for restroom accessories.

Q15. Per note 26 on A101.B as shown in rooms 136 and 137 we are to provide some folding seats, but there's no spec. Please provide.
A15. Specification 10 28 00 revised for restroom accessories

Q16. On 27/A404 there is an outline of a detox sauna. We don't need to provide or install that correct?
A16. Correct, the detox sauna is Owner Furnished Owner Installed.

Q17. The Kitchen hood does not appear on the equipment schedule. What Kitchen hood is

being specified?

A17. Refer to Keynote 4 on M101 and Specification Section 23 37 00 for additional information.

Q18. Can you provide specs for the roof insulation on this project? I can't find any reference to thickness, r value, density, etc in either 07 21 00 or 07 41 13. I also need to know if this is intended to be a nailbase insulation?

A18. Refer to 5/A002 Assembly Types. Roof Detail assemblies, insulation type, minimum R-Value/Inch are listed. The insulation in NOT intended to be a nailbase.

Q19. On A141, note 5 & 7 have the same description but different hash markings. Are they the same system or two different systems?

A19. Keynote 5 is snow drift protection, Keynote 7 is ice break. The difference of system depends on manufacturer selected.

Q20. In specification section 05012 23, page 4, paragraph 1.4, item 4. It is called out for AESS steel. Where on the drawings does this section apply to?

A20. The canopy utilizes AESS Steel.

Q21. On A141, note 4 talks about roof safety equipment tie-off hooks. What are they? There is no mention of them further in the plans or specs.

A21. Information regarding fall protection system has been added to A141 in Addendum 3. Additional information was included in Structural drawings for Addendum 2.

Q22. Page A601 has tile at 8 foot high walls but when you add the tile sizes up per drawing the tile add up to 12 feet high

A22. The accent band tile begins at A.F.F. Tile pattern continues above accent band as required.

Q23. There is a spec for turn out gear lockers, but note 5 on A101.B says they're OFCI. Is that spec for our reference or do we actually need to supply them? Please advise.

A23. No, Turn-out Gear Lockers Contractor Furnished Contractor Installed. Note has been revised in Addendum 3.

Q24. The spec for window shades has manual and motorized shades. However, I can't find anything on the plans showing which windows receive shades and if they're manual or motorized. Please advise.

A24. Drawings have been revised. Refer to A121

Q25. Working on the Fire Station 14 project and have looked through plans searching for the location of the fabric wrapped AC panels. Can you point me in the direction of the location of these, please? Also, can you confirm the only location for Resilient Athletic Flooring is in the Fitness room?

A25. Fabric Wrapped AC panels have been removed from the project, The Athletic flooring is only in the Fitness, There are non-athletic rubber tiles in other locations and Resilient flooring (urethane flooring) is also in the apparatus bay and other locations.

Q26. Section 074213.23 - 1.1 C lists interior column covers– are there interior column covers?

A26. No.

Q27. 074213.23 - 2.3 – 1 states 3mm for panel thickness – this should be 4mm – 3mm is flimsy and used for gas station canopies – 4mm is industry standard for commercial buildings – can this be changed to 4mm
A27. Yes. 4mm is the basis of design. This has been updated in the specs.

Q28. 074213.23- 3.3 – ACM is already a tested system and the barrier is supposed to make the building water tight. Can the field testing be eliminated?
A28. Yes. Removed from Specifications

Q29. 074213 - 2.1 C & 2.2 A -2a – you are listing 2 different thermal girts – the cascade clip is a non-continuous clips spaced within the insulation and need a continuous galv zee off the front of it to attach the panel system to and the smart ci girt is a continuous zee you can attach your panel system to – please research these and eliminate one from the spec.
A29. The (2) options are considered equal and will remain in the specifications. The (2) fiberglass clips selected to ensure a competitive bid. The unique detailing from either system is addressed via the "Contractor's Option" added to A002.

Q30. 074213 – 2.3 – A 10 – copings are picked up by roofer and should be eliminated –there is not a coping above the phenolic
A30. I cannot find the reference to the spec item listed. Check the revised specifications to make sure the referenced spec is still listed.

Q31. Can a section cut of the wall be provided for the phenolic on the east side of the building between column lines 8 & 11?
A31. No. Please refer to SIM details (specifically from A311)

Q32. 074213 – 3.5 – field testing should be eliminated – this is an open joint system – the barrier is supposed to make the building water tight and this would be a waste of money- can this be eliminated?
A32. Yes. Field testing requirement is removed for OPEN joint systems.

Q33. Is the same ACM jamb wrap required at the jambs of the curtain walls above the overhead doors – no detail is given – ex cw13,cw14,cw15,cw16,cw17,cw18,cw19?
A33. Yes. The ACM jambs are needed to insulate the structural steel angle.

Q34. The #14 sign that is called out to be phenolic is too wide for the panel sheet available (sheet size is 48" x 96") and will have to have a joint in it. Would you like to reduce the sign to fit into the sheet size parameters or have a joint in the #4 of the sign at the size currently shown?
A34. Building Signage has been revised. Please refer to A220 with Addendum 3.

Q35. All the cabinets are laminate with 3mm edge banding but no colors are listed on the finish schedule on A601.
A35. Color to be selected by architect from supplier full line of laminate selections.

Q36. Stainless steel cabinets, 5/A403 notes reference stainless steel cabs and tops. Sections 5, 6, and 7 only show stainless tops with p.lam cabinets. Please confirm they are stainless cabinets.
A36. All Cabinets in the Kitchen (including the island) are stainless steel with a stainless steel counter top. The section references a typical configuration.

Basis of Design: Stainless Steel Kitchens, Inc Designer-MP Series Stainless Steel and Marine Plywood Cabinets and Countertops

Cabinet Specifications

Cabinet Body	Heavy duty 5/8" marine plywood, with Wilsonart laminate (fashion grey)
Doors and Drawers	Exteriors covered with 18 ga, 304 #4 stainless steel (marine plywood core)
Shelves	Marine plywood, laminated with Wilsonart laminate
Toe Kicks	Not included. Cabinets sit on terrazzo base that will remain in place.
Handles	Stainless Steel Rod Handle
Construction	All components securely assembled using stainless steel fasteners and corner stiffeners. Very rigid cabinet. Fully assembled and ready to install. Dimensions and quantity per plans.
Functional Hardware	Blumotion "clip top" (removable without tools). Concealed, 125 degree open. All metal (nickel plate) Adjustable X, Y, Z axis. Rated 200,000 cycles Soft close feature. Slides: Blumotion full extension drawer slides, with stainless steel drawer sides. Soft close feature.
Style	Frameless, with full overlay doors and drawers.

Q37. Do the roof safety tie-offs penetrate the standing seam metal roof? If so, where is the detail?

A37. Yes. See Addendum 3 – Detail 3/A141.

Q38. Is there a spec for the roof type 1 acoustical deck?

A38. Yes. Acoustical Steel Decking is detailed in 05 31 00 "Steel Deck" Part 2.2.

Q39. Is there a spec for the roof insulation?

A39. This spec was missing from 07 21 00. Roof insulation requirements have been added to 07 21 00 as part of Addendum 3.

3. **SUBSTITUTION REQUESTS**
No further substitution requests will be evaluated. Deadline for submission was 12/1/17.

APPROVED

04 20 01	Custom Cast Stone (Masonry Veneer)
05 31 00	Versa Dek 3.5 LS Acoustical (Structural Decking)
07 21 00	Thermal Insulation – Mineral Wool (Johns Manville)
07 42 13	Composite Wood Veneer Panels (Parklex via Arcspec)
07 42 13.2	Composite Wood Veneer – Fiberglass Clips (Cascadia via Tegan)
08 62 23	Skylights – Velux
10 22 43	Sliding Glass Partitions – Sunflex
10 51 10	Turnout Gear Lockers – Weldon Company, LLC (Ready Rack)
10 51 13	Welded Metal Lockers – Weldon Company, LLC (Tiffin Metal Products)
23 21 00	Expansion Tank – John Wood
23 21 00	Glycol Feed – John Wood
31 26 00	Helical Pier – Techno Metal Post
31 26 00	Helical Pier - Helical Anchors Inc. (Veit)

DENIED (NOT APPROVED)

04 20 01	RockCast (Masonry Veneer)
07 41 13	Meatal Roof Panels – Berridge Standing Seam
08 45 10	Insulated Translucent Wall Panel System – Kalwall
08 45 10	Insulated Translucent Wall Panel System – Exterior Technologies
08 62 23	Skylights – Tubular Skylights, Inc
10 22 43	Sliding Glass Partitions – Panda Windows and Doors
12 24 13	Window Blinds – CE Contract
12 24 13	Window Blinds – SWF Contract
23 25 00	Vector Industries, JL Wingert and Neptune
23 52 16	Condensing Boilers – Laars
32 14 13.19	H20 Pavers – County Materials
--	Heat Trace / Snow Melt – not used on this project

4. **SPECIFICATIONS**

07 21 00 – MODIFIED to include polyisocyanate roof insulation requirements

07 42 13 – DELETED 3.5

07 42 13_23 - MODIFIED Aluminum Composite Panels to 4mm thickness (2.3 A 1) and DELETED 3.5

08 43 13 - MODIFIED Aluminum-Framed Storefronts to painted per drawings (2.2 A)

08 44 13 – MODIFIED BSD-Glazed Aluminum Curtain Walls to painted per drawings (2.5)

08 71 00 – MODIFIED door hardware to update hardware packages

08 80 00 – MODIFIED BSD-Glazing to include spandrel glass (2.5 B)

10 21 23 - ADDED Cubicle Curtains and Track section

10 28 00 - REVISED BSD-toilet accessories

Removed sanitary napkin dispenser per plan

Added Mop/Broom holders

Added shower seat

23 74 23.13 – REVISED paragraph 2.1, B, 5 to the following:

"5. Controls shall include terminal connections for burner modulation and supply fan start/stop and vfd alarm."

31 26 00 – REMOVED line 21 from section 1.9, B.

31 26 00 - REVISED section 1.6, E to the following:
"Adjustments in the Contract Price will be made due to changes in the number and length of piles, based on unit prices provided on the proposal page as follows:"

32 11 23.33 – MODIFIED language in paragraph 3.3A to coordinate undercutting with proposal page (unit costs).

5. **DRAWINGS**

A002 MODIFIED - Rain-screen Wall Type Assemblies to show 1" vertical air space and information regarding Contractor's Option

A003 MODIFIED - Code Review per DSPS review comments. Reclassification of "S-2 Warehouse" and lower occupancy mezzanine count to comply with IBC 1104.4.

A101.B CLARIFICATIONS to procurement keynotes

- Keynote 5 – Turnout Lockers – CFCI
- Keynote 45 – Commercial Washer – OFOI
- Keynote 46 – Commercial Dryer – OFOI
- Keynote 52 – Ice Machine – OFOI
- Keynote 63 – Detox Sauna – OFOI
- Keynote 64 – Laundry Extractor – OFOI
- Keynote 65 – Gear Dryer – OFOI

A102 MODIFED – Wire Mesh Partition Fence and ADDED plywood shelving to comply with DSPS review comments

A121 ADDED – Locations for Manual and Automatic Roller Shades, CLARIFIED ceiling cloud edge trim

A141 MODIFIED – Fall Protection Spacing, ADDED Roof Safety Tie-Off Detail

A220 MODIFIED – Rainscreen wall type to show 1" air space and information regarding Contractor's Option. REVISED Building signage "14"

A311 ADDED – Access Hatches in overhang void spaces – typ.

A341 REVISED – Tube connection for channel fascia at parapet connection

A343 REVISED – Tube connection for channel fascia at parapet connection

A403 ADDED – Kitchen Hood Exhaust chase with (2) access hatches at elbows to be coordinated in field

A407 CLARIFIED – (14) Personal Lockers – CFCI

A601 REVISED – Typical PCT wall layout, MODIFED Ceiling Finish and Remarks in Room Finish Schedule

C201 REVISED Detail Callout for Thickened Edge 3/C301

C301 MODIFIED Undercut Section 11/C301

C302 MODIFIED Permeable Pavement Notes

EL101 REVISED - lighting layout to match with shifting walls. Add downlight to lieutenant restroom to match its larger square footage.

EP101 REVISED - receptacle layouts to match with shifting walls.

M101 REVISED - location of control sensors.
M102 REVISED - location of DDC control panels.

M451 REVISED - Apparatus Bay Controls.

M500 REVISED - mechanical equipment schedules

P101 REVISED - sanitary and vent routing due to revised floor plans.

P102 REVISED - sanitary and vent routings.

P104 REVISED - orientation of solar collector array.

P200 REVISED - sanitary, vent, and domestic water routings due to revised floor plans.

P400 REVISED - sanitary and vent isometrics due to revised floor plans.

P401 REVISED - sanitary and vent isometrics due to revised floor plans.

P402 REVISED - domestic water isometrics due to revised floor plans.

P500 REVISED - plumbing material list descriptions.

S002 REVISED - note regarding foundation loads.

S101 REVISED - continuous footing schedule.

S102 REVISED - lintel schedule and lintel on east side of building.

S103 ADDED – information regarding fascia detailing. Add solar panel support framing. Revise lintel on east side of building.

S301 ADDED – detail 10.

S401 REVISED - details 10 and 15.

S402 REVISED - wall elevations 1 and 3.

S501 REVISED - detail 5. Add detail 15.

S502 REVISED - details 2, 3, 4, 5, 11, 12 and 13.

6. **PROPOSAL**

Proposal page was updated to reflect unit pricing for undercut of pavement and slab on grade.

Proposal page was also updated to reflect unit pricing for helical piles (if used).

Please attach these Addendum documents to the Drawings and Project manual in your possession.

Please acknowledge this addendum on page E1 of the contract documents and/or in Section E: Bidder's Acknowledgement on Bid Express.

Electronic version of these documents can be found on the Bid Express web site at:

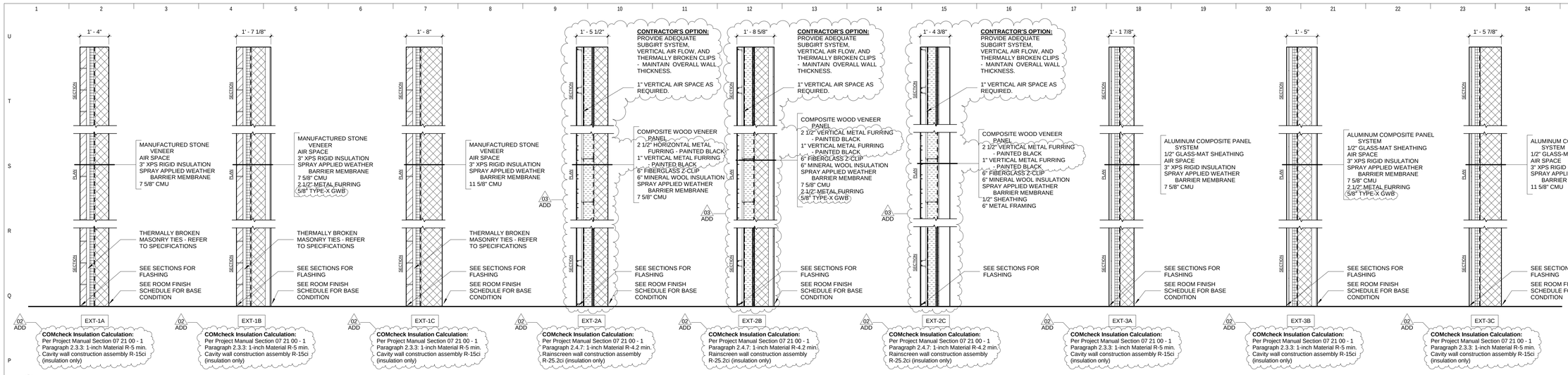
http://www.bidexpress.com

If you are unable to download plan revisions associated with the addendum, please contact the Engineering office at 608-266-4751 receive the material by another route.

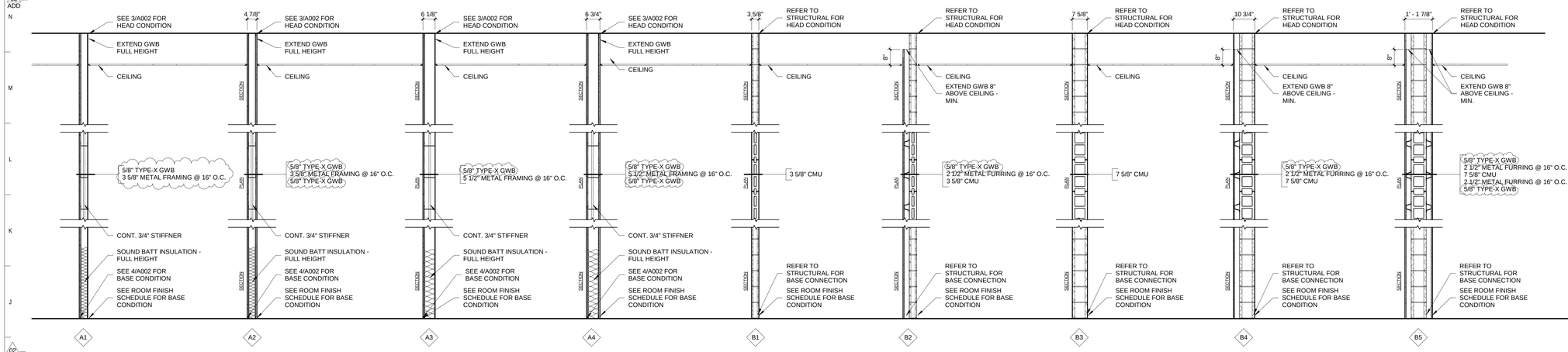
Sincerely,

Robert F. Phillips, P.E., City Engineer

Cc: Greg Fries, Kathy Cryan



1 WALL TYPES - EXTERIOR
1/2" = 1'-0"



2 WALL TYPES - INTERIOR
1/2" = 1'-0"

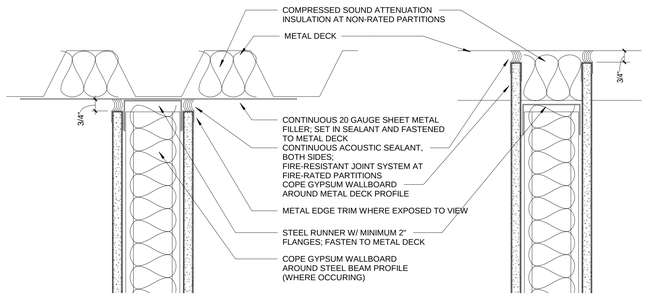
02 ADD

FIRE RATED WALL LEGEND

WALLTYPE	FIRE RATING	STC RATING	UL NUMBER
A1	--	--	N/A
A2	1 HR	51	U419
A3	--	--	N/A
A4	1 HR	51	U419
B1	1 HR	40	U905
B2	1 HR	45.8	U905
B3	1 HR	55	U905
B4	1 HR	60.8	U905
B5	1 HR	61.2	U905

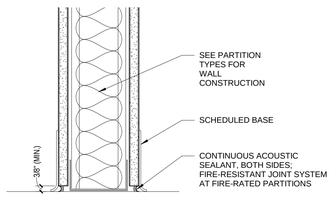
GENERAL NOTES

1. REFER TO CODE PLANS ON A003 FOR FIRE RATED ASSEMBLY LOCATIONS AND RATING REQUIREMENTS

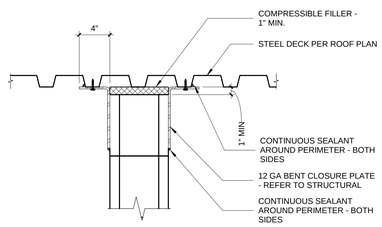


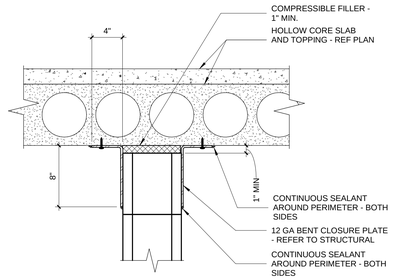
NOTE:
FASTEN STEEL RUNNER TO METAL DECK; FRICTION FIT METAL STUDS TO RUNNER AND FASTEN GYPSUM WALLBOARD TO STUDS (DO NOT FASTEN TO RUNNER); MAINTAIN GAP AS INDICATED BETWEEN METAL DECK AND METAL STUD / GYPSUM WALLBOARD TO ACCOMODATE DEFLECTION OF STRUCTURE

3 TYPICAL HEADS AT METAL STUD PARTITIONS
3" = 1'-0"

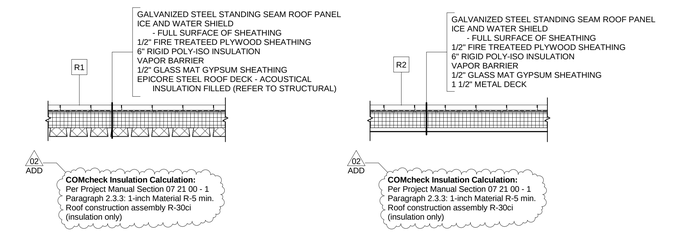


4 TYPICAL BASE AT METAL STUD PARTITIONS
3" = 1'-0"





6 TYPICAL HEADS AT CMU PARTITIONS
1 1/2" = 1'-0"



5 ROOF TYPES
1/2" = 1'-0"

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Mechanical Engineer
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Electrical Engineer
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Middleton, WI 53562
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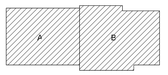
Key Plan



Sheet Issue Date
BID DOCUMENTS 11/03/17

Revision	Date
ADDENDA #2	11/22/17
ADDENDA #3	12/06/17

BID DOCUMENTS

Drawing
ASSEMBLY TYPES

City of Madison Contract No. **8027**
OPN Project No. **17207000**

A002

Code Summary

Applicable Code
Wisconsin Commercial Building Code - Wisconsin Department of Safety and Professional Services Chapters SPS 360- SPS 366 incorporating:
International Building Code 2009
International Energy Conservation Code 2009
International Mechanical Code 2009
International Fuel Gas Code 2009
International Existing Building Code 2009
ICC/ANSI Standard A117.1 for Accessibility

Building Description
The City of Madison Fire Department Station 14 is a proposed new structure comprised of approximately 19,232 GSF on 1 story and a 2,526 GSF mezzanine. Station 14 represents a hybrid as a City of Madison Fire Department training facilities and a functioning station, including a community room/training room.

Proposed Uses include: Apparatus bays (6), offices, kitchen, fitness and sleeping facilities for fire personnel, and a multipurpose training and community room.

Occupancy Classification: B (with Separated and Non-separated uses)
Type of Construction: II-B
Building Height: 30'-0" – One Story

Proposed Building will be have an Automatic Sprinkler System per IBC Section 903.

Total Gross Building Area: 19,232 GSF*
Total Fire Area: 21,758 GSF**

***505.1 General -** A mezzanine or mezzanines in compliance with section 505 shall be considered a portion of a story in which it is contained. Such mezzanines shall not contribute to either the building area or number of stories as regulated by Section 503.1. ...

****505.1 General (Cont) -** The area of the mezzanine shall be included in determining the fire area defined in Section 902.

Building Code Summary

Chapter 3 – Use and Occupancy Classification
303 Assembly Group A-3 - Occupancy consists of a duel-functioning training room and community room, capacity based unconcentrated seating of 15 SF per occupant.

304 Business Group B - Occupancy includes: offices, work rooms, small storage rooms, training and meeting rooms, day and break rooms, restrooms, and building support rooms.

310 Residential Group R-2 - Occupancy includes sleeping rooms for fire fighting personnel.

311.3 Storage Group S-2 - Occupancy for low-hazard storage of fire fighting vehicles and apparatus, and equipment.

Chapter 4 – Special Detailed Requirements Based on Use and Occupancy
420.2 Group R Separation Walls - Walls separating dwelling units in the same building, walls separating sleeping units in the same building and walls separating dwelling or sleepin gunits from other occupancies contiguous to them in the same building shall abe constructed as fire partitions in accordance with Section 709.

709.3 Fire-resistance rating - Fire Partitions shall have a fire-resistance rating of not less than 1 hour.

Excpetion 2 - Dwelling units and sleeping units separations in buildings of Type IIB...construction shall have fire-resistance rating of not less than 1/2-hour in building equipped throughout with an automatic sprinkler system in accordance with Section 903.3.1.1.

Chapter 5 – General Building Heights and Areas
508.3.1 - Non-Separated Occupancies - Building or portions of building that comply with the provision of this section shall be considered as non-separated occupancies.

508.3.2 - Allowable building area and height - The allowable building area and height of the building or portion thereof shall be based on the most restrictive allowances for the occupancy groups under consideration for the type of construction of the building in accorance with Section 503.1.

The most restrictive height and area allowances for Madison Fire Station 14 is Occupancy B. For the purposes of height and area calculations Occupancy Group B shall be utilized. Areas with S-2 occupancy shall be treated as NON-SEPARATED occupancies. Occupancy Groups A-3 and R-2 shall be treated as accessory occupancies to the main occupancy as they each represent less than 10 percent of the First Floor building area.

The seperation walls for the dwelling units are still required to comply with 420.2.

Table 503 – Allowable Building Height in Feet above the Grade Plane
Occupancy Group B or Type II-B Construction with Spinkler System Increase per 504.2

	Allowable	Proposed
Height	75 ft	*<30 ft*
Stories	4 Stories	*1 Story*
Area	69,000 sf	*19,232 sf*

The proposed Madison Fire Station 14 complies with the allowable building heights and areas when classified as B occupancy.

505.1 (Mezzanines) General - A mezzanine or mezzanines in compliance with Section 505 shall be considered a portion of the story in which it is contained. Such mezzaninse shall not contribue to either the building area or number of stories as regulated by Section 503.1

505.2 Area Limitations - The aggregate area of a mezzanine or mezzanines within a room shall not exceed one-third of the floor area of that room or space in which they are located.

505.3 Egress - Each occupant of a mezzanine shall have access to at least two independent means of egress where the common path of egress travel exceeds the limitations of Section 1014.3

Exception - A Single means of egress shall be permitted in accordance with Section 1015.1

1015.1 Exits or exit access doorways from spaces - two exits or exit access doorways from any space shall be provided where one of the following conditions exists:

Exception - Where a buildng contains mixed occupancies, each individual occupancy shall comply with the applicable requirements for that occupancy.

Table 1015.1 Spaces with one exit or exit access doorway
A,B = 49 Occupants
R = 10 Occupants
S = 29 Occupants

Permitted and Non-permitted use of the mezzanine space
Occupancy Group B and S are permitted use
Occupancy Group A and R are NON-permitted use

The mezzanine for the Madison Fire Station 14 is only occupied by Occupancy Group S (both Mechanical Room and Warehouse S-2 classifications therefore is compliant with the occupancy limits in table 1015.1

The mezzanine for the Madison Fire Station 14 has an occupancy of less than 10. This is compliant with the strictest occupancy limits in table 1015.1 therefore one exit out of the mezzanine is permitted.

505.4 Openness - A mezzanine shall be open and unobstructed to the room in which such mezzanine is located except for walls not more than 42 inches high, columns and posts.

Exception 1 - Mezzanines or portions thereof are not required to be open to the roomm in which the mezzanines are located, provided thatt the occupant load of the aggregate area of the enclosed space does not exceed 10.

The mezzanine for the Madison Fire Station 14 has an occupancy of less than 10. Therefore closing portions of the mezzanine for fire fighter training permitted.

Chapter 6 – Types of Construction
Table 601 Fire-Resistance Rating Requirements for Building Elements
Type II-B Construction:
0HR Primary Structural Frame
0HR Exterior Bearing Walls
0HR Interior Bearing Walls
0HR Non-bearing walls and partitions Exterior
0HR Non-bearing walls and partitions Interior
0HR Floor construction and associated secondary members
0HR Roof Construction and associated secondary members

Table 602 Fire-Resistance Rating for Exterior Walls Based on Fire Separation Distance
The exterior walls for the proposed Madison Fire Station 14 are to be a distance of at least 30' from the nearest property line (or centerline of street).

Per Table 602, a B-Occupancy Type II-B Construction requires 0-HR rating for exterior walls.

Chapter 7 – Fire and Smoke Protection Features
705.8.1 Allowable area of openings - The maximum are of unprotected and protected openings permitted in an exterior wall in any story of a building shall not exceed the the percentages specified in Table 705.8.

Exception 2 - Buildings whose exterior bearing walls, exterior nonbearing walls and exterior primary stuctural frame are not required to be fire-resistance rated shall be permitted to have unlimited unprotected openings.

705.11 Parapets - Parapets shall be provided on exterior walls of buidings.

Exception 1 - The wall is not required to be fire-resistance rated in accordance with Table 602 because of fire separation distance.

708.2.9 Shaft enclosure required - A shaft enclosure is not required for floor openings vetween a mezzanine and the floor below.

713 Penetrations - *Penetrations through fire-rated wall or floor assemblies shall meet the requirements of this Section.*

714 Fire-Resistant Joint Systems - *Joints installed in or between fire-rated wall or floor assemblies shall meet the requirements of this Section.*

715 Opening Protection - *Doors and fire shutters in fire rated assemblies shall meet the requirements of this Section. Refer to the Door Schedule.*

716 Ducts and Transfer Openings - *Duct penetrations and air transfer openings in fire-rated assemblies shall meet the requirements of this Section.*

Chapter 9 - Fire Protection Systems
The proposed Madison Fire Station 14 be fully sprinkered per 903 Automatic Sprinkler Systems.

Chapter 10 – Means of Egress
Table 1004.1.1 Occupant Load

15	Net / Occ.	= Assembly without fixed Seating
50	Gross / Occ.	= Dormitories, Fitness Rooms, Locker Rooms
100	Gross / Occ.	= Business
200	Gross / Occ	= Kitchen, Commercial
300	Gross / Occ.	= Accessory Storage areas, Mechanical Equipment, Equipment Room
500	Gross / Occ.	= Warehouse

First Floor Occupants = 187
Second Floor Occupants = 5
Total Occupant Load = 192

1005.1 Egress Width.

Stairway	0.3 IN/Occ x 5 Occ	= 1.5 IN Required (48 IN Provided)*
Other Exit Component	0.2 IN/Occ x 194 Occ	= 48 IN Minimum (180 IN Provided)

**1.5 IN is required occupancy multiplier for egress width. The stairway will still need to comply with the provisions 1007.1.*

1007.1 Accessible Means of Egress - Accessible means of egress shall comply with this section. Accessible spaces shall be provided with not less than one accessible means of egress. Where more than one means of egress is required by Section 1015.1 or 1019.1 from any accessible space, each accessible portion of the space shall be served by not less than two accessible means of egress.

Exception 2 - One accessible means of egress is required from an accessible mezzanine level in accordance with Section 1007.3, 1007.4 or 1007.5

The mezzanine in the proposed Madison Fire Station 14 is for mechanical equipment and warehouse storage. Per Section 1104.4 Exception 4, the stair is note required to be an accessible mezzanine. As a result, the minimum stairway width will comply with 1009.1

All Exits in the proposed Madison Fire Station 14 will be accessible means of egress.

1007.3 Stairways - In order to be considered part of an accessible means of egress, an exit access stairway as permitted by Section 1016.1or exit stairway shall have a clear width of 48 inches between handrails and shall either incorporate an area of refuge within an enlarged floor-level landing or ahall be access from either an area of refuge complying with Section 1007.6 or a horizontal exit.

Exception 1 - The area of refuge is not required at open exit access or exit stairways as permitted by Sections 1016.1 and 1022.1 in buildings with an automatic sprinkler system installed in accordance with Section 903.3.1.1 or 903.3.1.2.

The mezzanine stairway for the proposed Madison Fire Station 14 does not require an area of refuge.

1009.1 Stairway width - The width of stairways shall be determined as specified in Section 1005.1, but such width shall not be less than 44 inches...

Exception 1 - Stairways serving an occupant load of less than 50 shall have a width of not less than 36 inches.

The required stairway width for the mezzanine stairway for the proposed Madison Fire Station 14 is 36 inches. The proposed design complies with both the Occupant Egress width per Section 1005.1 and required minimum width per Section 1009.1.

1014.3 Common Path of Egress Travel

Exception 1 - The length of a common path of egress travel in Group B, F and S occupancies shall not be more than 100 feet, provided that the building is equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.1.

Table 1016.1 Exit Access Travel Distance

Occupancy Group B	= 300 FT
Occupancy Group A-3	= 250 FT
Occupancy Group S-2	= 400 FT

Table 1018.1 Corridor Fire Resistance Rating.
B and S occupancy groups with automatic sprinkler system require 0 HR .

Table 1021.1 Minimum Number of Exits for Occupant Load
Minimum two exits required for 1-500 occupant load.

1029.1 Emergency Escape and Rescue. In addition to the means of egress required by this chapter, provisions shall be made for emergency escape and rescue...shall have at least one extreior emegency exit and rescue opening in accordance with this section...

Exception 1 - In other than Group R-3 occupancies, buildings equipped throughout with an approved automatic sprinkler system in accordance with Section 903.3.1.1.

Chapter 11 Accessibility
1104.4 / SPS 362.1104(2) - Multilevel Building Accessibility - At least one accessible route shall connect each accessible level, including mezzanines in multilevel building and facilities.

Exception 4 - Where a two story building or facility has one story with an occupant load fo five or fewer persons that does not contain public use spaces, that story shall not be required to connect by an accessible route to the story above.

The mezzanine contains both Warehouse and Mechanical room S-2 storage classifications. The occupancy of the mezzanine is (5) and satisfies the requirement of 1104.4 Exception 4. Therefore an accessible route to the mezzanine is NOT required.

Chapter 12 Interior Environment
1207.2 Sound Transmission - Walls and partitions and floor/ceiling assemblies separating sleeping units from each other and from public or service areas shall have an STC rating not less than 50.... Penetrations or openings in construction assemblies for piping, electrical devices, recessed cabinets, bathtubs, soffits, or heating, ventilation or exhaust ducts shall be sealed, lined, insulated or otherwise treated to maintain the required ratings.

Chapter 29 Plumbing Systems
Table 2902.1 Minimum Number of Required Plumbing Fixtures

2902.2 Separate facilities - Where plumbing fixtures are required, separate facilities shall be provided for each sex.

Business (B)

Water Closets	= 1 per 25 for the first 50 and 1 per 50 for the remainder exceeding 50
Lavatories	= 1 per 40 for the first 80 and 1 per 80 for the remainder exceeding 80
Drinking Fountains	= 1 per 100
Other	= 1 Service Sink

194 Occupants

Water Closets	= 5 Required (8 Provided) (1 Men's, 1 Womens and 6 Unisex)
Lavatories	= 3 Required (8 Provided)
Drinking Fountains	= 2 Required (3 Provided)
Service Sink	= 1 Required (2 Provided)

Photovoltaic Canopy Code Summary

3105.1 General - Awnings or canopies shall comply with the requirements of this section and other applicable sections of this code.

3105.4 Canopy materials - Canopies shall be constructed of a rigid framework with an approved covering that meets the fire propagation performance criteria of NFPA 701 or has a flame spread index not greater than 25 when tested in accordance with ASTM E 84 or UL 723.

The Photovoltaic module used for Madison Fire Station 14 has a flame spread index of 6. This index classification satisfies the requirement of Canopy Materials and is permitted.

8.15.7 (NFPA 13). Exterior projections

8.15.7.2 (NFPA 13). Unless the requirements of 8.15.7.2, 8.15.7.3 or 8.15.7.4 are met, sprinklers shall be installed under exterior projections exceeding 4 ft (1.2 m) in width.

8.15.7.2 (NFPA 13). Sprinklers shall be permitted to be omitted where the exterior canopies, roofs, porte-cocheres, balconies, decks, and similar projections are constructed with materials that are non-combustible, limited-combustible, or fire retardant treated wood as defined in NFPA 703.

The Photovoltaic module, aluminum sub-girt, and steel structure used for Madison Fire Station 14 are non-combustible material per IBC 1505. This satisfies the requirements of NFPA 8.15.7.2

1505.1 General. Roof assemblies shall be divided into the classes defined below. Class A, Band C roof assemblies and roof coverings required to be listed by this section shall be tested in accordance with ASTM E 108 or UL 790. In addition, fire-retardant-treated wood roof coverings shall be tested in accordance with ASTM D 2898. The minimum roof coverings installed on buildings shall comply with Table 1505.1 based on the type of construction of the building.

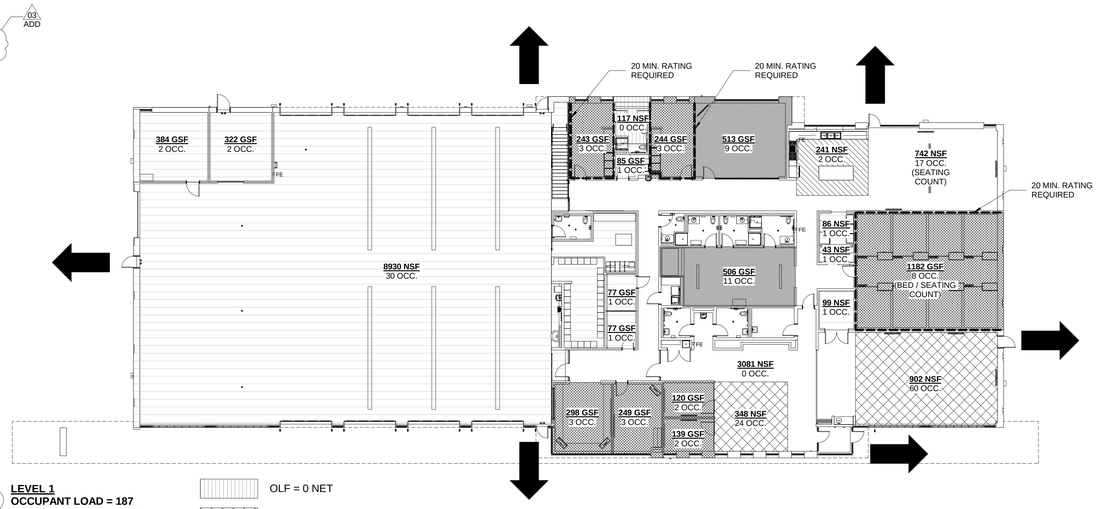
Table 1505.1 Minimum Roof Covering Classification for Types of Construction
Construction Type II-B requires C* Classification

1505.8 (IBC 2015) Building-Integrated Photovoltaic Products. Building-Integrated Photovoltaic products installed as the roof covering shall be tested, listed and labeled for fire classification in accordance with Section 1505.1

1505.9 (IBC 2015) Photovoltaic Panels and Modules. Rooftop-mounted photovoltaic panel systems shall be tested, listed and identified with a fire classification in accordance with UL 1703. The fire classification shall comply with Table 1505.1 based on the type of construction of the building.

The Photovoltaic module used for Madison Fire Station 14 is A-classified according the UL 1703. This classification exceeds the C-Classification requirement outlined in Table 1505.1 and is permitted.*

No automatic sprinkler system is not required under the photovoltaic canopy.



LEVEL 1
OCCUPANT LOAD = 187
EGRESS CAPACITY = 1,080 (PROVIDED)

TOTAL FLOOR AREA = 19,232 GSF

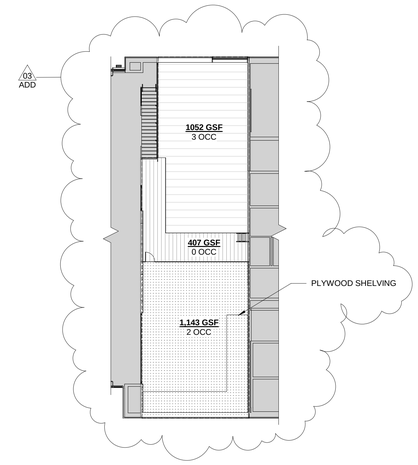
OLF = 0 NET
OLF = 15 NET
OLF = 50 NET
OLF = 100 GROSS
OLF = 200 GROSS
OLF = 300 GROSS
EXIT

1 LEVEL 1 FLOOR PLAN
1/16" = 1'-0"

MEZZANINE
OCCUPANT LOAD = 5
EGRESS CAPACITY = 160 (PROVIDED)

TOTAL FLOOR AREA = 2,526 GSF

OLF = 0 NET
OLF = 15 NET
OLF = 50 NET
OLF = 100 GROSS
OLF = 200 GROSS
OLF = 300 GROSS
OLF = 500 GROSS
EXIT



2 MEZZANINE CODE PLAN
1/16" = 1'-0"

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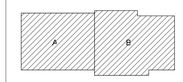
Key Plan



Sheet Issue Date
BID DOCUMENTS 11/03/17

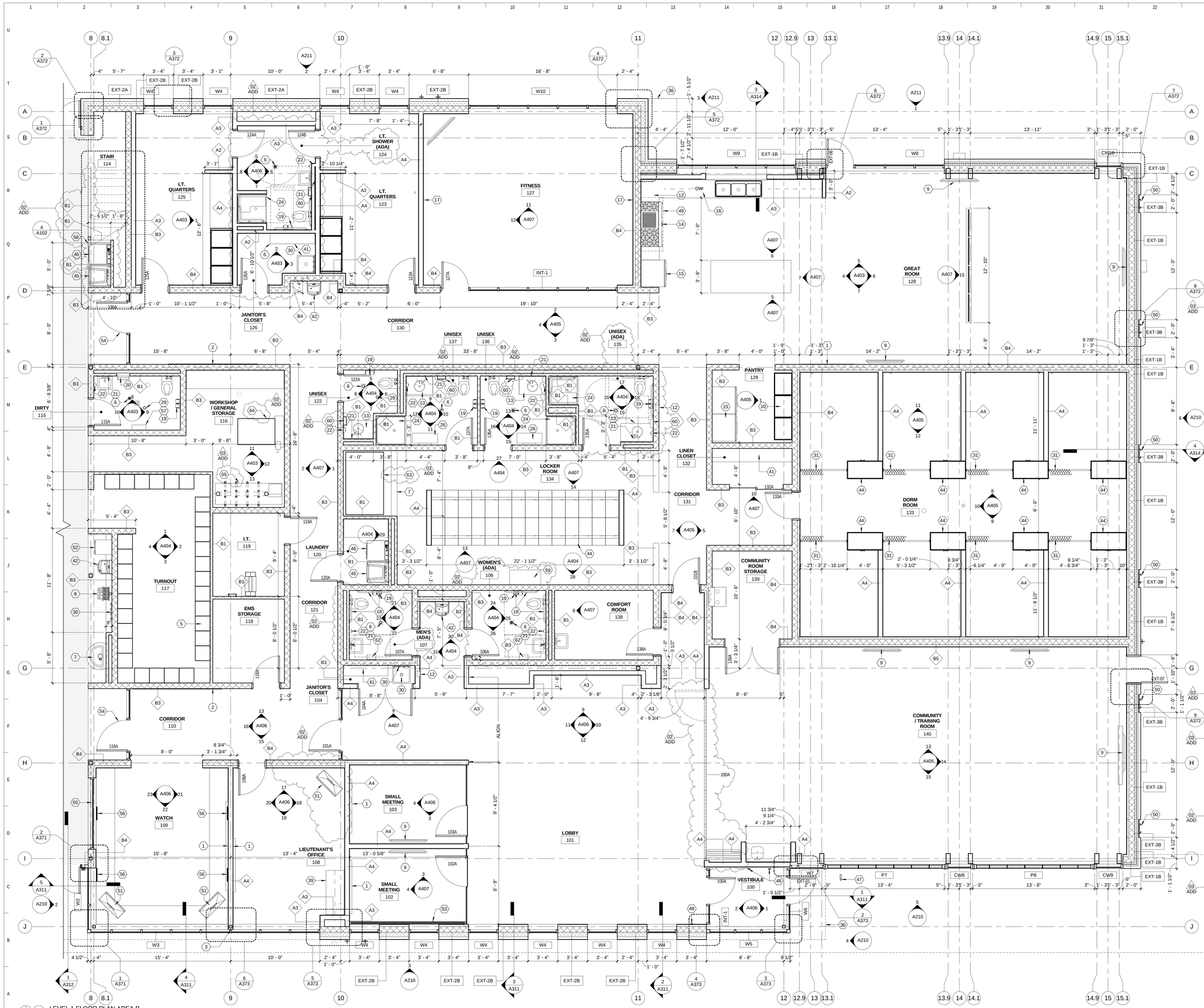
Revision	Date
ADDENDA #2	11/22/17
ADDENDA #3	12/06/17

BID DOCUMENTS

Drawing
CODE REVIEW

City of Madison Contract No. **8027**
OPN Project No. **17207000**

A003



1 LEVEL 1 FLOOR PLAN AREA B
1/4" = 1'-0"

GENERAL NOTES

1. DIMENSIONS ARE MEASURED FACE-OF-FINISH TO FACE OF FINISH OR ROUGH OPENING UNLESS NOTED OTHERWISE – TYPICAL FOR ALL DRAWINGS.
2. IN THE EVENT OF A DISCREPENCY BETWEEN ARCHITECTURAL AND CONSULTANT DRAWINGS, NOTIFY ARCHITECT IMMEDIATELY PRIOR TO COMMENCING WORK – TYPICAL FOR ALL DRAWINGS.
3. REFER TO ENLARGED FLOOR PLANS FOR ADDITIONAL WALL TYPE LOCATIONS, DIMENSIONS AND KEYNOTES.
4. REFER TO WALL TYPES SHEET FOR PARTITION WALL TYPES
5. PROVIDE CONCEALED, FIRE TREATED BLOCKING AT ALL ACCESSORIES AND CASEWORK LOCATIONS. EXTEND BLOCKING A MINIMUM OF 6' BEYOND EACH END AND 6" ABOVE AND BELOW ALL ACCESSORY ITEMS.
6. ALL WALLS WITH SOUND ATTENUATION BLANKETS ARE TO HAVE ACOUSTICAL SEALANT AT TOP AND BOTTOM AND ALL WALL PENETRATIONS.
7. ALL PENETRATIONS IN FIRE RATED WALLS MUST BE SEALED WITH APPROPRIATE FIRESTOPPING SYSTEMS.
8. COORDINATE LOCATIONS OF ALL FLOOR DRAINS WITH MECHANICAL. SLOPE AROUND DRAINS 1/8" PER 12" MIN. U.N.O.
9. PROVIDE BULLNOSE CMU AT ALL EXPOSED INTERIOR OUTSIDE CORNERS.
10. PROVIDE ALUMINUM THRESHOLD AND WEATHERSTRIPPING AT EXTERIOR DOORS – TYP.
11. ALL WOOD BLOCKING / SHEATHING USED IN THIS CONSTRUCTION SHALL BE FIRE-RETARDANT TREATED AS DEFINED BY II-B CONSTRUCTION.
12. PROVIDE VERTICAL GYPSUM BOARD CONTROL JOINTS AT 30'-0" O.C. MAX. – U.N.O.

FLOOR PLAN LEVEL 1 KEYNOTES

1	MARKER BOARD
2	MAP AREA
3	CENTER WALL ON MULLION
4	TACKBOARD
5	TURN OUT GEAR LOCKERS – CFCI. REFER TO INTERIOR ELEVATIONS FOR MOUNTING HEIGHTS
6	FLOOR DRAIN
7	FLOOR TRENCH DRAIN - SET FLUSH WITH FLOOR. FLOOR TO PITCH TOWARD DRAIN AT ¼": 1'-0" (MIN)
8	WALL MOUNTED HOSE REEL
9	MONITOR – REFER TO TECHNOLOGY DRAWINGS AND INTERIOR ELEVATIONS FOR SIZING AND MOUNTING INFORMATION. PROVIDE BLOCKING AS REQUIRED.
10	(3) 24" DEEP PANTRY UNITS - REFER TO CASEWORK DETAILS FOR ADDITIONAL INFORMATION.
11	CONCRETE FILLED PIPE BOLLARD
12	SEMI-RECESSED FIRE EXTINGUISHER CABINET AND STANDARD EXTINGUISHER
13	24" DEEP CABINET AT SINK
14	RANGE - OFCI
15	REFRIGERATOR - OFCI
16	DISHWASHER - OFCI
17	¾" PLYWOOD UNDER GYP. – ENTIRE WALL
18	GRAB BARS – 36" HORIZONTAL BEHIND TOILET, 42" HORIZONTAL AND 18" VERTICAL ADJACENT TO TOILET. PROVIDE BLOCKING AS REQUIRED. REFER TO GENERAL INFORMATION DRAWINGS FOR ADDITIONAL INFORMATION
19	DOUBLE ROLL TOILET DISPENSER – O.F.C.I. PROVIDE BLOCKING AS REQUIRED
20	HAND TOWEL DISPENSER – O.F.C.I. PROVIDE BLOCKING AS REQUIRED
21	FRAMELESS MIRROR 24" X 48" W/ STAINLESS STEEL CLIPS FASTENERS
22	WALL MOUNTED SOAP DISPENSER – O.F.C.I. PROVIDE BLOCKING AS REQUIRED
23	COAT HOOK
24	SHOWER - SOLID SURFACE SHOWER BASIN, SOLID SURFACE SHOWER WALLS
25	SHOWER TRANSFER ACCESSIBLE FOLDING SEAT
26	FOLDING SEAT
27	WALL MOUNTED LADDER HANGERS
28	MOP SINK – REFER TO PLUMBING FOR ADDITIONAL INFORMATION
29	IN-FLOOR CATCH BASIN – REFER TO PLUMBING DRAWINGS FOR ADDITIONAL INFORMATION
30	MOP / BROOM HOLDER – WALL MOUNTED. REFER TO INTERIOR ELEVATIONS FOR ADDITIONAL INFORMATION
31	CUBICLE CURTAIN AND CEILING MOUNTED TRACK
32	HVAC EQUIPMENT – REFER TO MECHANICAL DRAWINGS.
33	WALL MOUNTED OSCILLATING FAN. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION
34	RECESSED SLAB. REFER TO ROOM FINISH SCHEDULE
35	BUILDING SIGNAGE
36	DASHED LINE INDICATES EXTERIOR SOFFIT ABOVE
37	DASHED LINE INDICATES CANOPY STRUCTURE ABOVE
38	ELECTRICAL EQUIPMENT – REFER TO ELECTRICAL FOR ADDITIONAL INFORMATION
39	CASEWORK - REFER TO ELEVATIONS AND DETAILS
40	REINFORCED CONCRETE FROST STOOP - REFER TO STRUCTURAL
41	ADJUSTABLE SHELVES
42	WATER FOUNTAIN/BOTTLE FILLER STATION
44	PERSONAL STORAGE LOCKERS - CFCI
45	COMMERCIAL WASHER - OFOI
46	COMMERCIAL DRYER - OFOI
47	PUSH BUTTON BOLLARD FOR DOOR
48	PUSH BUTTON
49	DASHED LINE INDICATES HOOD
50	GALVANIZED STEEL DOWNSPOUT
51	CEILING MOUNTED MONITOR
52	ICE MACHINE - OFOI
53	RADIANT PANEL, REFER TO MECHANICAL DRAWINGS
54	INTERIOR DOOR - THERMALLY BROKEN ALUMINUM STOREFRONT WINDOW SYSTEM, 1" INSULATED GLASS UNITS, WEATHER STRIPPING AND DOOR THRESHOLD.
55	INTERIOR WINDOW - THERMALLY BROKEN ALUMINUM STOREFRONT WINDOW SYSTEM, 1" INSULATED GLASS UNIT
56	WIRE BRUSH GROMET
57	EMERGENCY EYEWASH STATION
58	4" CONCRETE HOUSEKEEPING PAD UNDERSTAIR. CANE DETECTION
59	WALL MOUNTED ACCESSIBLE LOCKER ROOM BENCH (42" X 20")
60	HAND TOWEL DISPENSERS - OFCI
61	SURFACE MOUNTED KNOX BOX
62	HAND DRYER - OFCI
63	DETOX SAUNA - OFOI
64	LAUNDRY EXTRACTOR - OFOI
65	GEAR DRYER - OFOI

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Key Plan

Sheet Issue Date

BID DOCUMENTS	11/03/17

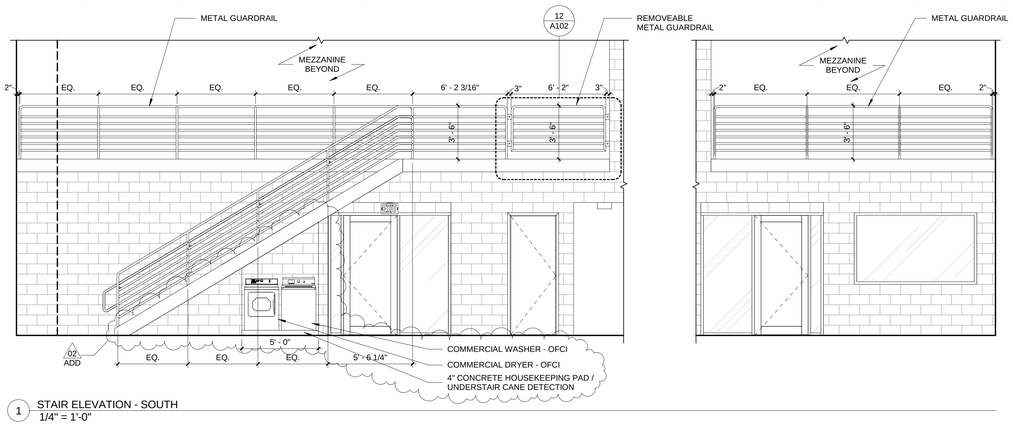
Revision	Date
ADDENDA #2	11/22/17
ADDENDA #3	12/06/17

BID DOCUMENTS

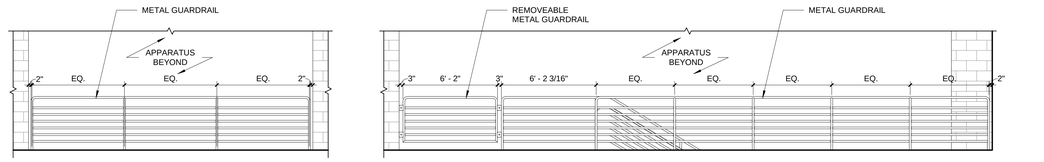
Drawing
FLOOR PLAN LEVEL 1.B

City of Madison Contract No. **8027**
OPN Project No. **17207000**

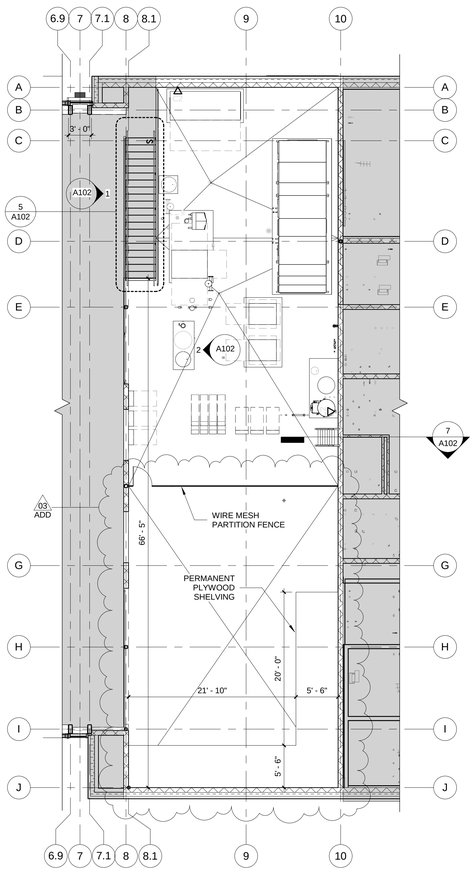
A101.B



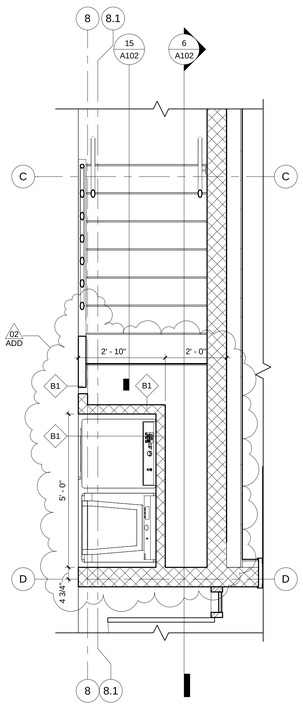
1 STAIR ELEVATION - SOUTH
1/4" = 1'-0"



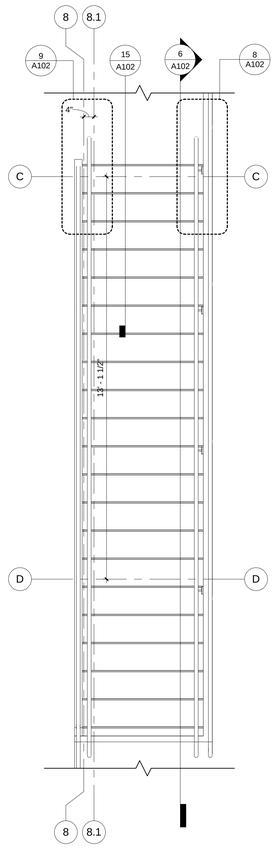
2 GUARDRAIL ELEVATION
1/4" = 1'-0"



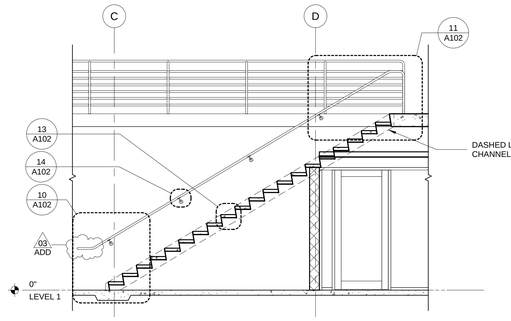
3 MEZZANINE PLAN
1/8" = 1'-0"



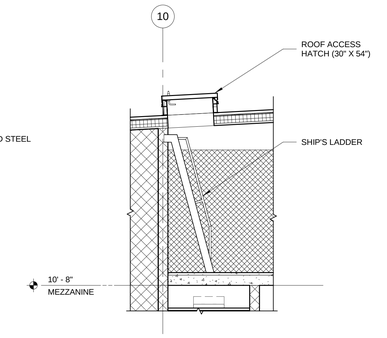
4 MEZZANINE STAIR (BELOW) - PLAN
1/2" = 1'-0"



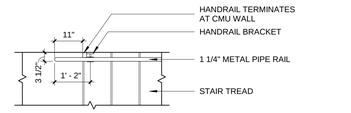
5 MEZZANINE STAIR (ABOVE) - PLAN
1/2" = 1'-0"



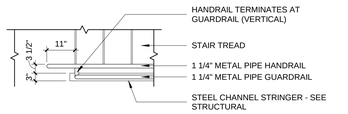
6 MEZZANINE STAIR - SECTION
1/4" = 1'-0"



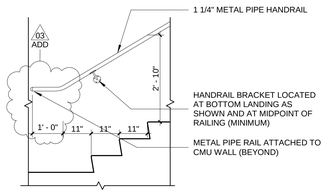
7 SHIP LADDER - SECTION
1/4" = 1'-0"



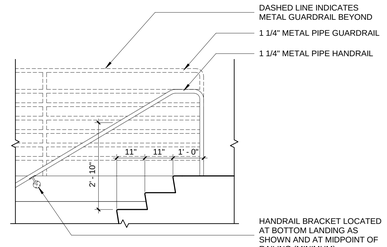
8 HANDRAIL EXTENSION PLAN DETAIL - BOTTOM LANDING (EAST)



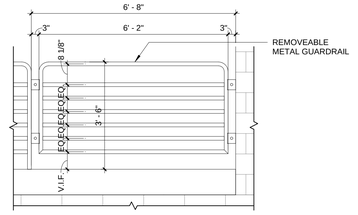
9 HANDRAIL EXTENSION PLAN DETAIL - BOTTOM LANDING (WEST)
1/2" = 1'-0"



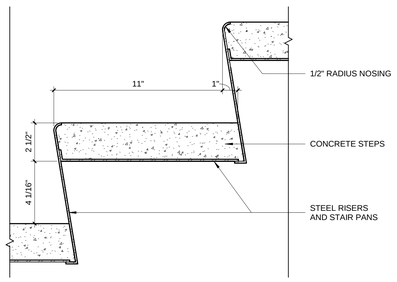
10 HANDRAIL EXTENSION - BOTTOM LANDING
1/2" = 1'-0"



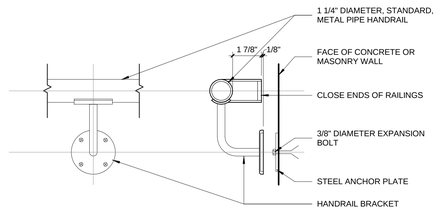
11 HANDRAIL EXTENSION - TOP LANDING
1/2" = 1'-0"



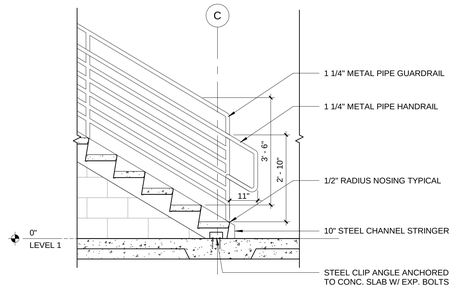
12 REMOVEABLE METAL GUARDRAIL
1/2" = 1'-0"



13 METAL PAN TREAN AND RISER
3" = 1'-0"



14 HANDRAIL WALL BRACKET
3" = 1'-0"



15 STAIR BOTTOM RAILING
1/2" = 1'-0"

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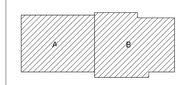


Sheet Issue Date
BID DOCUMENTS 11/03/17

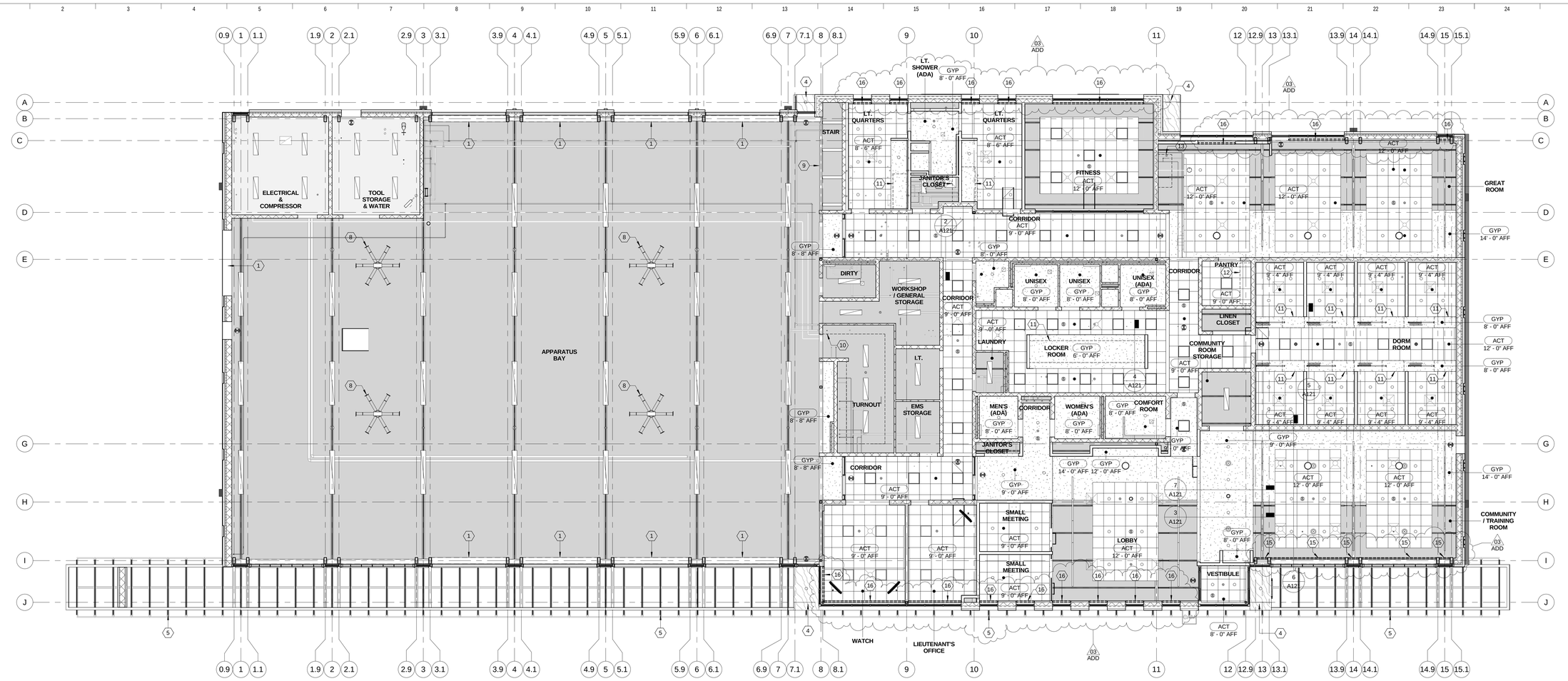
Revision	Date
ADDENDA #2	11/22/17
ADDENDA #3	12/06/17

BID DOCUMENTS

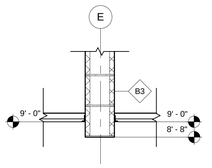
Drawing
MEZZANINE PLAN

City of Madison Contract No. **8027**
OPN Project No. **17207000**

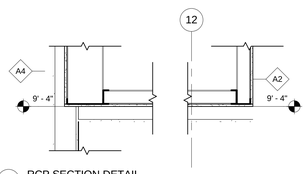
02 ADD **A102**



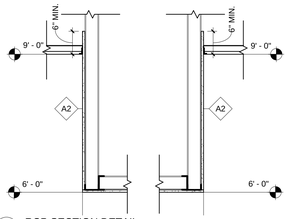
1 LEVEL 1 RCP
1/8" = 1'-0"



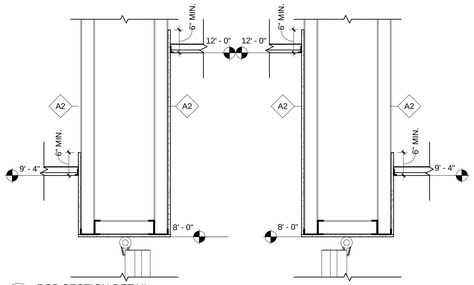
2 RCP SECTION DETAIL
3/4" = 1'-0"



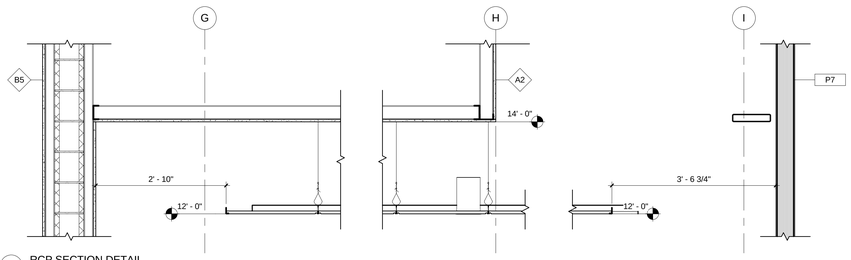
3 RCP SECTION DETAIL
3/4" = 1'-0"



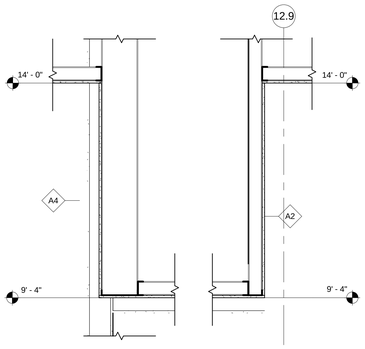
4 RCP SECTION DETAIL
3/4" = 1'-0"



5 RCP SECTION DETAIL



6 RCP SECTION DETAIL
3/4" = 1'-0"



7 RCP SECTION DETAIL
3/4" = 1'-0"

FAN

METALUX SUSPENDED COOPER INDUSTRIAL LED LINEAR BAY - 8'-0"

METALUX SUSPENDED COOPER INDUSTRIAL LED LINEAR BAY - 4'-0"

2' X 2' TROFFER

RECESSED DOWNLIGHT

LIGHT 2 3/4" X 4'-0"

VANITY LIGHT - 3'-4"

VANITY LIGHT - 3'-0"

VANITY LIGHT - 2'-6"

VANITY LIGHT - 2'-0"

PAGING SPEAKER

OCCUPANCY SENSOR

FIRE STROBE

EXIT SIGN

SECURITY CAMERA

AV SPEAKER

MICROPHONE

SMOKE DETECTOR

INFORMATION OUTLETS

HEAT DETECTOR

CEILING MOUNTED TELEVISION

REFLECTED CEILING PLAN SYMBOLS/LEGEND

REFLECTED CEILING PLAN...

1	OVERHEAD DOOR AND ACTUATOR
4	EXTERIOR SOFFIT ABOVE
5	CANOPY STRUCTURE ABOVE
8	DESTRATIFICATION FAN – REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION
9	DASHED LINE INDICATES STAIR
10	DASHED LINE INDICATES TURNOUT GEAR LOCKERS
11	DASHED LINE INDICATES PERSONAL STORAGE LOCKERS
12	DASHED LINE INDICATES DEEP PANTRY UNITS
13	DASHED LINE INDICATES HOOD
14	DASHED LINE INDICATES UPPER CASEWORK
15	AUTOMATIC ROLLER SHADES - DUAL ROLL
16	MANUAL ROLLER SHADE

03 ADD

GENERAL NOTES

1. PAINT ALL EXPOSED STRUCTURE, DECK, DUCTWORK, CONDUIT, SPRINKLER PIPING, ETC. IN AREAS NOTED TO BE "OPEN TO STRUCTURE" – U.N.O. PAINTING OF EXPOSED STRUCTURE TO BE DONE AFTER ALL UTILITIES INSTALLED. REFER TO FINISH SCHEDULE.
2. CEILING HEIGHTS ARE LISTED NEXT TO APPROPRIATE KEYNOTE. HEIGHT IS GIVEN ABOVE FINISHED FLOOR U.N.O.
3. PERIMETER CEILING TILES SHALL NOT BE LESS THAN 4" – TYP.
4. LOCATE ALL SPRINKLER HEADS, SMOKE DETECTORS, AUDIO SPEAKER AND CEILING MOUNTED EQUIPMENT IN THE CENTER OF CEILING TILE – TYP.
5. CENTER CEILING GRID IN ROOMS AS SHOWN U.N.O.
6. LIGHT FIXTURES IN APPARATUS BAY TO BE MOUNTED TO BOTTOM OF STRUCTURAL JOIST – TYP.
7. ALL MECHANICAL DIFFUSERS SHALL BE PAINTED BY MANUFACTURER TO MATCH ADJACENT SOFFIT/ACP – U.N.O.
8. REFER TO ARCHITECTURAL DRAWINGS FOR ALL MECHANICAL AND ELECTRICAL DEVICE LOCATIONS AND MOUNTING HEIGHTS. IF NOT CLEARLY SPECIFIED, CONTACT ARCHITECT FOR FURTHER CLARIFICATION. MECHANICAL AND ELECTRICAL DRAWINGS ARE FOR FIXTURE TYPE REFERENCE ONLY.
9. CAULK JOINT BETWEEN GYPSUM WALL BOARD ASSEMBLIES AND FACE OF CMU AT ALL WALL AND SOFFIT CONDITIONS. CAULKING TO BE CONTINUOUS VERTICALLY AND EXTEND ABOVE LAY-IN CEILING A MINIMUM OF 18". CAULK PRIOR TO PAINTING.
10. SKYLIGHT DIFFUSER TO CENTER ON CEILING GRID AS SHOWN. - TYP
11. EXTRUDED ALUMINUM CEILING CLOUD EDGE (BASIS OF DESIGN: ARMSTRONG AXIOM CLASSIC 4IN STRAIGHT (AX4STR)) AROUND PERIMETER OF CEILING CLOUDS - TYP.
12. SEGMENTED ROLLER SHADES TO ALIGN WITH MULLION LOCATIONS. CONFIRM LOCATIONS WITH ARCHITECT DURING SHOP DRAWING PHASE.

03 ADD

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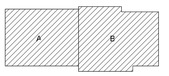

Sheet Issue Date	
BID DOCUMENTS	11/03/17

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ADDENDA #3	12/06/17

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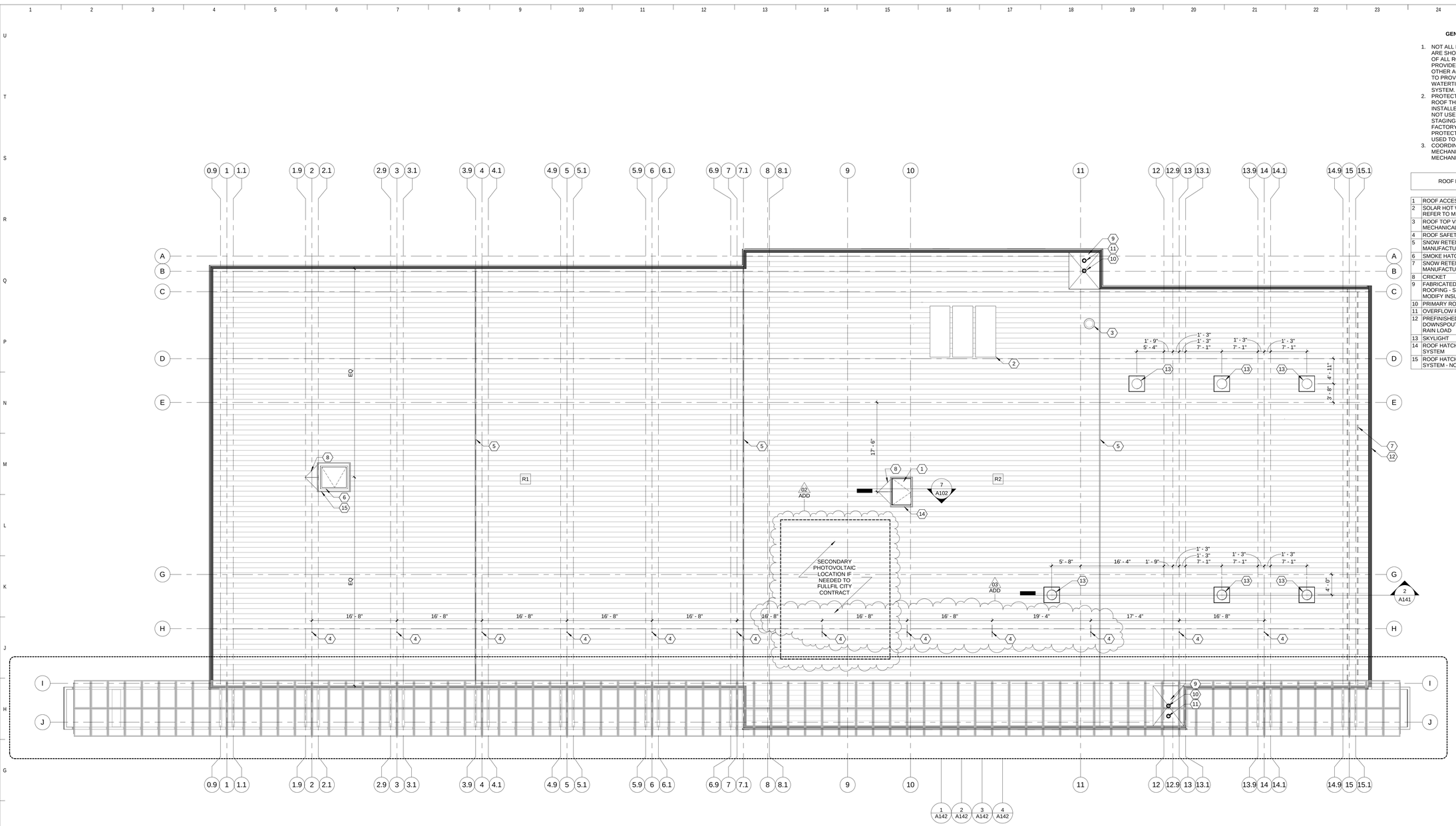
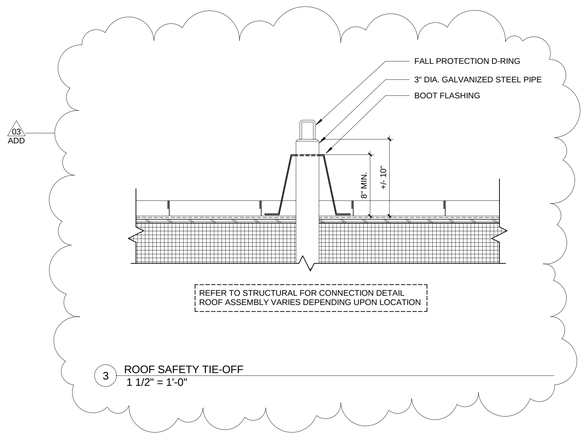
Drawing
REFLECTED CEILING PLAN

City of Madison Contract No. **8027**
OPN Project No. **17207000**

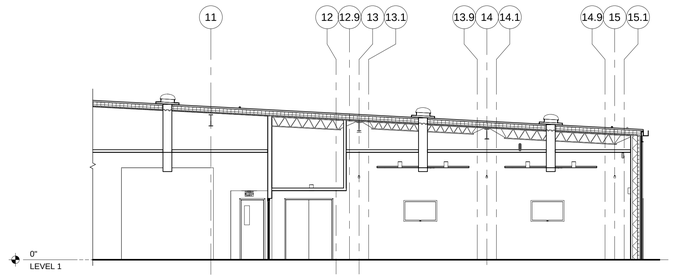
A121



1 ROOF LEVEL FLOOR PLAN
1/8" = 1'-0"



3 ROOF SAFETY TIE-OFF
1 1/2" = 1'-0"



2 SKYLIGHT DIAGRAM
1/8" = 1'-0"

GENERAL NOTES

1. NOT ALL ROOF PENETRATIONS ARE SHOWN. VERIFY LOCAITONS OF ALL ROOF PENETRATIONS. PROVIDE BOOTS, FLASHING AND OTHER ACCESSORIES REQUIRED TO PROVIDE A COMPLETE, WATERTIGHT WARRANTIED SYSTEM.
2. PROTECT SECTIONS OF THE ROOF THAT HAVE ALREADY BEEN INSTALLED FROM DAMAGE. DO NOT USE THE ROOF AS A STAGING AREA UNLESS FACTORY, MUTUALLY APPROVED PROTECTION MEASURES ARE USED TO PROTECT THE ROOF.
3. COORDINATE LOCATION OF MECHANICAL EQUIPMENT WITH MECHANICAL DRAWINGS.

ROOF PLAN KEYNOTES

1	ROOF ACCESS HATCH
2	SOLAR HOT WATER HEATER MODULE - REFER TO MECHANICAL
3	ROOF TOP VENTILATOR - REFER TO MECHANICAL
4	ROOF SAFETY EQUIPMENT TIE-OFF
5	SNOW RETENTION BARS PER MANUFACTURER RECOMMENDATIONS
6	SMOKE HATCH
7	SNOW RETENTION BARS PER MANUFACTURER RECOMMENDATIONS
8	CRICKET
9	FABRICATED GALVANIZED STEEL ROOFING - SLOPES TO ROOF DRAIN - MODIFY INSULATION AS REQUIRED
10	PRIMARY ROOF DRAIN
11	OVERFLOW ROOF DRAIN
12	PREFINISHED ALUMINUM GUTTER AND DOWNSPOUTS SIZED TO ACCOMIDATE RAIN LOAD
13	SKYLIGHT
14	ROOF HATCH SAFETY RAILING SYSTEM
15	ROOF HATCH SAFETY RAILING SYSTEM - NO ACCESS

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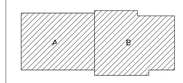

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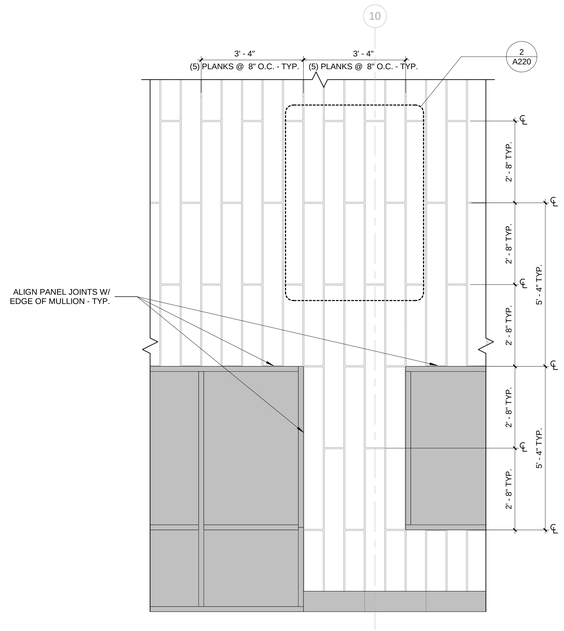
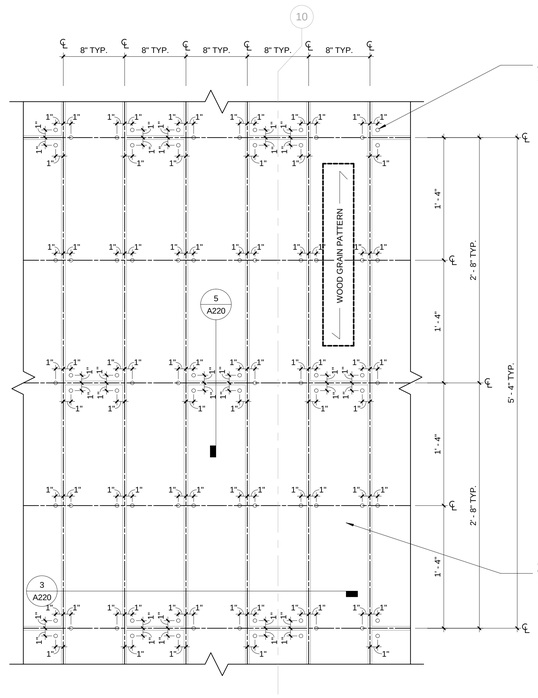
Drawing
ROOF PLAN

City of Madison Contract No. **8027**
OPN Project No. **17207000**

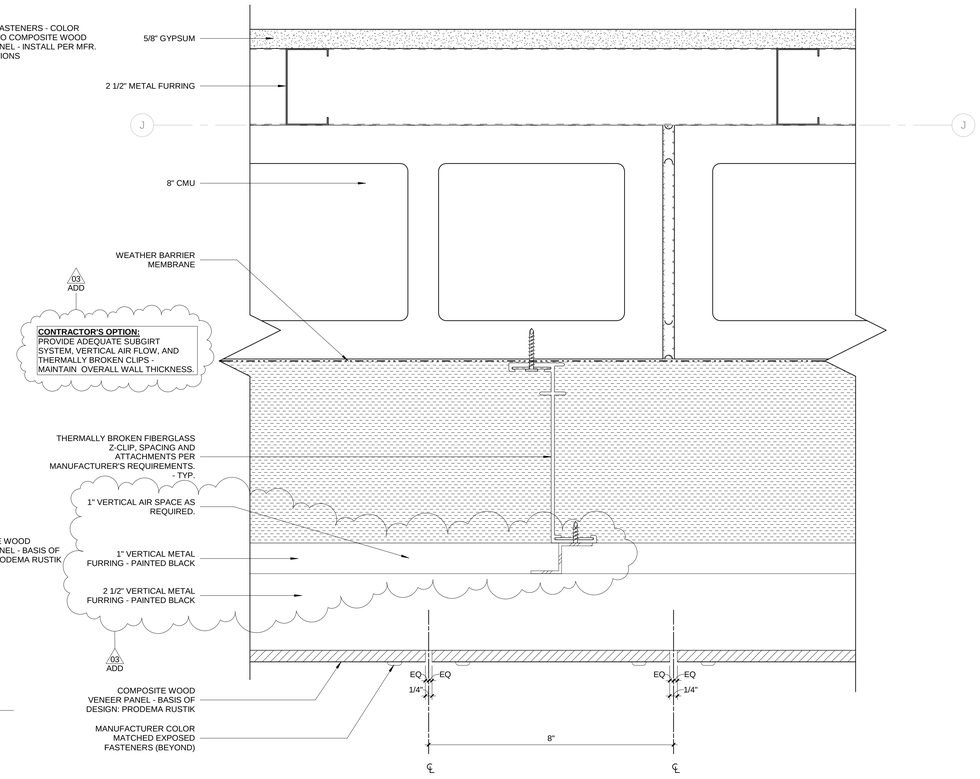
A141



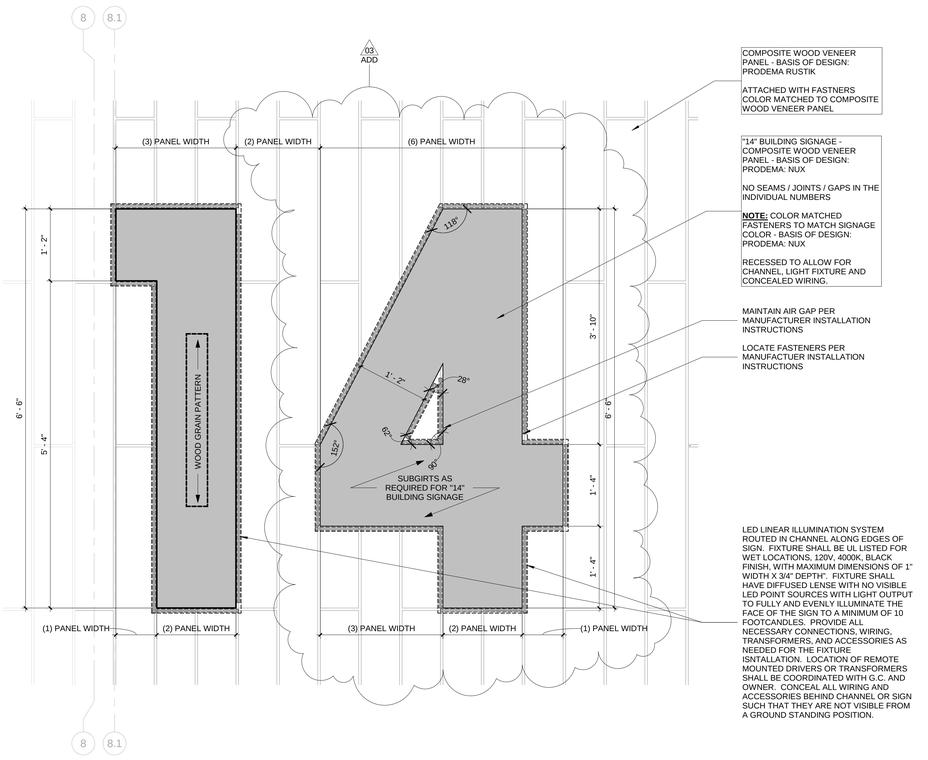
1 TYPICAL COMPOSITE WOOD VENNER PANEL - CONFIGURATION
1/2" = 1'-0"



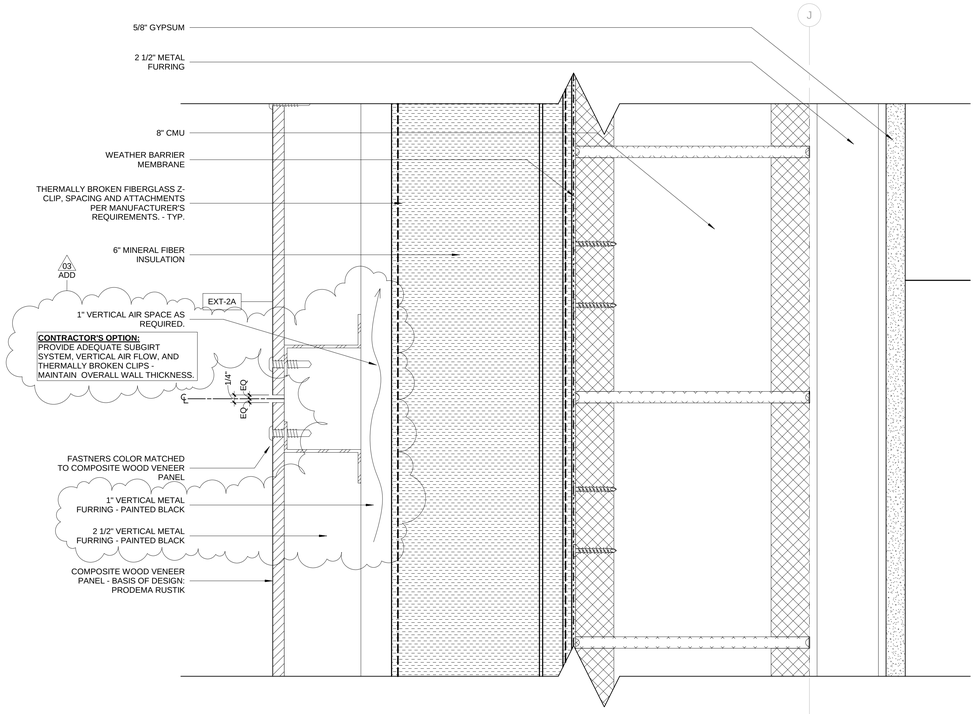
2 TYPICAL COMPOSITE WOOD VENEER PANEL - CONNECTIONS
1 1/2" = 1'-0"



3 COMPOSITE WOOD VENEER PANEL - PLAN DETAIL
6" = 1'-0"



4 COMPOSITE WOOD VENEER PANEL - "14" BUILDING SIGNAGE
1" = 1'-0"



5 COMPOSITE WOOD VENEER PANEL - SECTION
6" = 1'-0"

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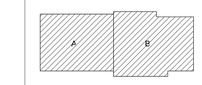

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ADDENDA #3	12/06/17

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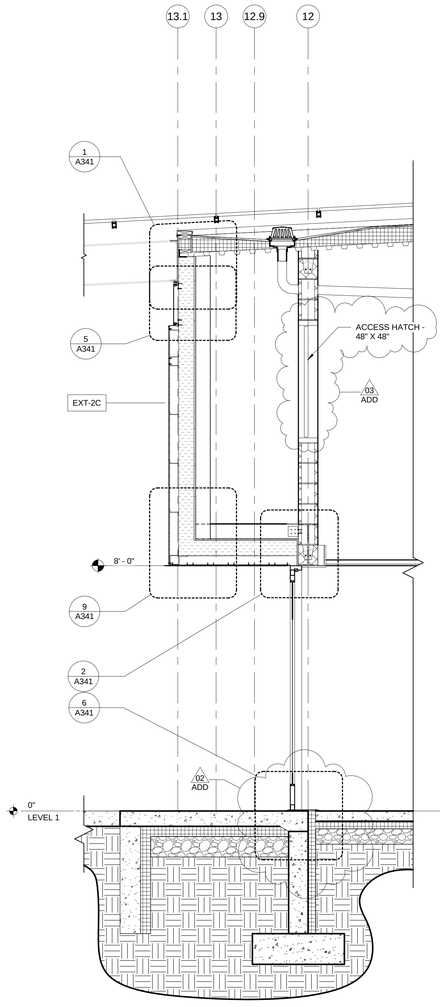
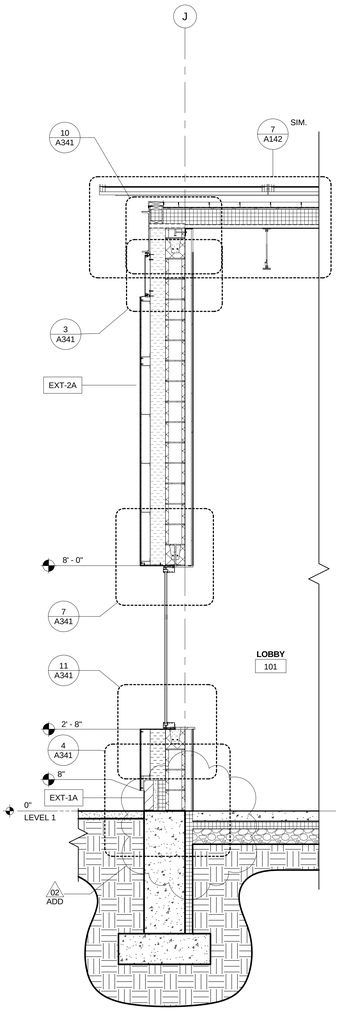
Drawing
STANDARD DETAILS

City of Madison Contract No. **8027**
OPN Project No. **17207000**

A220



1 WALL SECTION
1/2" = 1'-0"



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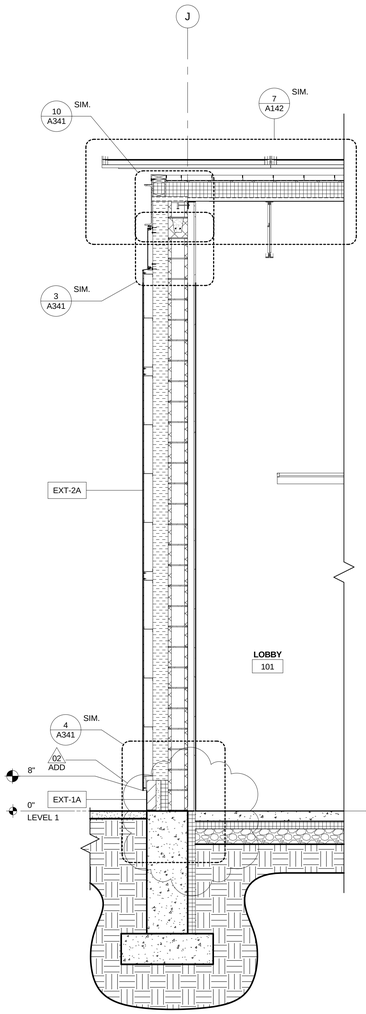
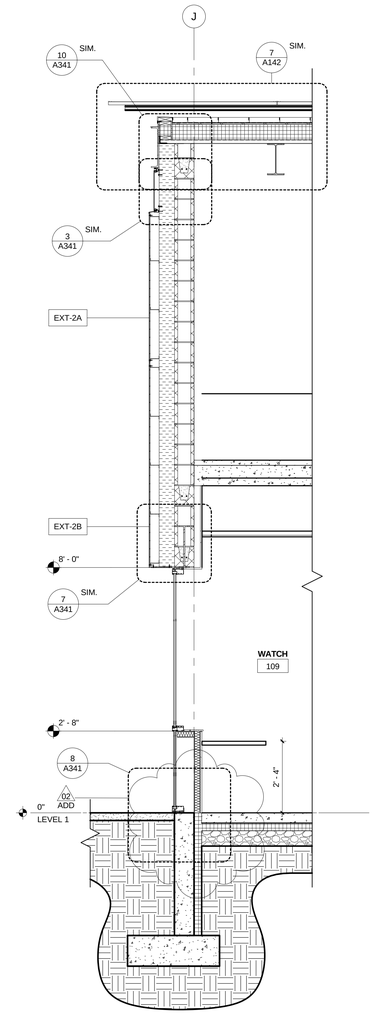


3 WALL SECTION
1/2" = 1'-0"



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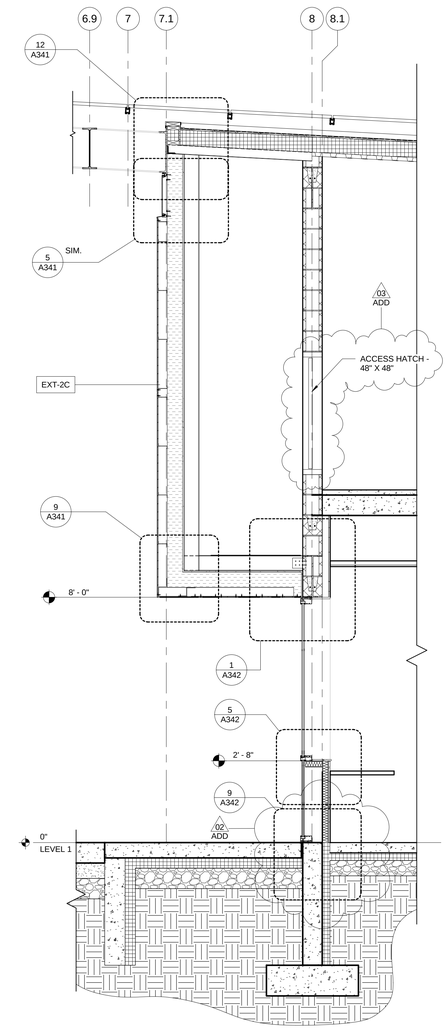
1/2" = 1'-0"



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1/2" = 1'-0"

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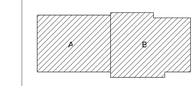

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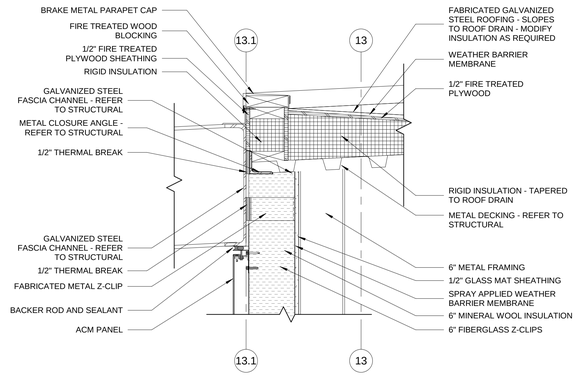
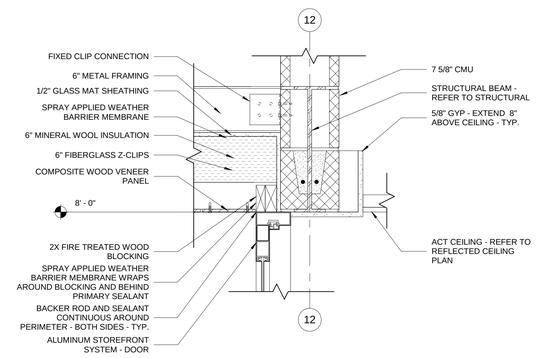
WALL SECTIONS

City of Madison Contract No. **8027**
OPN Project No. **17207000**

A311



1 SECTION DETAIL
1 1/2" = 1'-0"



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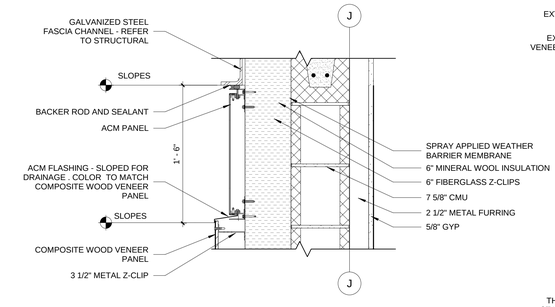
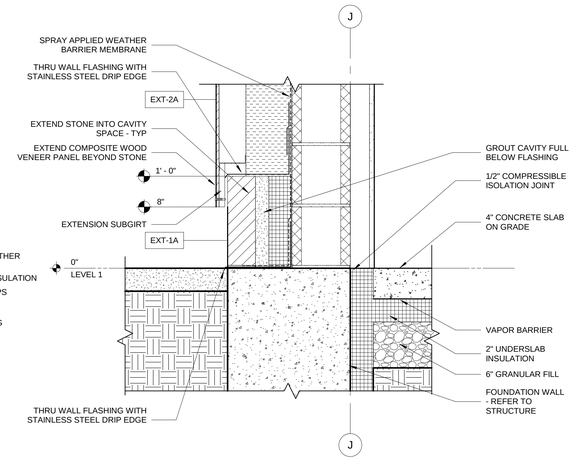
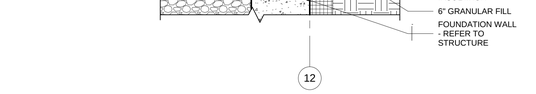


3 SECTION DETAIL
1 1/2" = 1'-0"



4 SECTION DETAIL
1 1/2" = 1'-0"

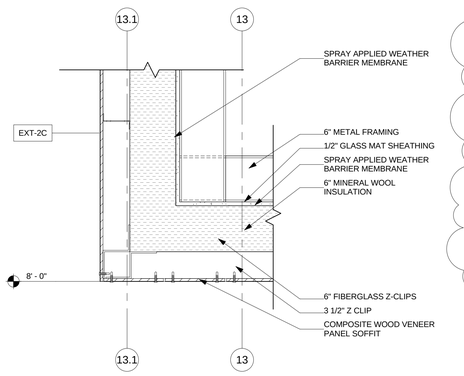
5 SECTION DETAIL
1 1/2" = 1'-0"



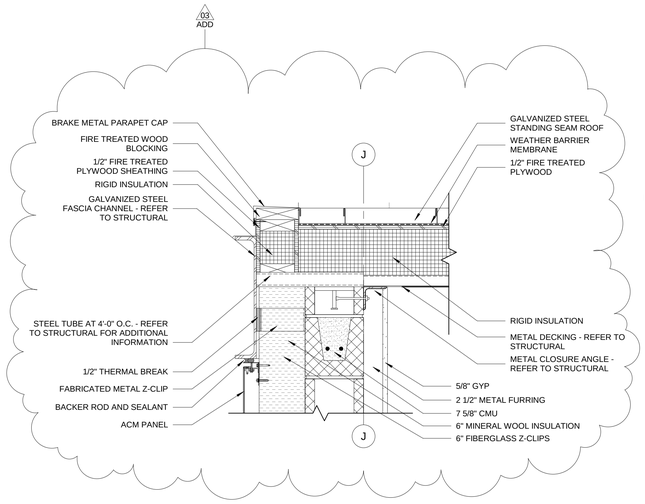
6 SECTION DETAIL
1 1/2" = 1'-0"

7 SECTION DETAIL
1 1/2" = 1'-0"

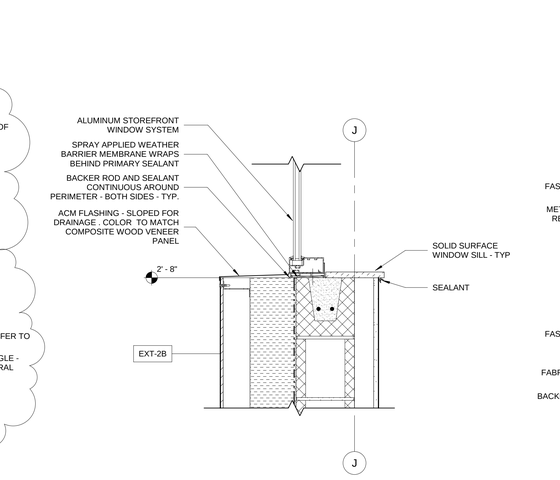
8 SECTION DETAIL
1 1/2" = 1'-0"



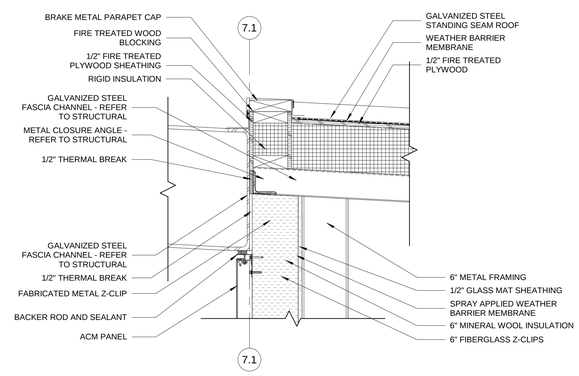
9 SECTION DETAIL
1 1/2" = 1'-0"



10 SECTION DETAIL
1 1/2" = 1'-0"



11 SECTION DETAIL
1 1/2" = 1'-0"



12 SECTION DETAIL
1 1/2" = 1'-0"

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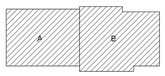
Key Plan



Sheet Issue Date
BID DOCUMENTS 11/03/17

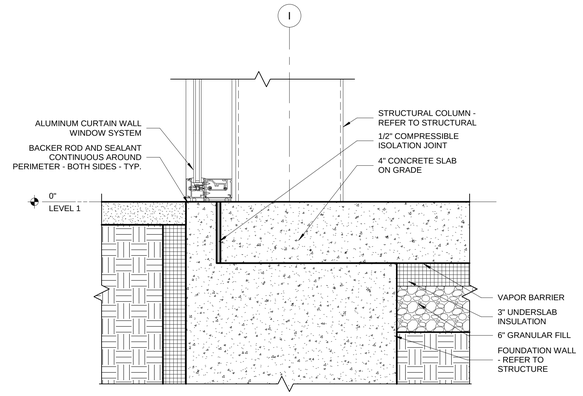
Revision	Date
ADDENDA #3	12/06/17

BID DOCUMENTS

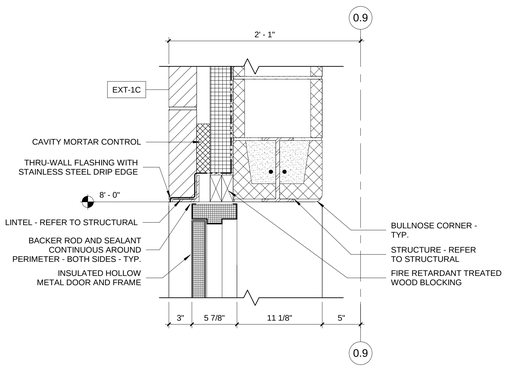
Drawing
SECTION DETAILS

City of Madison Contract No. **8027**
OPN Project No. **17207000**

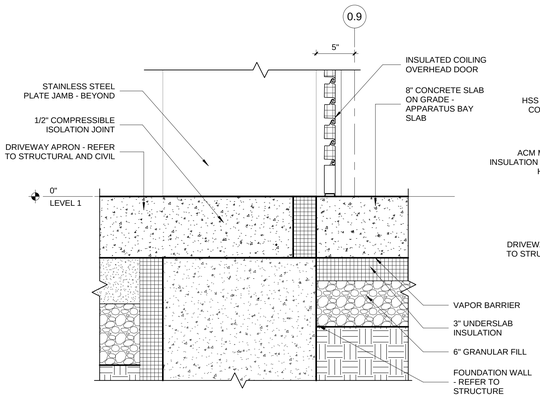
A341



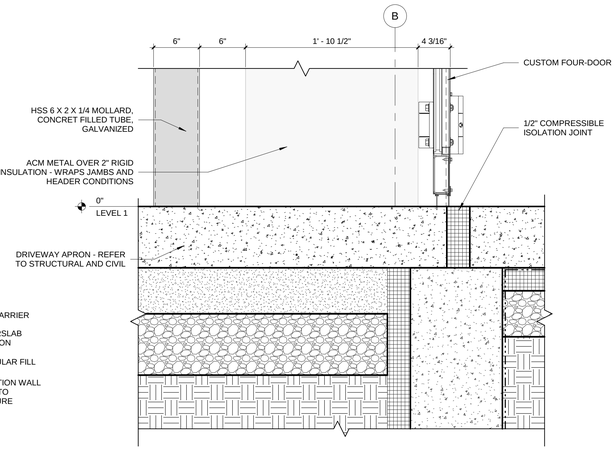
1 SECTION DETAIL
1 1/2" = 1'-0"



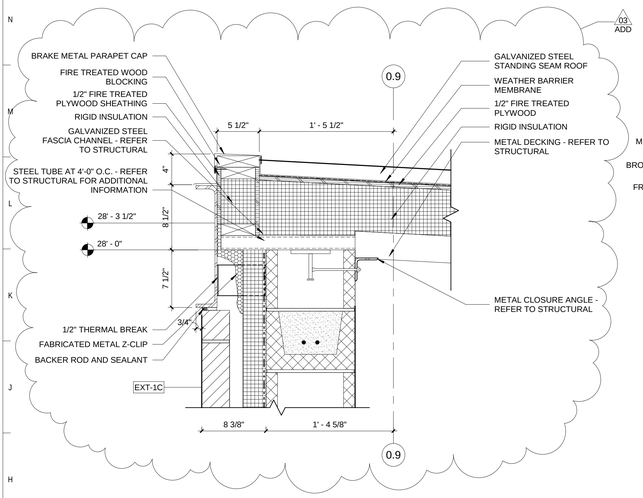
2 SECTION DETAIL
1 1/2" = 1'-0"



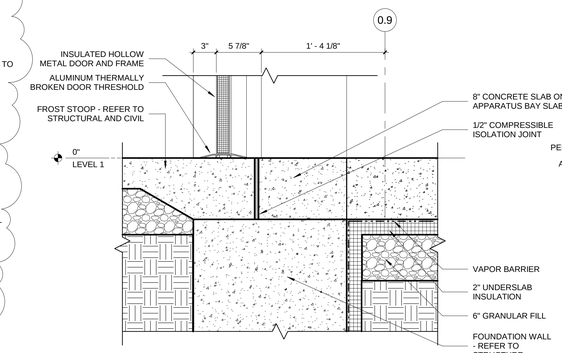
3 SECTION DETAIL
1 1/2" = 1'-0"



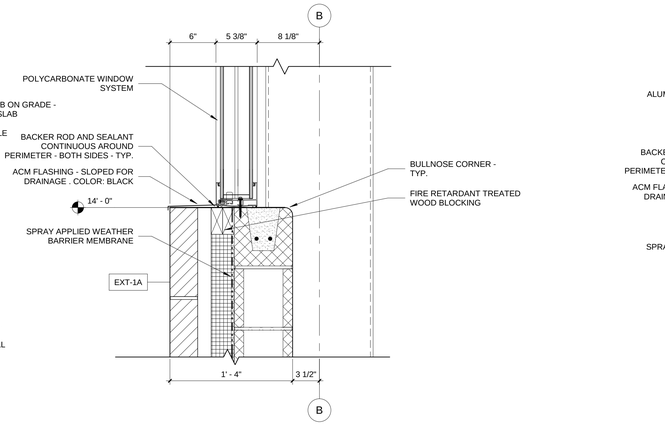
4 SECTION DETAIL
1 1/2" = 1'-0"



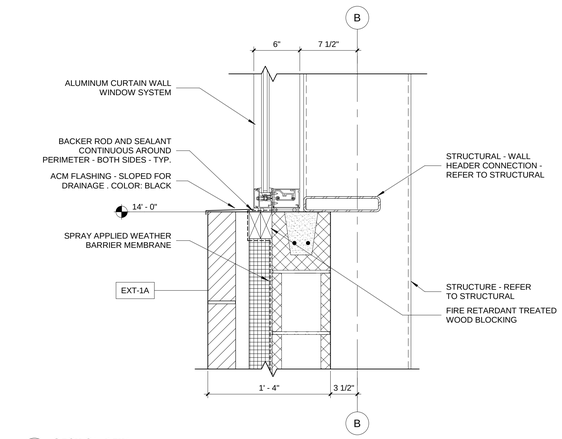
5 SECTION DETAIL
1 1/2" = 1'-0"



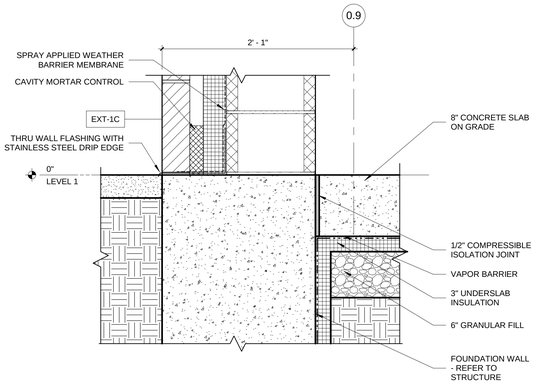
6 SECTION DETAIL
1 1/2" = 1'-0"



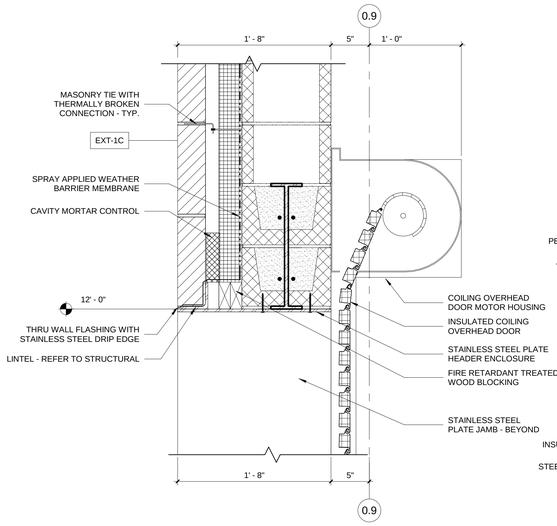
7 SECTION DETAIL
1 1/2" = 1'-0"



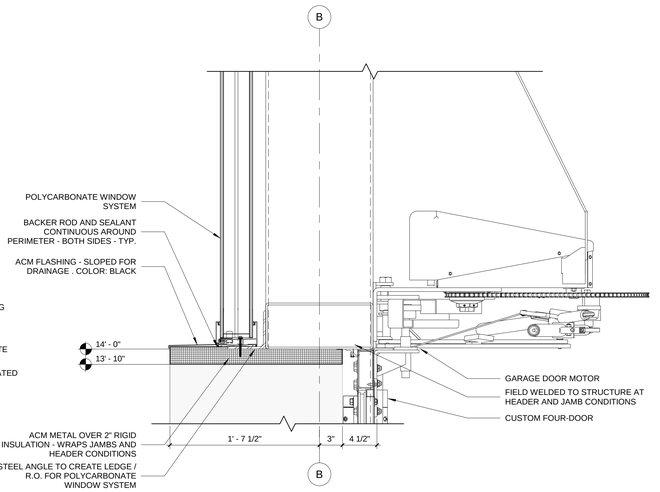
8 SECTION DETAIL
1 1/2" = 1'-0"



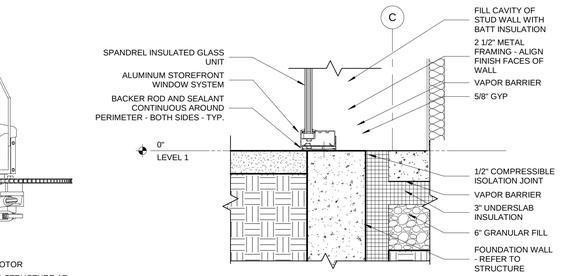
9 SECTION DETAIL
1 1/2" = 1'-0"



10 SECTION DETAIL
1 1/2" = 1'-0"



11 SECTION DETAIL
1 1/2" = 1'-0"



12 SECTION DETAIL
1 1/2" = 1'-0"

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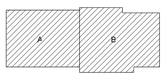
Key Plan



Sheet Issue Date
BID DOCUMENTS 11/03/17

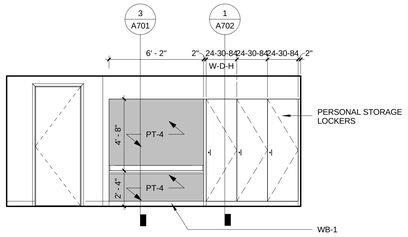
Revision	Date
ADDENDA #3	12/06/17

BID DOCUMENTS

Drawing
SECTION DETAILS

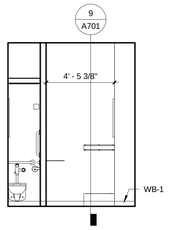
City of Madison Contract No. **8027**
OPN Project No. **17207000**

A343

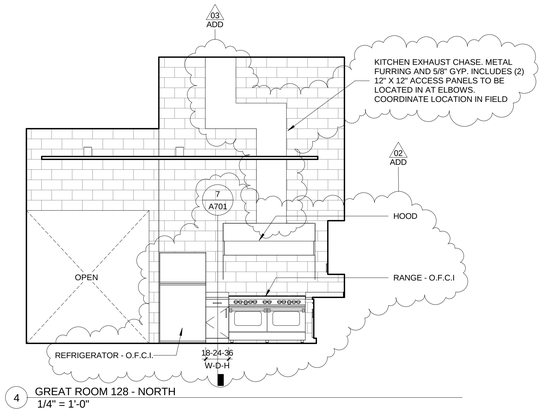


1 LT. QUARTERS 125 - SOUTH
1/4" = 1'-0"

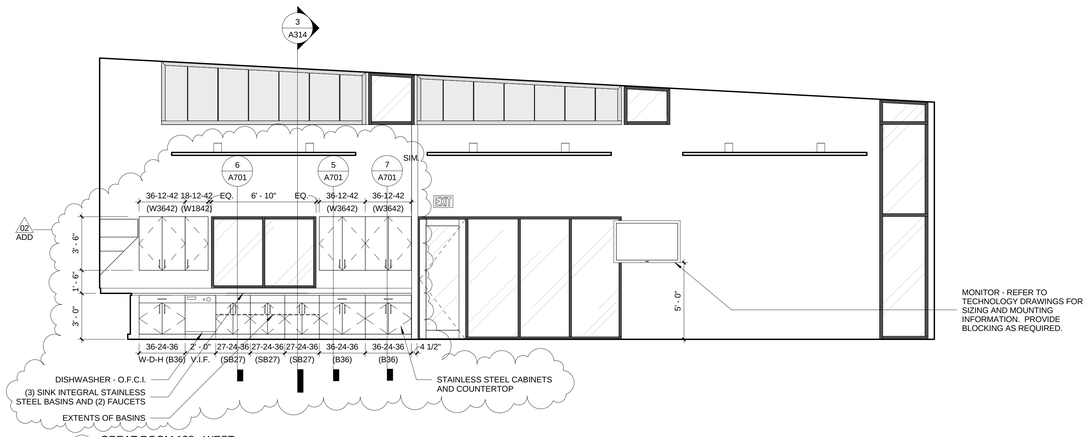
2 JANITOR'S CLOSET 126 - EAST
1/4" = 1'-0"



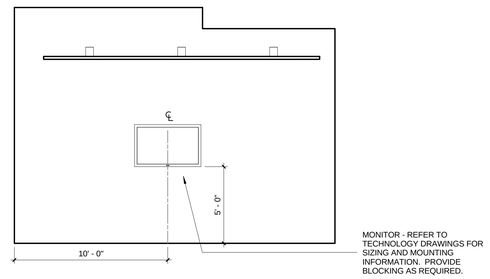
3 JANITOR'S CLOSET 126 - SOUTH
1/4" = 1'-0"



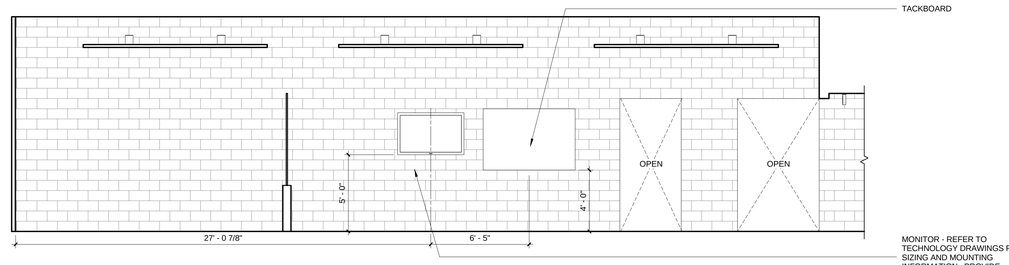
4 GREAT ROOM 128 - NORTH
1/4" = 1'-0"



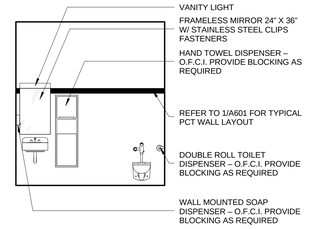
5 GREAT ROOM 128 - WEST
1/4" = 1'-0"



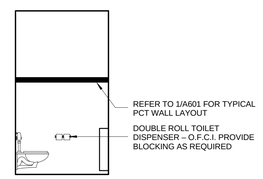
6 GREAT ROOM 128 - SOUTH
1/4" = 1'-0"



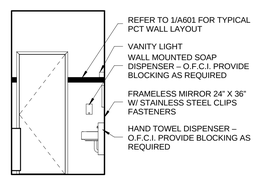
7 GREAT ROOM 128 - EAST
1/4" = 1'-0"



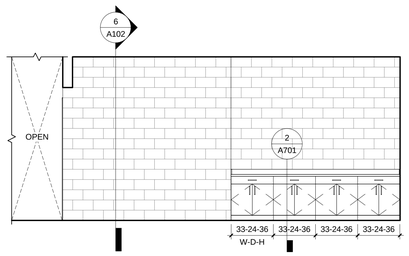
8 DIRTY 115 - EAST
1/4" = 1'-0"



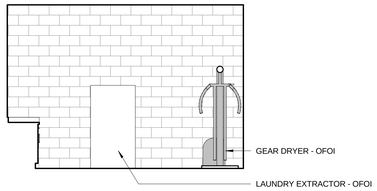
9 DIRTY 115 - SOUTH
1/4" = 1'-0"



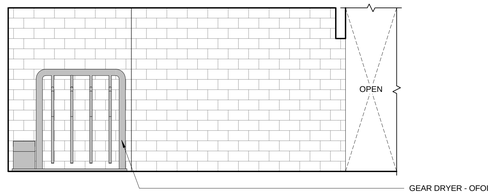
10 DIRTY 115 - NORTH
1/4" = 1'-0"



11 WORKSHOP / GENERAL STORAGE 116 - EAST
1/4" = 1'-0"



12 WORKSHOP / GENERAL STORAGE 116 - SOUTH
1/4" = 1'-0"



13 WORKSHOP / GENERAL STORAGE 116 - WEST
1/4" = 1'-0"

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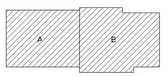


Sheet Issue Date
BID DOCUMENTS 11/03/17

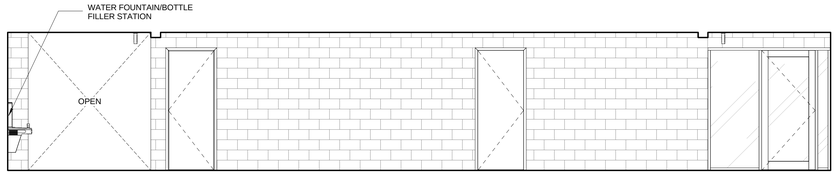
Revision	Date
ADDENDA #2	11/22/17
ADDENDA #3	12/06/17

BID DOCUMENTS

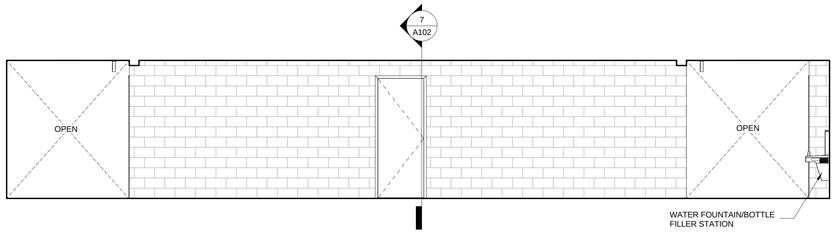
Drawing
INTERIOR ELEVATIONS

City of Madison Contract No. **8027**
OPN Project No. **17207000**

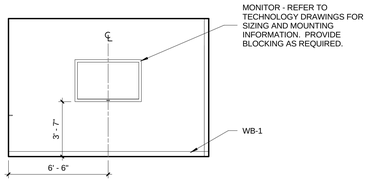
A403



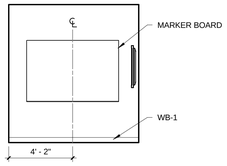
1 CORRIDOR 122 - SOUTH
1/4" = 1'-0"



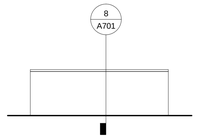
2 CORRIDOR 122 - NORTH
1/4" = 1'-0"



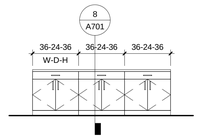
3 SMALL MEETING 102 - EAST
1/4" = 1'-0"



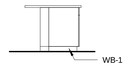
4 SMALL MEETING 102 - NORTH
1/4" = 1'-0"



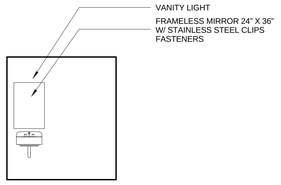
5 GREAT ROOM ISLAND 128 - EAST
1/4" = 1'-0"



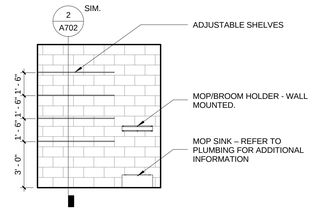
6 GREAT ROOM ISLAND 128 - WEST
1/4" = 1'-0"



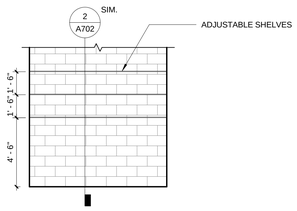
7 GREAT ROOM ISLAND 128 - NORTH
1/4" = 1'-0"



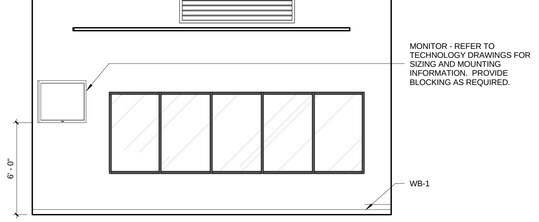
8 COMFORT ROOM 138 - NORTH
1/4" = 1'-0"



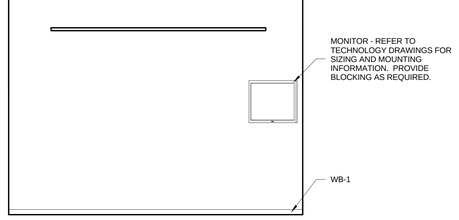
9 JANITOR'S CLOSET 104 - EAST
1/4" = 1'-0"



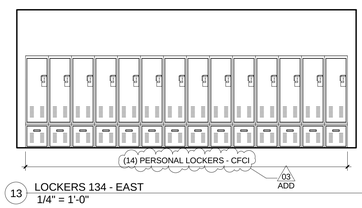
10 LINEN CLOSET 132 - EAST
1/4" = 1'-0"



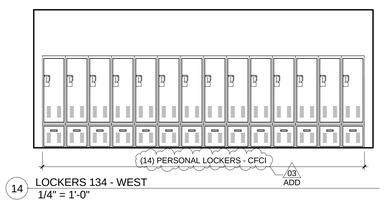
11 FITNESS 127 - EAST
1/4" = 1'-0"



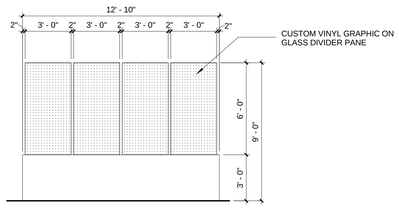
12 FITNESS 127 - NORTH
1/4" = 1'-0"



13 LOCKERS 134 - EAST
1/4" = 1'-0"



14 LOCKERS 134 - WEST
1/4" = 1'-0"



15 GREAT ROOM 128 - DIVIDING WALL - SOUTH
1/4" = 1'-0"

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www.opnarchitects.com
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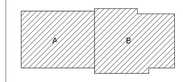
Key Plan



Sheet Issue Date
BID DOCUMENTS 11/03/17

Revision	Date
ADDENDA #3	12/06/17

BID DOCUMENTS

Drawing
INTERIOR ELEVATIONS

City of Madison Contract No. **8027**
OPN Project No. **17207000**

A407

ROOM FINISH SPECIFICATIONS:

CARPET:

CPT-1	MANUFACTURER:	INTERFACE CARPET
	STYLE:	OFF LINE - 138740AK00
	COLOR:	104334 PEWTER/CLOUD
	SIZE:	25CM X 1M
	INSTALLATION:	ASHLAR / REFER TO FINISH PLAN
CPT-2	MANUFACTURER:	INTERFACE CARPET
	STYLE:	ON LINE - 138700AK00
	COLOR:	103788 PEPPER
	SIZE:	25CM X 1M
	INSTALLATION:	ASHLAR / REFER TO FINISH PLAN
CPT-3	MANUFACTURER:	INTERFACE CARPET
	STYLE:	ON LINE - 138700AK00
	COLOR:	105272 BERRY
	SIZE:	25CM X 1M
	INSTALLATION:	ASHLAR / REFER TO FINISH PLAN

CORNER GUARD:

CG-1	MANUFACTURER:	KOROSEAL
	STYLE:	BENT METAL
	COLOR:	ALUMINUM
	SIZE:	1" WIE - FLOOR TO CEILING (A.F.F.)
	INSTALLATION:	REFER TO FINISH PLANS FOR LOCATION
	NOTE:	TYPICAL TYPES INCLUDE: 90 DEGREE ANGLE

GROUT:

GT-1	MANUFACTURER:	BOSTIK - TRU COLOR
	COLOR:	DELOREAN GRAY - H160
	APPLICATION:	WALLS AND FLOORS

PAINT:

PT-1	MANUFACTURER:	SHERWIN WILLIAMS
	COLOR:	SNOWBOUND SW 7004
	FINISH:	SATIN/EG-SHEL
PT-2	MANUFACTURER:	SHERWIN WILLIAMS
	COLOR:	MINDFUL GRAY SW 7016
	FINISH:	SATIN/EG-SHEL
PT-3	MANUFACTURER:	SHERWIN WILLIAMS
	COLOR:	DOVETAIL SW 7018
	FINISH:	SATIN/EG-SHEL
PT- 4	MANUFACTURER:	SHERWIN WILLIAMS
	COLOR:	BOLERO SW 7600
	FINISH:	SATIN/EG-SHEL

PORCELAIN TILE:

PCT-1	MANUFACTURER:	RBC TILE & STONE
	STYLE:	MARATHON
	COLOR:	WHITE
	SIZE:	12" X 24"
	APPLICATION:	RESTROOM / LOCKER ROOM WALLS (NOTE - SHOWER WALLS ARE SOLID SURFACE)
PCT-2	MANUFACTURER:	RBC TILE & STONE
	STYLE:	MARATHON
	COLOR:	WHITE
	SIZE:	18" X 24"
	APPLICATION:	RESTROOM / LOCKER ROOM WALLS (NOTE - SHOWER WALLS ARE SOLID SURFACE)
PCT-3	MANUFACTURER:	RBC TILE & STONE
	STYLE:	MARATHON
	COLOR:	BLACK
	SIZE:	RANDOM MOASIC - 4" TALL BAND
	APPLICATION:	ACCENT BAND IN RESTROOM / LOCKER ROOM WALLS (NOTE - SHOWER WALLS ARE SOLID SURFACE)
PCT-4	MANUFACTURER:	DALTILE
	STYLE:	EXHIBITION
	COLOR:	BLACK EX05 - UNPOLISHED
	SIZE:	24" X 48"
	APPLICATION:	FLOOR TILE

RUBBER FLOORING:

RB-1	MANUFACTURER:	NORA SYSTEMS, INC.
	STYLE:	NORAMENT GRANO 4881
	COLOR:	HEMATITE
	SIZE:	~39.53 (1004MM) X 39.53" (1004MM)
	INSTALLATION:	ASHLAR
RB-2	MANUFACTURER:	NORA SYSTEMS, INC.
	STYLE:	NORAMENT GRANO 4881
	COLOR:	CEPHALOPOD
	SIZE:	~39.53 (1004MM) X 39.53" (1004MM)
	INSTALLATION:	ASHLAR
RB-3	MANUFACTURER:	MONDO
	STYLE:	SPORT IMPACT
	COLOR:	BLACK
	SIZE:	ROLLS (6' WIDE, 3/8" THICK)
	INSTALLATION:	MONOLITHIC

SOLID SURFACE:

SLD-1	MANUFACTURER:	CORIAN
	COLOR:	GRAY
	APPLICATION:	SHOWER WALLS
SLD-2	MANUFACTURER:	CORIAN
	COLOR:	GLACIER WHITE
	APPLICATION:	WINDOW SILLS

SOLID SURFACE SHOWER TRAY:

ST	MANUFACTURER:	CORIAN
	COLOR:	GRAY
	SIZE:	CASUAL 800mm
	APPLICATION:	SHOWER TRAY

WALL BASE

WB-1	MANUFACTURER:	JOHNSONITE
	STYLE:	RUBBER COVE BASE
	SIZE:	2 1/2"
	COLOR:	63 BURNT UMBER

WOOD:

WD-1	MANUFACTURER:	MARSHFIELD DOOR SYSTEMS
	SPECIES:	WHITE MAPLE
	COLOR/FINISH:	AMBER 30 - 95
	APPLICATION:	DOORS

02 ADD

ROOM FINISH SCHEDULE

ROOM NAME	Number	FLOOR FINISH	FLOOR BASE	WALL FINISH NORTH	WALL FINISH EAST	WALL FINISH SOUTH	WALL FINISH WEST	CEILING FINISH	Remarks
LOBBY	101	POLISH CONC.	WB-1	SEE ELEVATION	SEE ELEVATION	SEE ELEVATION	PT-1	PT-1, PT-2	2
SMALL MEETING	102	CPT-1, CPT-3	WB-1	PT-4	PT-1	--	PT-1	--	
SMALL MEETING	103	CPT-1, CPT-3	WB-1	PT-4	PT-1	--	PT-1	--	
JANITOR'S CLOSET	104	POLISH CONC.	WB-1	PT-1	PT-1	PT-2	PT-1	PT-2	
CORRIDOR	105	PCT-4	PCT	PT-1	PT-1	PT-1	PT-1	PT-1	3
WOMEN'S (ADA)	106	PCT-4	PCT	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PT-1	1, 3
MEN'S (ADA)	107	PCT-4	PCT	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PT-1	1, 3
LIEUTENANT'S OFFICE	108	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	--	
WATCH	109	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	--	
CORRIDOR	110	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	--	
APPARATUS BAY	111	RF-1, RF-2, RF-3	WB-1	PT-2	PT-2	PT-2	PT-2	PT-3	
ELECTRICAL & COMPRESSOR	112	RF-1	WB-1	PT-2	PT-2	PT-2	PT-2	PT-3	
TOOL STORAGE & WATER	113	RF-1	WB-1	PT-2	PT-2	PT-2	PT-2	PT-3	
STAIR	114	--	WB-1	PT-1	PT-1	PT-1	PT-1	PT-3	
DIRTY	115	PCT	PCT	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PT-3	1
WORKSHOP / GENERAL STORAGE	116	RF-1	WB-1	PT-2	PT-2	PT-2	PT-2	PT-3	
TURNOUT	117	RF-1	WB-1	PT-2	PT-2	PT-2	PT-2	PT-3	
EMS STORAGE	118	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	PT-3	
I.T.	119	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	PT-3	
LAUNDRY	120	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	PT-2	
CORRIDOR	121	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	--	
UNISEX	122	PCT-4	PCT	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PT-1	1,3
LT. QUARTERS	123	RB-1	WB-1	PT-1	PT-1	PT-1	PT-1	--	
LT. SHOWER (ADA)	124	PCT	PCT	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PT-1	1
LT. QUARTERS	125	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	--	
JANITOR'S CLOSET	126	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	PT-2	
FITNESS	127	RB-3	WB-1	PT-4	PT-1	PT-1	PT-1	PT-2	2
GREAT ROOM	128	POLISH CONC., PCT	WB-1	PT-1	PT-1	PT-1	PT-1	PT-1, PT-2	2
PANTRY	129	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	--	
CORRIDOR	130	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	--	
CORRIDOR	131	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	--	
LINEN CLOSET	132	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	PT-2	
DORM ROOM	133	RB-1, RB-2	WB-1	PT-4	PT-1	PT-4	PT-1	PT-1	
LOCKER ROOM	134	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	--	
UNISEX (ADA)	135	PCT-4	PCT	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PT-1	1, 3
UNISEX	136	PCT-4	PCT	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PT-1	1, 3
UNISEX	137	PCT-4	PCT	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PT-1	1, 3
COMFORT ROOM	138	PCT-4	PCT	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PCT-1, PCT-2, PCT-3	PT-1	3
COMMUNITY ROOM STORAGE	139	POLISH CONC.	WB-1	PT-1	PT-1	PT-1	PT-1	PT-2	
COMMUNITY / TRAINING ROOM	140	SEE FINISH PLAN	WB-1	PT-1	PT-1	PT-1	PT-1	PT-1, PT-2	2

03 ADD

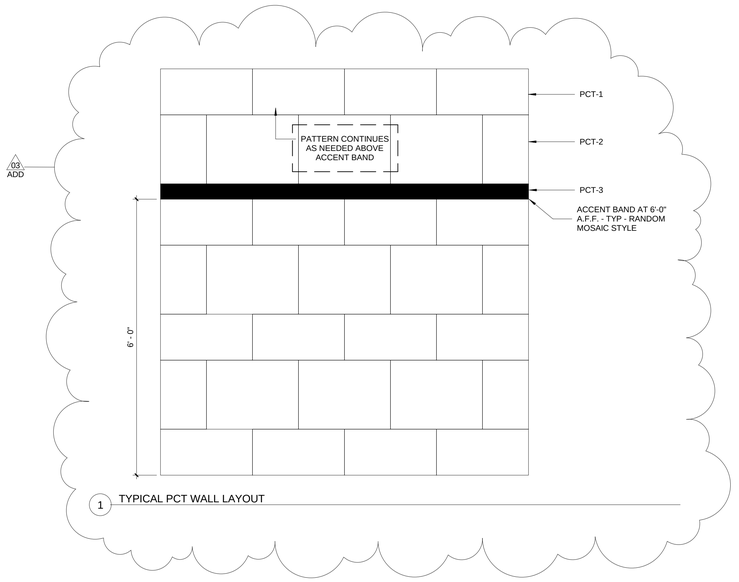
REMARKS

1. REFER TO TYPICAL PCT WALL LAYOUT BELOW (1 / A601)

2. PT-1 IS INTENDED FOR HARD-LID SURFACES, PT-2 IS INTENDED TO OPEN TO STRUTURE ELEMENTS. CONFIRM WITH ARCHITECT

3. RECESS PCT-4 IN CONCRETE SLAB, PROVIDE TRANSITION STRIPS AS NEEDED.

03 ADD



1 TYPICAL PCT WALL LAYOUT

OPN ARCHITECTS

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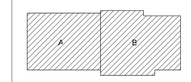
Key Plan



Sheet Issue Date

BID DOCUMENTS 11/03/17

Revision	Date
ADDENDA #2	11/22/17
ADDENDA #3	12/06/17

BID DOCUMENTS

Drawing

FINISH SCHEDULE AND SPECIFICATIONS

City of Madison Contract No. **8027**
OPN Project No. **17207000**

A601

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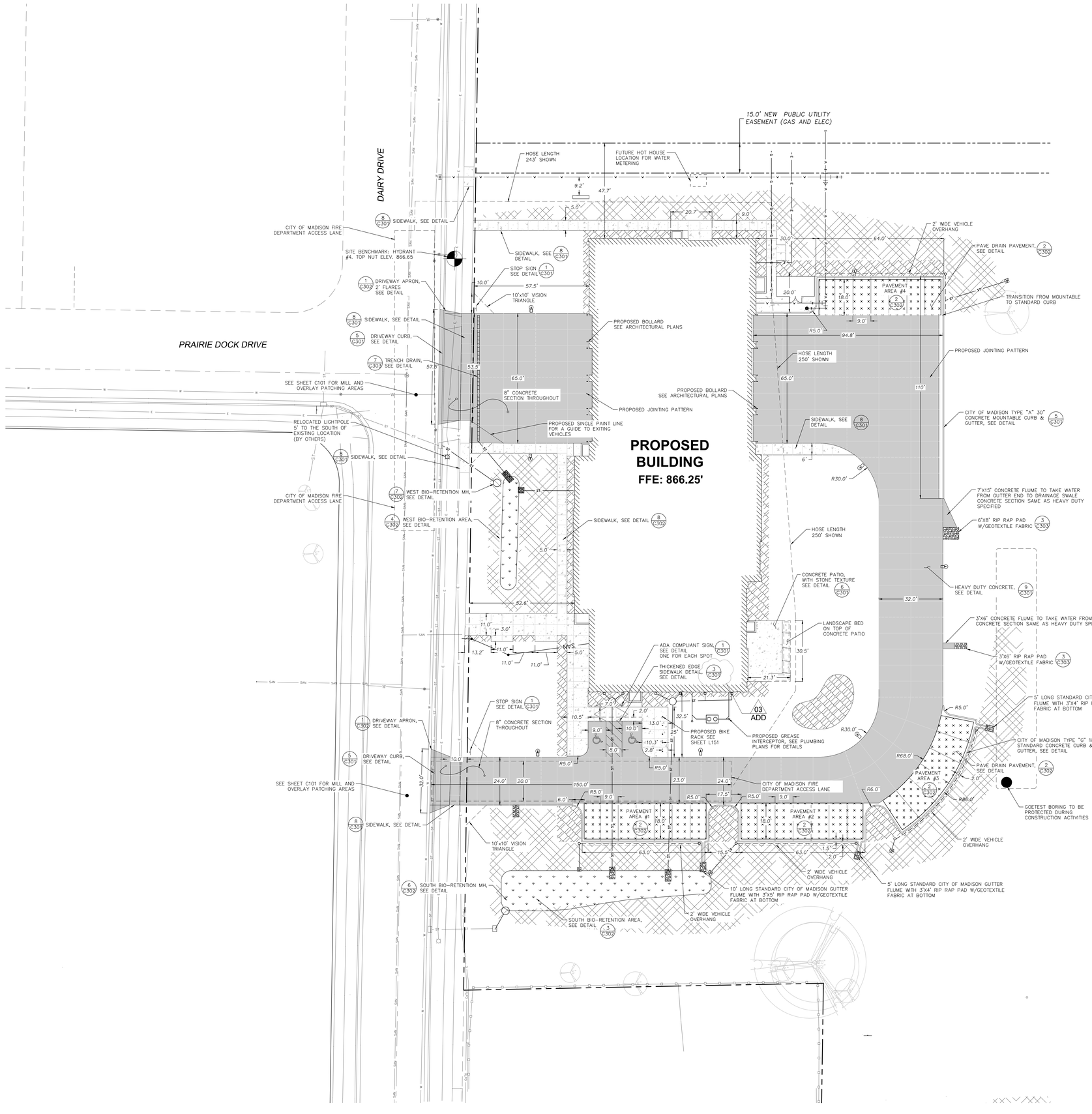

NORTH

0 20 40

SCALE: 1" = 20'

TO OBTAIN LOCATION OF PARTICIPANTS' UNDERGROUND FACILITIES BEFORE YOU DIG IN WISCONSIN

CALL DIGGERS HOTLINE
1-800-242-8511
TOLL FREE

WIS. STATUTE 182.0175 (1974) REQUIRES MIN. OF 3 WORK DAYS NOTICE BEFORE YOU EXCAVATE

LEGEND

- PROPOSED CONCRETE SIDEWALK
- PROPOSED HEAVY DUTY CONCRETE PAVEMENT
- PROPOSED BIORETENTION AREA
- PROPOSED PERMEABLE PAVEMENT
- PROPOSED LANDSCAPE AREA REFERENCE L SHEETS
- PROPOSED BUILDING
- PROPOSED TRENCH DRAIN
- PROPOSED LIGHT POLE LOCATION

NOTES:

1. ALL DIMENSIONS ARE FROM FACE OF CURB TO FACE OF CURB.
2. MADISON FIRE STATION 14
   3201 DAIRY DRIVE
   MADISON WI, 53718
3. WHEN WORKING IN THE RIGHT OF WAY, ALL CITY OF MADISON PATCHING CRITERIA FOR SIDEWALK, CURB & GUTTER AND PAVEMENT SHALL BE FOLLOWED AT ALL TIMES
4. SITE LIGHTING LOCATIONS ARE FOR REFERENCE ONLY. EXACT LOCATION OF SIGHT LIGHTING FIXTURES SHALL BE FIELD DETERMINED BY SITE ELECTRICAL CONTRACTOR.
5. ALL PAVEMENT MARKINGS SHALL BE 4" WIDTH AND YELLOW IN COLOR.
6. THE RIGHT OF WAY IS THE SOLE JURISDICTION OF THE CITY OF MADISON AND IS SUBJECT TO CHANGE AT ANYTIME PER THE RECOMMENDATION/PLAN OF TRAFFIC ENGINEERING AND CITY ENGINEERING DEPARTMENTS.

SITE DATA

ZONING DISTRICT:	SE SUBURBAN EMPLOYMENT DISTRICT
TOTAL SITE AREA:	481,950 SF
PRO. IMPERVIOUS:	45,218 SF
PRO. PERMEABLE PAVEMENT	4,558 SF
PROPOSED GREEN AREA:	427,616 SF

PARKING REQUIREMENTS

PARKING PROVIDED = 29
BICYCLE PARKING PROVIDED = 10

PER CODE, FOR 26-50 TOTAL PARKING STALLS
2 HANDICAP PARKING STALLS MUST BE PROVIDED

2 HANDICAP PARKING STALLS ARE SHOWN ON PLAN

BUILDING SETBACKS
FRONT = NONE
REAR = 20'
SIDE YARD = ONE STORY 5'
TWO STORY 6'
MAX LOT COVERAGE = 85%

OPN ARCHITECTS

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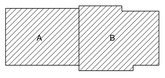

Sheet Issue Date
BID DOCUMENTS 11/03/17

Revision	Date
ADDENDA #3	12/6/17

BID DOCUMENTS

Drawing
Site Plan

City of Madison Contract No. **8027**
OPN Project No. **17207000**

C201

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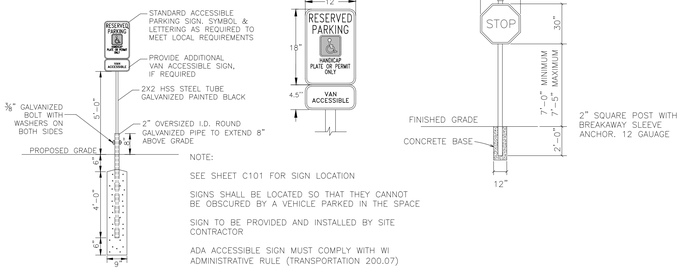
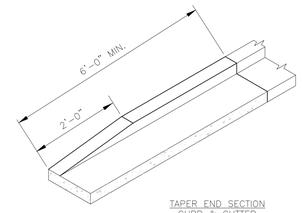
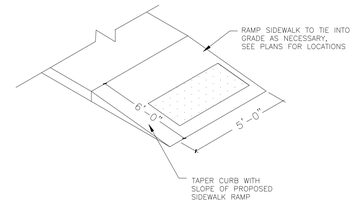


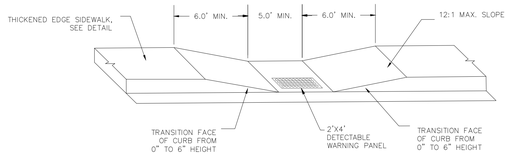
1 C301 SIGNAGE DETAILS
NOT TO SCALE



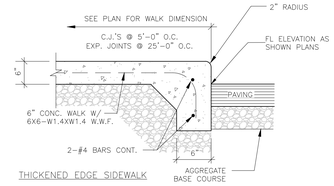
TAPER END SECTION
CURB & GUTTER



TAPER END SECTION
CURB & GUTTER

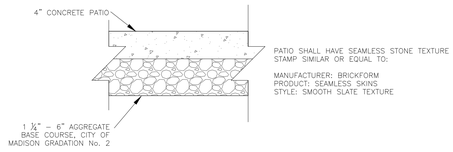


DEPRESSED SIDEWALK RAMP



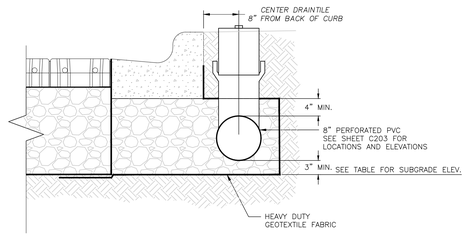
THICKENED EDGE SIDEWALK

3 C301 SIDEWALK DETAILS



4" CONCRETE PATIO DETAIL

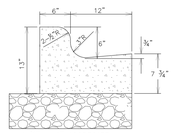
6 C301 PATIO DETAIL
NOT TO SCALE



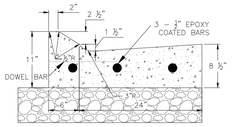
NOTE:

1. SEE DETAIL #2 SHEET C302 FOR CONCRETE PAVEMENT SECTION DETAILS

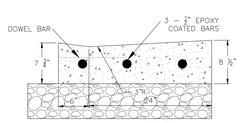
4 C301 STORM SEWER CLEANOUTS DETAIL
NOT TO SCALE



CITY OF MADISON
TYPE "G"
STANDARD CONCRETE CURB & GUTTER



CITY OF MADISON
TYPE "A"
MOUNTABLE CURB & GUTTER



CITY OF MADISON
TYPE "A" MODIFIED
DRIVEWAY SECTION
CURB & GUTTER

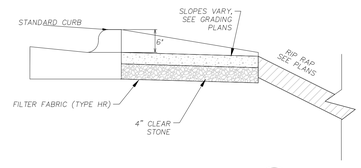
NOTES:

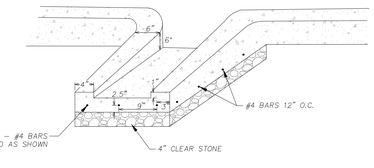
LATERAL CONTRACTION JOINTS SHALL BE PLACED AT INTERVALS OF NOT MORE THAN 15' NOR LESS THAN 6' IN LENGTH. THE JOINTS SHALL BE A MINIMUM OF 3" IN DEPTH EXPANSION JOINTS SHALL BE PLACED TRANSVERSELY AT RADIUS POINTS ON CURVES OF RADIUS 200' OR LESS, AND AT ANGLE POINTS, OR AS DIRECTED BY THE ENGINEER.

THE EXPANSION JOINT SHALL BE A ONE PIECE ASPHALTIC MATERIAL HAVING THE SAME DIMENSIONS AS CURB & GUTTER AT THAT STATION AND BE 1/2" THICK. IN ALL CASES, CONCRETE CURB & GUTTER SHALL BE PLACED ON THOROUGHLY COMPACTED CRUSHED STONE THAT IS 6" THICK.

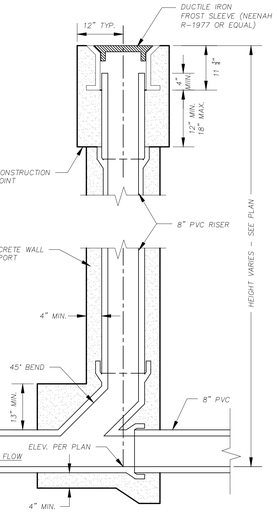
IN ALL CASES, CONCRETE CURB & GUTTER SHALL BE PLACED ON 6" OF THOROUGHLY COMPACTED AGGREGATE BASE COURSE (MADISON GRADATION NO.2).

5 C301 CONCRETE CURB AND GUTTER
NOT TO SCALE

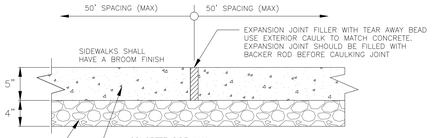




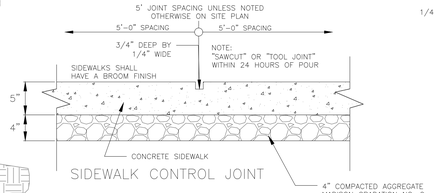
10 C301 STORMWATER FLUME
NOT TO SCALE



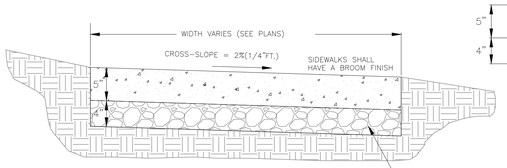
7 C301 SANITARY SEWER CLEANOUT DETAIL
NOT TO SCALE



SIDEWALK EXPANSION JOINT



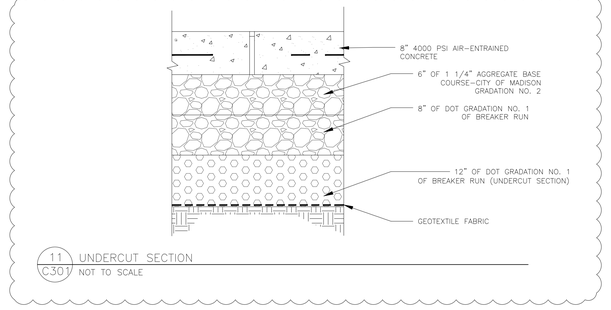
SIDEWALK CONTROL JOINT



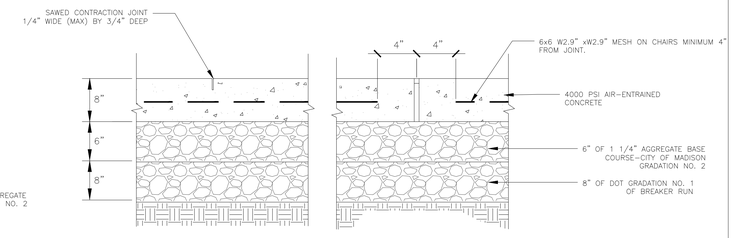
5" SITE SIDEWALK

8 C301 5" SIDEWALK
NOT TO SCALE

03
ADD



11 C301 UNDERCUT SECTION
NOT TO SCALE



COMPACTED SUBGRADE

NOTE:
PROVIDE #4 – 8" DOWEL CONNECTION BETWEEN ADJACENT SLABS AT 12" O.C. EPOXY-COATED.

9 C301 HEAVY DUTY CONCRETE
NOT TO SCALE

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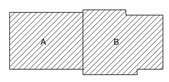
Key Plan



Sheet Issue Date
BID DOCUMENTS 11/03/17

Revision	Date
ADDENDA #3	12/6/17

BID DOCUMENTS

Drawing
Plan Details

City of Madison Contract No. 8027
OPN Project No. 17207000

C301

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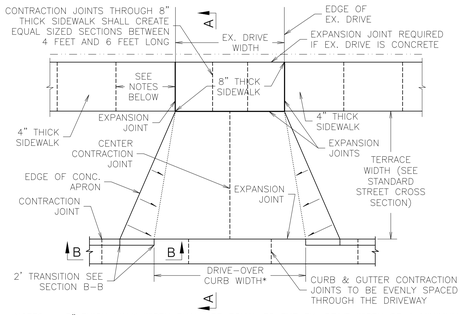
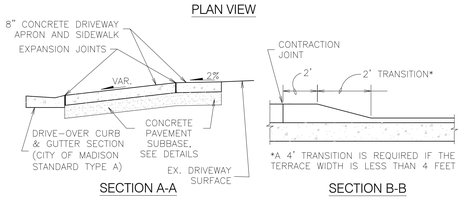


NOTES: – 8" THICK WALK WIDTH SHALL BE EQUAL TO THE EX. DRIVE WIDTH OR A MINIMUM OF 12' CENTERED ON THE EX. DRIVE. THE DRIVE-OVER CURB WIDTH SHALL BE EQUAL TO THE 8" THICK WALK WIDTH PLUS 2', CENTERED ON THE EX. DRIVE.

– CONTRACTION JOINTS IN 4" THICK SIDEWALKS SHALL BE PLACED EVERY 5'. EXPANSION JOINTS SHALL BE PLACED AT INTERVALS NOT TO EXCEED 96 FEET.

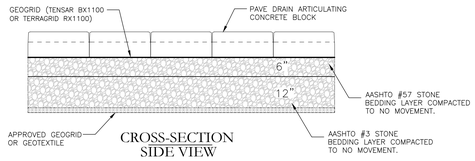
PLAN VIEW



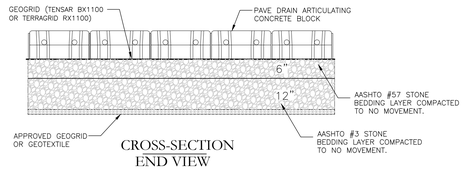
SECTION A-A

SECTION B-B

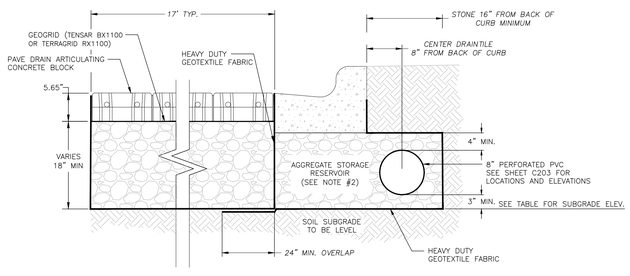
1 C302 DRIVEWAY ENTRANCE DETAIL
NOT TO SCALE



CROSS-SECTION SIDE VIEW



CROSS-SECTION END VIEW



PAVE DRAIN PAVEMENT

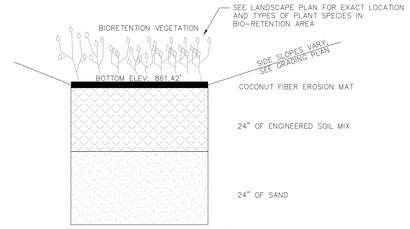
NOTES:

1. PAVEMENT SURFACE PERCENT VOIDS SHALL BE LESS THAN 25%.
2. PAVER BEDDING COURSE SHALL CONSIST OF 6" of AASHTO #57 AND 12" OF ASSHTO #3 AGGREGATE BASE COURSES.
3. AGGREGATE STORAGE RESERVOIR DEPTH SHALL BE A MINIMUM OF 18 INCHES.
4. IF UNDERCUT IS NEEDED UNDER THE PAVE DRAIN SECTION, ADDITIONAL AGGREGATE OF THE SAME TYPE WILL BE USED.

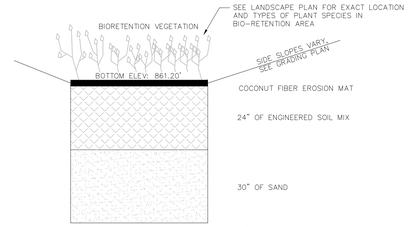
03 ADD

PAVEMENT AREAS		
AREA #	SUBGRADE ELEV.	DRAINTILE I.E.
#1	862.64	862.89
#2	862.70	862.95
#3	862.14	862.39
#4	862.16	862.86

2 C302 PERMEABLE PAVEMENT DETAIL
NOT TO SCALE

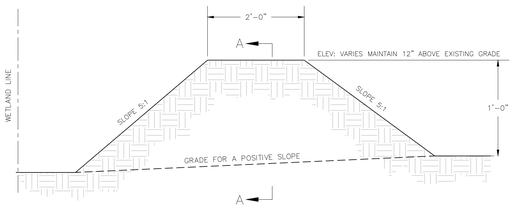


3 C302 SOUTH BIORETENTION PROFILE
NOT TO SCALE



4 C302 WEST BIORETENTION PROFILE
NOT TO SCALE

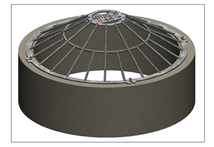
SECTION A-A



5 C302 BERM DETAIL
NOT TO SCALE

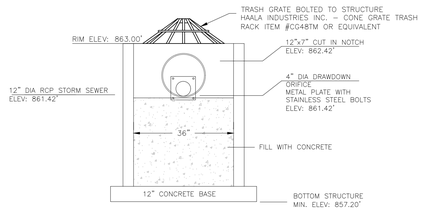
BIORETENTION NOTES

1. BIORETENTION SHALL CONFORM TO WIS. DNR TECH STANDARD 1004.
2. ENGINEERED SOIL SHALL CONSIST OF 70%–85% SILICA SAND AND 15%–30% COMPOST WITH A PH OF 5.5–6.5
3. BIORETENTION BASINS SHALL BE EXCAVATED AND USED AS SEDIMENT TRAPS DURING CONSTRUCTION. UPON COMPLETION OF CONSTRUCTION AND SITE STABILIZATION, THE BASINS SHALL BE OVER-EXCAVATED 3 FEET MINIMUM AND THEN THE SAND LAYER AND ENGINEERED SOIL SHALL BE PLACED TO WITHIN THREE INCHES OF FINAL GRADE. ONCE THE ENGINEERED SOIL IS PLACED, THREE INCHES OF HARDWOOD MULCH SHALL BE ADDED ON TOP OF THE ENGINEERED SOIL.
4. SPECIFIC SPECIES OR CONTAINER SIZE SUGGESTED SUBSTITUTIONS SHALL BE PRESENTED TO CONSULTANT ALONG WITH THE REASONS FOR THE SUGGESTIONS. WITH CONSULTANT OR PROJECT ENGINEER'S APPROVAL, SUBSTITUTIONS MAY BE MADE. IF SUBSTITUTIONS ARE MADE, CONTRACT PRICES MAY NEED TO BE ADJUSTED ACCORDINGLY.
5. LIVE PLANTS CAN BE PLANTED IN THE FIELD DURING THE GROWING SEASON FROM MAY 1 THROUGH OCTOBER 15. ANY SUGGESTED PLANTING TIMES NOT IN THIS WINDOW SHALL BE APPROVED BY CONSULTANT OR ENGINEER. IF PLANTING OCCURS OUTSIDE OF THIS WINDOW ADDITIONAL MEASURES MAY NEED TO BE TAKEN (I.E. MULCH) TO ENSURE PLANT SURVIVAL. IN THESE INSTANCES, THE CONTRACT PRICE MAY NEED TO BE ADJUSTED ACCORDINGLY.
6. ALL PLANTED MATERIALS WILL BE WARRANTED BY INSTALLATION CONTRACTOR TO BE IN HEALTHY CONDITION WITH A REPLACEMENT GUARANTEE FOR A PERIOD OF TWO YEARS FROM THE DATE OF PLANTING.
7. SEE LANDSCAPE PLAN FOR LOCATION, SPACING, AND TYPE OF PLANTS FOR BIO-RETENTION AREAS.



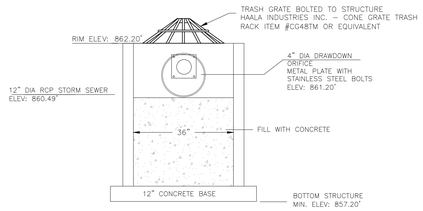
TRASH RACK
(HAALA INDUSTRIES INC)

NOTES:
1. TRASH GRATE TO BE BOLTED TO STRUCTURE
2. GRATE SHALL BE PAINTED OR COATED PER CITY OF MADISON STANDARD SPECIFICATIONS 506.2(b).
3. LEVEL SPREADER SHALL BE 12'x2'x2' WITH TOP ELEVATION AT 884.85'. ROCK SHALL CONSIST OF 2"–3" CLEAR STONE, BOTTOM SHALL BE WRAPPED IN GEOTEXTILE FABRIC.



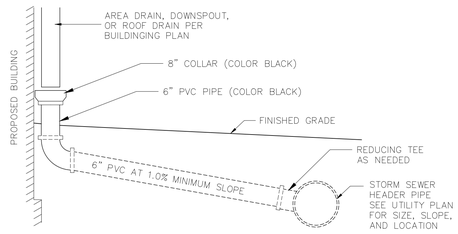
SOUTH BIORETENTION

6 C302 SOUTH BIORETENTION OVERFLOW MH#1
NOT TO SCALE



WEST BIORETENTION

7 C302 WEST BIORETENTION OVERFLOW MH#2
NOT TO SCALE



8 C302 ROOF DRAIN CONNECTION DETAIL
NOT TO SCALE

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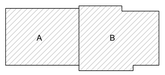

Sheet Issue Date
BID DOCUMENTS 11/03/17

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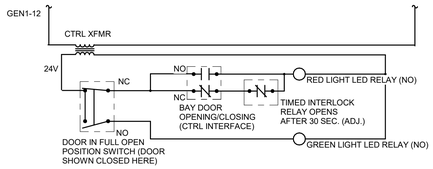
ADDENDA #3	12/6/17

BID DOCUMENTS

Drawing
Plan Details

City of Madison Contract No. 8027
OPN Project No. 17207000

C302



2 BAY DOOR ANNUNCIATION WIRING DIAGRAM

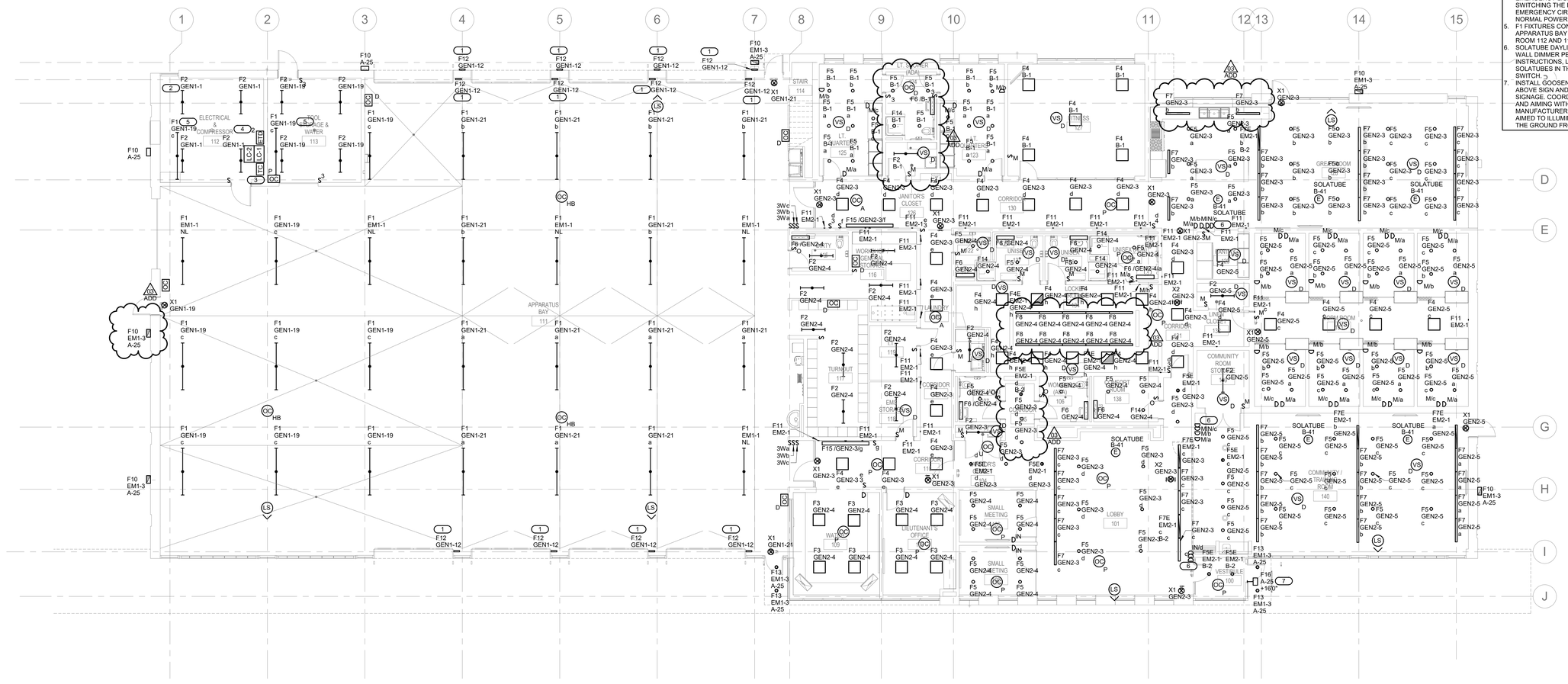
NO SCALE

SHEET NOTES :

1. COORDINATE HANGING OF EQUIPMENT AND DEVICES IN APARATUS BAY AND SURROUNDING SPACES WITH STRUCTUAL METAL ROOF DECK, DECK MANUFACTURER'S REQUIREMENTS, AND OTHER TRADES. UTILIZE DECK MANUFACTURER HANGERS TO SUPPORT EQUIPMENT AND DEVICES WHERE APPLICABLE. ENSURE DECK HANGER LOADING LIMITS AND SQUARE FOOT LOADING LIMITS ARE NOT EXCEEDED FOR EQUIPMENT FROM ALL TRADES.
2. CONCEAL ALL CONDUITS WHERE POSSIBLE. WHERE NOT POSSIBLE, ROUTE EXPOSED CONDUITS IN INCONSPICUOUS LOCATIONS APPROVED BY ARCHITECT.
3. PROVIDE EMERGENCY TRANSFER DEVICE SHOWN ON EL102 MONITORING AN UNSWITCHED PORTION OF GEN2-3. UPON LOSS OF NORMAL POWER, TRANSFER DEVICE IS TO TRANSFER F11 FIXTURES TO AN UNSWITCHED PORTION OF THEIR LIGHTING CIRCUIT.
4. F1 FIXTURES TO BE MOUNTED TIGHT TO BEAMS.

KEYNOTES: (#)

1. DOOR OPEN AND CLOSE SIGNAL LIGHTS TYPE "SR" AND "SG" MOUNTED AT APPROXIMATELY 8'-0" AFF, CENTERED VERTICALLY ON STEEL PURLIN WITH ANY JUNCTION BOXES PAINTED TO MATCH THE STRUCTURAL STEEL. ("SR" RED ABOVE "SG" GREEN LIGHT). INTERLOCK WITH N.O. 2-SPOT DOOR POSITION SWITCH (SQ. "D" HD IND. XCKT4-SERIES) IN NEMA 1 ENCLOSURE. PROVIDE (120/24 VOLT) TRANSFORMER FOR DOOR POSITION CONTROL WITH TOGGLE SWITCH DISCONNECT. SEQUENCE: RED LIGHT SHALL BE ACTIVATED UPON BAY DOOR OPENING; GREEN LIGHT COMES ON WITH BAY DOOR IN FULL OPEN POSITION; RED LIGHT COMES ON WITH DOOR CLOSING AND REMAINS ON UNTIL 30 SECONDS (TIME DELAY ADJ.) AFTER DOOR CLOSES. REFER TO DETAIL 2/EL101 FOR MORE INFORMATION.
2. ROUTE CONDUIT IN THIS AREA ALONG THE WALL TO AVOID THE TRANSPARENT WALL ABOVE.
3. REFER TO 2/E050.
4. EMERGENCY TRANSFER DEVICE TO MONITOR UNSWITCHED PORTION OF EXTERIOR EMERGENCY LIGHTING CIRCUIT A-25, SWITCHING THE FIXTURES TO THE EMERGENCY CIRCUIT EM1-3 UPON LOSS OF NORMAL POWER.
5. F1 FIXTURES CONTINUE ACROSS THE APPARATUS BAY ABOVE THE HARD LID OF ROOM 112 AND 113.
6. SOLATUBE DAYLIGHT TO BE CONTROLLED VIA WALL DIMMER PER MANUFACTURERS INSTRUCTIONS, LINKED TOGETHER WITH SOLATUBES IN THE SAME ROOM TO ONE WALL SWITCH.
7. INSTALL GOOSENECK FIXTURE CENTERED ABOVE SIGN AND AIMED TO ILLUMINATE SIGNAGE. COORDINATE EXACT PLACEMENT AND AIMING WITH ARCHITECT AND SIGN MANUFACTURER. ENSURE LIGHTS ARE NOT AIMED TO ILLUMINATE ABOVE PARALLEL TO THE GROUND FROM THE LIGHT.



1 FLOOR PLAN LEVEL 1 - LIGHTING

1/8" = 1'-0"

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Key Plan

Sheet Issue Date

BID DOCUMENTS 11/03/17

Revision	Date
ADDENDA #2	11/22/17
ADDENDA #3	12/06/2017

Drawing

FLOOR PLAN LEVEL 1 - LIGHTING

City of Madison Contract No. **8027**
OPN Project No. **17207000**

EL101

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PROJECT # 1700114I.00

REFERENCE SCALE IN INCHES

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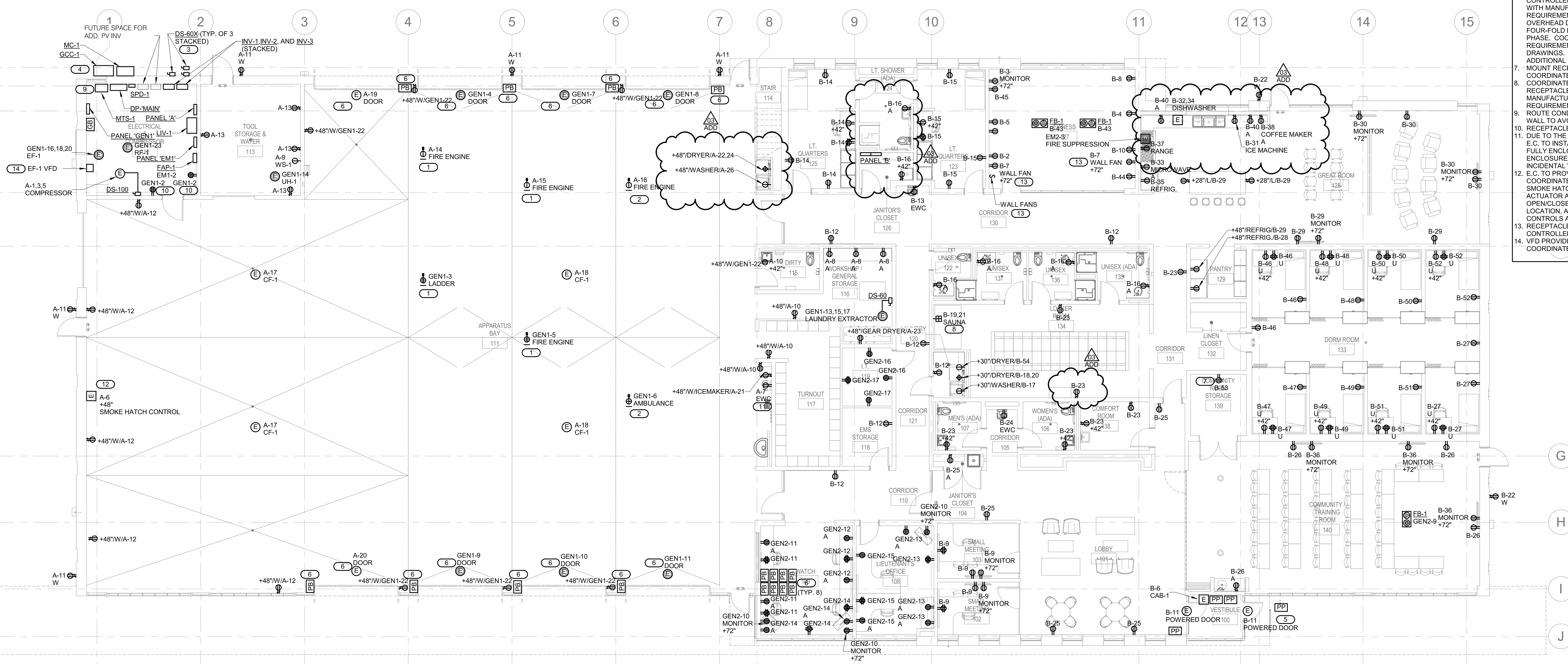

FLOOR PLAN LEVEL 1 - POWER

1/8" = 1'-0"

SHEET NOTES :

1. COORDINATE HANGING OF EQIUPMENT AND DEVICES IN APARATUS BAY AND SURROUNDING SPACES WITH STRUCTURAL METAL ROOF DECK, DECK MANUFACTURER'S REQUIREMENTS, AND OTHER TRADES. UTILIZE DECK MANUFACTURER HANGERS TO SUPPORT EQUIPMENT AND DEVICES WHERE POSSIBLE. ENSURE DECK HANGER LOADING LIMITS AND SQUARE FOOT LOADING LIMITS ARE NOT EXCEEDED FOR EQUIPMENT FROM ALL TRADES.
2. CONCEAL ALL CONDUITS WHERE POSSIBLE. WHERE NOT POSSIBLE, ROUTE IN INCONSPICUOUS LOCATIONS APPROVED BY ARCHITECT.

KEYNOTES: (#)

1. DROP CORD RECEPTACLE SERVES FIRE ENGINE. COORDINATE EXACT LOCATION AND CORD LENGTH WITH OWNER PRIOR TO INSTALLATION. REFER TO 2/E300 FOR DROP CORD DETAIL.
2. DROP CORD RECEPTACLE SERVES AMBULANCE. COORDINATE EXACT LOCATION AND CORD LENGTH WITH OWNER PRIOR TO INSTALLATION. REFER TO 3/E300 FOR DROP CORD DETAIL.
3. PROVIDE LABEL ON EACH DISCONNECT SWITCH. LABEL SHALL READ "UTILITY PHOTOVOLTAIC INTERCONNECT DISCONNECT".
4. GENERATOR CONNECTION CABINET, GCC-1, SHALL BE WALL MOUNT, UL LISTED, STAINLESS STEEL NEMA 3R OR 4X HOUSING WITH LOCKABLE DOOR, 400 AMPS, 208/120 VOLT, 3 PHASE, 4 WIRE WITH COLOR-CODED CAM-LOCK CONNECTORS. APPROVED MANUFACTURERS INCLUDE BERTHOLD ELECTRIC CO. AND POWERTRON SERIES 400UL. SUBMIT PRODUCT DATA AND DIMENSIONED DRAIWNGS UNDER DIVISION 26 05 00.
5. REFER TO LANDSCAPING PLANS FOR ADA BOLLARD LOCATIONS.
6. APPARATUS BAY DOOR CONTROLLERS AND PUSHBUTTONS ARE PROVIDED BY G.C. AND INSTALLED BY E.C. LOCATE PUSHBUTTON STATIONS FOR WEST DOORS AT WEST LOCATION SHOWN AND EAST DOORS AT EAST LOCATION SHOWN. REMOTE MOUNT DOOR CONTROLLERS ON MEZZANINE. COORDINATE WITH MANUFACTURERS INSTALLATION REQUIREMENTS. BASE BID IS SECTIONALIZED OVERHEAD DOORS. ADD ALTERNATE BID IS FOUR-FOLD DOORS CIRCUITED AT 208V, 3 PHASE. COORDINATE FINAL CIRCUITING REQUIREMENTS WITH FOUR-FOLD DOOR SHOP DRAWINGS. REFER TO ARCHITECTURAL FOR ADDITIONAL INFORMATION.
7. MOUNT RECEPTACLES AT A/V RACK LOCATION. COORDINATE EXACT LOCATION WITH OWNER.
8. COORDINATE LOCATION OF SAUNA RECEPTACLE WITH OWNER AND MANUFACTURER'S INSTALLATION REQUIREMENTS PRIOR TO INSTALLATION.
9. ROUTE CONDUIT IN THIS AREA ALONG THE WALL TO AVOID THE GLASS WINDOW ABOVE.
10. RECEPTACLES TO BE RED.
11. DUE TO THE NATURE OF THE APPARATUS BAY, E.C. TO INSTALL EWC OUTLET SUCH THAT IT IS FULLY ENCLOSED BY THE WATER COOLER ENCLOSURE AND PROTECTED FROM INCIDENTAL WATER SPRAY.
12. E.C. TO PROVIDE NECESSARY EQUIPMENT, COORDINATED WITH MANUFACTURER OF SMOKE HATCH DOOR, TO POWER 24V LINEAR ACTUATOR AND PROVIDE CONTROLS TO OPEN/CLOSE THE HATCH FROM THIS LOCATION. ANY EQUIPMENT ENCLOSURES AND CONTROLS ARE TO BE WET-LOCATION LISTED.
13. RECEPTACLES SERVING WALL FANS SHALL BE CONTROLLED BY WALL SWITCH.
14. VFD PROVIDED BY M.C. AND INSTALLED BY E.C. COORDINATE LOCATION WITH M.C.

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Key Plan

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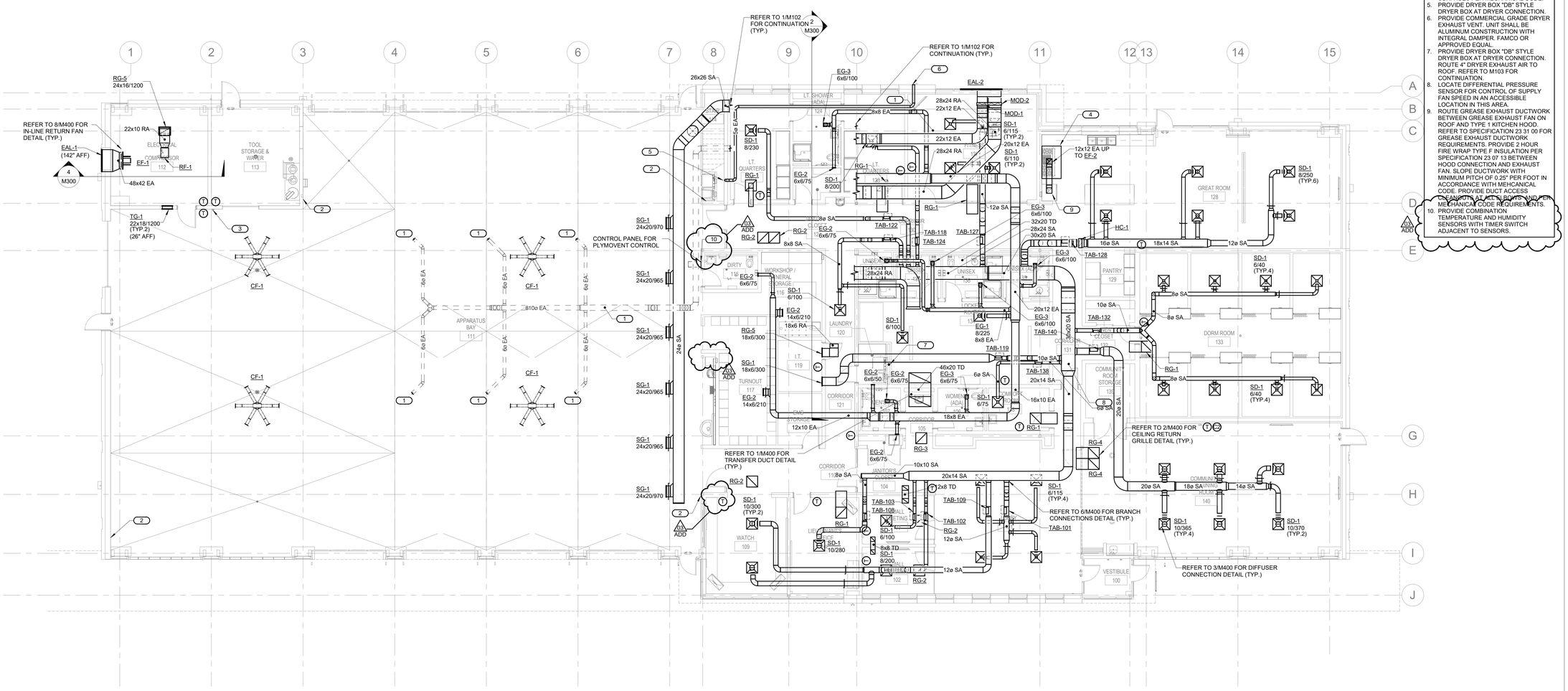
PROJECT # 17001140.00

REFERENCE SCALE IN INCHES
0 1 2 3

Drawing
FLOOR PLAN LEVEL 1 - POWER

City of Madison Contract No. **8027**
OPN Project No. **17207000**

EP101



NORTH

1 **FLOOR PLAN LEVEL 1 - VENTILATION**

1/8" = 1'-0"

KEYNOTES: (#)

1. OWNER FURNISHED AND OWNER INSTALLED PLYMOVENT VEHICLE EXHAUST SYSTEM. COORDINATE ROUTING OF UTILITIES WITH OWNER AND THE INSTALLING CONTRACTOR.
2. PROVIDE CO/NOX SENSOR FOR CONTROL OF APPARATUS BAY EXHAUST SYSTEM. REFER TO 1/M453 FOR ADDITIONAL INFORMATION.
3. INSTALL LOCAL FAN CONTROLLERS FOR GROUPS OF CEILING FANS SERVING APPARATUS BAY. ONE FAN CONTROLLER SHALL SERVE FOUR DESTRATIFICATION FANS (CF-1). LABEL CONTROLLERS WITH NAMEPLATE AS "CEILING FANS". REFER TO CEILING FAN SPECIFICATIONS AND CONTROL SEQUENCES FOR ADDITIONAL REQUIREMENTS ON CONTROL OF THE DESTRATIFICATION FANS.
4. DIVISION 23 CONTRACTOR TO PROVIDE TYPE 1 KITCHEN EXHAUST HOOD. BASIS OF DESIGN IS CAPTIVEAIR MODEL 4224ND-2 THAT IS 72" LONG X 42" DEEP. BASIS OF DESIGN IS 1050 CFM UNIT AT 0.75" STATIC PRESSURE. RANGE BASIS OF DESIGN IS BLUE STAR RNB606GV2. REFER TO SPECIFICATION 23 37 00 FOR ADDITIONAL CONSTRUCTION REQUIREMENTS ON THE HOOD AND DSPS SUBMITTAL REQUIREMENTS. CONTRACTOR RESPONSIBLE FOR ANY MODIFICATIONS TO AIRFLOWS BASED ON FINAL KITCHEN HOOD SELECTION. HOOD SHALL BACK AND SHALL INCLUDE INSULATION TO MEET ZERO INCH REQUIREMENTS FOR CLEARANCE TO COMBUSTIBLE SURFACES PER MECHANICAL CODE.
5. PROVIDE DRYER BOX "DB" STYLE DRYER BOX AT DRYER CONNECTION.
6. PROVIDE COMMERCIAL GRADE DRYER EXHAUST VENT. UNIT SHALL BE ALUMINUM CONSTRUCTION WITH INTEGRAL DAMPER. FAMCO OR APPROVED EQUAL.
7. PROVIDE DRYER BOX "DB" STYLE DRYER BOX AT DRYER CONNECTION. ROUTE 4" DRYER EXHAUST AIR TO ROOF. REFER TO M103 FOR CONTINUATION.
8. LOCATE DIFFERENTIAL PRESSURE SENSOR FOR CONTROL OF SUPPLY FAN SPEED IN AN ACCESSIBLE LOCATION IN THIS AREA.
9. ROUTE GREASE EXHAUST DUCTWORK BETWEEN GREASE EXHAUST FAN ON ROOF AND TYPE 1 KITCHEN HOOD. REFER TO SPECIFICATION 23 31 00 FOR GREASE EXHAUST DUCTWORK REQUIREMENTS. PROVIDE 2 HOUR FIRE WRAP TYPE F INSULATION PER SPECIFICATION 23 07 13 BETWEEN HOOD CONNECTION AND EXHAUST FAN. SLOPE DUCTWORK WITH MINIMUM PITCH OF 0.25" PER FOOT IN ACCORDANCE WITH MECHANICAL CODE. PROVIDE DUCT ACCESS OPENINGS AT ALL BENDS AND PER MECHANICAL CODE REQUIREMENTS.
10. PROVIDE COMBINATION TEMPERATURE AND HUMIDITY SENSORS WITH TIMER SWITCH ADJACENT TO SENSORS.

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Key Plan

Sheet Issue Date

BID DOCUMENTS 11/03/17

Revision	Date
ADDENDA #3	12/06/2017

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REFERENCE SCALE IN INCHES
0 1 2 3

Drawing

FLOOR PLAN LEVEL 1 - VENTILATION

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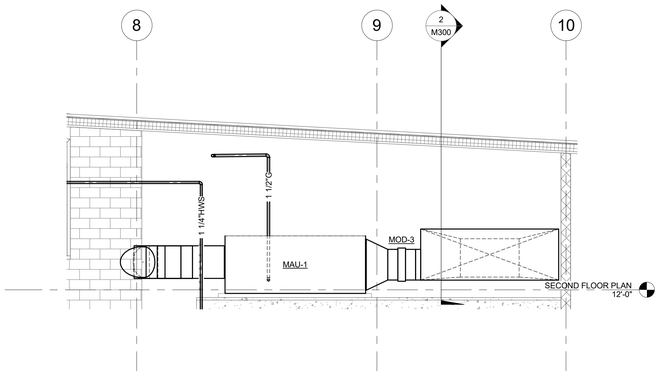
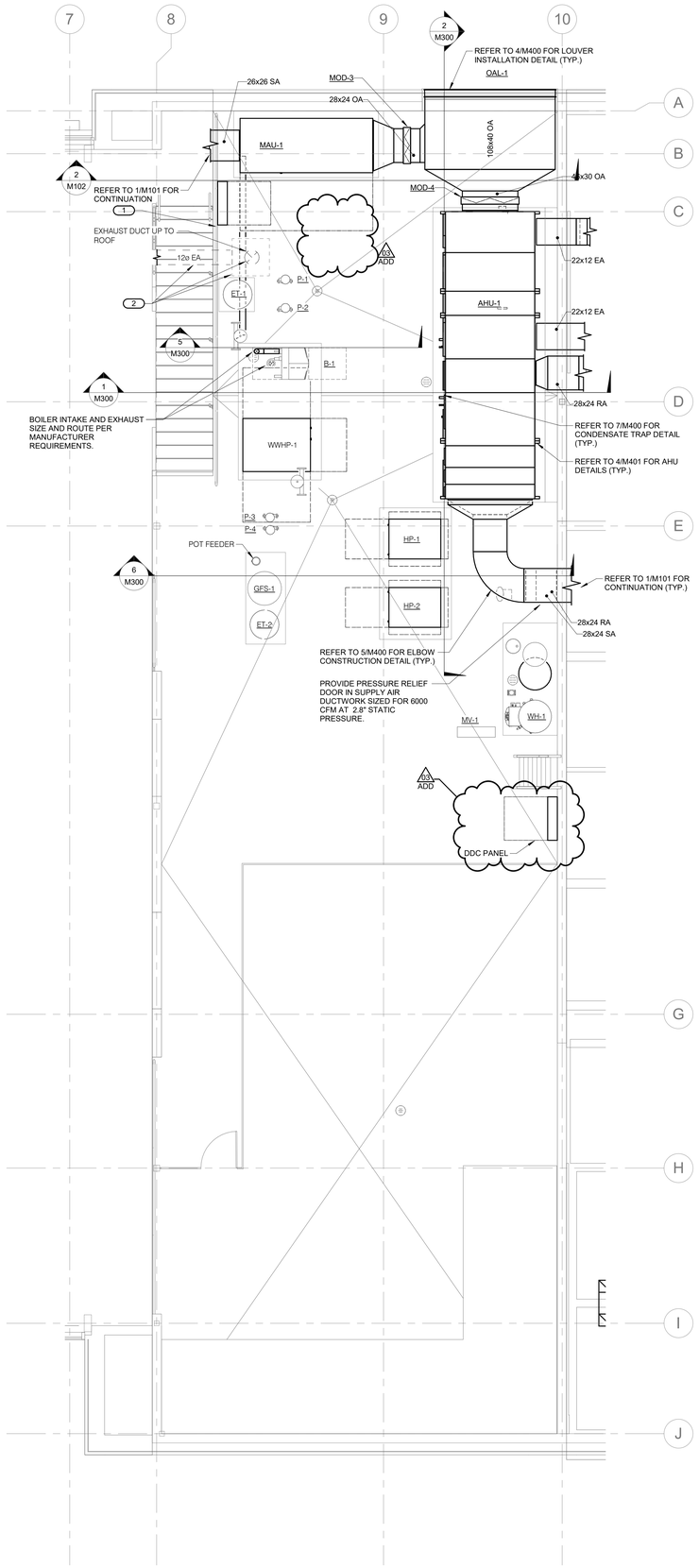
M101



2 SECTION FOR MAU - MECHANICAL

1/4" = 1'-0"



1 MEZZANINE PLAN - VENTILATION

1/4" = 1'-0"

NORTH

KEYNOTES: (#)

1. DDC CONTROL PANEL, MOUNT CONTROL PANEL ON UNISTRUT SUPPORT SYSTEM FROM FLOOR TO ROOF STRUCTURE.
2. OWNER FURNISHED AND OWNER INSTALLED PLYMOVENT VEHICLE EXHAUST SYSTEM. COORDINATE ROUTING OF UTILITIES WITH OWNER AND THE INSTALLING CONTRACTOR.

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Drawing
MEZZANINE PLAN - VENTILATION

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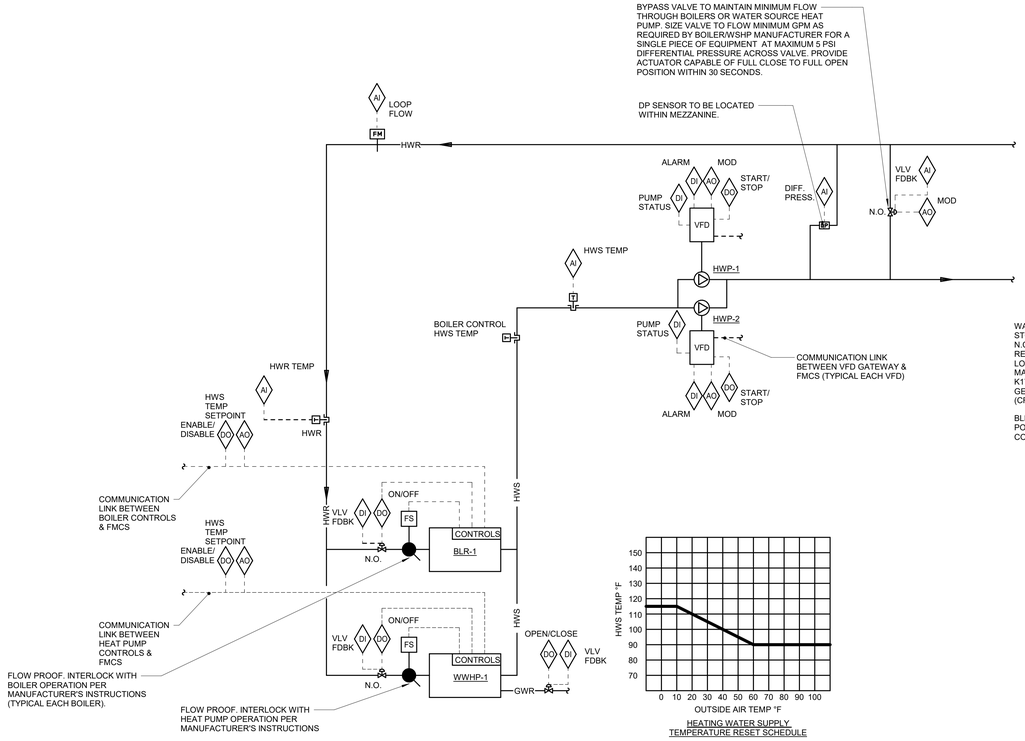
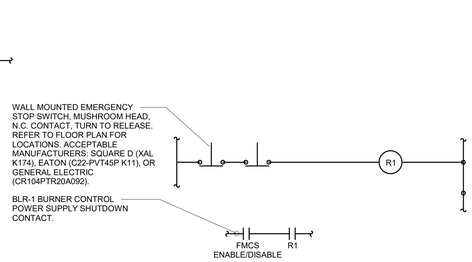
M102





EMERGENCY BOILER SHUTDOWN

PROVIDE TWO-COLOR ENGRAVED PHENOLIC LABELS WITH MIN. 1/2" HIGH WHITE LETTERS ON RED BACKGROUND FOR EACH EMERGENCY BOILER SHUTDOWN SWITCH. SECURELY MOUNT TO WALL ABOVE EACH SWITCH.

ALARMS, INTERLOCKS, AND SAFETIES:
TCC SHALL PROVIDE EMERGENCY BOILER SHUTDOWN SWITCH AT MEZZANINE EXIT POINT MEETING CSD-1 REQUIREMENTS. ACTIVATION OF SWITCH SHALL INTERRUPT POWER TO ALL BOILER CONTROLS VIA BOILER SAFETY SHUTDOWN CONTACTS.

EMERGENCY BOILER SHUTDOWN

SEQUENCE OF OPERATION:
HEATING WATER BOILER AND WATER-TO-WATER HEAT PUMP SHALL HAVE UNIT MOUNTED CONTROLS PROVIDED BY THE BOILER AND HEAT PUMP MANUFACTURER. TCC SHALL INTERFACE WITH BOILER AND HEAT PUMP MANUFACTURER CONTROLS AS DESCRIBED IN THIS SEQUENCE OF OPERATION. BOILER AND HEAT PUMP MANUFACTURER SHALL PROVIDE A GATEWAY INTERFACE CARD THAT IS COMPATIBLE WITH THE COMMUNICATION PROTOCOL OF THE FMCS NETWORK. SEQUENCES OF OPERATION FOR BOTH BOILER CONTROL SYSTEM AND FMCS SHALL BE AS FOLLOWS:

FMCS SHALL OPERATE HEATING WATER SYSTEM. WHENEVER OUTSIDE AIR TEMPERATURE IS BELOW 70°F AND THERE ARE AT LEAST 2 CALLS FOR HEAT. IF OUTSIDE AIR TEMPERATURE IS BELOW 40°F HEATING SYSTEM SHALL BE ENABLED REGARDLESS OF CALLS FOR HEAT.

HOT WATER PUMPS SEQUENCE OF OPERATION:
ONLY ONE HEATING WATER PUMP SHALL RUN AT TIME. THE SECOND HEATING WATER PUMP IS FULLY REDUNDANT. FMCS SHALL AUTOMATICALLY ROTATE THE LEAD HEATING WATER PUMP ONCE/WEEK (10:00 AM EACH TUESDAY, ADJ.) TO EQUALIZE RUN TIME BETWEEN PUMPS. PROVIDE GRAPHICAL BUTTON ON OPERATOR WORKSTATION GRAPHICAL SCREEN TO ALLOW FMCS OPERATOR TO SWITCH LEAD PUMP TO NEXT ROTATION IN THE EVENT THE CURRENT LEAD PUMP REQUIRES MAINTENANCE.

FMCS SHALL MODULATE SIGNAL TO LEAD PUMP VFD AS REQUIRED TO MAINTAIN HEATING WATER DIFFERENTIAL PRESSURE (DP) SETPOINT. FMCS SHALL RESET HEATING WATER DIFFERENTIAL PRESSURE (DP) SETPOINT AS REQUIRED TO MAINTAIN AT LEAST ONE HEATING WATER VALVE 95% (ADJ.) OPEN. FMCS SHALL UTILIZE COMMAND TO ALL HEATING WATER VALVE POSITIONS TO RESET THE HEATING WATER DIFFERENTIAL PRESSURE. IN NO EVENT SHALL THE FMCS DECREASE THE HEATING WATER (DP) SETPOINT BELOW 4 PSI (ADJ.) OR ABOVE 10 PSI (ADJ.).

BOILER & HEAT PUMP SEQUENCE OF OPERATION:
THE FMCS SHALL ENABLE THE WATER-TO-WATER HEAT PUMP AS THE LEAD SYSTEM IF THE GEOTHERMAL LOOP TEMPERATURE RETURNING FROM THE GEOTHERMAL BORIELD IS ABOVE 38°F (ADJ.) AND OPEN THE ASSOCIATED TWO-POSITION ISOLATION VALVES ON THE HEAT PUMP'S CONDENSER AND EVAPORATOR SECTIONS. THE FMCS SHALL ENERGIZE THE LEAD PUMP. THE HEAT PUMP TWO-POSITION ISOLATION VALVES SHALL BE OPEN EVEN IF THE HEAT PUMP IS NOT FIRING TO ALLOW CIRCULATION THROUGH THE VARIABLE PRIMARY HEATING WATER SYSTEM.

WHEN FMCS ENABLES WATER-TO-WATER HEAT PUMP FMCS SHALL OPEN WATER-TO-WATER HEAT PUMP GWR ISOLATION VALVE. WHEN FMCS DISABLES WATER-TO-WATER HEAT PUMP FMCS SHALL CLOSE ASSOCIATED GWR ISOLATION VALVE.

IF THE GEOTHERMAL LOOP TEMPERATURE RETURNING FROM THE GEOTHERMAL BOREFIELD IS BELOW 38°F (ADJ.) THE FMCS SHALL SWITCH THE BOILER TO THE LEAD HEATING SYSTEM AND HAVE THE WATER-TO-WATER HEAT PUMP AS THE LAG SYSTEM. TWO-POSITION BOILER ISOLATION VALVE OPERATION SHALL BE CONTROLLED BY THE BOILER CONTROL PANEL OF THE RESPECTIVE BOILER THEY SERVE.

THE FMCS SHALL OUTPUT AN ANALOG SIGNAL TO LEAD HEATING SYSTEM (BOILER OR WATER-TO-WATER HEAT PUMP) TO MAINTAIN THE HEATING WATER SUPPLY TEMPERATURE SETPOINT PER THE HEATING WATER SUPPLY TEMPERATURE RESET SCHEDULE. THE BOILER OR WATER-TO-WATER HEAT PUMP'S INTERNAL CONTROLS SHALL MODULATE HEAT AS REQUIRED TO MAINTAIN SETPOINT. THE FMCS SHALL STAGE ON THE LAG HEATING SYSTEM (BOILER OR WATER-TO-WATER HEAT PUMP) TO MAINTAIN THE SYSTEM HEATING WATER SUPPLY TEMPERATURE PER THE HEATING WATER SUPPLY TEMPERATURE RESET SCHEDULE. FMCS SHALL LIMIT LAG HEAT SOURCE FROM OPERATING UNLESS PRIMARY HEAT SOURCE IS AT 100% FIRING RATE (ADJ.) FOR 10 (ADJ.) MINUTES WITH HEATING WATER SUPPLY TEMPERATURE BELOW SETPOINT AND HEATING WATER FLOW RATE IS ABOVE MINIMUM FLOW RATE OF BOTH BOILERS. THIS IS TO PREVENT OVERPUMPING OF SYSTEM.

THE FOLLOWING HEAT PUMP CONTROL PANEL POINTS (TO INCLUDE BUT NOT LIMITED TO) SHALL BE CONTROLLED BY THE FMCS AND DISPLAYED ON THE OPERATOR WORKSTATION GRAPHICAL SCREEN:
- HEAT PUMP STATUS: ENABLE/DISABLE
- HEAT PUMP OUTPUT: PERCENTAGE
- HEAT PUMP OUTLET WATER TEMPERATURE SETPOINT: [°F]

THE FOLLOWING BOILER CONTROL PANEL POINTS (TO INCLUDE BUT NOT LIMITED TO) SHALL BE CONTROLLED BY THE FMCS AND DISPLAYED ON THE OPERATOR WORKSTATION GRAPHICAL SCREEN:
- BOILER STATUS: ENABLE/DISABLE
- BOILER OUTLET WATER TEMPERATURE SETPOINT: [°F]

THE FOLLOWING BOILER CONTROL PANEL POINTS (TO INCLUDE BUT NOT LIMITED TO) SHALL BE MONITORED BY THE FMCS AND DISPLAYED ON THE OPERATOR WORKSTATION GRAPHICAL SCREEN:
- BOILER STATUS: DISABLED/STANDBY/MANUAL OPERATION/REMOTE OPERATION/AUTO/FAULT
- FIRING RATE INPUT: [0 - 100%]
- FIRING RATE OUTPUT: [0 - 100%]
- ACTIVE SETPOINT: [°F]
- SYSTEM HWR TEMP: [°F]
- SYSTEM HWS TEMP: [°F]
- FAULT MESSAGE DISPLAY CODE: [NUMERICAL]
- RUN CYCLES: [NUMERICAL]
- RUN HOURS: [NUMERICAL]

ALARMS, INTERLOCKS & SAFETIES:
BOILER CONTROLS SHALL BE PROGRAMMED TO MAINTAIN CONSTANT SETPOINT (LAST KNOWN VALUE) IN THE EVENT THE FMCS NETWORK COMMUNICATION SIGNAL IS LOST.

ALL CONTROLLED AND MONITORED POINTS LISTED IN THE BOILER CONTROL PANEL SEQUENCE ABOVE SHALL BE DISPLAYED ON THE OPERATOR WORKSTATION GRAPHICAL SCREEN.

MINIMUM HEATING WATER FLOW CONTROL:
FMCS SHALL MODULATE THE HEATING WATER BYPASS CONTROL VALVE AS REQUIRED TO MAINTAIN MINIMUM FLOW THROUGH EACH OPERATIONAL WATER-TO-WATER HEAT PUMP AND BOILER. TCC SHALL VERIFY THE MINIMUM FLOW LIMIT OF EACH HEAT PUMP/BOILER WITH EQUIPMENT MANUFACTURER. ADEQUATE FLOW THROUGH EACH HEAT PUMP/BOILER SHALL BE DETERMINED BY THE FLOW METER IN THE HEATING WATER RETURN PIPING. MINIMUM FLOW SHALL BE STAGED WITH THE RESPECTIVE EQUIPMENT IN OPERATION SO AS MORE EQUIPMENT IS IN CALLED INTO OPERATION THE MINIMUM FLOW IS THE SUMMATION OF THE MINIMUM FLOWS OF ALL PIECES OF OPERATING EQUIPMENT.

ALARMS, INTERLOCKS & SAFETIES:
TCC SHALL COORDINATE ALL SAFETY AND INTERLOCK REQUIREMENTS WITH BOILER MANUFACTURER. TCC SHALL COORDINATE AND PROVIDE THE INSTALLATION AND WIRING OF BOILER WATER DIFFERENTIAL PRESSURE/FLOW SWITCHES AND OTHER COMPONENTS PROVIDED WITH THE BOILER AS REQUIRED FOR PROPER OPERATION. TCC SHALL PROVIDE AND TERMINATE ALL SAFETY AND INTERLOCK WIRING WITH BOILER CONTROL PANELS AS REQUIRED.

FMCS SHALL AUTOMATICALLY ENABLE THE LAG HEATING WATER PUMP TO RUN IN THE EVENT THE LEAD HEATING WATER PUMP FAILS TO OPERATE.

TCC SHALL VERIFY THE ACCEPTABLE TEMPERATURE RANGES THE BOILERS ARE APPROVED TO OPERATE AT AS PUBLISHED IN THE BOILER MANUFACTURER'S LITERATURE. IF THE TEMPERATURE RANGES LISTED IN THE MANUFACTURER'S LITERATURE DIFFER FROM THOSE IN THIS SEQUENCE OF OPERATION, CONTACT PROJECT ARCHITECT/ENGINEER FOR DIRECTION.

AN ALARM SHALL BE INDICATED TO THE FMCS OPERATOR WORKSTATION IN THE EVENT ANY OF THE FOLLOWING OCCUR:
- HWR TEMPERATURE DROPS BELOW 50°F (ADJ.) FOR 5 MINUTES (ADJ.) (AUTO RESET).
- HWS TEMPERATURE RISES MORE THAN 10°F (ADJ.) ABOVE SETPOINT (AUTO RESET).
- HWS TEMPERATURE DROPS MORE THAN 10°F (ADJ.) BELOW SETPOINT (AUTO RESET).
- AN ALARM IS INDICATED AT ANY BOILER ALARM PANEL.
- AN ALARM IS INDICATED AT ANY HEAT PUMP ALARM PANEL.
- AN ALARM IS INDICATED AT ANY PUMP VFD
- SHOULD THE FMCS COMMAND THE LEAD HEATING WATER PUMP TO OPERATE AND THE PUMP FAILS TO DO SO AS DETERMINED BY THE VFD STATUS, AN ALARM SHALL BE INDICATED AT THE FMCS OPERATOR WORKSTATION AND THE LAG HW PUMP SHALL AUTOMATICALLY START.

1 CONDENSING HEATING WATER BOILER CONTROL - VARIABLE PRIMARY
NO SCALE

SEQUENCE OF OPERATION:
APPARATUS BAY MINIMUM EXHAUST AIR IS PROVIDED THROUGH OPERATION OF AHU-1'S EXHAUST FAN. SYSTEM SHALL RUN CONTINUOUSLY 24 HOURS/DAY, 7 DAYS/WEEK. REFER TO AHU SEQUENCE FOR DETAILS.

EXHAUST FAN PURGE FAN (EF-1) SHALL BE STARTED AND STOPPED THROUGH A HAND-OFF-AUTO SWITCH ON THE FACE OF THE MOTOR STARTER. WHEN PLACED IN THE HAND POSITION THE EXHAUST FAN SHALL RUN CONTINUOUSLY. WHEN PLACED IN THE AUTO POSITION THE FMCS SHALL CONTROL FAN OPERATION. WHEN PLACED IN THE OFF POSITION THE EXHAUST FAN MOTOR SHALL BE DE-ENERGIZED.

EXHAUST FAN PURGE FAN (EF-1) SHALL BE CONTROLLED AS FOLLOWS:
- TO PROVIDE COOLING TO THE SPACE WHEN SPACE TEMP RISES ABOVE 76°F (ADJ.) AND OUTSIDE AIR IS AT LEAST 4°F (ADJ.) COOLER THAN SPACE TEMPERATURE FMCS SHALL COMMAND INTAKE AIR DAMPER AND EXHAUST AIR DAMPER TO FULLY OPEN. MAU AND EXHAUST FAN SHALL BE ENABLED AFTER A 30 SECOND DELAY TO ALLOW FOR OPENING OF THE DAMPERS. EXHAUST FAN SPEED SHALL BE AT FULL AIRFLOW IF OWNER FURNISHED VEHICLE EXTRACTION SYSTEM IS NOT OPERATING. IF OWNER FURNISHED VEHICLE EXTRACTION SYSTEM IS OPERATING AS DETECTED BY THE CURRENT SENSOR THE EXHAUST FAN SPEED SHALL BE REDUCED BY 3500 CFM. FINAL RATE SHALL BE DETERMIEND BY BALANCING CONTRACTOR BASED ON EXHAUST RATE OF THE VEHICLE EXTRACTION SYSTEM.
- WHEN SPACE TEMP DROPS BELOW 72°F (ADJ.) MAU AND EXHAUST FAN SHALL BE DISABLED AND THE INTAKE AIR DAMPER AND EXHAUST AIR DAMPER SHALL FULLY CLOSE.
- IN THE EVENT THE CO DETECTORS SENSE THE CONCENTRATION OF CARBON MONOXIDE RISES ABOVE 25 PPM (ADJ.) OR THE CONCENTRATION OF NITROGEN DIOXIDE RISES ABOVE 1 PPM (ADJ.) , FMCS SHALL COMMAND THE INTAKE AIR DAMPER AND EXHAUST AIR DAMPER TO FULLY OPEN. AFTER DAMPERS HAVE PROVEN OPEN THE MAU AND EXHAUST FAN SHALL BE ENABLED. EXHAUST FAN SPEED SHALL BE AT FULL AIRFLOW IF OWNER FURNISHED VEHICLE EXTRACTION SYSTEM IS NOT OPERATING. IF OWNER FURNISHED VEHICLE EXTRACTION SYSTEM IS OPERATING AS DETECTED BY THE CURRENT SENSOR THE EXHAUST FAN SPEED SHALL BE REDUCED BY 3500 CFM. FINAL RATE SHALL BE DETERMIEND BY BALANCING CONTRACTOR BASED ON EXHAUST RATE OF THE VEHICLE EXTRACTION SYSTEM. PURGE FAN OPERATION SHALL CONTINUE UNTIL BOTH CO AND NOx LEVELS FALL BELOW 10 PPM (ADJ.) FOR CO AND 0.4 PPM (ADJ.) FOR NOx.
- A SEPERATE TIMER SWITCH (0-120 MINUTES) SHALL BE PROVIDED TO MANUALLY ENABLE THE EXHAUST FAN AND MAKEUP AIR UNIT. WHEN TIMER SWITCH IS ENABLED FMCS SHALL COMMAND INTAKE AIR DAMPER AND EXHAUST AIR DAMPER TO FULLY OPEN. MAU AND EXHAUST FAN SHALL BE ENABLED AFTER THE DAMPERS HAVE PROVEN OPEN. EXHAUST FAN SPEED SHALL BE AT FULL AIRFLOW IF OWNER FURNISHED VEHICLE EXTRACTION SYSTEM IS NOT OPERATING. IF OWNER FURNISHED VEHICLE EXTRACTION SYSTEM IS OPERATING AS DETECTED BY THE CURRENT SENSOR THE EXHAUST FAN SPEED SHALL BE REDUCED BY 3500 CFM (ADJ.). FINAL RATE SHALL BE DETERMIEND BY BALANCING CONTRACTOR BASED ON EXHAUST RATE OF THE VEHICLE EXTRACTION SYSTEM.
- A RELATIVE HUMIDITY SENSOR SHALL BE PROVIDED TO ENABLE ENABLE THE EXHAUST FAN AND MAKEUP AIR UNIT IF THE SPACE RELATIVE HUMIDITY EXCEEDS 40% (ADJ.) WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 20°F (ADJ.) OR IF THE SPACE RELATIVE HUMIDITY EXCEEDS 30% (ADJ.) WHEN THE OUTSIDE AIR TEMPERATURE IS BELOW 0°F (ADJ.) WHEN CONDITIONS ARE MET FMCS SHALL COMMAND INTAKE AIR DAMPER AND EXHAUST AIR DAMPER TO FULLY OPEN. MAU AND EXHAUST FAN SHALL BE ENABLED AFTER THE DAMPERS HAVE PROVEN OPEN. EXHAUST FAN SPEED SHALL BE AT FULL AIRFLOW IF OWNER FURNISHED VEHICLE EXTRACTION SYSTEM IS NOT OPERATING. IF OWNER FURNISHED VEHICLE EXTRACTION SYSTEM IS OPERATING AS DETECTED BY THE CURRENT SENSOR THE EXHAUST FAN SPEED SHALL BE REDUCED BY 3500 CFM (ADJ.). FINAL RATE SHALL BE DETERMIEND BY BALANCING CONTRACTOR BASED ON EXHAUST RATE OF THE VEHICLE EXTRACTION SYSTEM. ONCE RELATIVE HUMIDITY IS 5% (ADJ.) BELOW SETPOINT SYSTEM SHALL BE DISABLED.

ONCE ENERGIZED, EXHAUST PURGE FAN AND MAU SHALL CONTINUE TO RUN FOR MIN. 10 MINUTES (ADJ.) TO PREVENT SHORT CYCLING.

MAU SHALL HAVE SAFETY CONTROLS PER SPECIFICATION 23 74 23.13. FMCS SHALL CONTROL FAN START/STOP AND BURNER MODULATION TO THE MAU TO MAINTAIN A DISCHARGE AIR TEMPERATURE THAT IS 5°F (ADJ.) ABOVE SPACE HEATING SETPOINT.

MAU SPEED SHALL BE SET BY THE BALANCING CONTRACTOR AT THE VFD.

HEATING OF APPARATUS BAY IS SERVED BY TWO IN-FLOOR RADIANT HEATING MANIFOLD ZONES PLUS A UNIT HEATER. A SPACE TEMPERATURE SENSOR SHALL SERVE EACH INDIVIDUAL RADIANT MANIFOLD (NORTH BAY VS SOUTH BAY) OF APPARATUS BAY. WHEN OUTSIDE AIR TEMPERATURE IS BELOW 55°F (ADJ.) THE FMCS SHALL MODULATE THE INFLOOR HEAT CONTROL VALVE TO MAINTAIN A SPACE TEMPERATURE SETPOINT OF 60°F (ADJ.). WHEN THE OUTSIDE AIR TEMPERATURE IS ABOVE 55°F THE CONTROL VALVE SHALL BE FULLY CLOSED. IF EITHER OF THE SPACE TEMPERATURE SENSORS INDICATES THE SPACE IS 10°F (ADJ.) BELOW SPACE SETPOINT THE UNIT HEATER SHALL BE ENABLED AND THE UNIT HEATER FAN SHALL BE ENERGIZE AND ASSOCIATED CONTROL VALVE SHALL MODULATE TO REHEAT THE SPACE BACK UP TO ORIGINAL SPACE SETPOINT QUICKLY. ONCE TEMPERATURE SETPOINT HAS BEEN ACHIEVED THE UNIT HEATER SHALL BE DISABLED. MAXIMUM TEMPERATURE OF IN-FLOOR HEAT SHALL BE LIMITED FROM EXCEEDING 85° (ADJ.).

ALARMS, INTERLOCKS AND SAFETIES:
AN ALARM SHALL BE GENERATED AT THE FMCS OPERATOR WORKSTATION IN THE FOLLOWING EVENTS:
- THE GAS DETECTORS SENSE A CONCENTRATION OF CARBON MONOXIDE ABOVE 50 PPM (ADJ.) OR A CONCENTRATION OF NITROGEN DIOXIDE ABOVE 5 PPM (ADJ.)
- THE FMCS COMMANDS THE EXHAUST PURGE FAN TO OPERATE AND THE CURRENT SENSING RELAY DETECTS INSUFFICIENT CURRENT DRAW.
- THE FMCS COMMONDS THE MAU TO OPERATE AND THE CURRENT SENSING RELAY DETECTS INSUFFICIENT CURRENT DRAW.
- THE FMCS COMMANDS THE MAU TO OPERATE AND THE DAT IS 10°F (ADJ.) BELOW SETPOINT AFTER A 3 MINUTE (ADJ.) DELAY TO ALLOW FOR BURNER WARMUP. IF THIS ALARM OCCURS MAU AND EXHAUST PURGE FAN SHALL BE DISABLED.
- IF SPACE TEMPERATURE FALLS BELOW 40°F (ADJ.)

2 APPARATUS BAY CONTROLS
NO SCALE

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Drawing
CONTROL DIAGRAMS - MECHANICAL

City of Madison Contract No. **8027**
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M451

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AIR HANDLING SCHEDULE

NOTES:
1.PROVIDE SHAFT GROUNDING AS REQUIRED IN THE MOTOR SPECIFICATION 23 05 13.

		SUPPLY FAN (NOTE 1)										RETURN FAN (NOTE 1)										EXHAUST FAN (NOTE 1)														DX COOLING/HEATING COIL- COOLING								DX COOLIN/HEATING COIL - HEATING									DX VENTILATION AIR COOLING COIL										
TAG NAME	AREA SERVED	CFM	MIN. CFM	EXT. S.P.	TYPE	RPM (NOTE D)	BHP (NOTE E)	MHP (NOTE E)	DISCONNECT BY (NOTE A)	DISCONNECT TYPE (NOTE B)	CONTROLLER/ STARTER BY (NOTE A)	CONTROLLER/ STARTER TYPE (NOTE C)	CFM	EXT. S.P.	TYPE	RPM (NOTE D)	BHP (NOTE E)	MHP (NOTE E)	DISCONNECT BY (NOTE A)	DISCONNECT TYPE (NOTE B)	CONTROLLER/ STARTER BY (NOTE A)	CONTROLLER/ STARTER TYPE (NOTE C)	CFM	MIN CFM	EXT. S.P.	TYPE	RPM (NOTE D)	BHP (NOTE E)	MHP (NOTE E)	DISCONNECT BY (NOTE A)	DISCONNECT TYPE (NOTE B)	CONTROLLER/ STARTER BY (NOTE A)	CONTROLLER/ STARTER TYPE (NOTE B)	MINIMUM OUTSIDE AIR CFM	VOLTAGE	PHASES	EAT DB °F	EAT WB °F	LAT DB °F	LAT WB °F	TOTAL MBH	MAX. A.P.D. IN. W.C.	SAT SUC °F	REFRIGERANT	CFM	EAT DB °F	EAT WB °F	LAT DB °F	LAT WB°F	TOTAL MBH	MAX. A.P.D. IN. W.C.	SAT SUC °F	CFM	REFRIGERANT	EAT DB °F	EAT WB °F	LAT DB °F	LAT WB °F	TOTAL MBH	MAX. A.P.D. IN. W.C.	SAT SUC °F	CFM	MANUFACTURER	MODEL	NOTES
AHU-1	FIRST FLOOR	6000	1850	1.25	PLENUM	1986	5.1	7.5	MC	VFD/B	MC	VFD/B	4400	0.75	PLENUM	1594	1.9	3	MC	VFD/B	MC	VFD/B	1675	1550	75	PLENUM	3082	.95	1.5	MC	VFD/B	MC	VFD/B	2900	208	3	66.3	59.4	52.7	51.0	140	0.4	40.0	R410a	6000	49.4	35.9	70.4	46.7	136	0.35	40	6000	R401A	80.8	69.3	57.2	56.0	125	0.4	49.0	2900	DAIKIN APPLIED	CAH	NOTE 1

AIR HANDLING SCHEDULE CONTD..

	FILTER												
	EA FILTER				RA FILTER				OA FILTER				
TYPE	FACE VELOCITY	PRESSURE DROP DIRTY	PRESSURE DROP CLEAN	TYPE	FACE VELOCITY	PRESSURE DROP DIRTY	PRESSURE DROP CLEAN	TYPE	FACE VELOCITY	PRES SURE DROP DIRTY	FINAL FILTER PRESSURE DROP CLEAN	MANUFACTURER	MODEL	NOTES
MERV 8	4400	0.6	0.75	MERV 8	260	0.60	0.1	MERV 13	355	0.60	0.22 in-wg	DAIKIN APPLIED	CAH	NOTE 1

ENERGY RECOVERY WHEEL SCHEDULE

NOTES:
1.REFER TO SPECIFICATION 23 72 00 FOR REQUIREMENTS. REFER TO AIR HANDLING UNIT SCHEDULE FOR ADDITIONAL UNIT REQUIREMENTS.

				OUTSIDE/SUPPLY AIR STREAM									RETURN/EXHAUST AIR STREAM											WHEEL	ELECTRICAL								
					SUMMER			WINTER						SUMMER			WINTER									DISCONNECT		CONTROLLER/STARTER				
AIR HANDLING UNIT TAG NAME	AREA SERVED	TYPE	WINTER TOTAL EFFECTIVENSS	CFM	EAT DB °F	EAT WB °F	LAT DB °F	LAT WB °F	EAT DB °F	EAT WB °F	LAT DB °F	LAT WB °F	APD	CFM	EAT DB °F	EAT WB °F	LAT DB °F	LAT WB °F	EAT DB °F	EAT WB °F	LAT DB °F	LAT WB °F	APD	RECOVERED SUMMER MBH	RECOVERED WINTER MBH	MOTOR HP	VOLTAGE	PHASE	BY (NOTE A)	TYPE (NOTE B)	BY (NOTE A)	TYPE (NOTE C)	MANUFACTURER	MODEL
AHU-1	FIRST FLOOR	ENTHALPY	93%	2,900	87	75	80.8	69.3	-15	-15	29.1	22.7	0.87	1,550	75	62.5	86.3	73.9	70	48	-9.9	-9.9	0.46	66	150	0.13	115	1	MFR	VFD	MFR	VFD	DAIKIN APPLIED	SXA-1200-MW

WATER TO WATER HEAT PUMP SCHEDULE

NOTES:
1. REFER TO SPECIFICATION SECTION 23 64 17 FOR ADDITIONAL INFORMATION.
2. WATER TO WATER HEATING ONLY UNIT.
3. REFER TO 1/M202 FOR SIZE AND CLEARANCE REQUIREMENTS FOR THE UNIT.
4. UNIT SHALL HAVE BE SELECTED WITH FOULING FACTOR OF 0.0001 ON EVAPORATOR AND CONDENSER HEAT EXCHANGERS.
5. UNIT SHALL HAVE TWO COMPRESSORS WITH DIGITAL SCROLLS OR VARIABLE SPEED COMPRESSORS.
6. UNIT SHALL BE SCCR RATING OF 42000.

			CAPACITY/PERFORMANCE		EVAPORATOR PERFORMANCE - 25% PROPYLENE GLYCOL				CONDENSER PERFORMANCE				ELECTRICAL												
																			DISCONNECT		CONTROLLER/ STARTER				
TAG NAME	AREA SERVED	REFRIGERANT TYPE	TOTAL MBH	HEATING COP BASED ON WATER CONDITION LISTED	EWT °F	LWT °F	GPM	MAX. PRESS. DROP FT. HEAD	EWT °F	LWT °F	GPM	MAX. PRESS. DROP FT. HEAD	VOLTAGE	PHASES	FLA	MCA	MOCP	BY (NOTE A)	TYPE (NOTE B)	BY (NOTE A)	TYPE (NOTE C)	MANUFACTURER	MODEL	NOTE
WWHP-1	BUILDING	R-410A	332.00	3.2	38	30	61.2	9.000	100	120	33.4	5.40	208	3	118.4	148.0	225	EC	-	MFR	FV	MULTISTACK	HS520	NOTES 1, 2, 3, 4, 5, 6

MAKE-UP AIR UNIT SCHEDULE

NOTES:
1. PROVIDE SHAFT GROUNDING AS REQUIRED IN THE MOTOR SPECIFICATION 23 05 13.
2. UNIT SHALL HAVE 4" MERV 13 FILTER SECTION.

		MAX. DIMENSIONS										ELECTRICAL											
																DISCONNECT		CONTROLLER/ STARTER					
TAG NAME	AREA SERVED	LENGTH	WIDTH	HEIGHT	CFM	FAN TYPE	FAN RPM (NOTE D)	EXT. S.P. IN. W.C.	MIN. EFFICIENCY AFUE	MIN. MBH OUTPUT	EAT °F	LAT °F	BHP (NOTE E)	MHP (NOTE E)	VOLTAGE	PHASES	BY (NOTE A)	TYPE (NOTE B)	BY (NOTE A)	TYPE (NOTE C)	FUEL TYPE	FUEL PRESSURE (IN. W.C.)	MANUFACTURER	MODEL	NOTES
MAU-1	APPARATUS BAY	109	44	45	5800	PLENUM	1736	0.75	92	469	-15.0	60.0	3.15	5	208	3	MFR	NF	MFR	VFD	NG	12	GREENHECK	DGX-P120-H22	NOTE 1, 2

ADD

FAN SCHEDULE

NOTES:
1. PROVIDE SHAFT GROUNDING AS REQUIRED IN THE MOTOR SPECIFICATION 23 05 13.
2. FAN SHALL HAVE FINGED VENTED CURB AND FAN SHALL MEET UL762 REQUIREMENTS. UNIT SHALL HAVE ECM TYPE MOTOR WITH 0-10 VDC OUTPUT FROM KITCHEN HOOD CONTROLLER TO CONTROL FAN SPEED AND START/STOP FUNCTION.
3. UNIT SHALL HAVE ECM TYPE MOTOR WITH MANUAL SPEED ADJUSTMENT ON FAN CONTROLLER FOR BALANCING.

										ELECTRICAL (NOTE 1)									
														DISCONNECT		CONTROLLER/ STARTER			
TAG NAME	AREA SERVED	CFM	S.P. IN. W.C.	WHEEL DIA. INCHES	FAN RPM (NOTE F)	DRIVE TYPE	MAX. AMCA SONES	BACKDRAFT DAMPER TYPE	CURB TYPE (NOTE G)	BHP	MHP	VOLTAGE	PHASES	BY (NOTE A)	TYPE (NOTE B)	BY (NOTE A)	TYPE (NOTE C)	MANUFACTURER	MODEL	NOTES
EF-1	APERATUS BAY	5800	0.25	30	709	DIRECT	10.4	ELECTRIC	N/A	0.51	2	208	3	MC	VFD/B	MC	VFD/B	GREENHECK	SE2-30-620-B	NOTE 1
EF-2	KITCHEN	1050	1.20	14.625	1392	DIRECT	9.9	N/A	MFR	0.4	0.75	115	1	MFR	NF	TCC	FV	GREENHECK	CUE-141-VG	NOTE 2
RF-1	ELECTRICAL 112	1200	0.40	11.187	1651	DIRECT	10.5	N/A	MFR	0.21	0.25	115	1	MFR	NF	TCC	FV	GREENHECK	SQ-100-VG	NOTE 3

ADD

RADIANT FLOOR MANIFOLD SCHEDULE

NOTES: REFER TO DRAWINGS M201 AND M403 FOR ADDITIONAL INFORMATION ON SPACE SERVED. REFER TO SPECIFICATION SECTION 23 83 00 FOR ADDITIONAL REQUIREMENTS. MAXIMUM WATER SUPPLY TEMPERATURE AVAILABLE IS 115°F. RADIANT FLOOR MANUFACTURER REQUIRED TO CALCULATE TUBE SPACING, TUBE SIZE, AND FLOW RATES REQUIRED TO MEET SCHEDULED REQUIRED HEAT OUTPUT FOR EACH ZONE.

MANIFOLD NAME	AREA SERVED	# OF LOOPS	TUBING SIZE (IN.)	PRESSUDE DROP (FT. HD)	MAX. MANIFOLD FLOW (GPM)	SUPPLY WATER TEMP	WATER TEMP DIFFERENCE	TUBE SPACING (IN.)	REQUIRED HEAT OUTPUT (MBH)
1	MECH. STOR.	1	3/4"	3.5	1.1	105	20	12	11.2
2	APPARATUS BAY	9	3/4"	10	15.2	107	20	12	151.1
3	APPARATUS BAY	8	3/4"	7.6	10.8	110	20	12	107
4	WATCH	2	5/8"	2.1	1.4	109	20	12	13.8
5	TRAINNING ROOM	4	5/8"	5.8	3.8	114	20	12	37.9
6	LOCKER ROOM	3	5/8"	1.1	1.2	90	20	12	11.6
7	LT OFFICE 123	1	5/8"	1.2	0.5	105	20	12	5.5
8	WORKSHOP	5	5/8"	.6	1.4	85	20	12	13.6
9	LT OFFICE 125/ SHOWER	1	5/8"	2.7	0.8	104	20	12	7.8
10	SMALL MEETING ROOM 102	1	5/8"	2.7	0.6	92	20	12	6
11	SMALL MEETING ROOM 103	1	5/8"	.3	0.4	110	20	12	3.5
12	LT OFFICE	1	5/8"	1.4	0.6	105	20	12	6
13	DORM ROOM	3	5/8"	11.7	1.4	92	20	12	13.6
14	GREAT ROOM	3	5/8"	1.7	3.9	111	20	12	38.8
15	LOBBY/ VEST	2	5/8"	5.6	1.8	102	20	12	17.8
16	STORAGE/ WATER	1	3/4"	1.3	0.7	108	20	12	7.4
17	FITNESS	2	5/8"	2.6	1.5	110	20	12	14.8

PUMP SCHEDULE

NOTES:
1.PROVIDE SHAFT GROUNDING AS REQUIRED IN THE MOTOR SPECIFICATION 23 05 13.
2.PUMP SHALL BE SELECTED BASED ON 25% PROPYLENE GLYCOL AND 36° F TEMPERATURE.

							ELECTRICAL (NOTE 1)									
											DISCONNECT		CONTROLLER/ STARTER			
TAG NAME	AREA SERVED	GPM	PUMP FT. HEAD AT DESIGN	MINIMUM PUMP EFFICIENCY	INLET SIZE	IMPELLER SIZE	HP (NOTE E)	RPM	VOLTAGE	PHASES	BY (NOTE A)	TYPE (NOTE B)	BY (NOTE A)	TYPE (NOTE C)	MANUFACTURER	MODEL	NOTES
P-1	PRIMARY LOOP	65.0	65.00	53.3	1 1/2"	8.375	3	1800	208	3	MC	VFD/B	MC	VFD/B	B & G	e-80	
P-2	PRIMARY LOOP	65.0	65.00	53.3	1 1/2"	8.375	3	1800	208	3	MC	VFD/B	MC	VFD/B	B & G	e-80	
P-3	GEOTHERMAL	110.0	60.00	58.8	2 1/2"	8.000	5	1800	208	3	MC	VFD/B	MC	VFD/B	B & G	e-80	NOTE 2
P-4	GEOTHERMAL	110.0	60.00	58.8	2 1/2"	8.000	5	1800	208	3	MC	VFD/B	MC	VFD/B	B & G	e-80	NOTE 2

BOILER SCHEDULE - HOT WATER

	MAX. DIMENSIONS											ELECTRICAL								
															DISCONNECT		CONTROLLER/ STARTER			
TAG NAME	LENGTH	WIDTH	HEIGHT	FUEL	INLET FUEL PRESSURE (IN. W.C.)	TURNDOWN RATIO	BOILER MINIMUM FLOW (GPM)	INPUT BTUH/HR	EWT °F	LWT °F	OPERATING PRESSURE PSI	MOCP	VOLTAGE	PHASES	BY (NOTE A)	TYPE (NOTE B)	BY (NOTE A)	MANUFACTURER	MODEL	NOTES
B-1	30'-1/2"	26'-1/4"	53'-1/2"	NG	14	10:1	10	400000	95	115	160	20	115	1	MFR	F	MFR	LOCHINVAR	FTX400	

HEAT PUMP SCHEDULE - WATER-TO-DIRECT EXPANSION COIL

NOTES:
1.PROVIDE UNIT WITH DIGITAL SCROLL COMPRESSORS.

				CONDITIONS BASED ON 25% PROPYLENE GLYCOL			CONDITIONS BASED ON 25% PROPYLENE GLYCOL					ELECTRICAL											
																	DISCONNECT		CONTROLLER/ STARTER				
TAG NAME	AREA SERVED	CONFIGURATION	UNIT NOMINAL TONNAGE	EWT	LWT	MIN. EER	EWT	LWT	MIN. COP	COND. GPM	W.P.D. FT. HEAD	VOLTAGE	PHASES	FLA	MCA	MOCP	BY (NOTE A)	TYPE (NOTE B)	BY (NOTE A)	MANUFACTURER	MODEL (NOTE 1)	NOTES
HP-1	AHU-1 VENTILATION COIL	WATER SOURCE CONDENSING UNIT	10	90.0	94.3	13.3	0.0	0	0	30.0	9.00	208	3	30.0	38	60	EC	-	MFR	AAON	SB	NOTE 1
HP-2	AHU-1 HEATING/COOLING COIL	WATER SOURCE HEAT PUMP	14	90.0	99.6	10.2	38.0	31.2	2.98	40.0	8.00	208	3	48.0	60	100	EC	-	MFR	AAON	SB	NOTE 1

COIL SCHEDULE - WATER

		SIZE			EAT		LAT	TOTAL	A.P.D. IN. W.C.		LWT		W.P.D. FT.			
TAG NAME	AREA SERVED	L	H	CFM	DB °F	WB °F	DB °F	MBH		EWT °F	°F	GPM	HEAD	MANUFACTURER	MODEL	NOTES
HC-1	GREAT HALL	20	16	1500	55.0	54.0	70.0	24	0.10	115	95	2.4	5.0	TRANE	HTCL	

SCHEDULE GENERAL NOTES:

A. DISCONNECT AND CONTROLLER STARTER FURNISHED AND INSTALLED BY:
MFR = MANUFACTURER
EC = ELECTRICAL CONTRACTOR.
MC = FURNISHED BY MECHANICAL CONTRACTOR, INSTALLED BY ELECTRICAL CONTRACTOR.
MFR/EC = FURNISHED LOOSE BY MANUFACTURER INSTALLED BY ELECTRICAL CONTRACTOR....

B. DISCONNECT TYPE:
F = FUSED
NF = NON-FUSED

C. CONTROLLER STARTER TYPE:
FV = FULL VOLTAGE
WYE = WYE-DELTA
SS = SOLID STATE (SOFT START)
MS = MANUAL STARTER
VFD = VARIABLE FREQUENCY DRIVE
VFD/B = VARIABLE FREQUENCY DRIVE WITH BYPASS

D. FAN RPM SHALL NOT EXCEED 110% OF SCHEDULED VALUE, WITH THE SCHEDULED WHEEL TYPE. SUBSTITUTION OF BI OR BIA FANS FANS FOR FC IS ACCEPTABLE IF EFFICIENCY IS NOT LOWER.

E. NO EQUIPMENT SHALL BE SELECTED ABOVE 90% OF MOTOR NAME PLATE RATING.

F. MUST BE WITHIN +/- 10% OF SCHEDULED RPM.

G. CURB TYPE:
MFR = STANDARD CURB BY MANUFACTURER
GC = BY GENERAL CONTRACTOR
SAC = SOUND ATTENUATOR CURB

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Key Plan

Sheet Issue Date
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Revision	Date
ADDENDA #3	12/06/2017

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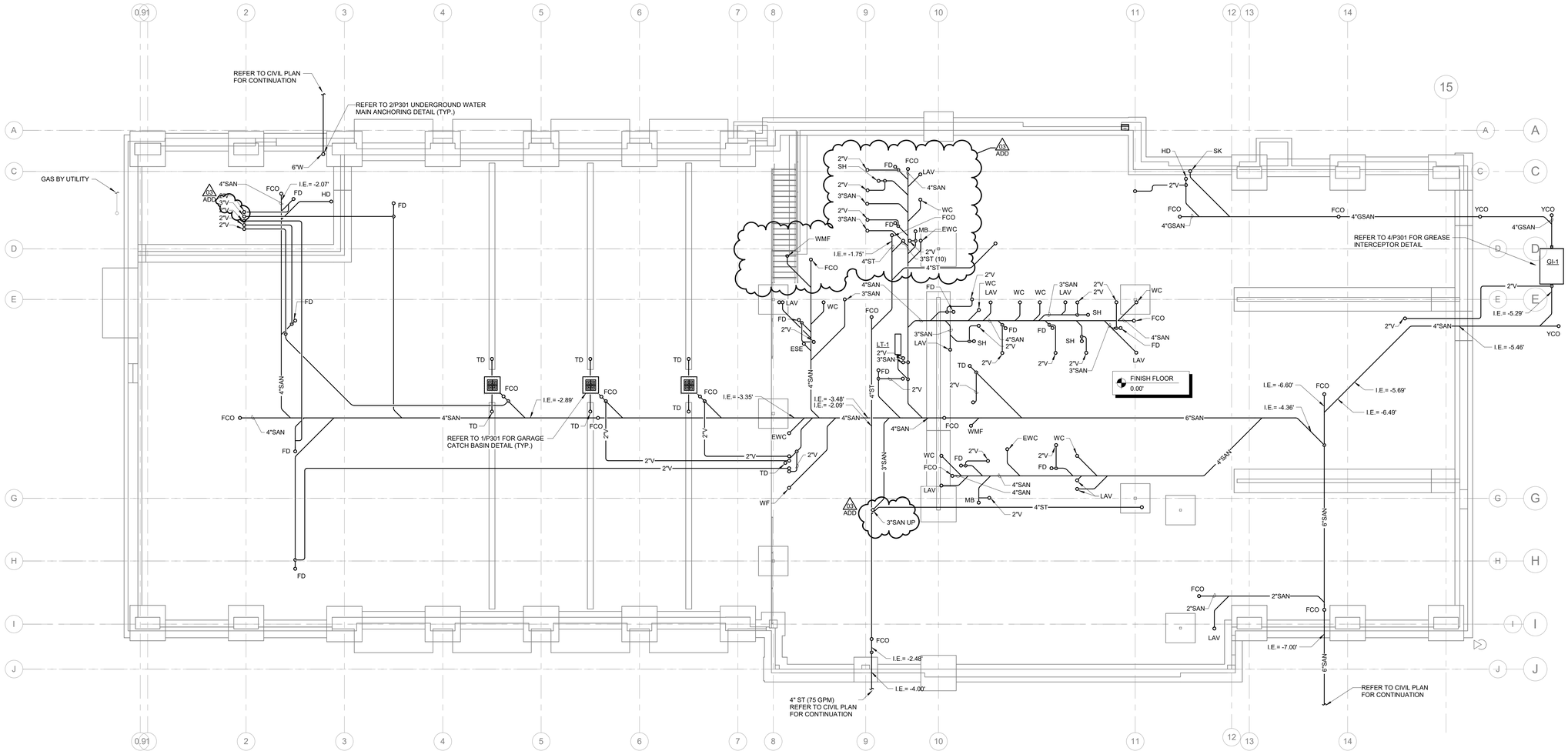
REFERENCE SCALE IN INCHES
0 1 2 3

Drawing
SCHEDULES - MECHANICAL

City of Madison Contract No. **8027**
OPN Project No. **17207000**

M500



NORTH

1 **UNDERFLOOR PLAN PLUMBING**

1/8" = 1'-0"

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Drawing

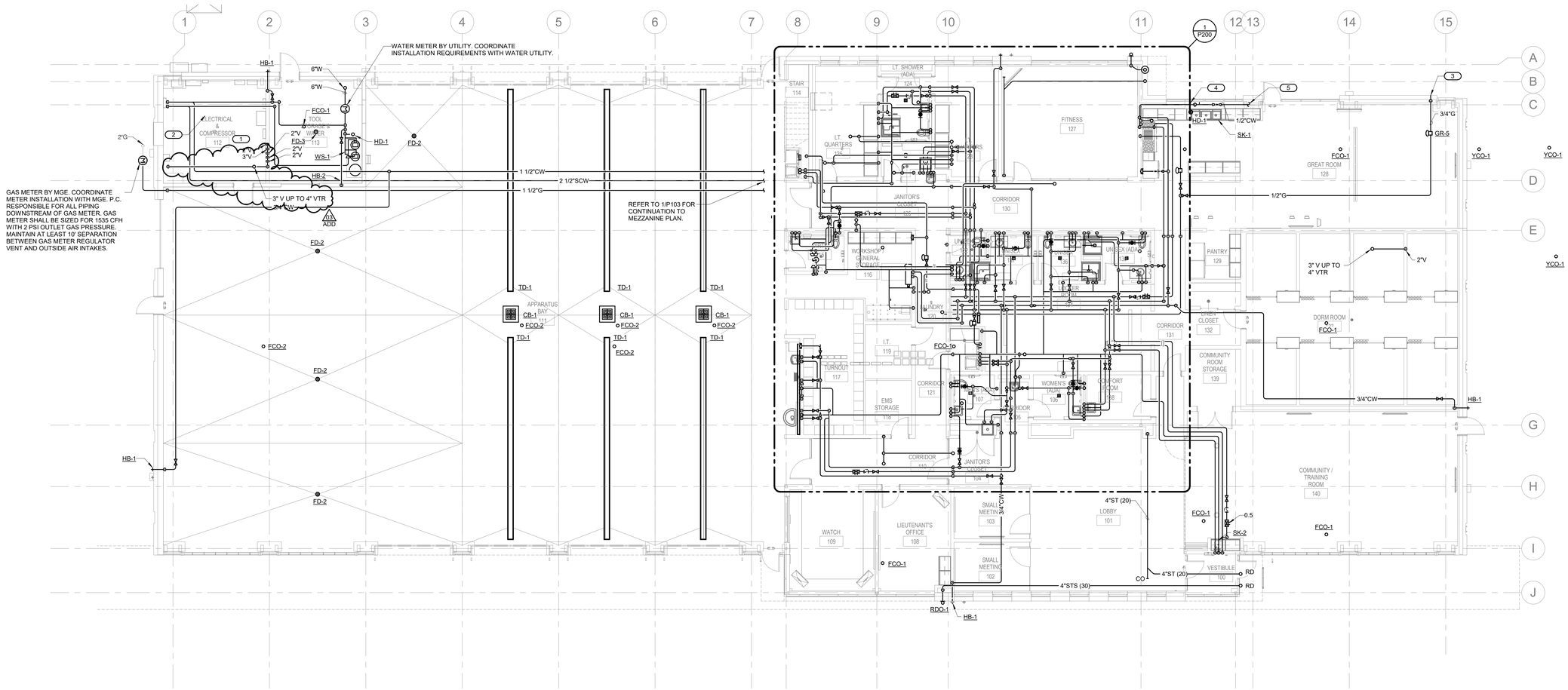
UNDERFLOOR PLAN - PLUMBING

City of Madison Contract No. **8027**
OPN Project No. **17207000**

P101

KEYNOTES: (#)

1. INSTALL OWNER FURNISHED AIR COMPRESSOR PER MANUFACTURER REQUIREMENTS. AIR COMPRESSOR IS BAUER MANUFACTURER WITH MODEL NUMBER UNICUS III.
2. PIPING SHALL BE ROUTED ABOVE CEILING LID OF ELECTRICAL ROOM NEAR EAST EXTERIOR WALL, BUT BELOW POLYCARBONATE GLAZING. PIPING SHALL THAN ROUTE UP INTERIOR OF NORTH EXTERIOR WALL TO TRUSS SPACE BEFORE ROUTING TO MEZZANINE AREA. REFER TO RISER DIAGRAMS FOR ADDITIONAL INFORMATION.
3. PROVIDE 1/2" G DOWN TO GAS CONNECTION FOR EXTERIOR NATURAL GAS GRILLE. PROVIDE EXTERIOR SHUTOFF VALVE AND QUICK CONNECT COUPLING. COORDINATE EXACT CONNECTIONS WITH OWNER.
4. ROUTE HW PIPING TO RESIDENTIAL DISHWASHER PER MANUFACTURER'S REQUIREMENTS.
5. ROUTE 1/2" CW TO COFFEE MAKER HOOKUP ON COUNTER. LOCATE BFP-2 UNDER SINK TO SERVE COFFEE MAKER.



1 FLOOR PLAN LEVEL 1 - PLUMBING

1/8" = 1'-0"

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FLOOR PLAN LEVEL 1 - PLUMBING

City of Madison Contract No. **8027**
OPN Project No. **17207000**

P102

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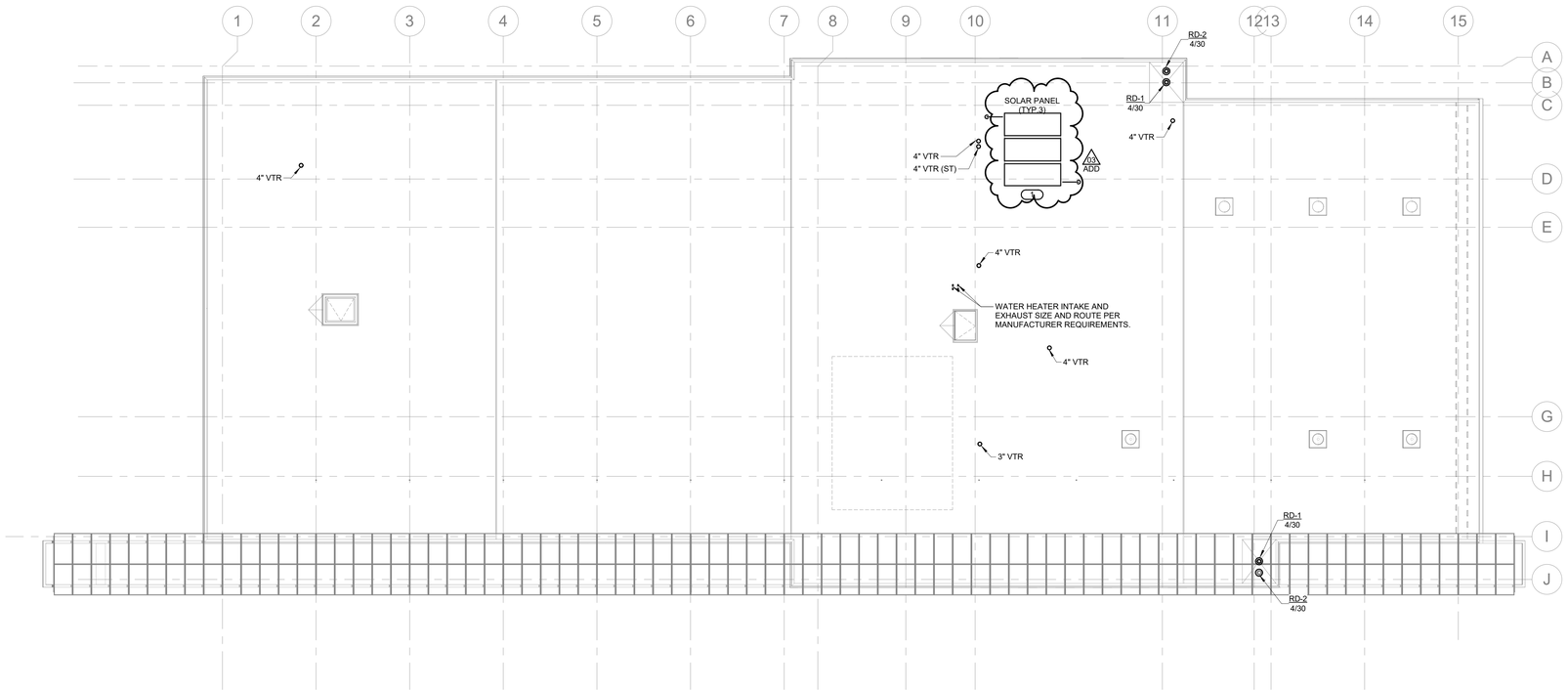
KEYNOTES: (#)

1. SOLAR PANEL PROVIDED BY P.C. REFER TO WH-1 DESCIPTION AND PLUMBING SPECIFICATION 22 3 39 FOR REQUIREMENTS.



1 ROOF PLAN - PLUMBING

3/32" = 1'-0"

NORTH

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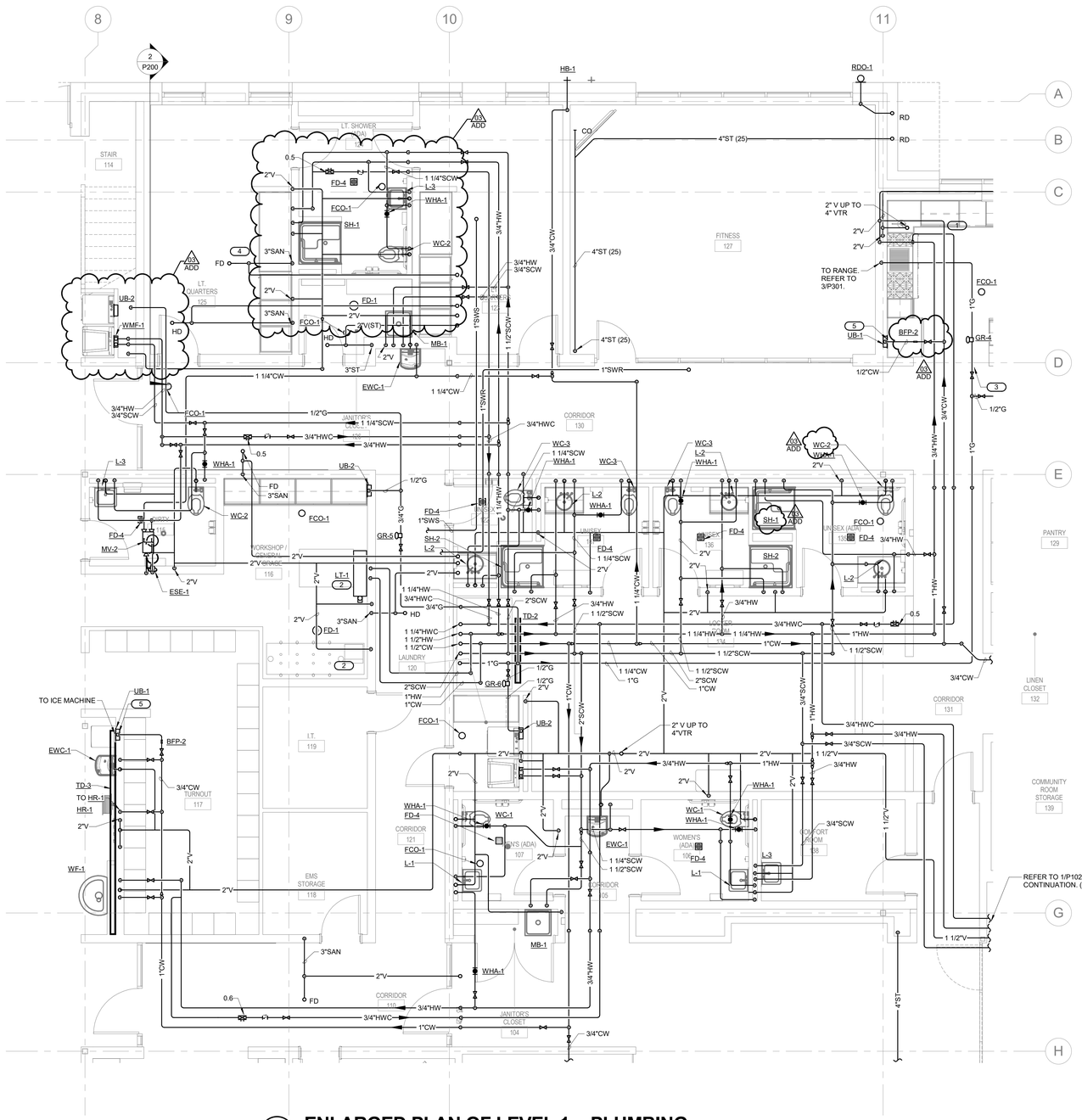
Drawing
ROOF PLAN - PLUMBING

City of Madison Contract No. **8027**
OPN Project No. **17297000**

P104



1 ENLARGED PLAN OF LEVEL 1 - PLUMBING

1/4" = 1'-0"

2 SECTION FOR LT. OFFICE 125

1/4" = 1'-0"

KEYNOTES: (#)

1. 1" HW AND 1" CW ROUTED TO COMMERCIAL WASHING MACHINE. PROVIDE BALL VALVES WITH 3/4" HOSE THREAD CONNECTIONS OUTSIDE OF THE WALL.
2. PROVIDE LT-1 RECESSED IN SLAB. PROVIDE AIR GAP ON DISCHARGE OF WASHING MACHINE DRAIN LINE INTO TROUGH.
3. INSTALL MECHANICAL GAS SHUTOFF VALVE IN GAS LINE. MECHANICAL GAS VALVE FURNISHED BY KITCHEN HOOD SUPPLIER. GAS VALVE CONTROLLED BY KITCHEN HOOD FIRE SUPPRESSION SYSTEM.
4. REFER TO 2/P200 SECTION FOR PLUMBING PIPING ROUTING ABOVE L.T. QUARTERS 125.
5. PROVIDE UB-1 AT REFRIGERATOR OR ICE MAKER.

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REFERENCE SCALE IN INCHES
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Key Plan

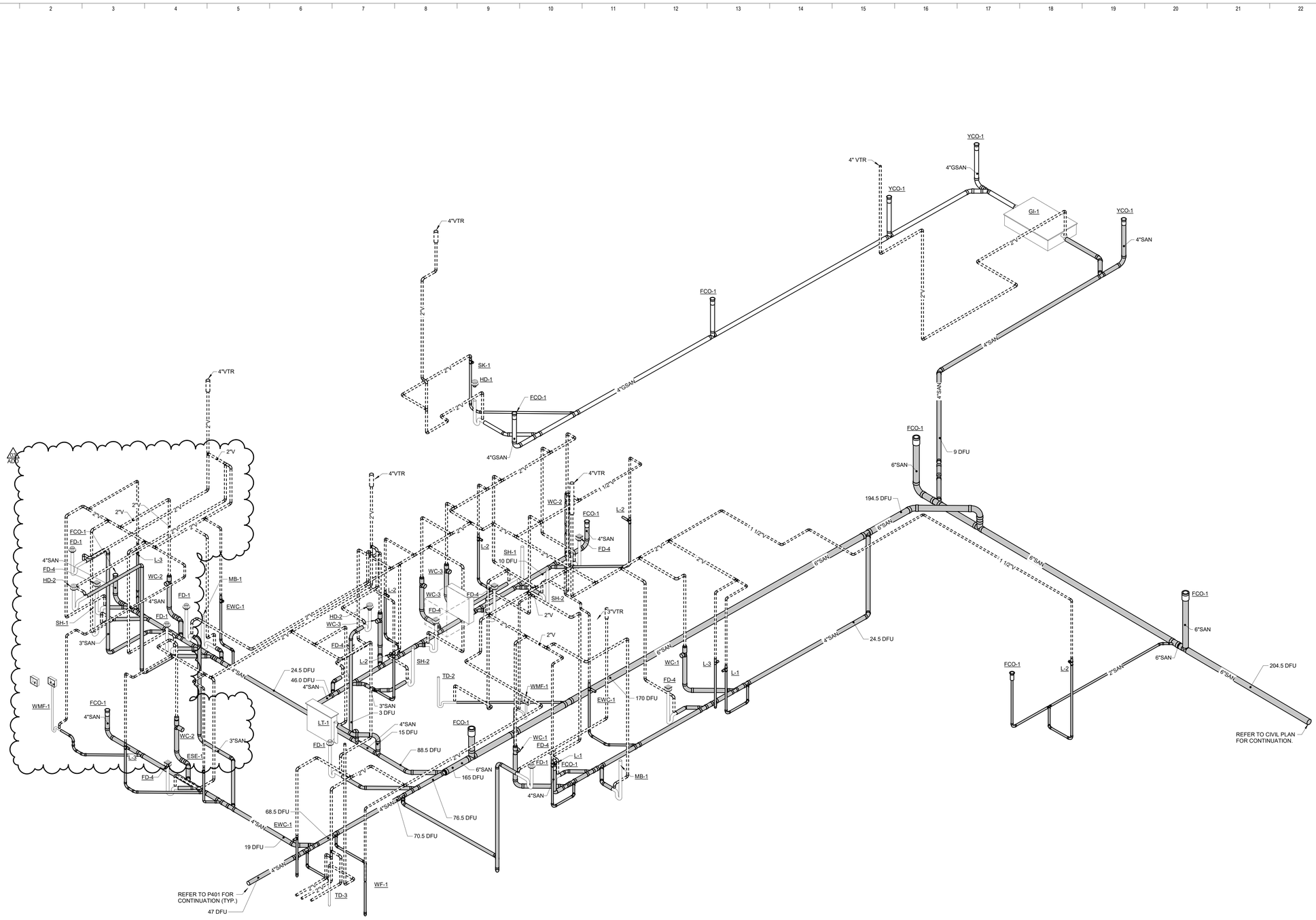
Sheet Issue Date
BID DOCUMENTS 11/03/17

Revision	Date
ADDENDA #3	12/06/2017

Drawing
ENLARGED PLAN - PLUMBING

City of Madison Contract No. **8027**
OPN Project No. **17207000**

P200



1 SAN-VENT RISER DIAGRAM - FIRST FLOOR - SOUTH - PLUMBING

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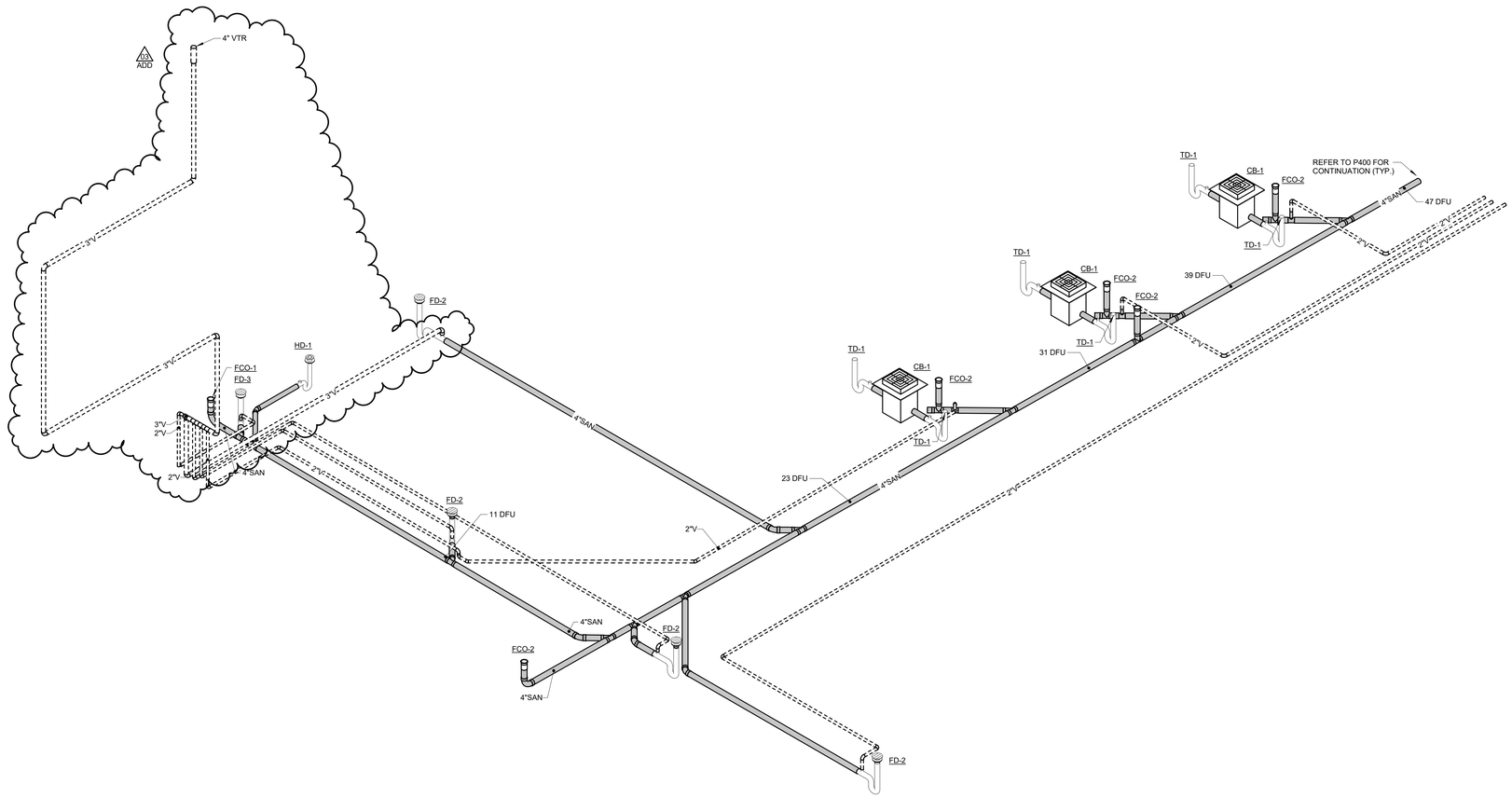
RISER DIAGRAM - SOUTH - PLUMBING

City of Madison Contract No. 8027
OPN Project No. 17207000

P400



1 SAN-VENT RISER DIAGRAM - FIRST FLOOR - NORTH - PLUMBING

NO SCALE

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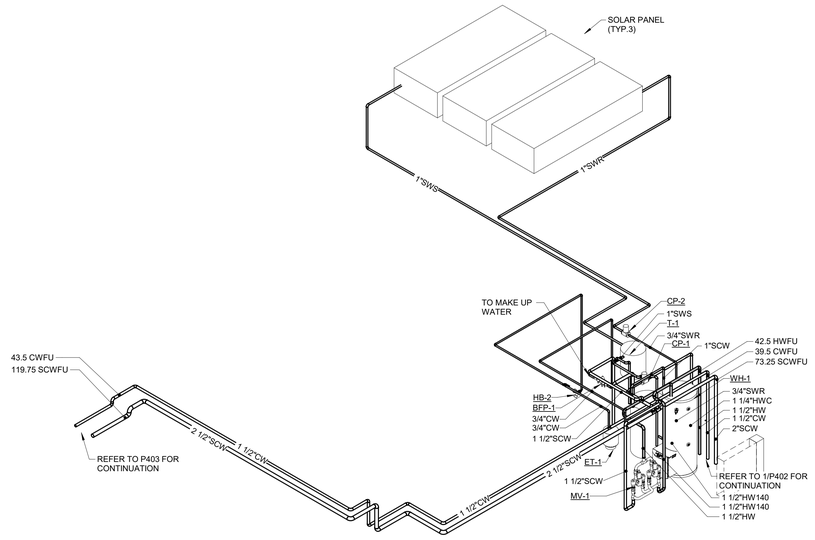
Drawing

RISER DIAGRAM - NORTH - PLUMBING

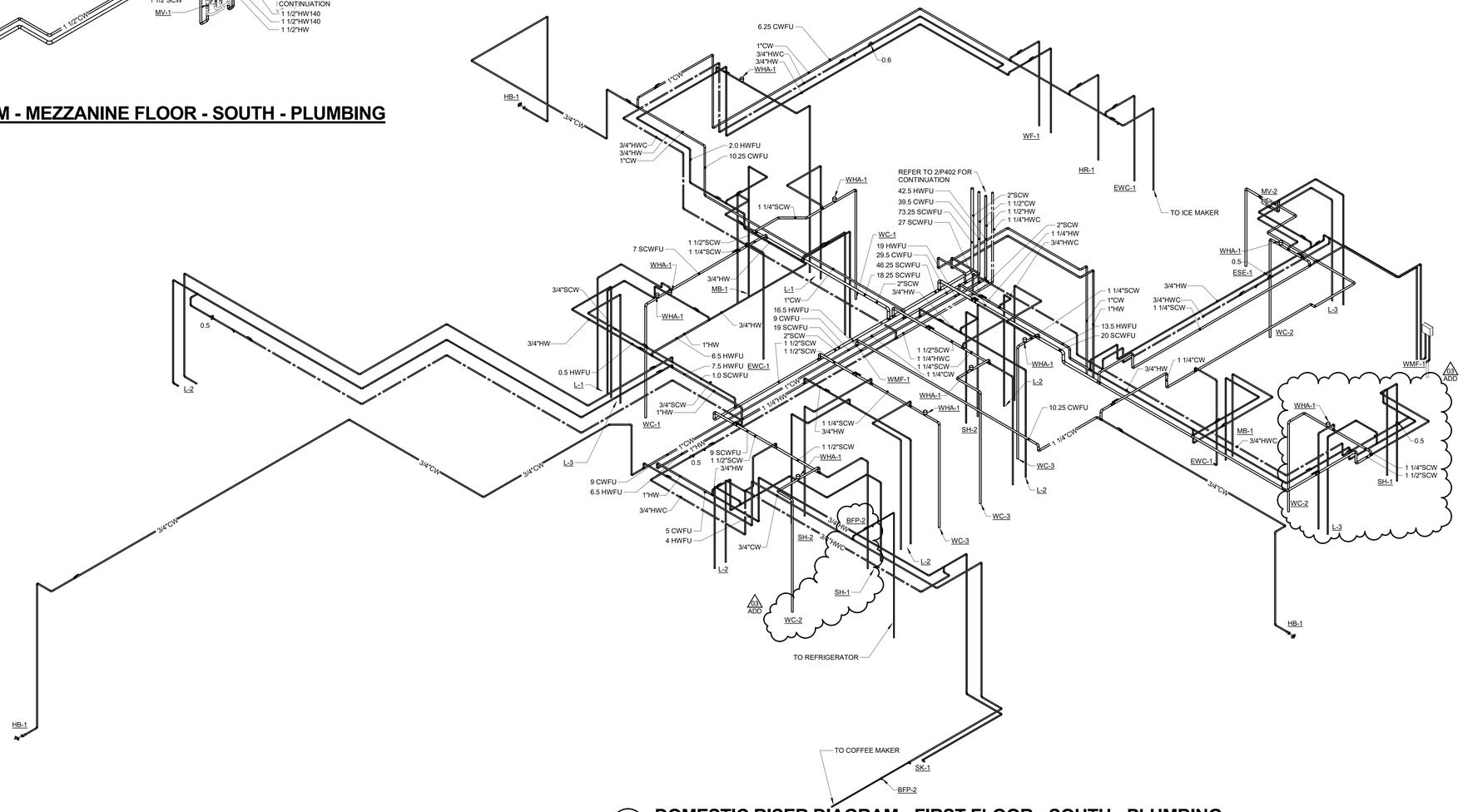
City of Madison Contract No. **8027**
OPN Project No. **17207000**

P401



2 DOMESTIC RISER DIAGRAM - MEZZANINE FLOOR - SOUTH - PLUMBING

NO SCALE



1 DOMESTIC RISER DIAGRAM - FIRST FLOOR - SOUTH - PLUMBING

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RISER DIAGRAM - SOUTH - PLUMBING

City of Madison Contract No. **8027**
OPN Project No. **17207000**

P402

PLUMBING FIXTURE SCHEDULE

TAG NAME	DESCRIPTION	MANF. & MODEL
BFP-1	BACK FLOW PREVENTER - REDUCED PRESSURE ZONE, LEAD FREE BRONZE OR STAINLESS STEEL CONSTRUCTION, SIZE SAME AS PIPE, NON-CORROSIVE INTERNAL PARTS, STAINLESS STEEL SPRINGS, DIFFERENTIAL PRESSURE RELIEF VALVE BETWEEN SPRING-LOADED CHECK VALVES, SHUT-OFF VALVES ON INLET AND OUTLET OF UNIT, BALL STYLE SHUTOFF VALVES FOR 3/4"-2" AND GATE STYLE VALVES FOR 2 1/2"-10", AIR GAP DRAIN FITTING, TEST PORTS WITH SHUT-OFF VALVES, RATED FOR 175 PSI AT 33°F TO 140°F, 15 PSI (MAXIMUM) PRESSURE DROP AT 10 FPS, FACTORY TESTED, ALL PARTS TO BE SERVICEABLE WITHOUT REMOVING UNIT FROM LINE, APPROVED BY USC FCCC & HR, AWWA C511-92, ASSE 1013, IAPMO AND SBCCI LISTED. MOUNT WITHIN 60" OF FINISHED FLOOR. PROVIDE AND INSTALL BRONZE OR EPOXY COATED STRAINER UPSTREAM OF EACH UNIT AND ADDITIONAL VALVE UPSTREAM OF EACH STRAINER. FLOW PRESSURE DROP CURVES SHALL BE SUBMITTED.	APOLLO (RPLF4A), WATTS (LF919 / 994), WILKINS (975XL2 / 375AST)
BFP-2	BACK FLOW PREVENTER - DUAL CHECK WITH ATMOSPHERIC PORT, LEAD FREE STAINLESS STEEL BODY, STRAINER, HEAVY DUTY FDA APPROVED RUBBER DIAPHRAGMS, 3/8" SIZE, RATED FOR 150 PSI AT 33°F TO 130°F, APPROVED BY ASSE 1022. PROVIDE 3/8" DRAINAGE TUBING FROM DISCHARGE PORT TO NEARBY DRAIN.	WATTS (SD-3), WILKINS (740)
CB-1	CATCH BASIN - REFER TO DETAILS SHEET FOR REQUIREMENTS.	N/A
CP-1	CIRCULATING PUMP - VARIABLE SPEED CONTROLLER WITH SETTINGS TO ADJUST AND MAINTAIN A CONSTANT: SPEED, FIXED PRESSURE, OR PROPORTIONAL PRESSURE. LEAD FREE BRONZE OR STAINLESS STEEL CONSTRUCTION, PERMANENTLY LUBRICATED SEALED BEARINGS, MECHANICAL SEAL, OIL LUBRICATED, ECM MOTOR WITH INTEGRATED VARIABLE SPEED CONTROL, FLANGED CONNECTIONS, RATED FOR 125 PSIG AT 225°F, UL LISTED. 4 GPM @ 10 FEET OF HEAD. MOTOR SHALL BE 0.65 AMPS. ELECTRICAL REQUIREMENTS - 115V, 1 PHASE HARD WIRED AQUASTAT - LINE VOLTAGE, ADJUSTABLE SETTING OF 90-180°F WITH STRAP-ON REMOTE SENSOR BULB, UL LISTED. PROVIDE WITH TRANSFORMER IF REQUIRED. INSTALL PER MANUFACTURERS INSTRUCTIONS.	PUMP - GRUNDFOS (ALPHA SERIES), B&G (ECOCIRC SERIES), ARMSTRONG (COMPASS 20-20 SS SERIES) AQUASTAT - HONEYWELL, WHITE-RODGERS, JOHNSON CONTROLS, SAME AS PUMP MANUFACTURER
CP-2	SOLAR CIRCULATING PUMP - VARIABLE SPEED CONTROLLER WITH SETTINGS TO ADJUST AND MAINTAIN A CONSTANT: SPEED, FIXED PRESSURE, OR PROPORTIONAL PRESSURE. LEAD FREE BRONZE OR STAINLESS STEEL CONSTRUCTION, PERMANENTLY LUBRICATED SEALED BEARINGS, MECHANICAL SEAL, OIL LUBRICATED, ECM MOTOR WITH INTEGRATED VARIABLE SPEED CONTROL, FLANGED CONNECTIONS, RATED FOR 125 PSIG AT 225°F, UL LISTED. APPROXIMATE FLOW RATE OF 3 GPM. FINAL FLOW RATE AND HEAD DETERMINED BY SOLAR COLLECTOR SUPPLIER. ELECTRICAL REQUIREMENTS - 115V, 1 PHASE HARD WIRED PUMP SHALL BE CONTROLLED BY SOLAR COLLECTOR CONTROLLER. REFER TO SPECIFICATION 22 33 39 FOR ADDITIONAL REQUIREMENTS.	PUMP - GRUNDFOS (ALPHA SERIES), B&G (ECOCIRC SERIES), ARMSTRONG (COMPASS 20-20 SS SERIES)
ESE-1	EMERGENCY SHOWER & EYE/FACE WASH - ACCESSIBLE, COMBINATION UNIT, RECESSED EYEWASH AND EXPOSED SHOWER HEAD, STAINLESS STEEL SHOWER HEAD, BRASS/BRONZE STAY OPEN BALL VALVE, RECESSED STAINLESS STEEL SHOWER PULL HANDLE, RECESSED STAINLESS STEEL 16 GAUGE EYEWASH COVER AND DRAIN PAN, EYEWASH SHALL DRAIN BACK INTO INTERNALLY COLLECTED PAN WITH DIRECT CONNECTION TO SANITARY WASTE PIPING, EYE/FACE WASH SHALL BE ACTIVATED BY PULLING COVER/DRAIN PAN DOWN WITH HANDLE, EYE/FACE WASH SHALL HAVE PLASTIC SPRAY HEADS WITH CAPS AND RETAINING CHAINS/STRAPS, INTEGRAL FLOW CONTROL FITTINGS, STAINLESS STEEL SUPPLY PIPING AND FITTINGS, UNIVERSAL IDENTIFICATION SIGN, ANSI Z358.1-2009 COMPLIANT. MINIMUM FLOW RATE OF SHOWER SHALL BE 20 GPM AT 30 PSI. MINIMUM FLOW RATE OF EYE/FACE WASH SHALL BE 3.0 GPM AT 30 PSI. ACTIVATION TIME SHALL BE 1 SECOND OR LESS. BRASS/BRONZE PIPING, FITTINGS, AND VALVES SHALL BE CHROME-PLATED OR CHEMICAL-RESISTANT POWDER COATED. MOUNT SHOWER HEAD, SHOWER ACTIVATION HANDLE, AND EYE/FACE WASH OUTLET HEADS IN COMPLIANCE WITH LATEST A.D.A. AND ANSI 117.1 STANDARDS.	EMERGENCY SHOWER - GUARDIAN (GBF2150), BRADLEY (S19345 SERIES), ACORN SAFETY (S3160 SERIES), HAWS (8356WCC SERIES), SPEAKMAN (SE-575-DP-238)
ET-1	EXPANSION TANK - WELDED BLACK STEEL CONSTRUCTION, GUARANTEED AIRTIGHT AND LEAKPROOF, STAINLESS STEEL SYSTEM CONNECTION, HEAVY DUTY BUTYL DIAPHRAGM AND RIGID POLYPROPYLENE LINER MECHANICALLY BONDED TO TANK TO PROVIDE A 100% NON-CORROSIVE WATER RESERVOIR, DIAPHRAGM AND LINER SHALL BE APPROVED FOR USE IN POTABLE WATER SYSTEMS, ALL WETTED COMPONENTS OF FDA APPROVED MATERIALS. PROVIDE STANDARD SCHRADER AIR VALVE FOR FIELD CHARGING. TANK SHALL COMPLY WITH FEDERAL ACT S.3874. TANK SHALL HAVE A WORKING TEMPERATURE OF 200°F AND A WORKING PRESSURE OF 125 PSIG. MINIMUM TANK VOLUME TO BE 10 GALLONS, MINIMUM ACCEPTING VOLUME TO BE 6 GALLONS. FACTORY PRE-CHARGED FOR SHIPPING. FIELD CHARGE TANK TO 55 PSIG.	AMTROL (THERM-X-TROL), B&G (PT), ELBI (DT), TACO (PAX SERIES), WATTS (DETA), WESSELS (TX)
EWC-1	ELECTRIC WATER COOLER - WALL HUNG, 18 GAUGE STAINLESS STEEL CABINET AND NON-SPLASH BASIN WITH STAINLESS STEEL FINISH, STREAM PROJECTOR WITH PROTECTIVE HOOD, PUSH BAR OR LEVER OPERATING CONTROLS ON FRONT AND SIDES, BUILT-IN FLOW REGULATOR, PLASTIC P-TRAP ASSEMBLY, ADJUSTABLE THERMOSTAT, MOUNTING ACCESSORIES, TANK DRAIN AND ANGLE STOPS, HERMETIC COMPRESSOR TO OPERATE ON HFC-134a REFRIGERANT. COMPLIANT TO LATEST ANSI A117.1 AND ADA STANDARDS. UNIT SHALL COMPLY WITH FEDERAL ACT S.3874. BOTTLE FILLING STATION - UNIT MOUNTED, STAINLESS STEEL CONSTRUCTION AND FINISH, INTEGRAL DRAIN, SENSOR OPERATED WITH AUTOMATIC SHUTOFF, REPLACEABLE LEAD-CHLORINE-TASTE-ODOR WATER FILTER, BOTTLE COUNTER. UNIT SHALL PROVIDE 8.0 GPH OF WATER FROM 80°F TO 50°F AT 90°F AMBIENT. WATER SYSTEM SHALL BE OF LEAD FREE CONSTRUCTION. TANK SHALL BE TESTED TO 125 PSIG. ORIFICE SHALL BE AT 36" (MAXIMUM) ABOVE FINISHED FLOOR. BOTTOM OF APRON SHALL BE AT 27" ABOVE FINISHED FLOOR IN COMPLIANCE WITH LATEST ADA STANDARDS. ELECTRICAL REQUIREMENTS - 115V-1 PHASE, CORD AND PLUG, 1/5 HP MOTOR	ELKAY (LZS8), HALSEY-TAYLER (HTHB-HAC8WF), ACORN (A111)
FCO-1	FLOOR CLEANOUT - ADJUSTABLE, CAST IRON HOUSING, ANCHOR FLANGE, TAPERED THREAD PLUG, SECURED NICKEL BRONZE TOP. TOP STYLE SHALL MATCH FLOOR FINISH AS FOLLOWS: UNFINISHED FLOOR - ROUND SOLID SCORIATED TOP TILE OR TERRAZZO - SQUARE RECESSED TOP CARPET - ROUND TOP WITH CARPET MARKER	ZURN (Z1400), JOSAM (55000), MIFAB (C1100), SMITH (4000), WADE (6000), WATTS (CO-200)
FCO-2	FLOOR CLEANOUT - ADJUSTABLE, CAST IRON HOUSING, ANCHOR FLANGE, TAPERED THREAD PLUG, EXTRA HEAVY DUTY SOLID TOP.	ZURN (Z1400), JOSAM (55000), MIFAB (C1100), SMITH (4000), WADE (6000), WATTS (CO-200)
FD-1	FLOOR DRAIN - CAST IRON BODY, NICKEL BRONZE ADJUSTABLE TOP, 5" ROUND, 3" BOTTOM OUTLET, FLASHING COLLAR, SURFACE MEMBRANE CLAMP, DEEP SEAL TRAP.	FLOOR DRAIN - ZURN (Z-415), SMITH (2005), WADE (1100), JOSAM (30000), WATTS (FD-100), MIFAB (F1100), SUN (FD1000)
FD-2	FLOOR DRAIN - EPOXY COATED CAST IRON BODY, EXTRA HEAVY DUTY CAST IRON SELF CLOSING HINGED GRATE, 12" ROUND ANTI-PONDING SLOTS, 4" BOTTOM OUTLET, CAST IRON SUSPENDED PERFORATED SEDIMENT BUCKET.	FLOOR DRAIN - ZURN, WATTS, SMITH, WADE, JOSAM, MIFAB
FD-3	FLOOR DRAIN - CAST IRON BODY, NICKEL BRONZE ADJUSTABLE TOP, 7" ROUND , 4" BOTTOM OUTLET, FLASHING COLLAR, SURFACE MEMBRANE CLAMP, DEEP SEAL TRAP.	FLOOR DRAIN - ZURN (Z-550), SMITH (2110), WADE (1310), JOSAM (32100). WATTS (FD-300), MIFAB (F1320)
FD-4	FLOOR DRAIN - CAST IRON BODY, NICKEL BRONZE ADJUSTABLE TOP, 6" SQUARE, 3" BOTTOM OUTLET, FLASHING COLLAR, SURFACE MEMBRANE CLAMP, DEEP SEAL TRAP.	FLOOR DRAIN - ZURN (Z-415), SMITH (2005), WADE (1100), JOSAM (30000), WATTS (FD-100), MIFAB (F1100), SUN (FD1000)
GI-1	GREASE INTERCEPTOR - RECESSED, POLYETHYLENE, FIBERGLASS REINFORCED POLYESTER, OR EPOXY COATED STEEL CONSTRUCTION, REMOVABLE OR CLEANABLE INTAKE AND DISCHARGE BAFFLES, INTERNAL FLOW CONTROL FITTING IF NECESSARY FOR OPERATION, GASKETED H-20 RATED COVER, PDI G101 COMPLIANT, PDI APPROVED AND LISTED FOR USE, 30 YEAR WARRANTY. PROVIDE RISERS FOR EXTENDING COVER TO GRADE. PROVIDE TWO-WAY CLEANOUTS UPSTREAM AND DOWNSTREAM OF GREASE INTERCEPTOR. PROVIDE UNIT WITH AK1 HIGH WATER LEVEL ANCHOR KIT AND INSTALL ANCHOR KIT PER MANUFACTURERS INSTRUCTIONS FOR HIGH WATER TABLE APPLICATIONS. 100 GPM FLOW, 1,076 LB. GREASE CAPACITY, 275 GALLONS HOLDING CAPACITY, 4" PIPE INLET AND OUTLET. CONTRACTOR HAS OPTION TO PROVIDE 750 GALLON CONCRETE GREASE INTERCEPTOR PER WISCONSIN SPS 382 REQUIREMENTS. GREASE INTERCEPTOR SIZING CRITERIA FOR STANDARD CONCRETE INTERCEPTOR: 18 MEALS PER DAY (6 FIRE-FIGHTERS PER SHIFT STAFFED 24/7) C = (M x G x H) / (2 x P) = (24 x 3 x 6) / (2 x 3) = 72 GALLONS SIZING CRITERIA FOR SCHIER GREASE INTERCEPTOR: MEALS PER DAY x GREASE PRODUCTION VALUE x DAYS PER PUMP OUT = GREASE CAPACITY NEEDED. 24 MEALS PER DAY x 0.0455 LBS/MEAL x 365 DAYS = 399 LBS GREASE	SCHIER (GREAT BASIN SERIES)
GR-1	GAS PRESSURE REGULATOR - CAST IRON BODY, INTERNAL PRESSURE RELIEF, THREADED CONNECTIONS, ADJUSTABLE PRESSURE SETTING, TIGHT SHUTOFF. 2 PSI INLET PRESSURE, 7" W.C. OUTLET PRESSURE, 400 CFH CAPACITY, MINIMUM CONTROLLABLE FLOW AS PER EQUIPMENT REQUIREMENT	MAXITROL 325 OR APPROVED EQUAL.
GR-2	GAS PRESSURE REGULATOR - CAST IRON BODY, VENTLESS TYPE, THREADED CONNECTIONS, ADJUSTABLE PRESSURE SETTING, TIGHT SHUTOFF. 2 PSI INLET PRESSURE, 7" W.C. OUTLET PRESSURE, 200 CFH CAPACITY, MINIMUM CONTROLLABLE FLOW AS PER EQUIPMENT REQUIREMENT	MAXITROL 325 OR APPROVED EQUAL.

03 ADD

PLUMBING FIXTURE SCHEDULE

TAG NAME	DESCRIPTION	MANF. & MODEL
GR-3	GAS PRESSURE REGULATOR - CAST IRON BODY, VENTLESS TYPE, THREADED CONNECTIONS, ADJUSTABLE PRESSURE SETTING, TIGHT SHUTOFF. 2 PSI INLET PRESSURE, 7" W.C. OUTLET PRESSURE, 515 CFH CAPACITY, MINIMUM CONTROLLABLE FLOW AS PER EQUIPMENT REQUIREMENT	MAXITROL 325 OR APPROVED EQUAL.
GR-4	GAS PRESSURE REGULATOR - CAST IRON BODY, VENTLESS TYPE, THREADED CONNECTIONS, ADJUSTABLE PRESSURE SETTING, TIGHT SHUTOFF. 2 PSI INLET PRESSURE, 7" W.C. OUTLET PRESSURE, 185 CFH CAPACITY, MINIMUM CONTROLLABLE FLOW AS PER EQUIPMENT REQUIREMENT	MAXITROL 325 OR APPROVED EQUAL.
GR-5	GAS PRESSURE REGULATOR - CAST IRON BODY, VENTLESS TYPE, THREADED CONNECTIONS, ADJUSTABLE PRESSURE SETTING, TIGHT SHUTOFF. 2 PSI INLET PRESSURE, 7" W.C. OUTLET PRESSURE, 100 CFH CAPACITY, MINIMUM CONTROLLABLE FLOW AS PER EQUIPMENT REQUIREMENT	MAXITROL 325 OR APPROVED EQUAL.
GR-6	GAS PRESSURE REGULATOR - CAST IRON BODY, VENTLESS TYPE, THREADED CONNECTIONS, ADJUSTABLE PRESSURE SETTING, TIGHT SHUTOFF. 2 PSI INLET PRESSURE, 7" W.C. OUTLET PRESSURE, 35 CFH CAPACITY, MINIMUM CONTROLLABLE FLOW AS PER EQUIPMENT REQUIREMENT	MAXITROL 325 OR APPROVED EQUAL.
HB-1	HOSE BIBB - FREEZELESS WALL HYDRANT, BRASS VALVE BODY AND SEAT, STANDARD FINISH, NON-FERROUS METAL STEM, AUTOMATIC DRAINING, VACUUM BREAKER, 3/4" MALE HOSE THREAD, WALL CLAMP, CONCEALED IN FLUSH MOUNTED LOCKABLE WALL BOX, KEY OPERATED, ASSE 1019 OR 1052 LISTED AND APPROVED. VERIFY NUMBER OF KEY OPERATORS TO BE PROVIDED WITH OWNER. BOX COVER AND HYDRANT SHALL USE A COMMON KEY. MOUNT AT 18" ABOVE GRADE UNLESS NOTED OTHERWISE ON DRAWINGS.	PRIER (C-634BX), WOODFORD (B67), ZURN (Z1300), WATTS (HY-725), MIFAB (MHY-20), SMITH (5509QT), WADE (8700)
HB-2	HOSE BIBB - FOR INDOOR USE, BRASS CONSTRUCTION, STANDARD FINISH, ASSE 1011 APPROVED VACUUM BREAKER, 3/4" MALE HOSE THREAD, METAL WHEEL HANDLE. MOUNT AT 18" ABOVE FINISHED FLOOR.	PRIER (C-155NP.75), WOODFORD (24), CHICAGO FAUCET (293), ACORN (8121), T&S BRASS (B-0736), MIFAB (MHY-90)
HD-1	HUB DRAIN - OPEN SITE HUB DRAIN, PVC TRAP AND STANDPIPE EXTENDED 2" AFF, 3" BOTTOM OUTLET, DEEP SEAL TRAP	NOT APPLICABLE
HD-2	HUB DRAIN - OPEN SITE HUB DRAIN, CAST IRON TRAP AND STANDPIPE EXTENDED 2" AFF, 3" BOTTOM OUTLET, DEEP SEAL TRAP	NOT APPLICABLE
HR-1	HOSE REEL - WALL MOUNTED RETRACTABLE HOSE REEL, STEEL CONSTRUCTION, GUIDE ARM, 3/8" I.D. X 70 FT WATER HOSE INCLUDED. POWDER COAT FINISH, AUTO REWIND, STEEL SUPPORT BASE MEANT FOR WALL INSTALLATION, 300 PSI RATED, 150°F WORKING TEMPERATURE INCLUDE ANIT-SPILL VACUUM BREAKER WATTS LF008PCQT (ASSE 1056 APPROVED).	REELCRAFT 7000 SERIES OR APPROVED EQUAL
L-1	LAVATORY - ACCESSIBLE, WALL MOUNTED, WHITE VITREOUS CHINA, 20"x18", 4" HIGH CONTOURED BACKSPLASH, SINGLE FAUCET HOLE, DRILLED FOR CONCEALED ARM CARRIER. LAVATORY TRIM - SINGLE HANDLE MIXING FAUCET, SELF CLOSING, BRASS CONSTRUCTION, CHROME-PLATED FINISH, CONVENTIONAL SPOUT WITH AERATOR, WASHERLESS BLADE HANDLE WITH SUPPLIES AT 4" CENTERS, OPERATING FORCE OF 5.0 LBS. (MAXIMUM), PERFORATED GRID STRAINER WITH 1-1/4" 17 GAUGE TAILPIECE, ADJUSTABLE TEMPERATURE LIMIT STOP. MAXIMUM FLOW SHALL BE 0.175 GALLONS PER CYCLE IN COMPLIANCE WITH ENERGY POLICY ACT OF 2005 AND ASME/ANSI STANDARD A112.18.1M. FAUCET SHALL COMPLY WITH FEDERAL ACT S.3874. MINIMUM FLOW TIME SHALL BE 15 SECONDS. INSULATION KIT - PRE-MANUFACTURED FOR P-TRAP, STOP VALVES AND SUPPLY LINES. ACCESSORIES - QUARTER-TURN 3/8" CHROME PLATED HEAVY BRASS ANGLE SUPPLY LOOSE KEY STOPS, CHROME PLATED SOFT COPPER SUPPLY LINES, DRAIN AND OFFSET TAILPIECE, 1-1/4" 20 GAUGE CAST BRASS P-TRAP, SUPPORT CARRIER. MOUNT LAVATORY WITH SUPPORT CARRIER BOLTED SECURELY TO FLOOR. TOP OF RIM SHALL BE AT 34" ABOVE FLOOR IN COMPLIANCE WITH LATEST ADA STANDARD. PROVIDE 29" MINIMUM CLEARANCE FROM FLOOR TO BOTTOM OF APRON IN COMPLIANCE WITH LATEST ANSI A117.1 AND ADA STANDARDS. ARMAFLEX WITH TAPE IS NOT ACCEPTABLE IN LIEU OF INSULATION KIT.	LAVATORY - AMERICAN STANDARD (0356.421), KOHLER (K-2007), SLOAN (SS-3103), TOTO (LT307), ZURN (Z5361) LAVATORY TRIM - SYMMONS (S-60), CHICAGO FAUCET (3300-ABCP) INSULATION KIT - TRUEBRO (LAV-GUARD), BROCAR PRODUCTS (TRAP WRAP), MCGUIRE (PROWRAP), PLUMBEREX (PRO-EXTREME)
L-2	LAVATORY - PROVIDED AND INSTALLED BY G.C. STRAINER AND TAILPIECE PROVIDED BY PLUMBING CONTRACTOR AND INSTALLED BY PLUMBING CONTRACTOR. LAVATORY TRIM - SINGLE HANDLE MIXING FAUCET, BRASS CONSTRUCTION, CHROME-PLATED FINISH, CONVENTIONAL SPOUT WITH AERATOR, WASHERLESS PUSH-PULL LEVER HANDLE WITH SUPPLIES AT 4" CENTERS, CERAMIC DISC CARTRIDGE, PERFORATED GRID STRAINER WITH 1-1/4" OFFSET 17 GAUGE TAILPIECE. MAXIMUM FLOW TO BE 0.35 GPM IN COMPLIANCE WITH PROJECT WATER CONSERVATION REQUIREMENTS (LEED). FAUCET SHALL COMPLY WITH FEDERAL ACT S.3874. PROVIDE RESTRICTIVE DEVICE AS REQUIRED. ACCESSORIES - QUARTER-TURN 3/8" CHROME PLATED HEAVY BRASS ANGLE SUPPLY LOOSE KEY STOPS, CHROME PLATED SOFT COPPER SUPPLY LINES, DRAIN AND OFFSET TAILPIECE, 1-1/4" 20 GAUGE CAST BRASS P-TRAP. COORDINATE OPENINGS REQUIRED IN COUNTERTOP WITH GENERAL CONTRACTOR. FIELD CUT OPENINGS WILL NOT BE ACCEPTABLE.	LAVATORY TRIM - CHICAGO FAUCET (2200-E2805ABCP), DELTA (22C631), AMERICAN STANDARD (6114.116.002), , MOEN (8417), ZURN (Z822200-XL)
L-3	LAVATORY - ACCESSIBLE, WALL MOUNTED, WHITE VITREOUS CHINA, 20"x18", 4" HIGH CONTOURED BACKSPLASH, SINGLE FAUCET HOLE, DRILLED FOR CONCEALED ARM CARRIER. LAVATORY TRIM - SINGLE HANDLE MIXING FAUCET, BRASS CONSTRUCTION, CHROME-PLATED FINISH, CONVENTIONAL SPOUT WITH AERATOR, WASHERLESS PUSH-PULL LEVER HANDLE WITH SUPPLIES AT 4" CENTERS, CERAMIC DISC CARTRIDGE, PERFORATED GRID STRAINER WITH 1-1/4" 17 GAUGE TAILPIECE. MAXIMUM FLOW TO BE 0.35 GPM IN COMPLIANCE WITH PROJECT WATER CONSERVATION REQUIREMENTS (LEED). FAUCET SHALL COMPLY WITH FEDERAL ACT S.3874. PROVIDE RESTRICTIVE DEVICE AS REQUIRED. INSULATION KIT - PRE-MANUFACTURED FOR P-TRAP, STOP VALVES, AND SUPPLY LINES. ACCESSORIES - QUARTER-TURN 3/8" CHROME PLATED HEAVY BRASS ANGLE SUPPLY LOOSE KEY STOPS, CHROME PLATED SOFT COPPER SUPPLY LINES, DRAIN AND OFFSET TAILPIECE, 1-1/4" 20 GAUGE CAST BRASS P-TRAP, SUPPORT CARRIER. MOUNT LAVATORY WITH SUPPORT CARRIER BOLTED SECURELY TO FLOOR. TOP OF RIM SHALL BE AT 34" ABOVE FLOOR IN COMPLIANCE WITH LATEST ADA STANDARD. PROVIDE 29" MINIMUM CLEARANCE FROM FLOOR TO BOTTOM OF APRON IN COMPLIANCE WITH LATEST ANSI A117.1 AND ADA STANDARDS. ARMAFLEX WITH TAPE IS NOT ACCEPTABLE IN LIEU OF INSULATION KIT.	LAVATORY - AMERICAN STANDARD (0356.421), KOHLER (K-2007), SLOAN (SS-3103), TOTO (LT307), ZURN (Z5361) LAVATORY TRIM - CHICAGO FAUCET (2200-E2805ABCP), DELTA (22C631), AMERICAN STANDARD (6114.116.002), , MOEN (8417), ZURN (Z822200-XL) INSULATION KIT - TRUEBRO (LAV-GUARD), BROCAR PRODUCTS (TRAP WRAP), MCGUIRE (PROWRAP), PLUMBEREX (PRO-EXTREME)
LT-1	LAUNDRY TROUGH - IN GROUND LAUNDRY TROUGH. OVERALL SIZE SHALL BE 42" L X 12" W X 24" DEEP MINIMUM DIMENSIONS WITH TOP FLUSH WITH SURFACE. LINT SCREEN SHOULD BE POSITIONED 3" FROM END OF UNIT SO STORAGE CAPACITY UPSTREAM OF LINT SCREEN IS 39"X12"X24" MINIMUM. UNIT SHALL BE 4" END DISCHARGE. UNIT SHALL INCLUDE TROUGH LID AND LINT SCREEN. UNIT CONSTRUCTION SHALL BE POLYPROPYLENE WITH PVC LINT FILTER. UNIT SHALL BE RATED FOR MAXIMUM WATER TEMPERATURE OF 200°F AND INCLUDE STAINLESS STEEL SCREWS FOR ATTACHING LID TO BODY. CONTRACTOR SHALL INSTALL P-TRAP AND VENT IN 4" SANITARY PIPING CONNECTING TO THE UNIT. UNIT SHALL INCLUDE TROUGH LID AND LINT SCREEN. UNIT CONSTRUCTION SHALL BE POLYPROPYLENE WITH PVC LINT FILTER. UNIT SHALL BE RATED FOR MAXIMUM WATER TEMPERATURE OF 200°F AND INCLUDE STAINLESS STEEL SCREWS FOR ATTACHING LID TO BODY. CONTRACTOR SHALL INSTALL P-TRAP AND VENT IN 4" SANITARY PIPING CONNECTING TO THE UNIT.	H-M COMPANY OR APPROVED EQUAL
MB-1	MOP BASIN - MOLDED STONE, WHITE WITH BLACK ACCENTS, 24"x24"x10", STAINLESS STEEL DRAIN WITH COMBINATION DOME STRAINER AND LINT BASKET, 3" OUTLET, VINYL BUMPER GUARD ON EXPOSED SIDES. TRIM - EXPOSED TWO HANDLE MIXING FAUCET, BRASS CONSTRUCTION, CHROME-PLATED FINISH, SINGLE WING HANDLES, 1/4 TURN CERAMIC DISC CARTRIDGE, 3/4" HOSE THREAD SPOUT WITH SEPERATE ASSE 1011 RATED VACUUM BREAKER, WALL BRACE, PAIL HOOK, CHECK STOPS OR INLINE CHECK VALVES TO PREVENT THERMAL CROSSOVER. FAUCET SHALL COMPLY WITH FEDERAL ACT S.3874. ACCESSORIES - MOP HANGER, HOSE AND HOSE BRACKET, DEEP SEAL TRAP	MOP BASIN - FIAT (MSB), WILLIAMS (MTB), SWAN (MS), ZURN (Z-1996), MUSTEE (63M) TRIM - DELTA (28C2383), AMERICAN STANDARD (8344.012), CHICAGO FAUCETS (897-CP), MOEN (8124), SPEAKMAN (SC-5812), SYMMONS (S-2490), ZURN (Z841M1-XL) VACUUM BREAKER - WATTS (8A), OR APPROVED EQUAL

02 ADD

PLUMBING FIXTURE SCHEDULE

TAG NAME	DESCRIPTION	MANF. & MODEL
MV-1	MIXING VALVE - HI/LO MASTER THERMOSTATIC MIXING VALVE ARRANGEMENT FOR TEMPERED WATER CONTROL, ALL BRONZE/BRASS CONSTRUCTION, ROUGH BRASS FINISH, UNION INLETS WITH STRAINERS, COMBINATION CHECK STOPS OR SEPARATE SUPPLY CHECK VALVES AND SHUT OFF VALVES, DIAL THERMOMETER ON OUTLET. RATED FOR 30 GPM OUTPUT MAXIMUM AT 5 PSI DIFFERENTIAL AND 2 GPM OUTPUT MINIMUM BASED UPON CONTINUOUS RECIRCULATION. UNIT TO MIX 125 DEGREE F HOT WATER SUPPLY AND 40 DEGREE F COLD WATER SUPPLY FOR 120 DEGREE F OUTLET. DUE TO SOLAR SYSTEM HOT WATER SUPPLY TEMPERATURE MAX REACH TEMPERATURES OF 160 DEGREE F DURING PERIODS OF MINIMAL USE. WATER HEATER SET POINT IS 120°F. PROVIDE FIELD ADJUSTMENT BY FACTORY AUTHORIZED REPRESENTATIVE. UNIT SHALL SHALL BE ASSE 1017 LISTED AND APPROVED. ASSEMBLY SHALL COMPLY WITH FEDERAL ACT S.3874. RATED FOR 30 GPM OUTPUT MAXIMUM AT 5 PSI DIFFERENTIAL AND 2 GPM OUTPUT MINIMUM BASED UPON CONTINUOUS RECIRCULATION. UNIT TO MIX 125 DEGREE F HOT WATER SUPPLY AND 40 DEGREE F COLD WATER SUPPLY FOR 120 DEGREE F OUTLET. DUE TO SOLAR SYSTEM HOT WATER SUPPLY TEMPERATURE MAX REACH TEMPERATURES OF 160 DEGREE F DURING PERIODS OF MINIMAL USE. PROVIDE FIELD ADJUSTMENT BY FACTORY AUTHORIZED REPRESENTATIVE. UNIT SHALL SHALL BE ASSE 1017 LISTED AND APPROVED. ASSEMBLY SHALL COMPLY WITH FEDERAL ACT S.3874.	LEONARD (TM-LF SERIES), ACORN CONTROLS (SFMV SERIES), APOLLO (34HL), BRADLEY (HL SERIES), LAWLER (800 SERIES), POWERS (LFSH1430/LFMM430 SERIES), SYMMONS (TEMPCONTROL SERIES 7)
MV-2	MIXING VALVE - THERMOSTATIC MIXING VALVE FOR EMERGENCY SHOWER OR COMBINATION SHOWER/EYEWASH FIXTURE, BRONZE BODY CONSTRUCTION, COLD WATER BYPASS, INLET AND OUTLET THERMOMETERS, COMBINATION CHECK STOPS OR SEPARATE SUPPLY CHECK VALVES AND SHUT OFF VALVES, MOUNTING BRACKET. SUPPLY SHUT OFF VALVES SHALL BE LOCKED OPEN TO PREVENT UNAUTHORIZED CLOSURE. DUAL THERMOSTATIC MIXING AND PRESSURE REGULATING VALVE TO DELIVER 25 GPM OF TEMPERED WATER (60-100 DEGREE F) WITH 5 PSI PRESSURE DIFFERENTIAL. UNIT SHALL BE ASSE 1071 LISTED AND APPROVED. VALVE SHALL COMPLY WITH FEDERAL ACT S.3874.	MIXING VALVE - LEONARD (TM-LF), ACORN CONTROLS (ET71 SERIES), ARMSTRONG (Z358), BRADLEY (S19), HAWS (9201H), LAWLER (911), POWERS (ETV400), OR PRE-PACKAGED WITH EMERGENCY SHOWER FROM SAME MANUFACTURER.
RD-1	ROOF DRAIN - CAST IRON BODY, SECURED CAST IRON DOME, 15" ROUND, BOTTOM OUTLET, FLASHING CLAMP, GRAVEL STOP, UNDERDECK CLAMP, BEARING PAN, ADJUSTABLE EXTENSION TO MATCH INSULATION THICKNESS, OUTLET SIZE AS LISTED ON DRAWINGS.	ZURN (Z-100), SMITH (1010), WADE (3000), JOSAM (21500), WATTS (RD-300), MIFAB (R1200), SUN (RD4000)
RD-2	ROOF DRAIN - CAST IRON BODY, SECURED CAST IRON DOME, 15" ROUND, BOTTOM OUTLET, FLASHING CLAMP, GRAVEL STOP, UNDERDECK CLAMP, BEARING PAN, EXTENSION TO MATCH INSULATION THICKNESS, 2" TALL INTERNAL STANDPIPE, OUTLET SIZE AS LISTED ON DRAWINGS.	ZURN (Z-100), SMITH (1070), WADE (3000), JOSAM (21500), WATTS (RD-300), MIFAB (R1200)
RDO-1	ROOF DRAIN OUTLET - LAMBS TONGUE DOWNSPOUT NOZZLE, BRONZE BODY, INTEGRAL ANCHORING FLANGE. OUTLET SIZE AS LISTED ON DRAWINGS.	ZURN (Z-199), SMITH (1770), WADE (3940), JOSAM (25010), WATTS (RD-940), MIFAB (R1940), SUN (RD4500)
SH-1	SHOWER BASE - ONE PIECE, PRECAST TERRAZZO, 36"x36" (NOMINAL), 2" DRAIN, STAINLESS STEEL REMOVABLE STRAINER. INSTALL UNIT IN PIT TO ALL ADA ACCESS WITH MAXIMUM 1/2" LIP. SHOWER VALVE - ACCESSIBLE, SINGLE HANDLE PRESSURE BALANCED MIXING FAUCET, BRASS OR BRONZE CONSTRUCTION, WASHERLESS DESIGN, OFF-COLD-HOT TEMPERATURE RANGE INDICATOR DIAL, POLISHED CHROME CAST METAL LEVER HANDLE, INTEGRAL CHECK STOPS, ADJUSTABLE TEMPERATURE LIMIT STOP. ASSE 1016 LISTED. ACCESSORIES - CHROME-PLATED BRASS SHOWERHEAD WITH SWIVEL BALL JOINT, CHROME-PLATED BRASS ARM AND FLANGE, HAND HELD SHOWER WITH 60" CHROME-PLATED METAL HOSE AND QUICK DISCONNECT, CHROME-PLATED BRASS SWIVEL CONNECTOR, 30" CHROME-PLATED MOUNTING RAIL, CHROME-PLATED BRASS SUPPLY ELBOW FLANGE, CHROME-PLATED ELEVATED VACUUM BREAKER WITH CHROME-PLATED PIPING AND FLANGES, CHROME-PLATED BRASS 2 FUNCTION TRANSFER VALVE. INSTALL ALL CONTROLS BETWEEN 38" AND 48" ABOVE FINISHED FLOOR IN COMPLIANCE WITH LATEST ADA STANDARDS. MAXIMUM FLOW TO BE 1.5 GPM IN COMPLIANCE WITH PROJECT WATER CONSERVATION REQUIREMENTS (LEED). SET SAFETY LIMIT STOP TO 110 DEGREE F DISCHARGE.	TERRAZZO SHOWER BASE - FIAT (MFT), CREATIVE INDUSTRIES (74832), WILLIAMS (56), FLORESTONE SHOWER VALVE - MOEN COMMERCIAL (8346), SYMMONS (1-25-FSB), AMERICAN STANDARD (1662.221), DELTA (R10000-UNWS/T13H152-20), LEONARD (PAM-II), POWERS (PB413-9)
SH-2	SHOWER BASE - ONE PIECE, PRECAST TERRAZZO, 36"x36" (NOMINAL), 2" DRAIN, STAINLESS STEEL REMOVABLE STRAINER. SHOWER VALVE - SINGLE HANDLE PRESSURE BALANCED MIXING FAUCET, BRASS OR BRONZE CONSTRUCTION, POLISHED CHROME CAST METAL LEVER HANDLE, WASHERLESS DESIGN, OFF-COLD-HOT TEMPERATURE RANGE INDICATOR DIAL, INTEGRAL CHECK STOPS, ADJUSTABLE TEMPERATURE LIMIT STOP, ASSE 1016 LISTED. ACCESSORIES - CHROME-PLATED PLASTIC SHOWERHEAD WITH SWIVEL BALL JOINT, ADJUSTABLE SPRAY, CHROME-PLATED BRASS ARM AND FLANGE. INSTALL BOTTOM OF SHOWERHEAD AT 72" ABOVE FINISHED FLOOR. MAXIMUM FLOW TO BE 1.5 GPM IN COMPLIANCE WITH PROJECT WATER CONSERVATION REQUIREMENTS (LEED). SET SAFETY LIMIT STOP TO 110 DEGREE F DISCHARGE.	TERRAZZO SHOWER BASE - FIAT (MFT), CREATIVE INDUSTRIES (74832), WILLIAMS (56), FLORESTONE SHOWER VALVE - (8375EP15), SYMMONS (1-100), AMERICAN STANDARD (T675.501), DELTA (R10000-UNWS/T13H122), LEONARD (PAM-II), POWERS (PB413-K1)
SK-1	SINK - TRIPLE COMPARTMENT, COUNTER MOUNTED 18 GAUGE TYPE 304 STAINLESS STEEL, 63" (SIDE-TO-SIDE) x 22" (FRONT-TO-BACK) OVERALL SIZE, EACH COMPARTMENT 19" x 16" x 10" DEEP, 3-1/2" DIAMETER DRAIN OUTLETS. SINK TRIM - (2) SEMI-PROFESSIONAL KITCHEN FAUCET, BRASS SWIVEL SPOUT, SWING ARM, METAL LEVER HANDLE, PULL-DOWN SPRAY WITH ADJUSTABLE SPRAY PATTERN AND PUSH BUTTON ACTIVATION, METAL REINFORCED HOSE WITH STAINLESS STEEL PROTECTOR COIL, 2.2 GPM MAXIMUM FLOW RATE. ACCESSORIES - (2) TYPE 304 STAINLESS STEEL BODY AND REMOVABLE CONICAL BASKET STRAINER, 1-1/2" CENTER OUTLET CONTINUOUS WASTE, (2) CHROME-PLATED BRASS P-TRAP, (2) 1/2" CHROME PLATED BRASS SUPPLIES WITH LOOSE KEY STOPS, CHROME PLATED SOFT COPPER SUPPLY LINES. GARBAGE DISPOSER - CONTINUOUS FEED, SINGLE DIRECTION, CORROSION PROTECTION SHIELD, SERVICE WRENCH, STAINLESS STEEL GRINDING ELEMENTS, MANUALLY RESET OVERLOAD PROTECTION, FULL 4 YEAR WARRANTY. ELECTRICAL REQUIREMENTS - 115V-1 PHASE, CORD AND PLUG HARD WIRED, 3/4 HP MOTOR, 15 AMPS	SINK - ELKAY (LTR632210) SINK TRIM - AMERICAN STANDARD 4332.350 IN-SINK-ERATOR (EVOLUTION SERIES), SINKMASTER (950), WASTE KING (3300)
TD-1	TRENCH DRAIN - MODULAR, PRE-SLOPED, HEAVY DUTY PRECAST POLYMER CONCRETE, 8" WIDE CHANNEL, 0.6% SLOPE, EXTRA HEAVY DUTY LOCKING CLASS E RATED DUCTILE IRON GRATE, 4" OUTLETS, LENGTH AS SHOWN ON DRAWINGS. SYSTEM SHALL BE CLASS E RATED.	ACO (S200), SMITH, ABT, WATTS, ZURN, NDS/FILCOTEN
TD-2	TRENCH DRAIN - LOW PROFILE TRENCH SYSTEM FOR SHOWERS, 60" TRENCH LENGTH, PRE-SLOPED, TYPE 304 STAINLESS STEEL CHANNEL, MEMBRANE CLAMP, SURFACE MEMBRANE CLAMP, REMOVABLE STAINLESS STEEL GRATE WITH HORIZONTAL SLOTS, 2" OUTLET CONNECTION.	SIOUX CHIEF (823-TX SERIES), BLUCHER (BWS SERIES), OR APPROVED EQUAL
TD-3	TRENCH DRAIN - MODULAR, PRE-SLOPED, POLYESTER FIBERGLASS CHANNEL, 6" WIDE, STAINLESS STEEL SLOTTED GRATE - CLASS B, INTERLOCKING ENDS, HEAVY DUTY STEEL FRAME AND ANCHORING DEVICE, CATCH BASIN WITH 3" SIDE OUTLET AND SEDIMENT BUCKET, LENGTH AS SHOWN ON DRAWINGS.	ZURN (Z806/812), SMITH (9812), ACO (FG200), NDS
UB-1	UTILITY BOX - GALVANIZED STEEL ENCLOSURE, ANGLE VALVE WITH 1/4" COMPRESSION OUTLET, INTREGAL WATER HAMMER ARRESTOR.	GUY GRAY (BIM875AB), OATEY (39140)
UB-2	UTILITY BOX - GALVANIZED STEEL ENCLOSURE, 1/2" IPS CSA LISTED GAS VALVE.	GUY GRAY, OATEY
WC-1	WATER CLOSET - ACCESSIBLE, WALL MOUNTED, FLUSH VALVE TYPE, WHITE VITREOUS CHINA, SIPHON JET, WATER SAVING, ELONGATED BOWL, 1-1/2" TOP SPUD. FLUSH VALVE - EXPOSED, SENSOR OPERATED, BATTERY POWERED, DUAL FLOW 1.1/1.6 GALLONS PER FLUSH, CHROME PLATED 1" I.P.S. SCREWDRIVER STOP-CHECK VALVE, CHEMICAL RESISTANT MATERIAL, VACUUM BREAKER, SPUD COUPLING AND FLANGE, WALL FLANGE WITH SET SCREW, MECHANICAL OVER-RIDE BUTTON, LOW BATTERY INDICATOR LIGHT, RANGE ADJUSTMENT SCREW, 3 YEAR WARRANTY. SEAT - WHITE, EXTRA HEAVY, OPEN FRONT, INJECTION MOLDED SOLID PLASTIC, SELF-SUSTAINING HINGE, STAINLESS STEEL OR PLATED STEEL POSTS AND NUTS. CONTRACTOR OPTION: COMBINATION WATER CLOSET/FLUSH VALVE PACKAGED SYSTEM BY AMERICAN STANDARD, KOHLER, SLOAN, OR ZURN ACCESSORIES - WATER CLOSET SUPPORT CARRIER RATED FOR 500 LBS. MOUNT WATER CLOSET WITH CARRIER BOLTED SECURELY TO FLOOR. TOP OF SEAT SHALL BE AT 17"-19" ABOVE FINISHED FLOOR (VERIFY EXACT MOUNTING HEIGHT WITH MANUFACTURER). FLUSH HANDLE SHALL BE LOCATED ON THE WIDE SIDE OF THE TOILET STALL AND BE AT 12" (MAXIMUM) ABOVE BOWL RIM AND OPERATE WITH NO GREATER THAN 5 LB FORCE IN COMPLIANCE WITH LATEST ADA STANDARDS. VERIFY EQUIPMENT REQUIREMENTS AND ROUGH-IN LOCATIONS.	WATER CLOSET - AMERICAN STANDARD (2257.101), SLOAN (ST-2052), ZURN (Z5610), GERBER (25-030), KOHLER (K-4325), TOTO (CT708) FLUSH VALVE - ZURN (ZR6000AV-DF), SLOAN (111-DFSM), AMERICAN STANDARD (6065.761) SEAT - BEMIS (1655C), CHURCH (9500C), BENEKE (533), KOHLER (K-4666-C), OLSONITE (95), SAME AS WATER CLOSET MANUFACTURER

03 ADD

02 ADD

03 ADD

PLUMBING FIXTURE SCHEDULE

TAG NAME	DESCRIPTION	MANF. & MODEL
WC-2	WATER CLOSET - ACCESSIBLE, WALL MOUNTED, FLUSH VALVE TYPE, WHITE VITREOUS CHINA, SIPHON JET, WATER SAVING, ELONGATED BOWL, 1-1/2" TOP SPUD. FLUSH VALVE - EXPOSED, MANUAL OPERATION, DUAL FLOW 1.1/1.6 GALLONS PER FLUSH, 11-1/2" ROUGH-IN, CHROME PLATED, 1" I.P.S. SCREWDRIVER STOP-CHECK VALVE WITH VANDAL RESISTANT CAP, HIGH BACK PRESSURE VACUUM BREAKER, SPUD COUPLING AND FLANGE, WALL FLANGE WITH SET SCREW, NON-HOLD-OPEN HANDLE, ADJUSTABLE TAILPIECE, ADA COMPLIANT, 3 YEAR WARRANTY. SEAT - WHITE, EXTRA HEAVY, OPEN FRONT, INJECTION MOLDED SOLID PLASTIC, SELF-SUSTAINING HINGE, STAINLESS STEEL OR PLATED STEEL POSTS AND NUTS. CONTRACTOR OPTION: COMBINATION WATER CLOSET/FLUSH VALVE PACKAGED SYSTEM BY AMERICAN STANDARD, KOHLER, SLOAN, OR ZURN ACCESSORIES - WATER CLOSET SUPPORT CARRIER RATED FOR 500 LBS. MOUNT WATER CLOSET WITH CARRIER BOLTED SECURELY TO FLOOR. TOP OF SEAT SHALL BE AT 17"-19" ABOVE FINISHED FLOOR (VERIFY EXACT MOUNTING HEIGHT WITH MANUFACTURER). FLUSH HANDLE SHALL BE LOCATED ON THE WIDE SIDE OF THE TOILET STALL AND BE AT 12" (MAXIMUM) ABOVE BOWL RIM AND OPERATE WITH NO GREATER THAN 5 LB FORCE IN COMPLIANCE WITH LATEST ADA STANDARDS. VERIFY EQUIPMENT REQUIREMENTS AND ROUGH-IN LOCATIONS.	WATER CLOSET - AMERICAN STANDARD (2257.101), GERBER (25-030), KOHLER (K-4325), SLOAN (ST-2053), TOTO (CT708), ZURN (Z5610) FLUSH VALVE - ZURN (Z6000AV-DF), SLOAN (WES-111) SEAT - BEMIS (1655C), CHURCH (9500C), BENEKE (533), KOHLER (K-4666-C), OLSONITE (95), SAME AS WATER CLOSET MANUFACTURER
WC-3	WATER CLOSET - WALL MOUNTED, FLUSH VALVE TYPE, WHITE VITREOUS CHINA, SIPHON JET, WATER SAVING, ELONGATED BOWL, 1-1/2" TOP SPUD. FLUSH VALVE - EXPOSED, MANUAL OPERATION, DUAL FLOW 1.1/1.6 GALLONS PER FLUSH, 11-1/2" ROUGH-IN, CHROME PLATED, 1" I.P.S. SCREWDRIVER STOP-CHECK VALVE WITH VANDAL RESISTANT CAP, HIGH BACK PRESSURE VACUUM BREAKER, SPUD COUPLING AND FLANGE, WALL FLANGE WITH SET SCREW, NON-HOLD-OPEN HANDLE, ADJUSTABLE TAILPIECE, ADA COMPLIANT, 3 YEAR WARRANTY. SEAT - WHITE, EXTRA HEAVY, OPEN FRONT, INJECTION MOLDED SOLID PLASTIC, SELF-SUSTAINING HINGE, STAINLESS STEEL OR PLATED STEEL POSTS AND NUTS. CONTRACTOR OPTION: COMBINATION WATER CLOSET/FLUSH VALVE PACKAGED SYSTEM BY AMERICAN STANDARD, KOHLER, SLOAN, OR ZURN ACCESSORIES - WATER CLOSET SUPPORT CARRIER RATED FOR 500 LBS. MOUNT WATER CLOSET WITH CARRIER BOLTED SECURELY TO FLOOR. TOP OF SEAT SHALL BE AT 15"-16" ABOVE FINISHED FLOOR (VERIFY EXACT MOUNTING HEIGHT WITH MANUFACTURER). FLUSH HANDLE SHALL BE LOCATED ON THE WIDE SIDE OF THE TOILET STALL AND BE AT 12" (MAXIMUM) ABOVE BOWL RIM AND OPERATE WITH NO GREATER THAN 5 LB FORCE	WATER CLOSET - AMERICAN STANDARD (2257.101), GERBER (25-030), KOHLER (K-4325), SLOAN (ST-2053), TOTO (CT708), ZURN (Z5610) FLUSH VALVE - ZURN (Z6000AV-DF), SLOAN (WES-111) SEAT - BEMIS (1655C), CHURCH (9500C), BENEKE (533), KOHLER (K-4666-C), OLSONITE (95), SAME AS WATER CLOSET MANUFACTURER
WF-1	WASH FOUNTAIN - FLOOR MOUNTED, 3 STATION, 14 GAUGE 304 STAINLESS STEEL, 36" SEMI-CIRCULAR, SLOW CLOSING FOOT VALVE AND VOLUME CONTROL, BACKSPLASH PLATE, INTEGRAL SOAP DISPENSER, SUPPLY/WASTE/VENT THROUGH WALL, THERMOSTATIC MIXING VALVE WITH CHECK STOPS AND STRAINERS IN ENCLOSED PANEL.	BRADLEY (WF), ACORN (3460), WILLOUGHBY (WWF-3603)
WH-1	WATER HEATER - COMBINATION SOLAR WATER HEATER WITH GAS FIRED BACK-UP. CONDENSING, VERTICAL, MINIMUM 96% EFFICIENT, SEALED COMBUSTION, METAL CABINET, BAKED ENAMEL FINISH, GLASS-LINED STEEL OR STAINLESS STEEL TANK, INTEGRAL COPPER NICKEL HEAT EXCHANGER FOR SOLAR WITH SINGLE WALL CONSTRUCTED COIL, 160 PSI WORKING PRESSURE, FIBERGLASS OR FOAM INSULATION, BRASS WATER CONNECTIONS AND DRAIN VALVE, ASME APPROVED T&P RELIEF VALVE, MULTIPLE MAGNESIUM ANODE RODS, VENT PIPING KIT, HIGH TEMPERATURE GAS SHUT OFF, AUTOMATIC WATER THERMOSTAT, BUILT-IN GAS REGULATING VALVE, ADJUSTABLE TEMPERATURE RANGE, 3-YEAR WARRANTY, UL LISTED, COMPLIANT TO NAECA, ASHRAE 90.1 AND ASHRAE 90A. 119 GALLON CAPACITY, 199,000 BTUH INPUT NATURAL GAS, 237 GPH RECOVERY AT 100°F RISE. DRAIN BACK TANK: PROVIDE 15 GALLON DRAIN BACK TANK. SOLAR STORAGE TANK: METAL CABINET, BAKED ENAMEL FINISH, GLASS-LINED STEEL OR STAINLESS STEEL TANK, 160 PSI WORKING PRESSURE, FIBERGLASS OR FOAM INSULATION, BRASS WATER CONNECTIONS AND DRAIN VALVE. TANK SHALL INCLUDE INTEGRAL SINGLE WALL COPPER NICKEL HEAT EXCHANGER COIL WITHIN STORAGE TANK. SOLAR COLLECTOR: THREE (3) 40,000 BTU/DAY PANELS. INCLUDE SAFETY RELIEF VALVE ON SOLAR HEAT EXCHANGER LOOP WITH PRESSURE RATING OF 30 PSI OR LESS. ELECTRICAL REQUIREMENTS - 120V CIRCUIT FOR BLOWER AND CONTROLS, HARD-WIRED SET WATER TEMPERATURE AT 120°F. SET SUPPLY GAS PRESSURE AT 7" W.C.	WATER HEATER - HTP (PH199-119S) SOLAR STORAGE TANK - HTP (SSU-119C) DRAIN BACK TANK - HTP (SSU-15DB) SOLAR COLLECTOR - HTP (SS-40-FP-VW)
WHA-1	WATER HAMMER ARRESTER - BELLOWS TYPE, PRE-CHARGED, ALL LEAD FREE STAINLESS STEEL CONSTRUCTION, ASSE 1010 APPROVED, PDI CERTIFIED, RATED FOR 1-11 FIXTURE UNITS. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.	ZURN (Z1700), JR SMITH (5005-5050), WADE (W5-100), JOSAM (75000 SERIES), WATTS (SS), MIFAB (WHB)
WMF-1	UTILITY BOX - GALVANIZED STEEL ENCLOSURE, ANGLE VALVE WITH 1/4" COMPRESSION OUTLET, INTREGAL WATER HAMMER ARRESTOR.	GUY GRAY (BIM875AB), OATEY (39140)
WS-1	WATER SOFTENER - AUTOMATIC REGENERATION TYPE, DUPLEX SOFTENER TANKS, DEMAND RECALL CONTROLS, POWER SUPPLY WITH CORD AND PLUG. CONTINUOUS FLOW RATE OF 32.5 GPM AT 14 PSI PRESSURE DROP PER TANK, MAXIMUM FLOW RATE OF 65 GPM AT 14 PSI PRESSURE DROP FOR THE SYSTEM, CONTINUOUS FLOW RATE OF 90 GPM AT 25 PSI PER SYSTEM. MINIMUM CAPACITY OF 56,000 GRAINS PER 20LBS SALT PER TANK AT MEDIUM SALT CAPACITY. BRINE TANK SIZE MINIMUME SHALL BE 24" DIAMETER. ELECTRICAL REQUIREMENTS - 120V-1 PHASE RECEPTACLE REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.	REFER TO SPECIFICATIONS
YCO-1	YARD CLEANOUT - ROUND, DURA-COATED CAST IRON, SIZE AS LISTED ON DRAWINGS, DOUBLE FLANGED HOUSING, HEAVY DUTY SECURED SCORIATED DURA-COATED CAST IRON COVER, LIFTING DEVICE, BRONZE CLEANOUT PLUG WITH GAS/WATER-TIGHT SEAL.	ZURN (Z1474), SMITH (4261), WADE (8401), JOSAM (58680), WATTS (CO-300-MF)

02 ADD

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Key Plan

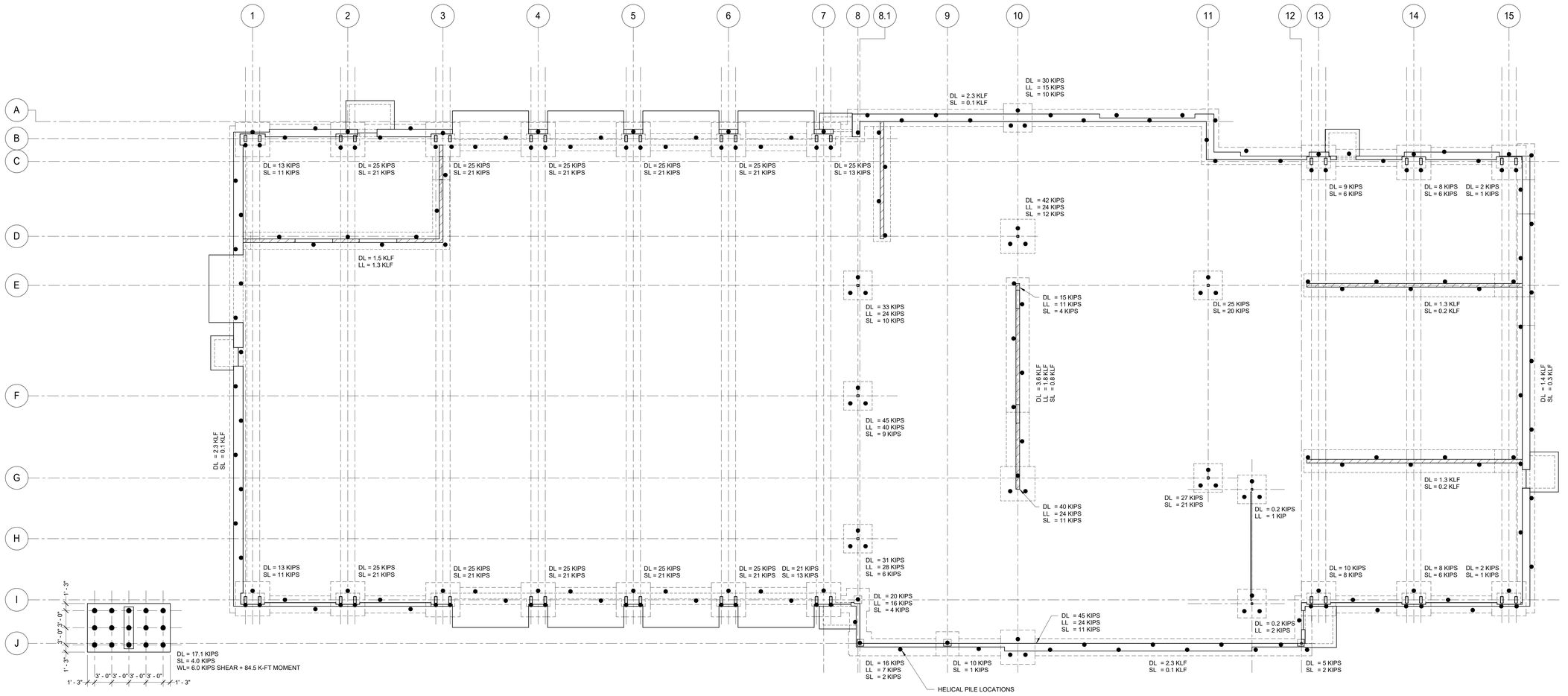
Sheet Issue Date
BID DOCUMENTS 11/03/17

Revision	Date
ADDENDA #2	11/22/17
ADDENDA #3	12/06/2017

Drawing
MATERIAL LIST - PLUMBING

City of Madison Contract No. **8027**
OPN Project No. **17207000**

P500



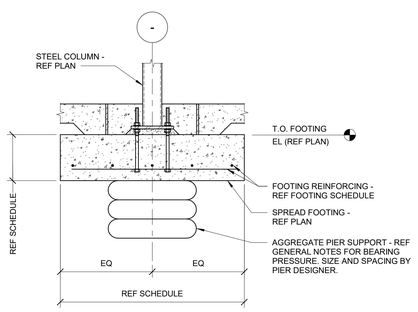
1 FOUNDATION LOADS AND HELICAL PILE LAYOUT

1/8" = 1'-0"

NORTH

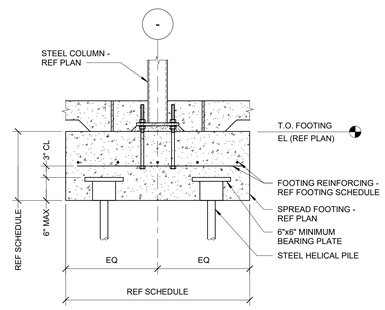
NOTES:

1. FOUNDATIONS TO BE SUPPORTED BY EITHER AGGREGATE PIERS OR STEEL HELICAL PILES. GIVEN LOADS ARE UNFACTORED VERTICAL LOADS, UNO.
   LOADS PROVIDED ARE EITHER COLUMN OR WALL LOADS APPLIED TO THE CONCRETE FOUNDATIONS. 03 ADD
2. AGGREGATE PIERS:
   AGGREGATE PIER (AP) SIZE, QUANTITY, SPACING, AND DEPTH TO BE DETERMINED BY AP DESIGNER TO MEET FOUNDATION BEARING CAPACITIES SHOWN IN GENERAL NOTES. CONTACT A/E IF MODIFICATIONS TO FOOTING SIZES ARE REQUIRED. TOP OF AP EQUAL TO BOTTOM OF FOOTING. REFER TO DETAIL 2/S002.
3. HELICAL PILES:
   HELICAL PILE (HP) DESIGN SHALL MEET THE SPECIFIED LOADING AS SHOWN ON PLAN. FOR BIDDING PURPOSES, HP QUANTITY SHALL BE AS SHOWN ON PLAN AND DEPTH SHALL BE 50-FEET BELOW THE BOTTOM OF FOUNDATION ELEVATION. REFER TO DETAILS 3 AND 4/S002 FOR FOUNDATION DESIGN PARAMETERS. CONTINUOUS FOOTINGS DESIGNED FOR MAX HP SPACING OF 6'-0" OC, STAGGERED ALONG LENGTH OF FOOTING. CONTACT A/E IF MODIFICATIONS TO FOOTING SIZES ARE REQUIRED.



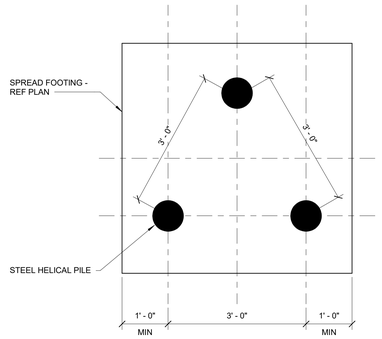
2 AGGREGATE PIER DETAIL

3/4" = 1'-0"



3 HELICAL PILE DETAIL

3/4" = 1'-0"



4 HELICAL PILE DETAIL

3/4" = 1'-0"

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Drawing
FOUNDATION LOAD PLAN

City of Madison Contract No. **8027**
OPN Project No. **17207000**

S002

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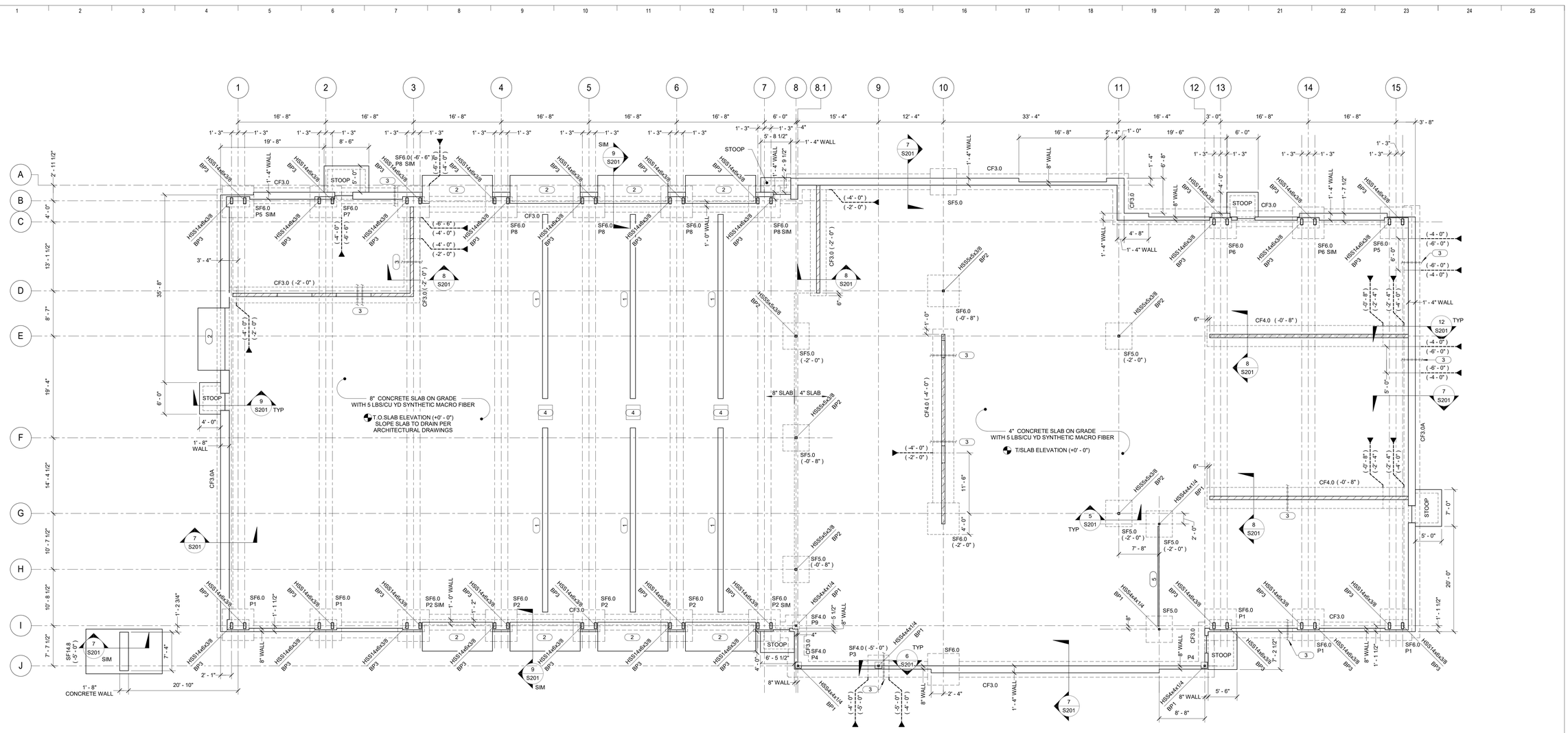

CONTINUOUS FOOTING SCHEDULE					
		THICKNESS		REINFORCING	
MARK	WIDTH	AGGREGATE PIERS	HELICAL PILES	LONG DIRECTION	SHORT DIRECTION
CF3.0	3' - 0"	1' - 0"	03 1' - 9" ADD 1' - 9"	(3) #5	WALL DOWELS
CF3.0A	3' - 0"	1' - 0"		(4) #5 AT BOTTOM & (3) #5 AT TOP	#5 @ 12" OC, BOTTOM
CF4.0	4' - 0"	1' - 0"	1' - 9"	(4) #5 TOP AND BOTTOM	#5 @12" OC, BOTTOM

SPREAD FOOTING SCHEDULE						
			THICKNESS		REINFORCING	
MARK	LENGTH	WIDTH	AGGREGATE PIERS	HELICAL PILES	LONG DIRECTION	SHORT DIRECTION
SF4.0	4' - 0"	4' - 0"	1' - 0"	1' - 9"	(4) #5	(4) #5
SF5.0	5' - 0"	5' - 0"	1' - 3"	1' - 9"	(6) #5	(6) #5
SF6.0	6' - 0"	6' - 0"	1' - 3"	1' - 9"	(6) #6	(6) #6
SF14.8	14' - 6"	8' - 6"	2' - 0"	2' - 9"	(8) #8 TOP AND BOTTOM	(14) #8

NOTES:

1. MAINTAIN MINIMUM DEPTH OF 4' - 0" FROM FINISH GRADE TO BOTTOM OF FOUNDATION WALL ELEVATION. STEP BOTTOM AS REQUIRED.

FOUNDATION WALL REINFORCING SCHEDULE				
WALL THICKNESS	VERTICALS		HORIZONTALS	
	INTERIOR FACE	EXTERIOR FACE	INTERIOR FACE	EXTERIOR FACE
8"	#4 @16" OC		#4 @12" OC	
1' - 0" TO 1' - 4"	#4 @16" OC	#4 @16" OC	#4 @12" OC	#4 @12" OC
1' - 8"	#4 @16" OC	#4 @16" OC	#5 @12" OC	#5 @12" OC

1 FOUNDATION PLAN

1/8" = 1'-0"

NOTES:

1. SF# AND CF# INDICATES SPREAD AND CONTINUOUS FOOTINGS. REFER TO THIS SHEET FOR SCHEDULES. TOP OF FOOTING ELEVATION (-4' - 0") UNO.
2. TOP OF FOUNDATION WALL ELEVATION (+0' - 0") UNO. REFER TO SCHEDULE THIS SHEET FOR REINFORCING.
3. P# INDICATES CONCRETE PIER. REFER TO S202 FOR DETAILS. TOP OF PIER ELEVATION (-0' - 8") UNO.
4. BP# INDICATES BASE PLATE. REFER TO S501 FOR ANCHOR ROD AND BASE PLATE DETAILS.
5. REFER TO 1, 2 AND 3/S201 FOR TYPICAL SLAB ON GRADE CONSTRUCTION DETAILS.
6. PROVIDE 2' - 6" x 2' - 6" CORNER BARS FOR FOOTING AND WALL INTERSECTIONS. BAR SIZE AND QUANTITY TO MATCH LONGITUDINAL AND HORIZONTAL BARS.
7. PROVIDE THICKENED SLAB AT ALL NON-STRUCTURAL MASONRY WALLS PER 11/S201.
8. ▶ INDICATES FOOTING STEP. REFER TO 12 AND 13/S201 FOR FOOTING STEP DETAILS.

KEYNOTES:

1. TRENCH DRAIN. COORDINATE LOCATION AND SIZE WITH PLUMBING AND ARCHITECTURAL DRAWINGS. REFER TO 4/S201 FOR TRENCH DRAIN DETAIL.
2. SITE PAVING AT O.H. DOORS, REFER CIVIL DRAWINGS.
3. SLEEVE UTILITIES THROUGH FOUNDATION PER 10/S201. COORDINATE SIZE AND LOCATION WITH MECHANICAL AND PLUMBING CONTRACTORS.
4. IN-FLOOR CATCH BASIN. REFER TO PLUMBING DRAWINGS FOR ADDITIONAL INFORMATION.
5. THICKEN SLAB AT RECESSED TRACK FOR OPERABLE WALL SIMILAR TO 4/S201. COORDINATE LOCATION WITH WALL SUPPLIER.

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Key Plan

Sheet Issue Date
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Revision	Date
ADDENDA #2	11/22/17
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Drawing
FOUNDATION PLAN

City of Madison Contract No. **8027**
OPN Project No. **17297000**

S101

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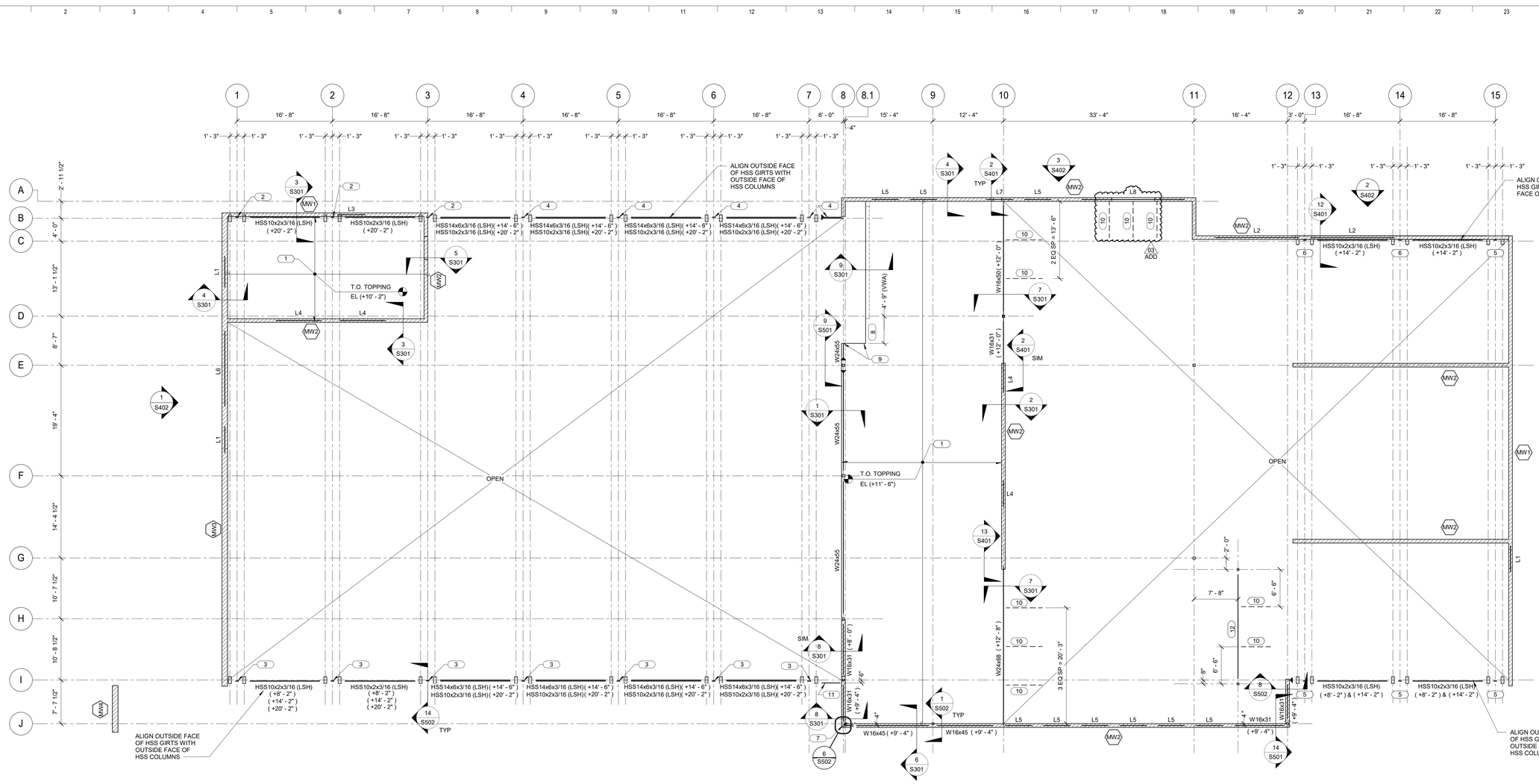

1 MEZZANINE FLOOR FRAMING PLAN - OVERALL

1/8" = 1'-0"

NOTES:

1. REFER TO 4 AND 5/S501 FOR TYPICAL SHEAR CONNECTION.
2. ▶ INDICATES MOMENT CONNECTION .
3. L# INDICATES LINTEL IN STRUCTURAL MASONRY WALL - REFER TO THIS SHEET FOR SCHEDULE.
4. FOR LINTEL IN NON-STRUCTURAL WALLS. REFER TO GENERAL NOTES FOR SCHEDULE.
5. PROVIDE BRACING BRACING OF NON-STRUCTURAL MASONRY PARTITION PER 5/S401.
6. ⟨MW#⟩ INDICATES MASONRY WALL - REFER TO THIS SHEET FOR SCHEDULE.

KEYNOTES:

(1) 8" HOLLOW CORE SLAB WITH 2" NON-COMPOSITE TOPPING WITH 3 LBS/CU YD SYNTHETIC MACRO FIBER. REFER TO PLAN FOR TOP OF TOPPING ELEVATION. PRECASTER TO DESIGN FOR THE FOLLOWING LOADS: DL = 10 PSF (EXCLUDING TOPPING SELF-WEIGHT) AND LL = 125 PSF.

(2) HSS10x2x3/16 (LSH) AT (+20' - 2").

(3) HSS10x2x3/16 (LSH) AT (+8' - 2"), (+14' - 2") AND (+20' - 2").

(4) HSS10x2x3/16 (LSH) AT (+14' - 2") AND (+20' - 2").

(5) HSS10x2x3/16 (LSH) AT (+8' - 2") AND (+14' - 2").

(6) HSS10x2x3/16 (LSH) AT (+14' - 2").

(7) PROVIDE PLATE AT CORNER TO SUPPORT MASONRY WALL CONSTRUCTION. REFER TO DETAIL 9/S502.

(8) HEADER FRAMING AT STAIR BY PRECAST SUPPLIER.

(9) PRECASTER TO DESIGN FOR STAIR STRINGER LOADS: DL = 660 LBS, LL = 2,200 LBS.

(10) L4x4x1/4 KICKER.

(11) W8x24 (+8' - 8") WITH 1/2"Ø x 6" LONG HEADED WELDED STUDS @ 16" OC ON TOP FLANGE.

(12) W12x22 PARTITION SUPPORT BEAM. COORDINATE ELEVATION WITH PARTITION SUPPLIER AND REFLECTED CEILING PLAN.

MASONRY LINTEL SCHEDULE

MARK	MEMBER BEARING, EACH END	MEMBER SIZE	REFERENCE DETAIL	NOTES
L1	0' - 8"	8" DEEP BOND BEAM WITH (2) #5 BARS + L4x3 1/2x3/8 (LLV)	8/S401	-
L2	0' - 8"	W16x31 +L5x5x3/8	10/S401	-
L3	0' - 8"	16" DEEP BOND BEAM WITH (2) #5 BARS + L4x3 1/2x3/8 (LLV)	8/S401	-
L4	0' - 8"	16" DEEP BOND BEAM WITH (2) #5 BARS	9/S401	-
L5	0' - 8"	8" DEEP BOND BEAM WITH (2) #5 BARS	9/S401	-
L6	0' - 8"	24" DEEP BOND BEAM WITH (2) #5 BARS + L5x5x3/8	11/S401	-
L7	0' - 8"	24" DEEP BOND BEAM WITH (2) #5 BARS	9/S401	-
L8	0' - 8"	W16x31	15/S401	-

03 ADD

MASONRY WALL REINFORCING SCHEDULE

MARK	WALL THICKNESS	VERTICAL WALL REINFORCING SIZE AND SPACING	HORIZONTAL WALL REINFORCING SIZE AND SPACING
⟨MW1⟩	8"	#5 @ 24" OC	TYPICAL @ 16" OC
⟨MW2⟩	8"	#5 @ 32" OC	TYPICAL @ 16" OC
⟨MW3⟩	12"	(2) #5 @ 24" OC	TYPICAL @ 16" OC
⟨MW4⟩	12"	(2) #8 @ 8" OC	TYPICAL @ 16" OC

NOTES:

1. TYPICAL HORIZONTAL REINFORCING IS AS PER SPECIFICATIONS. IT IS INTENDED TO BE A 'DUROWAL - TRUSS TYPE' OR EQUIVALENT.
2. REINFORCED CORES ARE ALWAYS GROUTED.
3. REFER TO 6/S401 FOR TYPICAL MASONRY OPENING DETAIL.
4. PROVIDE 2'-0" x 2'-0" CORNER BARS AT WALL INTERSECTIONS. BAR SIZE AND QUANTITY TO MATCH HORIZONTAL BOND BEAM BARS.

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Key Plan

Sheet Issue Date
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Revision	Date
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BID DOCUMENTS

Drawing
MEZZANINE FRAMING PLANS - AREA A AND B

City of Madison Contract No. **8027**
OPN Project No. **17207000**

S102

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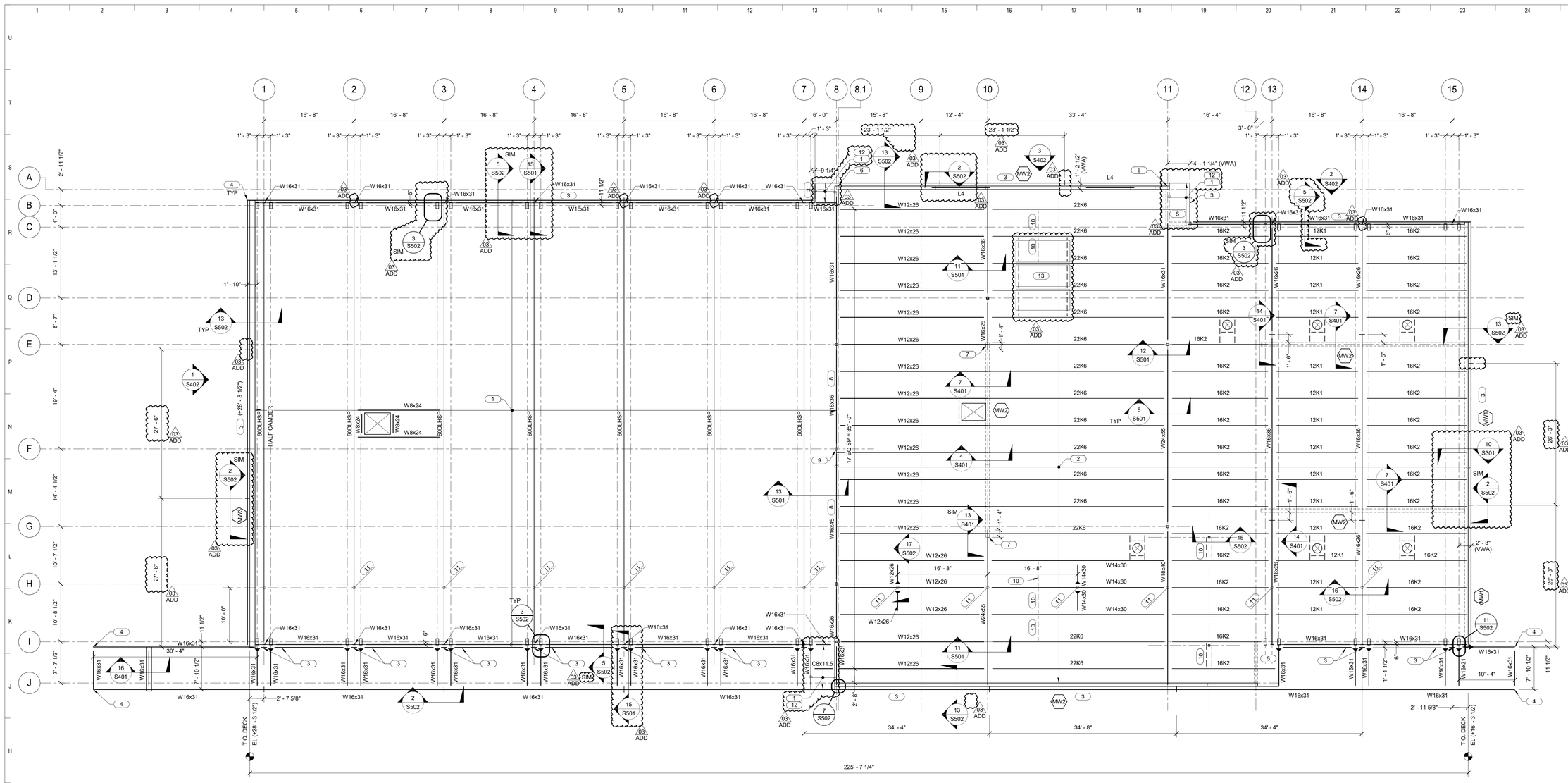

1 ROOF FRAMING PLAN

1/8" = 1'-0"

NORTH

NOTES:

1. REFER TO 4 AND 5/S501 FOR TYPICAL SHEAR CONNECTION.
2. ▶ INDICATES MOMENT CONNECTION.
3. PROVIDE BRACING OF NON-STRUCTURAL MASONRY PARTITION PER 5/S401.
4. L# INDICATES LINTEL IN STRUCTURAL MASONRY WALL - REFER TO S102 FOR SCHEDULE.
5. FOR LINTEL IN NON-STRUCTURAL WALLS. REFER TO GENERAL NOTES FOR SCHEDULE.
6. PROVIDE ANGLE FRAMING AROUND OPENING PER 6/S501.
7. REFER TO 10/S501 FOR JOIST MODIFICATION DETAIL.
8. (MW) INDICATES MASONRY WALL. REFER TO S102 FOR SCHEDULE
9. 60DLHSP JOISTS: JOIST SUPPLIER TO DESIGN FOR UNIFORM DL = 585 PLF, SL = 420 PLF AND SAFETY TIE-OFF LOADING.

KEYNOTES:

(1) EPICORE ER3.5A (16 GA) STEEL ROOF DECK, 2 SPAN MINIMUM WITH FASTENING = 24/3 PATTERN WITH 3/4" PUDDLE WELDS AND #12 SIDELAP SCREWS @ 24" OC OR EQUIVALENT. 03 ADD

(2) 1 1/2" (20 GA) STEEL ROOF DECK, 2 SPAN MINIMUM. FASTENING = 36/4 (2) WITH 5/8" PUDDLE WELDS AND #10 SIDELAP SCREWS.

(3) CONTRACTOR OPTION: W16x31 BEAM WITH FLANGES CUT OFF AND GRIND SMOOTH OR 7/16" BENT PLATE TO MATCH W16x31 DIMENSIONS.

(4) PROVIDE FULLY WELDED, MITERED CORNER CONNECTION.

(5) PROVIDE TYPE S10 JOIST EXTENSION.

(6) BEAM OR BENT PLATE PER KEYNOTE 3 TO CANTILEVER PAST CORNER OF MASONRY WALL TO SUPPORT ROOF. REFER TO DETAIL 13/S502 @ CANTILEVER CONDITION FOR DETAIL.

(7) PROVIDE 16" BEAM BEARING. REFER 4/S501 FOR BEAM TO BEAM SHEAR CONNECTION.

(8) FRAMING DESIGNED FOR SAFETY TIE-OFF POINT AT THIRD POINTS ALONG BEAM.

(9) COLUMN DESIGNED FOR SAFETY TIE-OFF POINT AT TOP OF COLUMN.

(10) L5x5x3/8 ANGLE FRAMING.

(11) SAFETY TIE-OFF:
STEEL BEAM FRAMING DESIGNED FOR SAFETY TIE-OFF POINT AT LOCATIONS INDICATED.

AT "SP" JOISTS, JOIST SUPPLIER TO DESIGN FOR ULTIMATE LOAD OF 5 KIPS SHEAR AND 10 K-FT MOMENT ACTING IN E-W DIRECTION AT LOCATIONS INDICATED.

(12) PROVIDE DECK SUPPORT ANGLES PER 1/S401 AND 5/S502.

(13) SOLAR PANEL: PROVIDE ANGLE FRAMING AT PANEL SUPPORT POINTS PER 6/S501. COORDINATE LOCATIONS WITH EQUIPMENT SUPPLIER. 03 ADD

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Drawing
ROOF FRAMING PLAN

City of Madison Contract No. **8027**
OPN Project No. **17207000**

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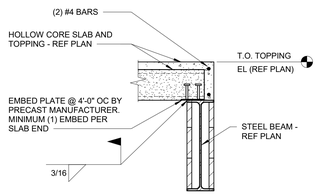
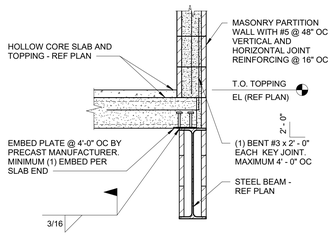
REFERENCE SCALE IN INCHES
0 1 2 3



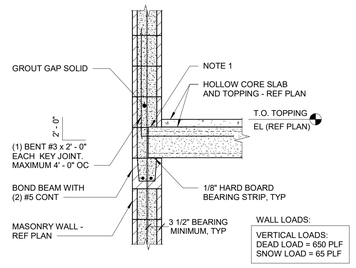


1 TYPICAL HOLLOW CORE SLAB BEARING AT STEEL BEAM

3/4" = 1'-0"

NOTES:

1. REFER TO ARCHITECTURAL DRAWINGS FOR WALL EXTENTS ABOVE HOLLOW CORE FLOOR.

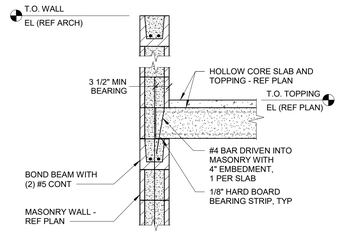


2 HOLLOW CORE SLAB BEARING AT INTERIOR WALL

3/4" = 1'-0"

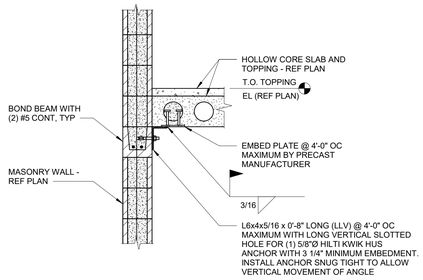
NOTES:

1. PRECAST MANUFACTURER TO DETERMINE IF ENDS OF HOLLOW CORE SLABS REQUIRE SOLID ENDS DUE TO WALL LOADS.



3 HOLLOW CORE SLAB BEARING AT CMU WALL

3/4" = 1'-0"



4 HOLLOW CORE SLAB PARALLEL TO EXTERIOR WALL

3/4" = 1'-0"

5 HOLLOW CORE SLAB PARALLEL TO CMU WALL

3/4" = 1'-0"

6 FLOOR EDGE DETAIL

3/4" = 1'-0"

7 FLOOR EDGE DETAIL

3/4" = 1'-0"

NOTES:

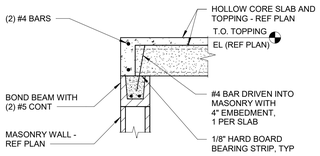
1. AT SIM: REFER TO DETAIL FOR KICKER CONNECTIONS. PROVIDE 3/8" STIFFENER PLATE AT ROOF BEAM ON GRID LINE 13 FOR KICKER ATTACHMENT.

8 HOLLOW CORE SLAB BEARING AT CMU WALL

3/4" = 1'-0"

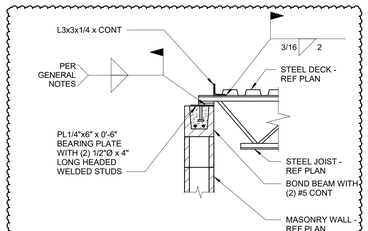
NOTES:

1. AT SIM: REFER TO ARCHITECTURAL DRAWINGS FOR WALL EXTENTS ABOVE HOLLOW CORE FLOOR.



9 HOLLOW CORE SLAB BEARING AT CMU WALL

3/4" = 1'-0"



10 TYPICAL ROOF JOIST BEARING ON MASONRY

3/4" = 1'-0"

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Key Plan

Sheet Issue Date
BID DOCUMENTS 11/03/17

Revision	Date
ADDENDA #2	11/22/17
ADDENDA #3	12/01/17

BID DOCUMENTS

Drawing
PRECAST DETAILS

City of Madison Contract No. **8027**
OPN Project No. **17207000**

S301

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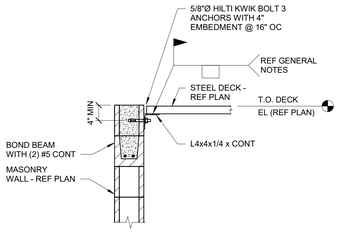
REFERENCE SCALE IN INCHES
0 1 2 3

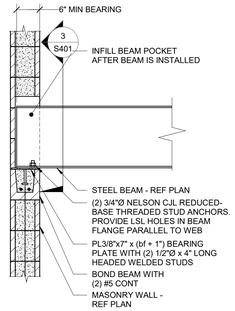


1 ROOF DECK SUPPORT AT MASONRY

3/4" = 1'-0"

NOTES:

1. REFER TO ARCHITECTURAL DRAWINGS FOR T.O. WALL ELEVATION. ROTATE ANGLE LEG UP WHERE MASONRY HEIGHT ALLOWS.

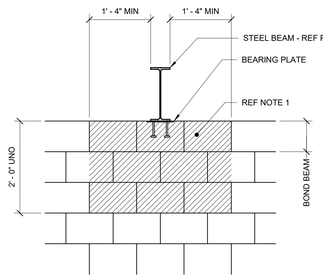


2 TYPICAL BEAM BEARING ON MASONRY

3/4" = 1'-0"

NOTES:

1. SIM CONDITION AT BEAM BEARING PARALLEL TO THE MASONRY WALL UNO.

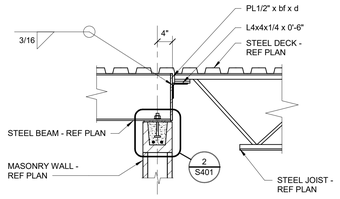


3 TYPICAL BEAM BEARING ON MASONRY

3/4" = 1'-0"

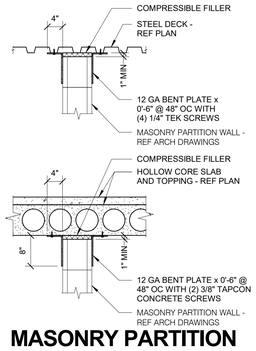
NOTES:

1. IN SHADED AREA, FILL ALL CORES IN WALL WITH GROUT MINIMUM AT CORNER CONDITION: 1'-4", EACH WAY.



4 FRAMING DETAILS

3/4" = 1'-0"

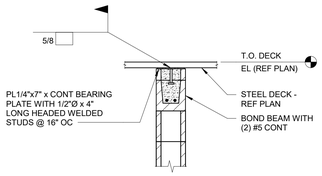


5 MASONRY PARTITION WALL AT STEEL DECK

3/4" = 1'-0"

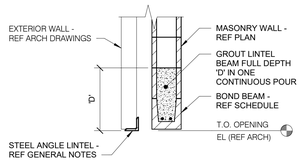
NOTES:

1. PROVIDE THE BENT PLATE CLIP ANGLES ON ALL INTERIOR NON-LOAD BEARING MASONRY PARTITION WALLS. REFERENCE ARCHITECTURAL DRAWINGS FOR LOCATION OF ALL MASONRY PARTITION WALLS.
2. BENT PLATE CLIPS MAY BE ELIMINATED IF ALL THE FOLLOWING CONDITIONS ARE MET.
   A. LENGTH OF WALL BETWEEN PERPENDICULAR INTERSECTING WALLS IS LESS THAN THE FOLLOWING:
      a. 15'-0" FOR 6" CMU
      b. 20'-0" FOR 8" CMU
      c. 22'-0" FOR 10" CMU
      d. 25'-0" FOR 12" CMU
   B. WALL AND INTERSECTION HAVE PROPERLY INSTALLED (9 GA) TRUSS TYPE HORIZONTAL JOINT REINFORCING @ 16" OC.



7 SHEAR WALL CONNECTION DETAIL

3/4" = 1'-0"

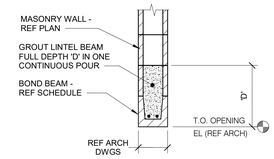


8 LINTEL DETAIL

3/4" = 1'-0"

NOTES:

1. REFERENCE ARCHITECTURAL DRAWINGS FOR INSULATION, THROUGH-WALL FLASHING, AND WEEP HOLES.
2. SHORE MASONRY UNTIL GROUT FOR LINTEL HAS REACHED ITS SPECIFIED STRENGTH.

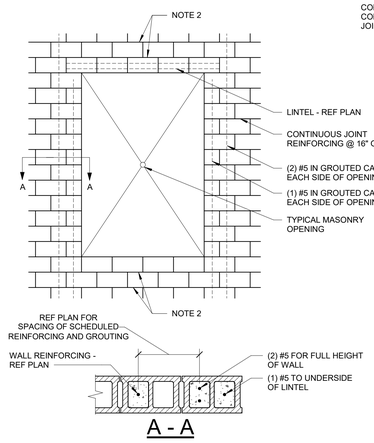


9 LINTEL DETAIL

3/4" = 1'-0"

NOTES:

1. SHORE MASONRY UNTIL GROUT FOR LINTEL HAS REACHED ITS SPECIFIED STRENGTH.

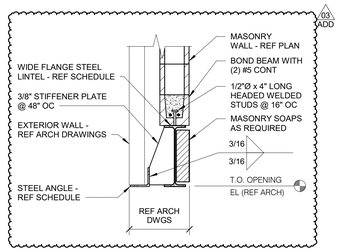


6 TYPICAL MASONRY WALL DETAIL

3/4" = 1'-0"

NOTES:

1. REFER TO ARCHITECTURAL ELEVATIONS FOR MASONRY CONTROL JOINT LOCATIONS.
2. TWO COURSES OF JOINT REINFORCING ARE REQUIRED ABOVE THE LINTEL AND BELOW THE SILL AND SHALL EXTEND A MINIMUM OF 24 INCHES PAST THE OPENING.

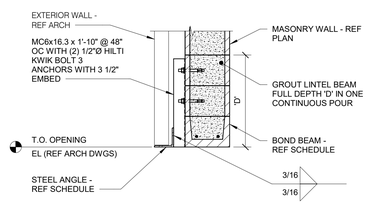


10 LINTEL DETAIL

3/4" = 1'-0"

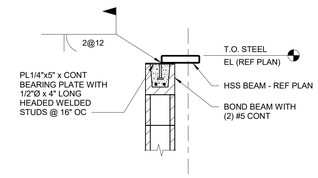
NOTES:

1. REFERENCE ARCHITECTURAL DRAWINGS FOR INSULATION, THROUGH-WALL FLASHING, AND WEEP HOLES.



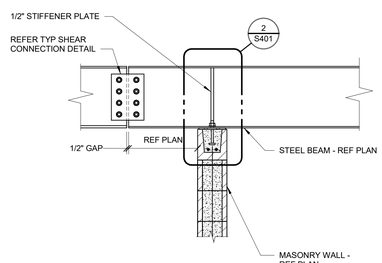
11 LINTEL DETAIL

3/4" = 1'-0"



12 WALL SUPPORT DETAIL

3/4" = 1'-0"



13 BEAM BEARING PARALLEL TO MASONRY

3/4" = 1'-0"

NOTES:

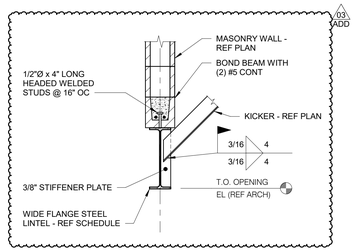
1. AT SIM: REFER TO PLAN FOR BEARING LENGTH. EXTEND BEARING PLATE 1" LONGER THAN BEARING LENGTH.

14 TYPICAL BEAM BEARING ON MASONRY

3/4" = 1'-0"

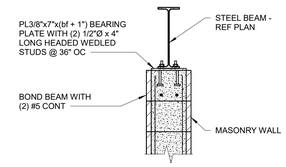
NOTES:

1. EITHER WELDED OR BOLTED CONNECTIONS MAY BE EMPLOYED.



15 LINTEL DETAIL

3/4" = 1'-0"



16 BEAM BEARING ON MASONRY WALL

3/4" = 1'-0"

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Civil Engineer

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Key Plan

Sheet Issue Date
BID DOCUMENTS 11/03/17

Revision	Date
ADDENDA #3	12/01/17

BID DOCUMENTS

Drawing
MASONRY DETAILS

City of Madison Contract No. **8027**
OPN Project No. **17207000**

S401

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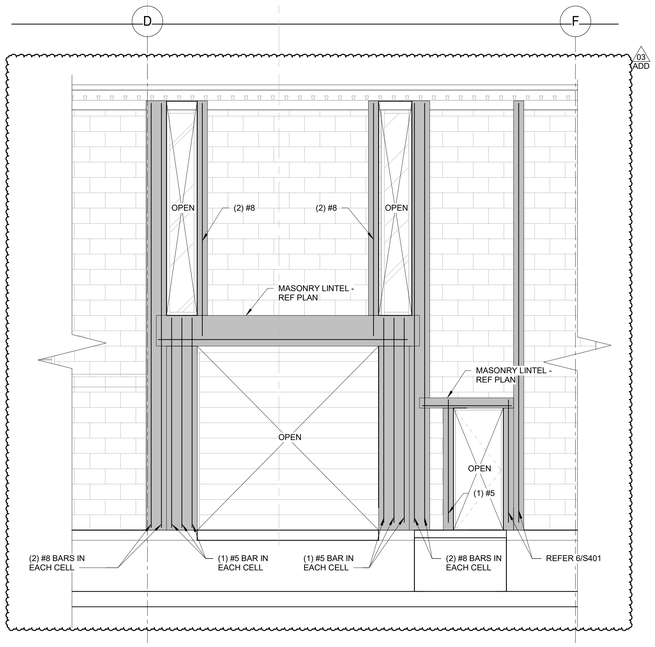
REFERENCE SCALE IN INCHES
0 1 2 3

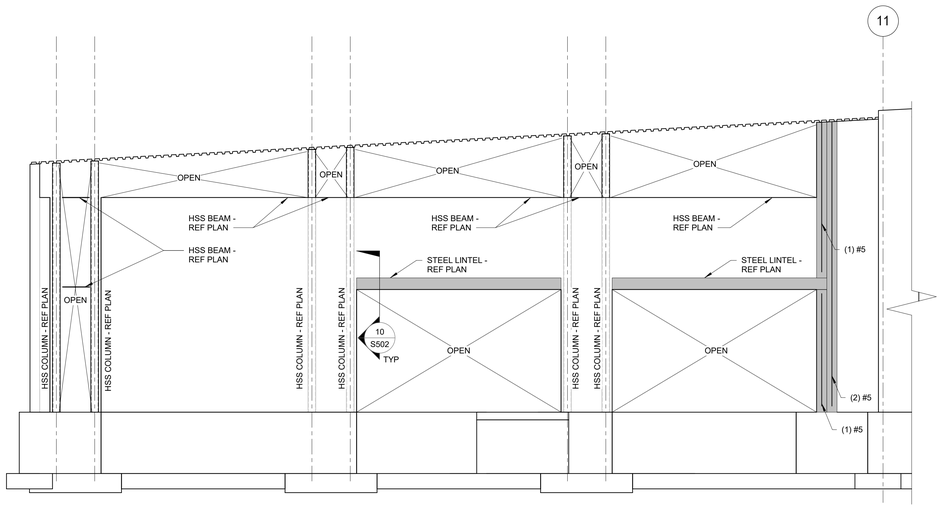


1 NORTH ELEVATION

1/4" = 1'-0"

NOTES:

1. TYPICAL WALL REINFORCEMENT NOT SHOWN FOR CLARITY.

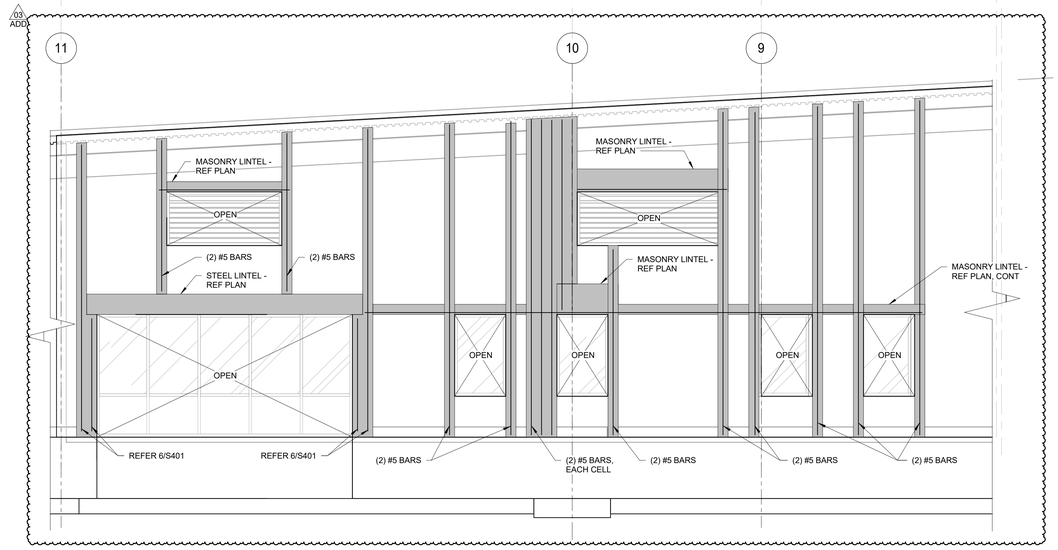


2 EAST ELEVATION

1/4" = 1'-0"

NOTES:

1. TYPICAL WALL REINFORCEMENT NOT SHOWN FOR CLARITY.



3 EAST ELEVATION

1/4" = 1'-0"

NOTES:

1. TYPICAL WALL REINFORCEMENT NOT SHOWN FOR CLARITY.

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Key Plan

Sheet Issue Date
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BID DOCUMENTS

Drawing
MASONRY WALL ELEVATIONS

City of Madison Contract No. **8027**
OPN Project No. **17207000**

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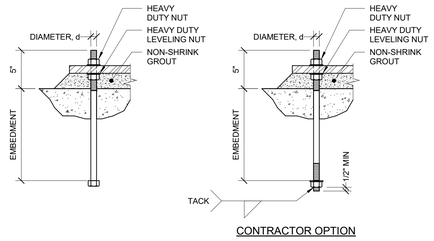
REFERENCE SCALE IN INCHES
0 1 2 3



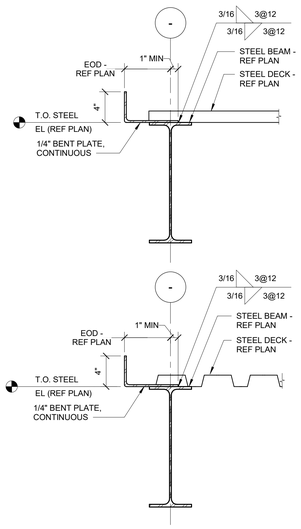
CONTRACTOR OPTION

1 TYPICAL ANCHOR ROD

1 1/2" = 1'-0"

NOTES:

1. REFERENCE BASE PLATE DETAILS FOR DIAMETER AND EMBEDMENT.
2. REFERENCE GENERAL NOTES FOR MATERIAL REQUIREMENTS.
3. ANCHOR RODS SHALL BE SET PRIOR TO PLACEMENT OF CONCRETE.
4. PROTECT ANCHOR RODS FROM DAMAGE.
5. ANCHOR SHALL BE SET SO AS NOT TO VARY FROM THE DIMENSIONS SHOWN ON THE ERECTION DRAWINGS BY MORE THAN THE FOLLOWING:
   A. 1/8" CENTER TO CENTER OF ANY TWO RODS WITHIN AN ANCHOR ROD GROUP.
   B. 1/4" CENTER TO CENTER OF ADJACENT ANCHOR ROD GROUPS.
   C. ELEVATION OF THE TOP OF ANCHOR RODS ± 1/2".
   D. MAXIMUM ACCUMULATION OF 1/4" PER HUNDRED FEET ALONG THE ESTABLISHED COLUMN LINE.
   E. 1/4" FROM THE CENTER OF ANY ANCHOR ROD GROUP TO THE ESTABLISHED COLUMN LINE THROUGH THAT GROUP.
   F. REFERENCE AISC CODE OF STANDARD PRACTICE FOR ADDITIONAL INFORMATION.
6. SET ANCHOR RODS PERPENDICULAR TO BEARING SURFACE, UNLESS NOTED OTHERWISE.
7. PROVIDE 1 1/2" NON-SHRINK GROUT AT ALL BASE PLATES.

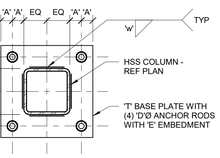


7 TYPICAL CLOSURE PLATE DETAIL

1 1/2" = 1'-0"

NOTES:

1. REFER TO PLAN FOR DECK ORIENTATION.



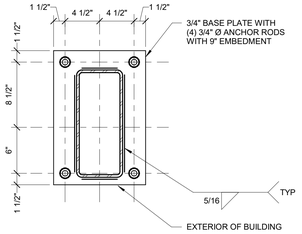
HSS BASE PLATE SCHEDULE							
MARK	COLUMN	'T'	'A'	'D'	'E'	'w'	COMMENTS
BP1	HSS4x4	3/4"	1 1/2"	3/4"	9"	1/4"	-
BP2	HSS5x5	1"	1 1/2"	3/4"	9"	1/4"	-

2 HSS COLUMN BASE PLATE DETAIL

1 1/2" = 1'-0"

NOTES:

1. REFER TO TYPICAL ANCHOR ROD DETAIL FOR ADDITIONAL INFORMATION.
2. NO WELDS REQUIRED AT RADIUSES.

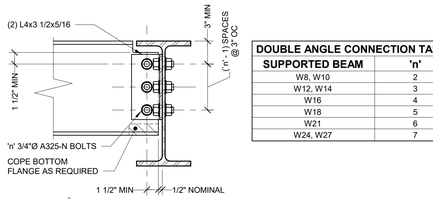


3 BASE PLATE (BP3) DETAIL

1 1/2" = 1'-0"

NOTES:

1. REFER TO TYPICAL ANCHOR ROD DETAIL FOR ADDITIONAL INFORMATION.
2. NO WELDS REQUIRED AT RADIUSES.



DOUBLE ANGLE CONNECTION TABLE	
SUPPORTED BEAM	'n'
W8, W10	2
W12, W14	3
W16	4
W18	5
W21	6
W24, W27	7

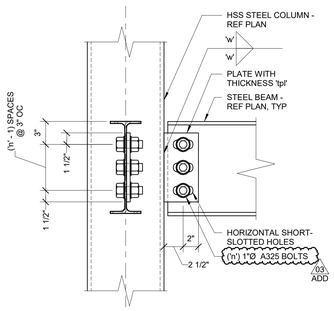
KNIFE PLATE CONNECTION TABLE			
SUPPORTED BEAM	'tpl'	'n'	'w'
W8, W10	1/4"	2	3/16"
W12, W14	5/16"	3	1/4"
W16	5/16"	4	1/4"
W18	5/16"	5	1/4"
W21	5/16"	6	1/4"
W24, W27	3/8"	7	1/4"

4 TYPICAL SHEAR CONNECTION

1 1/2" = 1'-0"

NOTES:

1. BOTH DOUBLE ANGLE AND KNIFE PLATE CONNECTION CONFIGURATIONS ARE ACCEPTABLE, UNLESS NOTED OTHERWISE. FABRICATOR AND DETAILER SHALL SELECT WHICH OPTION IS BEST SUITED FOR THEIR FABRICATION PROCESS AND THE ANTICIPATED ERECTION PROCEDURES.
2. DETAIL TO BE SIMILAR AT CONNECTIONS TO WIDE FLANGE OR HSS COLUMNS.
3. UNLESS NOTED OTHERWISE, PROVIDE SHEAR CONNECTIONS AS INDICATED BY THIS DETAIL.
4. DETAILER IS RESPONSIBLE FOR FULLY DEVELOPING GEOMETRY AND DIMENSIONAL INFORMATION REQUIRED TO FABRICATE.
5. WHERE TYPICAL SHEAR CONNECTION DETAIL IS NOT APPLICABLE, FABRICATOR SHALL SELECT AND DETAIL ALTERNATE CONNECTION CAPABLE OF DEVELOPING EQUAL STRENGTH. ALTERNATE CONNECTION SHALL BE SELECTED IN ACCORDANCE WITH AISC ASD CONNECTION TABLES.



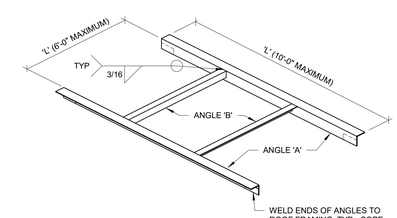
KNIFE PLATE CONNECTION TABLE			
SUPPORTED BEAM	'tpl'	'n'	'w'
W8, W10	1/4"	2	3/16"
W12, W14	5/16"	3	1/4"
W16	3/8"	4	1/4"
W18	1/2"	5	5/16"
W21	1/2"	6	5/16"
W24	1/2"	7	5/16"

5 TYPICAL BEAM TO TUBE COLUMN SHEAR CONNECTION

1 1/2" = 1'-0"

NOTES:

1. WHERE TYPICAL SHEAR CONNECTION DETAIL IS NOT APPLICABLE, FABRICATOR SHALL SELECT AND DETAIL ALTERNATE CONNECTION CAPABLE OF DEVELOPING EQUAL STRENGTH. ALTERNATE CONNECTION SHALL BE SELECTED IN ACCORDANCE WITH AISC ASD CONNECTION TABLES.



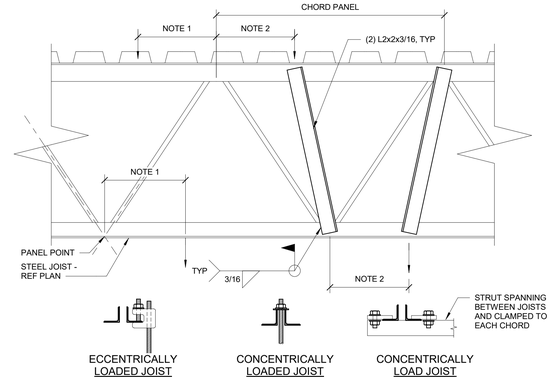
'L'	ANGLE 'A'	ANGLE 'B'
UP TO 1'-0"	NONE - SUMP PAN ONLY	NONE - SUMP PAN ONLY
1'-1" TO 4'-6"	L4x4x1/4	L4x4x1/4
4'-7" TO 6'-0"	L4x4x5/16	L4x4x1/4
6'-1" TO 8'-0"	L4x4x3/8	-
8'-1" TO 10'-0"	L6x4x3/8 (LLV)	-

6 DECK OPENING FRAMING DETAIL

3/4" = 1'-0"

NOTES:

1. USE ABOVE FRAMING AT ALL OPENINGS EXCEEDING 1'-0" UNO.
2. REFERENCE ARCHITECTURAL AND MECHANICAL DRAWINGS FOR SIZE AND LOCATION OF ALL OPENINGS.
3. ROOF OPENING FRAMING NOT REQUIRED AT SIDE DISCHARGE ROOF DRAINS. COORDINATE WITH MECHANICAL CONTRACTOR.

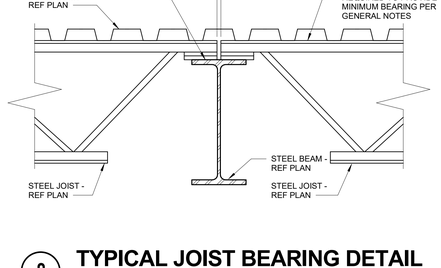


10 JOIST MODIFICATION DETAIL

1 1/2" = 1'-0"

NOTES:

1. FOR ATTACHMENTS TO JOISTS THAT ARE CONCENTRICALLY LOADED ON THE JOIST, A MAXIMUM OF 100 POUNDS MAY BE ATTACHED TO THE JOIST WITHIN A CHORD PANEL WITHOUT AN ADDITIONAL ANGLE. FOR ATTACHMENTS TO JOIST THAT ARE ECCENTRICALLY LOADED, A MAXIMUM OF 25 POUNDS MAY BE ATTACHED TO THE JOIST WITHIN A CHORD PANEL WITHOUT AN ADDITIONAL ANGLE. MULTIPLE ATTACHMENTS ARE ALLOWED IN EACH CHORD PANEL AS LONG AS THE SUM OF THE LOADS DO NOT EXCEED THE MAXIMUM LOAD INDICATED.
2. FOR LOADS BETWEEN 100 POUNDS AND 200 POUNDS, ADDITIONAL ANGLES ARE REQUIRED AND JOIST MUST BE CONCENTRICALLY LOADED.
3. FOR LOADING CONDITIONS IN NOTES 1 AND 2 ABOVE, TOTAL SUM OF LOADS SHALL NOT EXCEED 200 LBS FOR AN 8 FOOT SEGMENT OF JOIST. FOR LOADS GREATER THAN 200 POUNDS AND NOT NOTED ON THE DRAWINGS, CONTACT ENGINEER PRIOR TO INSTALLATION.
4. NO LOADS SHALL BE SUPPORTED FROM JOIST BRIDGING.

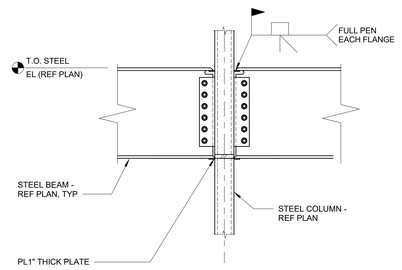


8 TYPICAL JOIST BEARING DETAIL

1 1/2" = 1'-0"

NOTES:

1. JOISTS AT OR IMMEDIATELY ADJACENT TO COLUMNS SHALL BE BOLTED WITH (2) BOLTS ON BEAM GAGE. REFER TO GENERAL NOTES FOR BOLT DIAMETER.

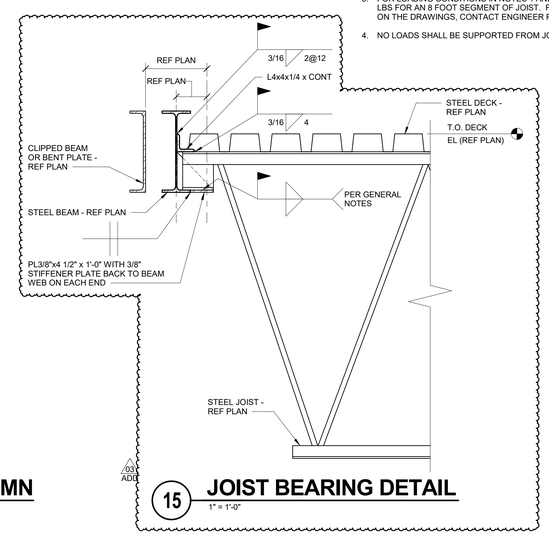


9 MOMENT CONNECTION DETAIL

3/4" = 1'-0"

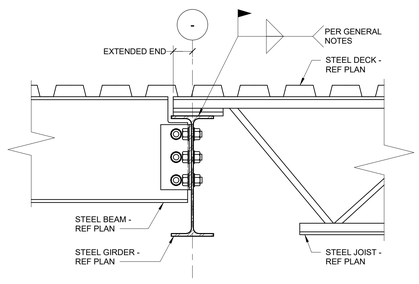
NOTES:

1. DETAIL SIMILAR FOR MOMENT CONNECTION OF BEAMS IN OPPOSITE DIRECTION.
2. STIFFENER PLATE THICKNESS SHALL MATCH LARGER FLANGE THICKNESS OR CONNECTOR PLATE UNO.



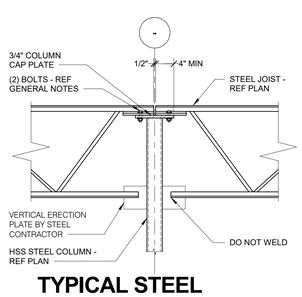
15 JOIST BEARING DETAIL

1" = 1'-0"



11 SECTION AT ROOF GIRDER

1 1/2" = 1'-0"

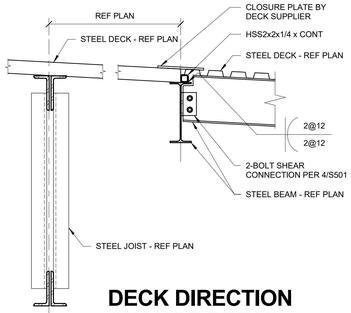


12 TYPICAL STEEL JOIST AT HSS COLUMN

3/4" = 1'-0"

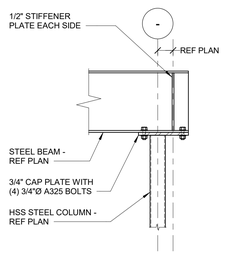
NOTES:

1. GIRDER NOT SHOWN FOR CLARITY.
2. DECK NOT SHOWN FOR CLARITY.
3. CONNECTION SHOWN IS BASED ON STEEL JOIST INSTITUTE REQUIREMENTS FOR K-SERIES BAR JOISTS. CONNECTION DETAIL NOT APPLICABLE FOR LH-SERIES JOISTS OR JOIST GIRDERS.



13 DECK DIRECTION CHANGE DETAIL

3/4" = 1'-0"



14 BEAM BEARING ON COLUMN

3/4" = 1'-0"

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Key Plan

Sheet Issue Date	
BID DOCUMENTS	11/03/17

Revision	Date
ADDENDA #3	12/01/17

BID DOCUMENTS

Drawing
STEEL DETAILS

City of Madison Contract No. **8027**
OPN Project No. **17207000**

S501

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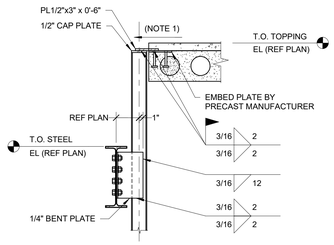
REFERENCE SCALE IN INCHES
0 1 2 3

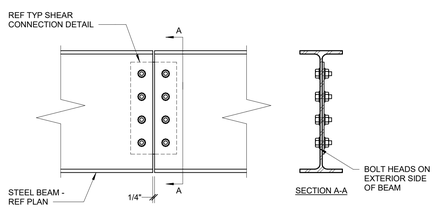


1 FRAMING DETAIL

3/4" = 1'-0"

NOTES:

1. PRECAST MANUFACTURER TO DESIGN EMBED FOR THE FOLLOWING UNFACTORED SERVICE LOADS: DEAD LOAD = 200 LB AND REVERSIBLE WIND LOAD = 1250 LB.
2. MASONRY WALL NOT SHOWN FOR CLARITY.



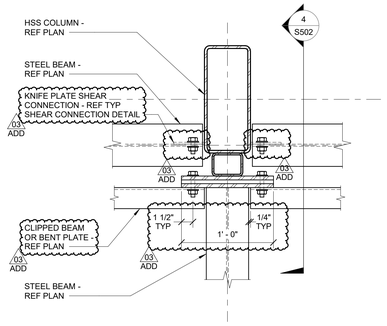
2 SPLICE DETAIL

1 1/2" = 1'-0"

NOTES:

1. AT SIM: PROVIDE 1/4" GAP BETWEEN STEEL FRAMING MEMBERS. BOLTED CONNECTION WITH CONNECTION PLATE NOT REQUIRED.

03 ADD



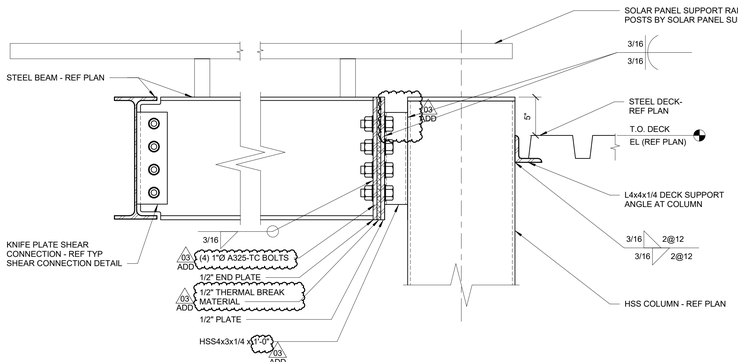
3 OVERHANG CONNECTION DETAIL

1 1/2" = 1'-0"

NOTES:

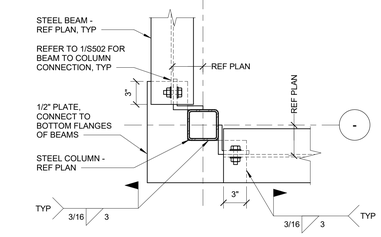
1. AT SIM: EXTEND CLIPPED BEAM OR BENT PLATE FRAMING ACROSS CONNECTION PLATE TO JOIST CENTERLINE WITH 1/4" GAP BETWEEN ENDS. SIMILAR TO 2/S502 ONLY ONE LINE OF BOLTS REQUIRED AT CONNECTION PLATES, PROVIDE BOLTED CONNECTION AT INSIDE FACES OF COLUMN GROUPS.

03 ADD



4 OVERHANG CONNECTION DETAIL

1 1/2" = 1'-0"

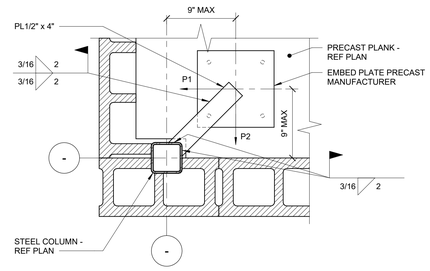


9 FRAMING DETAIL

1 1/2" = 1'-0"

NOTES:

1. MASONRY WALL NOT SHOWN FOR CLARITY.



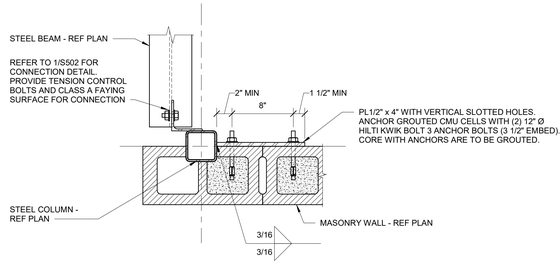
6 FRAMING DETAIL

1 1/2" = 1'-0"

NOTES:

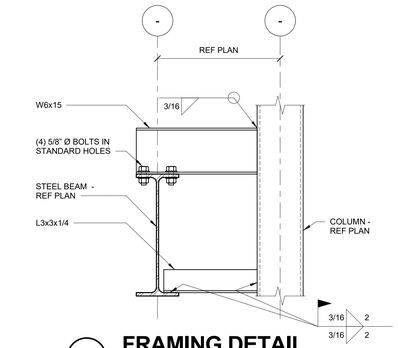
1. P# INDICATES HORIZONTAL LOAD REQUIRED TO BRACE COLUMN. PRECAST MANUFACTURER TO DESIGN EMBED FOR THE FOLLOWING UNFACTORED SERVICE LOADS:

P1 - DEAD LOAD (1.0DL)	=	150 LB
LIVE LOAD (1.0LL)	=	125 LB
REVERSIBLE WIND LOAD (1.0WL)	=	425 LB
P2 - DEAD LOAD (1.0DL)	=	100 LB
REVERSIBLE WIND LOAD (1.0WL)	=	850 LB



7 FRAMING DETAIL

1 1/2" = 1'-0"



8 FRAMING DETAIL

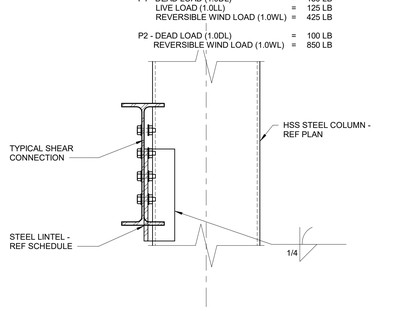
1 1/2" = 1'-0"

9 FRAMING DETAIL

1 1/2" = 1'-0"

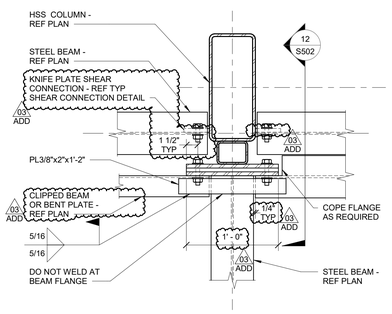
NOTES:

1. MASONRY WALL NOT SHOWN FOR CLARITY.



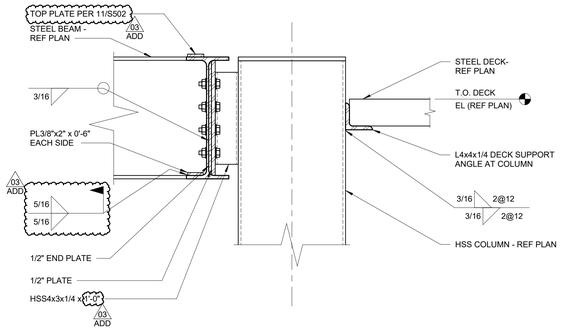
10 STEEL LINTEL CONNECTION DETAIL

1 1/2" = 1'-0"



11 OVERHANG CONNECTION DETAIL

1 1/2" = 1'-0"



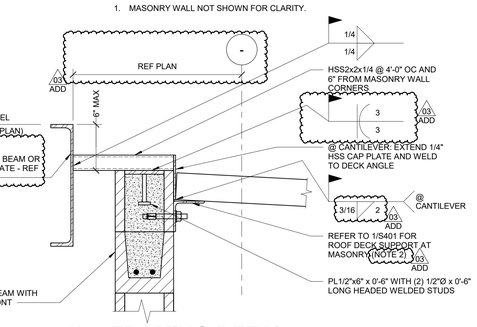
12 OVERHANG CONNECTION DETAIL

1 1/2" = 1'-0"

NOTES:

1. REFER TO 4/S502 FOR ADDITIONAL CONNECTION INFORMATION.

03 ADD

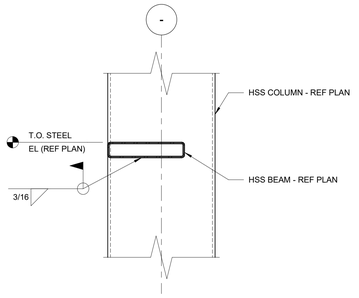


13 FRAMING DETAIL

1 1/2" = 1'-0"

NOTES:

1. AT SIM: DECK SPAN IS PARALLEL TO WALL. COORDINATE EMBED PLATE LOCATIONS WITH JOIST BEARING DETAIL 10/S401
2. COORDINATE WITH DETAIL 1/S401 TO PREVENT OVERLAP OF HILTI FASTENERS AND HEADED WELDED STUDS.

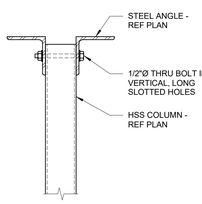


14 FRAMING DETAIL

1 1/2" = 1'-0"

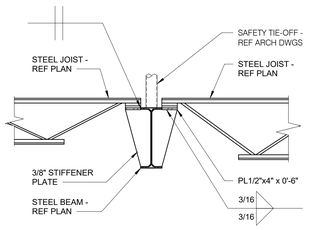
NOTES:

1. ANY TEMPORARY ERECTION SEATS USED TO SUPPORT FRAMING SHALL BE REMOVED.



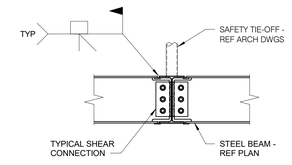
15 COLUMN SUPPORT DETAIL

1 1/2" = 1'-0"



16 FRAMING DETAIL

3/4" = 1'-0"



17 FRAMING DETAIL

3/4" = 1'-0"

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Key Plan

Sheet Issue Date

BID DOCUMENTS 11/03/17

Revision	Date
ADDENDA #2	11/22/17
ADDENDA #3	12/01/17

BID DOCUMENTS

Drawing

STEEL DETAILS

City of Madison Contract No. **8027**
OPN Project No. **17207000**

S502

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REFERENCE SCALE IN INCHES

0 1 2 3

SECTION 07 21 00

THERMAL INSULATION

ADD 3
added polyisocyanurate roofing insulation requirements to specification

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Board insulation at perimeter foundation wall, underside of floor slabs, and exterior wall behind masonry wall finish and roof

B. Mineral wool insulation in exterior wall construction.

1.2 REFERENCE STANDARDS

A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2015.

B. ASTM C553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications; 2013.

C. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2016.

D. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014.

E. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.

F. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2014.

1.3 SUBMITTALS

A. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

B. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

C. Submit surface temperature and dew point analysis. Analytical models shall include building areas clad with Composite Wood Veneer Panels, Aluminum Composite Panels and Fiber Reinforced Cement Panels, regardless of whether those materials are included in this Section or not. Identify temperatures for all surfaces, not just surfaces exposed to view. Analyze typical details and sufficient number of non-typical details to assure that the worst case has been identified. Required data includes:

1. Identification of dewpoint temperature.
2. Isothermal plots with color legend and numerical temperature values for: coldest indoor surface; indoor surfaces at or below dew point; indoor surfaces 0 to 5 degrees warmer than dewpoint.
3. Tabulation identifying solid materials, conductiveness and emissivities.
4. Tabulation identifying cavity dimensions, temperatures and emissivities.
5. Tabulation identifying boundary condition temperatures and film coefficients.

PART 2 PRODUCTS

2.1 LEED REQUIREMENTS

A. Recycled Content: Preference for products with a recycled content greater than 35 percent.

B. VOC Content: for adhesives applied on the interior, comply with requirements of Section 01 35 47 VOC CONTENT RESTRICTIONS.

2.2 APPLICATIONS

A. Insulation Under Concrete Slabs: Extruded polystyrene board.

B. Insulation at Perimeter of Foundation: Extruded polystyrene board.

C. Insulation in Exterior Wall Cavity: Mineral wool insulation.

D. Insulation Inside Masonry Cavity Walls: Extruded polystyrene board.

E. Insulation Over Roof Deck: Polyisocyanurate board.

2.3 FOAM BOARD INSULATION MATERIALS

A. Extruded Polystyrene Board Insulation: Extruded polystyrene board; ASTM C578; with either natural skin or cut cell surfaces, and the following characteristics:
   1. Flame Spread Index (FSI): Class A - 0 to 25, when tested in accordance with ASTM E84.
   2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   3. R-value; 1 inch of material at 72 degrees F: 5, minimum.
   4. Board Edges: Square.
   5. Water Absorption, Maximum: 0.3 percent, by volume.
   6. Compressive Strength: 25 psi.
   7. Manufacturers:
      a. Dow Chemical Company; STYROFOAM: www.dow.com/sle.
      b. Owens Corning Corporation; FOAMULAR Extruded Polystyrene (XPS) Insulation: www.ocbuildingspec.com/sle.

B. Polyiscyanurate Board Insulation with Facers Both Sides: Rigid cellular foam, complying with ASTM C1289; Type 1, Class 1, non-reinforced foam core.
   1. Flame Spread Index (FSI): 75 or less, when tested in accordance with ASTM E84
   2. Smoke Developed Index (SDI): 450 or less, when tested in accordance with ASTM E84.
   3. Board Size: 48 x 96 inch.
   4. Board Thickness: As indicated on drawings
   5. Board Edges: Square.

2.4 MINERAL WOOL INSULATION MATERIALS

A. Mineral Wool Insulation: Semi-rigid mineral fiber, ASTM C612; unfaced flame spread index of 0 (zero) when tested in accordance with ASTM E84.
   1. Smoke Developed Index: 0 (zero), when tested in accordance with ASTM E84.
   2. Combustion: Rated non-combustible per NFPA Standard 220 in accordance with ASTM E 136
   3. Board Size: As required for application.
   4. Board Thickness: As indicated on drawings.
   5. Board Edges: Square.
   6. Moisture Absorption: 1% max. per ASTM C1104.
   7. Thermal Resistance: R-value of 4.2 degrees F hr sq ft/Btu at 75 degrees F, minimum, when tested according to ASTM C518.
   8. Products:
      a. Thermafiber, Inc; RainBarrier: www.thermafiber.com.
      b. ROXUL, Inc; CAVITYROCK: www.roxul.com/sle.

2.5 ACCESSORIES

A. Tape: Foil tape, self-adhering type, not less than 2 inch wide.

B. Tape joints of rigid insulation in accordance with roofing and insulation manufacturer's instructions.

C. Insulation Fasteners: Impaling clip of unfinished steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.

D. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
   a. Length as required for thickness of insulation material and penetration of deck substrate.

E. Adhesive: Type recommended by insulation manufacturer for application and compatible with adjacent surfaces.

F. Spray Foam: Closed cell, Hilti CF812.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

3.2 BOARD INSTALLATION AT FOUNDATION PERIMETER

A. Install boards vertically over waterproofing systems on foundation perimeter where indicated on Drawings.
   1. Butt edges and ends tightly to adjacent boards and to protrusions.
   2. Start board installation flush with foundation wall corner. Extend board end on opposite side of same corner to overlap end of first panel.
   3. Fit panel bottom ends tight to tops of spread footings.

B. Extend boards over expansion joints, unbonded to foundation on one side of joint.

C. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.3 BOARD INSTALLATION AT EXTERIOR WALLS

A. Install boards horizontally on walls.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.4 BOARD INSTALLATION UNDER CONCRETE SLABS

A. Place insulation under slabs on grade after base for slab has been compacted.

B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.5 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions.

B. Install in exterior roof spaces without gaps or voids. Do not compress insulation.

C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.

3.6 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

3.6 BOARD INSTALLATION OVER LOW SLOPE ROOF DECK

A. Board Installation Over Roof Deck, General;
   1. See applicable roofing specification section for specific board installation requirements.
   2. Ensure vapor retarder is clean and dry, continuous, and ready for application of roofing system.
   3. Fasten insulation to deck in accordance with roofing manufacturer’s written instructions and applicable Factory Mutual requirements.
   4. Do not apply more insulation than can be covered with roofing in same day.

END OF SECTION

SECTION 07 42 13

COMPOSITE WOOD VENEER PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wood veneer composite panel system including the following:
      a. Wood veneer composite panels with mounting system. Panel mounting system including anchorages, clips, shims, offsets furring, fasteners and related flashing adapters as required for a complete system.

1.2 DEFINITION

A. Composite wood veneer panel Assembly: Composite wood veneer panels, attachment system components, miscellaneous metal framing and accessories necessary for a complete rainscreen wall system.

1.3 RELATED SECTIONS

A. Section 07 21 00 – Thermal Insulation: Insulation.

B. Section 07 25 00 – Weather Barriers.

C. Section 07 62 00 - Sheet Metal Flashing and Trim.

D. Section 07 92 00 – Joint Sealants.

1.4 SUBMITTALS

A. Product Data: Manufacturer's data sheet on each product to be used including:

B. Preparation instructions and recommendations.

C. Storage and handling requirements and recommendations.

D. Installation methods.

E. Quality Assurance: Certified test results from independent testing laboratory substantiating specified performance characteristics and physical properties.

F. Design Drawings: Include installation details and elevations showing all panel sizes, fastener locations.
   1. Provide details and calculations indicating loads of cladding system on thermal clip support assembly.
   2. Include design engineer's stamp or seal on shop drawings for panels, backup framing, attachments and anchors. Engineer shall be licensed in Iowa.

G. Samples: Submit two 6"x6" samples of specified color.

1.5 QUALITY ASSURANCE

A. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Provide installation and materials for mockups indicated on Drawings.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver Materials to site in Manufacturer's original, unopened packaging, with labels clearly identifying product name and manufacturer.

B. Storage: Store Materials in accordance with the Manufacturer's instruction in unopened packaging until ready for installation. Store materials in a covered area, away from water, on a flat, level surface with adequate support to prevent sagging.

C. Handling: Protect materials during handling to prevent damage.

1.7 ACCLIMATIZATION

A. All boxes shall be opened and all components removed from the packaging and stacked flat with spacers between the pieces in their final environment for a minimum 3-4 days prior to installation.

1.8 PROJECT CONDITIONS

A. Do not install composite wood veneer panel material under environmental conditions where it is likely to be immersed in water, or where the temperature is likely to exceed 120 degrees Fahrenheit for extended periods of time.

1.9 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's 10 year warranty.

PART 2 - PRODUCTS

2.1 PRODUCTS

A. Products: Subject to compliance with requirements, provide the following:
   1. ProdEX, Prodema North America. Website: www.prodema.com

B. System Description
   1. A complete, engineered metal aluminum or stainless steel clip girt system with metal member framing, closure pieces, trim and flashing. The system is to be composed of composite wood veneer panels fastened to metal sub-frame. System to be designed and engineered to attach to wall assembly substructure as indicated below. System shall be designed to incorporate flashing and drainage components in such a way that system will properly perform as a rear ventilated rainscreen system.
   2. System installation shall allow for all movements within structure and to support loads transferred from the adjacent construction and to fit within the space allotted without projections into the finished space as shown on the Drawings.
   3. Provide in conjunction with wall substrate and air/water barrier a weather tight wall assembly utilizing the “rain screen principle”.
      a. System design shall be single-source responsibility by the cladding supplier. All design criteria shall be project specific in accordance with the requirements of cladding supplier. Products provided must conform to the design intent shown.
      b. Panel System: Drained and Back Ventilated Rainscreen Design. System shall drain water and condensation to exterior. A complete pre-engineered system including but not limited to cladding panels, support structure, closure pieces, trim and flashing. Wall panels shall be removable. Fasteners are exposed. The panels shall be secured to a thermally broken above grade cladding support wall assembly substructure provided in this section with fastening to bracket horizontally to allow for concealed attachment of panels.
      c. Joints: Shall be dry and un-caulked.
      d. Metal Flashing: Provide metal flashing for a proper water managed assembly, to direct condensation and water infiltration within the wall to weeping points.
         1) Drainage flashing is the primary component of a water managed system which diverts water that has penetrated the exterior cladding away from the cladding compartment or condensation that occurs at the interior face of cladding surface.
         2) Provide metal drainage flashing at locations listed below prior to installation of membrane to assure proper water drainage. Membrane shall assure proper lap over flashing:
            (a) At bottom of system.
            (b) At penetrations: windows, doors, louvers, etc.
            (c) At floor line or other locations which accommodate vertical movement.
   4. System shall provide minimum 1 inch “clear” airspace behind cladding for proper ventilation.
   5. Design Modifications: Shall be provided only as necessary to satisfy as-built conditions and to meet performance requirements. Significant system and aesthetic design shall be requested in writing to architect 10 days prior to bid date.
   6. Material supplier shall be responsible for engineering system per architectural design criteria and performance requirements.
   7. Condensation: System shall accommodate positive drainage for moisture entering or condensation occurring within panel system.
   8. Flatness: System shall be flat with no noticeable warpage, buckling, deflections or other surface irregularities

C. System Description: The system shall consist of composite wood veneer panels and a system of custom aluminum extrusions in profiles indicated on drawings. The back-up framing shall utilize Cascadia fiberglass clips with aluminum extrusions in profiles indicated on the drawings. The details show the preferred profiles and performance requirements. Provide a rainscreen and structurally sound, self-draining wall panel system with minimal water penetration.

2.2 THERMAL CLIP CLADDING SUPPORT ASSEMBLY

A. Thermal Clip Cladding Support Assembly:
1. All thermal clip systems are to be designed for a fully engineered, sub-framing thermal spacer insulation clip.
2. Provide a system designed to thermally isolate the exterior cladding systems. The system shall provide the insulation retainage in addition to withstanding the loads, wind loads and dead loads imposed by the cladding systems.
    a. Approved Manufacturers:
        1) Advanced Architectural Products: SMARTci
3. Insulation clip system design: Minimum 4” wide thermal spacer designed for cladding system girt attachment.
4. Clip System and final girt attachment must be coordinated with cladding system manufacturers.
5. Final girt attachment must be designed to be perpendicular to the cladding system primary attachment system.
6. All fastener penetrations through air and vapor shall be fully sealed with compatible sealant where clip system is attached to substrate.
7. No push pin installations allowed for insulation. Insulation to be retained without fasteners.
8. Insulation to be installed in staggered layers with no gaps or voids.
9. Transition between the insulation clip system and the cladding final girt attachment will occur within the staggered layers of the insulation. Attachment of the cladding to the insulation clip may not occur at the outside face of the final layer of insulation.
10. System to be designed to accommodate the following maximum live load deflection in the plane of the exterior wall:
    a. Verify maximum live load deflection with structural requirements or 3/8 inch, whichever is greater.

2.3 MATERIALS

A. Wood Veneer Exterior Wall Panel with Resin Core
1. Panels: Grade A rotary cut, hardwood veneer from farmed forests and bonded to a bakelite core.
2. Fire Rating: Class A in accordance with ASTM E-84 criteria for flame spread 10 and smoke development 10 and Class 2 (M1) fire rating in accordance with UNE-EN 2372
3. Color: Pale
4. Panel Thickness: 8 mm.
5. Panel Dimensions: As indicated on drawings. Provide panels factory cut to required sizes. Factory finish all factory cut edges.
6. Adjacent flashings to match reveals.
7. Mounting: Exposed Fasteners to an subframe as required to suit loading.
8. Subframe Assembly: Extruded aluminum system. Provide manufacturer's standard sections as required for support and alignment of metal panel system which allows for attachment clips as necessary to accommodate continuous insulation.
9. Fasteners: Self-threading screws (SFS-SX3-L-12) with smooth heads lacquered to match panels.
10. Copings, Break Metal, Flashings and Trim: Provide as specified in Section 07 62 00 Sheet Metal Flashing and Trim.

B. MOUNTING SYSTEM
1. Manufacturer's ventilated facade mounting system.
    a. Sub-Structure: Exposed Fasteners to an Aluminum Subframe.
    b. Fasteners: Manufacturer's exposed head fasteners, color matched to color of wood veneer panel

PART 3 - EXECUTION

3.1 INSPECTION

A. Examine supporting structure and conditions under which the work is to be erected, and notify the Contractor in writing of conditions detrimental to proper and timely completion of the work. Do not proceed with erection until unsatisfactory conditions have been corrected.

B. Prior to installation, verify water barrier has been properly installed over sheathing substrate. Notify Architect in writing of unsatisfactory conditions prior to beginning installation.

3.2 PREPARATION

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

B. Protect metal surfaces in contact with concrete, masonry mortar, plaster or other cementitious surface with isolation coating.

3.3 EXTERIOR WALL THERMAL CLIP SYSTEM AND INSULATION

A. Install thermal clip assembly in accordance with approved shop drawings and manufacturer's instructions. Install to depth of cladding attachment system as detailed.

B. Install exterior wall insulation in conjunction with installation of attachment system provided as part of each cladding system.

C. All fastener penetrations through air and vapor shall be fully sealed with compatible sealant where clip system is attached to substrate.

D. No push pin installations allowed for insulation. Insulation to be retained without fasteners.

E. Insulation to be installed in staggered layers with no gaps or voids.

F. Transition between the insulation clip system and the cladding final girt attachment will occur within the staggered layers of the insulation. Attachment of the cladding to the insulation clip may not occur at the outside face of the final layer of insulation.

3.4 INSTALLATION

A. Comply with panel manufacturer’s instructions for assembly, installation and erection of panels, trims, flashings and sealants.

B. Do not install component parts, which are observed to be defective, including warped, bowed, dented, abraded and/or broken members

C. Install composite wood veneer panel subframe per manufacturer’s written instructions.

D. Do not force panels into place.

E. Install structural supports required to provide a complete system. Support system shall be installed to the same tolerance as required of the panel system.

F. Attach panels with exposed fastening. Space fastener symmetrically in straight rows as approved in shop drawings.

~~3.5 FIELD QUALITY CONTROL~~ removed with Addendum 3

~~A. Field hose testing for resistance to water leakage shall be conducted and results interpreted as defined herein. Perform a minimum of three (3) field hose tests. Test areas shall include both panel and adjacent curtain wall construction. Coordinate testing of panel areas with adjacent curtain wall construction contractors as required. Area and time of tests shall be per the direction of the Architect. Initial testing shall be conducted early in the construction schedule. Schedule any out of sequence work necessary, such as out of sequence sealant work, so that selected areas can be tested as specified.~~

~~B. Size of panel test areas will be as selected by Architect and will primarily be at areas surrounding curtain wall test area openings. There shall be no unacceptable water leakage as defined in this Section.~~

~~C. Conduct test with Monarch Type B-25 #6.030 brass nozzle and 3/4 inch diameter hose. Water pressure to nozzle shall be in the range 30 to 35 psi. Working upward from bottom of test area, direct water at 5 foot long segments~~

~~of panel joints and perimeter joints, moving slowly back and forth on each segment for minimum of 5 minutes. Sustained spraying at one point while the nozzle remains stationary is acceptable. Tip of nozzle shall be 12 inches from specimen exterior surface. Nozzle shall generally be perpendicular to specimen surface, but shall be tilted to any angle that maximizes exposure of a given joint to water flow rate and kinetic energy. Continuously check for leakage on indoor side. If necessary to pinpoint leak sources, perform additional testing. Repeated testing of joints is acceptable. The use of masking to pinpoint leaks is acceptable.~~

~~D. Check completed areas below test area, and report any leaks that occur. A test that results in leakage at a completed area below a designated test area is a failure.~~

~~E. Contractor performing work of this Section shall provide powered scaffold, hose, water supply, and manpower to perform each test, plus any unsuccessful tests.~~

~~F. If failure occurs, revise and retest specimens. Modifications must be realistic in terms of project conditions, must maintain standards of quality and durability and are subject to approval.~~

~~G. If failure necessitates retesting, Contractor for Work of this Section shall pay all additional fees associated with retesting, including fees and costs incurred by the testing agency, the Architect, Owner and their representatives.~~

~~H. Submit, for information only, reports that contain dates of tests, elevation drawings of test areas with locations relative to grid lines (including any lower areas where leaks occur), and location of each leak.~~

~~I. Coordinate testing under this section with testing specified in Section 08 44 13 - Glazed Aluminum Curtain Walls.~~

~~J. Replace and/or repair components that have failed field testing and retest until performance is satisfactory.~~

3.6 MAINTENANCE

A. Remove stains and graffiti with mild ph-neutral, non-abrasive soap and damp cloth.

B. Avoid use of caustic cleaning solutions, automatic cleaners or excessive liquids.

END OF SECTION

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SECTION 07 42 13.23
ALUMINUM COMPOSITE PANELS

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Exterior cladding consisting of formed aluminum composite material (ACM) sheet, secondary supports, and anchors to structure, attached to solid backup.

B. Matching flashing and trim.

C. Interior aluminum composite column covers.

1.2 RELATED REQUIREMENTS

A. Section 07 21 00 – Thermal Insulation: Insulation and thermal clip assembly.

B. Section 07 25 00 - Weather Barriers

C. Section 07 92 00 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

1.3 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

B. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2015.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.

D. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2016a.

E. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2016a.

F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.

G. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

H. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010 (Reapproved 2015).

I. ASTM D523 - Standard Test Method for Specular Gloss; 2014.

J. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives; 1998 (Reapproved 2012).

K. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2016.

L. ASTM D2244 - Standard Practice for Calculation of Color Tolerances and Color Differences from Instrumentally Measured Color Coordinates; 2016.

M. ASTM D4214 - Standard Test Methods for Evaluating the Degree of Chalking of Exterior Paint Films; 2007 (Reapproved 2015).

N. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.

O. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

P. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

Q. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

1.4 ADMINISTRATIVE REQUIREMENTS

A. Pre-Installation Meeting: Convene one week before starting work of this section to verify project requirements, co-ordinate with installers of other work, establish condition and completeness of building substrate, and review manufacturers' installation instructions and warranty requirements.

1. Require attendance by the installer and relevant sub-contractors.
2. Include ACM sheet manufacturer's representative and wall system manufacturer's representative to review storage and handling procedures.
3. Review in detail truck transportation, parking, vertical transportation, schedule, personnel, installation of adjacent materials and substrate.
4. Review procedures for protection of work and other construction.

1.5 SUBMITTALS

A. Product Data - MCM Sheets: Manufacturer's data sheets on each product to be used, including thickness, physical characteristics, and finish, and:
   1. Finish manufacturer's data sheet showing physical and performance characteristics.
   2. Storage and handling requirements and recommendations.
   3. Fabrication instructions and recommendations.
   4. Specimen warranty for finish, as specified herein.

B. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
   1. Physical characteristics of components shown on shop drawings.
   2. Storage and handling requirements and recommendations.
   3. Installation instructions and recommendations.

C. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, number of anchors, supports, reinforcement, trim, flashings, and accessories.
   1. Indicate panel numbering system.
   2. Differentiate between shop and field fabrication.
   3. Indicate substrates and adjacent work with which the wall system must be coordinated.
   4. Include large-scale details of anchorages and connecting elements.
   5. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches.
   6. Provide calculations indicating loads of cladding system on thermal clip support assembly.
   7. Include design engineer's stamp or seal on shop drawings for panels, backup framing, attachments and anchors. Engineer shall be licensed in Iowa.

D. Test Report: Submit report of full-size mock-up tests for air infiltration, water penetration, and wind performance.

E. Maintenance Data: Care of finishes and warranty requirements.

F. Executed Warranty: Submit warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

G. Compatibility:
   1. Submit letter from manufacturer stating that materials proposed for use are permanently chemically compatible and adhesively compatible with adjacent materials proposed for use.
   2. Submit letter from manufacturer stating that cleaning materials used during installation are chemically compatible with each of the adjacent materials proposed for use.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
   1. Protect finishes by applying heavy duty removable plastic film during production.
   2. Package for protection against transportation damage.
   3. Provide markings to identify components consistently with drawings.
   4. Exercise care in unloading, storing and installing panels to prevent bending, warping, twisting and surface damage.

B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
   1. Store in well ventilated space out of direct sunlight.
   2. Protect from moisture and condensation with tarpaulins or other suitable weather tight covering installed to provide ventilation.
   3. Store at a slope to ensure positive drainage of any accumulated water.
   4. Do not store in any enclosed space where ambient temperature can exceed 120 degrees F.

5. Avoid contact with any other materials that might cause staining, denting, or other surface damage.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal wall panel assemblies that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures, including rupturing, cracking or puncturing.
      b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   2. Warranty Period: Three years from date of Substantial Completion.

B. ACM Sheet Manufacturer's Finish Warranty: Provide manufacturer's written warranty stating that the finish will perform as follows for minimum of 20 years:
   1. Chalking: No more than that represented by a No. 8 rating based on ASTM D4214.
   2. Color Retention: No fading or color change in excess of 5 Hunter color difference units, calculated in accordance with ASTM D2244.
   3. Gloss Retention: Minimum of 30 percent gloss retention, when tested in accordance with ASTM D523.

PART 2 PRODUCTS

2.1 LEED REQUIREMENTS

A. Recycled Content: Minimum 30 percent recycled content value: post-consumer recycled content plus one-half of pre-consumer recycled content.

2.2 WALL PANEL SYSTEM

A. Wall Panel System: Metal panels, fasteners, and anchors designed to be supported by framing or other substrate provided by others; provide installed panel system capable of maintaining specified performance without defects, damage or failure.
   1. Provide structural design by or under direct supervision of a Structural Engineer licensed in the State in which the Project is located.
   2. Provide drained and back ventilated, reveal joint, rout and return panel system:
      a. The system shall consist of ACM panels, and a system of custom aluminum extrusions of size and shape indicated on drawing as specified herein. The system must utilize a Rout and Return configuration and a system of custom aluminum extrusions of size and shape indicated on drawings and as specified herein. The panel system shall be non-directional/non-sequential type installation and shall allow for the indiscriminate removal of any panel without disturbing adjacent panels. The system must allow for the removed panel to be replaced in the original and tested method.
   3. Basis-of-Design: Metal Design System, Series 44.

B. System Description
   1. A complete, engineered metal aluminum or stainless steel clip girt system with metal member framing, closure pieces, trim and flashing. The system is to be composed of aluminum composite panels attached to perimeter channels. System to be designed and engineered to attach to wall assembly substructure as provided under Section 07 21 00. System shall be designed to incorporate flashing and drainage components in such a way that system will properly perform as a rear ventilated rainscreen system.
   2. System installation shall allow for all movements within structure and to support loads transferred from the adjacent construction and to fit within the space allotted without projections into the finished space as shown on the Drawings.
   3. Provide in conjunction with wall substrate and air/water barrier a weather tight wall assembly utilizing the "rain screen principle".
      a. System design shall be single-source responsibility by the cladding supplier. All design criteria shall be project specific in accordance with the requirements of cladding supplier. Products provided must conform to the design intent shown.
      b. Panel System: Drained and Back Ventilated Rainscreen Design. System shall drain water and condensation to exterior. A complete pre-engineered system including but not limited to cladding panels, support structure, closure pieces, trim and flashing. Wall panels shall be removable. Fasteners are exposed.
      c. Joints: Shall be dry and un-caulked.

d. Metal Flashing: Provide metal flashing for a proper water managed assembly, to direct condensation and water infiltration within the wall to weeping points.
   1) Drainage flashing is the primary component of a water managed system which diverts water that has penetrated the exterior cladding away from the cladding compartment or condensation that occurs at the interior face of cladding surface.
   2) Provide metal drainage flashing at locations listed below prior to installation of membrane to assure proper water drainage. Membrane shall assure proper lap over flashing:
      (a) At bottom of system.
      (b) At penetrations: windows, doors, louvers, etc.
      (c) At floor line or other locations which accommodate vertical movement.

4. System shall provide minimum 1 inch “clear” airspace behind cladding for proper ventilation.
5. Design Modifications: Shall be provided only as necessary to satisfy as-built conditions and to meet performance requirements. Significant system and aesthetic design shall be requested in writing to architect 10 days prior to bid date.
6. Material supplier shall be responsible for engineering system per architectural design criteria and performance requirements.
7. Condensation: System shall accommodate positive drainage for moisture entering or condensation occurring within panel system.
8. Flatness: System shall be flat with no noticeable warpage, buckling, deflections or other surface irregularities

C. Performance Requirements:
1. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees F to 180 degrees F without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.
2. Wind Performance: Provide system tested in accordance with ASTM E330/E330M without permanent deformation or failures of structural members under the following conditions:
   a. Panels shall be designed to withstand the Design Wind Load based upon the local building code, but in no case less than 20 pounds per square foot (psf) and 30 psf on parapet and corner panels.
   b. Maximum deflection of perimeter framing member of L/175 or 3/4", whichever is less, normal to plane of the wall; maximum deflection of individual panels of L/60.
   c. Maximum anchor deflection in any direction of 1/16 inch at connection points of framing members to anchors.
   d. At 1-1/2 times design pressure, permanent deflections of framing members shall not exceed L/100 of span length and components shall not experience failure or gross permanent distortion. At connection points of framing members to anchors, permanent set shall not exceed 1/16".
3. Air Infiltration: 0.06 cfm/sq ft of wall area, maximum, when tested at 1.57 psf in accordance with ASTM E283.
4. Water Penetration: No water penetration under static pressure when tested in accordance with ASTM E331 at a differential of 10 percent of inward acting design load, 6.24 psf minimum, after 15 minutes.
   a. Water penetration is defined as the appearance of uncontrolled water on the interior face of the wall.
   b. Dynamic Water Infiltration – System will show compliance with the requirements stated in the AAMA 501 Dynamic Water Infiltration test.n to drain leakage and condensation to the exterior face of the wall.

D. Panels: One inch deep pans formed of metal composite material sheet by routing back edges of sheet, removing corners, and folding edges.
1. Reinforce corners with riveted aluminum angles.
2. Provide concealed attachment to supporting structure by adhering attachment members to back of panel; attachment members may also function as stiffeners.
3. Flatness Criteria: Maximum 1/8” in 15’-0” on panel in any direction for assembled units (non-accumulative).
4. Secure members to back face of panels using structural silicone sealant approved by ACM sheet manufacturer.
5. Fabricate panels under controlled shop conditions.
6. Where final dimensions cannot be established by field measurement before commencement of manufacturing, make allowance for field adjustments without requiring field fabrication of panels.
7. Fabricate as indicated on drawings and as recommended by MCM sheet manufacturer.
   a. Make panel lines, breaks, curves and angles sharp and true.

b. Keep plane surfaces free from warp or buckle.
c. Keep panel surfaces free of scratches or marks caused during fabrication.

8. Provide joint details providing a watertight and structurally sound wall panel system that allows no uncontrolled water penetration on inside face of panel system.

E. Perimeter Channels: Extruded aluminum channels which integrate to the continuous sub-system as detailed on drawings, so as to provide the following essential features:
1. Edges of ACM shall be supported by aluminum channels on all four sides.
2. Minimum overall system is 1-7/8".
3. The ACM panel shall be held in place with stainless steel pins through the panel returns and engaged over the channel extrusion allowing the panel to free float for thermal expansion in all directions. Panel systems utilizing attachment methods which secure two edges of the panel to the structure will not be allowed.
4. Channels shall be mill finished.

F. Reveals at Panel Joints:
1. Panel joints are to be joined with manufacturer's standard clip and snap cover. Snap covers shall be painted to match aluminum composite panel color.
2. Panel joints shall be ½" wide x 3/8" deep open reveal (Nominal).

G. Flashings:
1. Fabricate flashing from aluminum sheet in matching color; where exposed to view finish to match adjacent panels. Provide lap strip under flashing at abutted conditions; with lapped surfaces sealed with a full-bed of non-hardening sealant.

2.3 MATERIALS

A. Aluminum Composite Material (ACM) Sheet: Two sheets of aluminum sandwiching a core of extruded thermoplastic material, no foamed insulation material content.
1. Overall Sheet Thickness: 4 mm, minimum.
2. Face Sheet Thickness: 0.020 inches, minimum.
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3. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 22.4 inch-pound/inch with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees F.
4. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
5. Flammability: Self-ignition temperature of 650 degrees F or greater, when tested in accordance with ASTM D1929.
6. Finish: Exterior surfaces shall be coil coated with FEVE or PVDF based resin which meets or exceeds AAMA 2605-02 testing for durability In particular, the coating must have successfully passed the following or equal tests:
a. Humidity Resistance:
1) Test Method: ASTM D-2247. No formation of blisters when subjected to condensing water fog at 100% relative humidity and 100 degree Fahrenheit for 3000 hours.
b. Salt Spray Resistance
1) Test Method: ASTM B-117; expose coating system to 3000 hours, using 5% NaCl solution.
(a) Corrosion creepage from scribe line: 1/8" max.
(b) Minimum blister rating of 8 within the test specimen field.
c. Weather Exposure
1) Outdoor
(a) Ten year exposure at 45 degree angle facing south Florida exposure.
(b) Maximum color change of 5 Delta E units as calculated in accordance with ASTM D-2244.
(c) Maximum chalk rating of 8 in accordance with ASTM D-659.
(d) No checking, crazing, adhesion loss.
7. Color: As selected by Architect.
8. Products:
a. ALPOLIC material manufactured by Mitsubishi Plastics Composites America, Inc. ALPOLIC Materials Division.
b. REYNOBOND material manufactured by Reynolds Metals Company, Alcoa Architectural Products (USA).

c. ALUCOBOND material manufactured by 3A Composites USA Inc.

B. Metal Framing Members: Include sub-girts, zee-clips, base and sill angles and channels, hat-shaped and rigid channels, and furring channels required for complete installation.
1. Provide material strength, dimensions, configuration as required to meet the applied loads applied and in compliance with applicable building code.
2. Sheet Steel Components: ASTM A653/A653M galvanized to G90/Z275 or zinc-iron alloy-coated to A60/ZF180; or ASTM A792/A792M aluminum-zinc coated to AZ60/AZM180.
3. Stainless Steel Sheet Components: ASTM A480/A480M.

C. Flashing: Sheet aluminum; 0.040 inch thick, minimum; finish and color to match MCM sheet.

D. Anchors, Clips and Accessories: Use one of the following:
1. Stainless steel complying with ASTM A276/A276M, ASTM A480/A480M, or ASTM A666.
2. Steel complying with ASTM A36/A36M and hot-dipped galvanized to ASTM A153/A153M.
3. Steel complying with ASTM A36/A36M and hot-dipped galvanized to ASTM A123/A123M Coating Grade 10.

E. Fasteners:
1. Exposed Fasteners: Stainless steel; permitted only where absolutely unavoidable and subject to prior approval of the Architect.
2. Screws: Self-drilling or self-tapping Type 410 stainless steel or zinc-alloy steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal wall panels.
3. Bolts: Stainless steel.
4. Fasteners for Flashing and Trim: Blind fasteners of high-strength aluminum or stainless steel.

F. Provide panel system manufacturer's and installer's standard corrosion resistant accessories, including fasteners, clips, anchorage devices and attachments.

2.4 FABRICATION

A. Fabricate panel units to dimensions indicated on the drawings based on an assumed design temperature of 70 degrees F.

B. Fabricate panels in sizes shown using composite aluminum panel material and perimeter clips so that the panel thickness at the joinery is as required by design. Completed panel shall be properly fabricated and designed so that no restraints can be placed on the panel, which might result in compressive skin stresses. The installation detailing shall be such that the installed panels shall remain flat due to temperature changes and at all times remain water and wind tight. Oil canning of panel surface is not acceptable.

C. Shop fabricate units ready for erection. If not shop assembled, pre-fabricate components at the shop as required for proper and expeditious field assembly.

D. Design, fabricate, assemble, and erect wall panel units.

E. Where drawings indicate, factory curve panels to required radius.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify dimensions, tolerances, and interfaces with other work.

B. Verify substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturers written instructions.

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

D. Notify Architect in writing of conditions detrimental to proper and timely completion of work. Do not proceed with erection until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.

B. Comply with instructions and recommendations of ACM sheet manufacturer and wall system manufacturer, as well as with approved shop drawings.

C. Do not cut, trim, weld, or braze component parts during erection, in a manner which would damage finish, decrease strength, or result in a visual imperfection or a failure in performance of wall panels. Return component parts which require alteration to shop for re-fabrication, if possible, or for replacement by new parts.

D. Install wall system securely allowing for necessary thermal and structural movement; comply with wall system manufacturer's instructions for installation of concealed fasteners.

E. Do not handle or tool products during erection in manner that damages finish, decreases strength, or results in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.

F. Do not form panels in field unless required by wall system manufacturer and approved by the Architect; comply with ACM sheet manufacturer's instructions and recommendations for field forming.

G. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.

H. Install flashings as indicated on shop drawings At flashing butt joints, provide a lap strap under flashing and seal lapped surfaces with a full bed of non-hardening sealant.

I. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections maintaining the following installation tolerances:
   1. Variation From Plane or Location: 1/2 inch in 30 feet of length and up to 3/4 inch in 300 feet, maximum.
   2. Deviation of Vertical Member From True Line: 0.1 inch in 25 feet run, maximum.
   3. Deviation of Horizontal Member From True Line: 0.1 inch in 25 feet run, maximum.
   4. Offset From True Alignment Between Two Adjacent Members Abutting End To End, In Line: 0.03 inch, maximum.

J. Replace damaged products.

~~**3.3 FIELD QUALITY CONTROL**~~ removed with Addendum 3

~~A. Field hose testing for resistance to water leakage shall be conducted and results interpreted as defined herein. Perform a minimum of one (1) field hose test. Test areas shall include both panel and adjacent curtain wall construction. Coordinate testing of panel areas with adjacent curtain wall construction contractors as required. Area and time of tests shall be per the direction of the Architect. Initial testing shall be conducted early in the construction schedule. Schedule any out of sequence work necessary, such as out of sequence sealant work, so that selected areas can be tested as specified.~~

~~B. Size of panel test areas will be as selected by Architect and will primarily be at areas surrounding curtain wall test area openings. There shall be no unacceptable water leakage as defined in this Section.~~

~~C. Conduct test with Monarch Type B-25 #6.030 brass nozzle and 3/4 inch diameter hose. Water pressure to nozzle shall be in the range 30 to 35 psi. Working upward from bottom of test area, direct water at 5 foot long segments of panel joints and perimeter joints, moving slowly back and forth on each segment for minimum of 5 minutes. Sustained spraying at one point while the nozzle remains stationary is acceptable. Tip of nozzle shall be 12 inches from specimen exterior surface. Nozzle shall generally be perpendicular to specimen surface, but shall be tilted to any angle that maximizes exposure of a given joint to water flow rate and kinetic energy. Continuously check for leakage on indoor side. If necessary to pinpoint leak sources, perform additional testing. Repeated testing of joints is acceptable. The use of masking to pinpoint leaks is acceptable.~~

~~D. Check completed areas below test area, and report any leaks that occur. A test that results in leakage at a completed area below a designated test area is a failure.~~

~~E. Contractor performing work of this Section shall provide powered scaffold, hose, water supply, and manpower to perform each test, plus any unsuccessful tests.~~

~~F. If failure occurs, revise and retest specimens. Modifications must be realistic in terms of project conditions, must maintain standards of quality and durability and are subject to approval.~~

~~G. If failure necessitates retesting, Contractor for Work of this Section shall pay all additional fees associated with retesting, including fees and costs incurred by the testing agency, the Architect, Owner and their representatives.~~

~~H. Submit, for information only, reports that contain dates of tests, elevation drawings of test areas with locations relative to grid lines (including any lower areas where leaks occur), and location of each leak.~~

~~I. Coordinate testing under this section with testing specified in Section 08 44 13 - Glazed Aluminum Curtain Walls.~~

~~J.~~ ~~Replace and/or repair components that have failed field testing and retest until performance is satisfactory.~~

3.4 CLEANING

A. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.

B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.

C. Remove temporary coverings and protection of adjacent work areas.

D. Clean installed products in accordance with manufacturer's instructions.

3.5 PROTECTION

A. Protect installed panel system from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 43 13

ALUMINUM-FRAMED STOREFRONTS

03ADD

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aluminum-framed storefront, with vision glass.

B. Aluminum doors and frames.

C. Weatherstripping.

1.2 RELATED REQUIREMENTS

A. Section 08 80 00 - Glazing: Glass and glazing accessories.

1.3 REFERENCE STANDARDS

03ADD

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

B. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2015.

C. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

D. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2013.

E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.

G. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

H. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014.

I. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

J. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2009).

1.4 SUBMITTALS

A. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details.

B. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required. Include plans, elevations, sections, details, attachements to other work, embedment type, size and layout.

1. Provide water control diagrams for condensation and infiltration evacuation.
2. Include structural analysis data signed and sealed by the professional engineer, licensed in the State of Iowa, responsible for their preparation.

C. Samples: Submit two samples 2 x 3 inches in size illustrating finished aluminum surface, color matched to existing storefront framing..

1.5 QUALITY ASSURANCE

A. Designer Qualifications: Design structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this Work and licensed in the State in which the Project is located.

B. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

C. Mockups: Provide materials and installation for mockups specified in Division 01 Section "Mock-Up Requirements and as indicated on Drawings Sheet A---- to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.7 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.8 WARRANTY

A. Standard Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that deteriorate as defined in this Section within spedified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including, but not limited to, excessive deflection.
      b. Noise or vibration caused by thermal movements.
      c. Deterioration of metals and other materials beyond normal weathering.
      d. Water leakage through fixed glazing and framing areas.
      e. Failure of operating components to function property.
   2. Warranty Period: Two years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design: See below under description of products.
   1. Exterior Storefront System: Kawneer, Trifab VG 451T.

B. Other Acceptable Manufacturers:
   1. EFCO Corporation: www.efcocorp.com.
   2. Architectural Wall Systems.
   3. YKK AP America Inc
   4. Manko Window Systems, Inc.: www.mankowindows.com.
   5. United States Aluminum Corp
   6. Vistawall Architectural Products
   7. Pittco Architectural Metals Inc: www.pittcometals.com/sle.
   8. Tubelite, Inc.: www.tubeliteinc.com.

2.2 STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Finish: High performance organic coatings.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
      b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
   2. Finish Color: As indicated on the drawings.

B. Performance Requirements:
   1. General: Provide aluminum-framed systems, including anchorage, capable of withstanding, without failure, the effects of the following:
      a. Structural loads.
      b. Thermal movements.

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c. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
d. Dimensional tolerances of building frame and other adjacent construction.
e. Failure includes the following:
1) Deflection exceeding specified limits.
2) Thermal stresses transferred to building structure.
3) Framing members transferring stresses, including those caused by thermal and structural movements, to glazing.
4) Noise or vibration created by wind and thermal and structural movements.
5) Loosening or weakening of fasteners, attachments, and other components.
6) Sealant failure.
7) Failure of operating units to function properly.

2. Structural Loads:
a. Wind Loads: As indicated on Structural Drawings.
b. Seismic Loads: As indicated on Structural Drawings.
3. Deflection of Framing Members Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of coear span plus 1/4 inch for spans greater than 13 feet 6 inches or an amount that restricts edge deflection of individual glazing lites to 3/4 inch, whichever is less.
4. Structural-Test Performance: Systems tested according to ASTM E 330 as follows:
a. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.
b. When tested at 150 percent of positieve and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
c. Test Durations: As required by design wind velocity but not less than 10 seconds.
5. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
a. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
6. Water Penetration Resistance: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8 psf.
7. Air Leakage: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 psf pressure differential across assembly.
8. Movement: Accommodate movement between storefront and perimeter framing and deflection of lintel, without damage to components or deterioration of seals.
9. Air Infiltration: Limit air infiltration through assembly to 0.06 cu ft/min/sq ft of wall area, measured at minimum static-air-pressure difference of 6.24 lbf/sq. ft. across assembly in accordance with ASTM E 283.
10. Condensation Resistance Factor: Measure in accordance with AAMA 1503 with 1 inch insulating glass installed. Fixed glazing and framing areas of systems have condensation-resistance factor (CRF) of not less than 53 when tested according to AAMA 1503.
11. Water Leakage: None, when measured in accordance with ASTM E 331 at a minimum static-air-pressure difference of 20 percent of positive wind-load design pressure, but not less than 6.24 lbf/sq. ft.
12. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
13. Air and Vapor Seal: Maintain continuous water barrier membrane throughout assembly, primarily in line with pane of glass and heel bead of glazing compound.
14. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.

2.3 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
1. Framing members for interior applications need not be thermally broken.
2. Cross-Section: As indicated on drawings.

B. Swing Doors: Glazed aluminum.
   1. Thickness: 1-3/4 inches.
   2. Top Rail: 3-1/2 inches wide.
   3. Vertical Stiles: 3-1/2 inches wide.
   4. Bottom Rail: 10 inches wide.
   5. Glazing Stops: Square.
   6. Finish: Same as storefront.

2.4 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Fasteners: Stainless steel.

C. Glass: As specified in Section 08 80 00.

D. Glazing Accessories: As specified in Section 08 80 00.

2.5 FINISHES

A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

2.6 HARDWARE

A. Door Hardware: As specified in Section 08 71 00 - Door Hardware.

B. Weatherstripping: Wool pile, continuous and replaceable; provide on all doors.

C. Sill Sweep Strips: Resilient seal type, retracting, of neoprene; provide on all doors.

2.7 FABRICATION

A. Fabricate components with minimum clearances and shim spacing around perimeter of assembly, yet enabling installation and dynamic movement of perimeter seal and that have the following characteristics:
   1. Profiles that are sharp, straight and free of defects or deformations.
   2. Accurately fitted and secure joints and corners. Make joints flush, hairline, and weatherproof.
   3. Means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
   4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   5. Provisions for field replacement of glazing from exterior of building.
   6. Fasteners, anchors, and connection devices that are concealed from view to greatest extend possible.

B. Door Frames: Reinforce as required to support loads imposed by door operation and for installing hardware.
   1. At exterior doors, provide compression weather stripping at fixed stops. Provide continous aluminum drip above all doors, extend to outside of door frame.
   2. At interior doors, provide silencers at stops to prevent metal-to-metal contact. Install three silencers on strike jamb of single-door frames and two silencers on head of frames for pairs of doors.

C. Doors: Reinforce doors as required for installing hardware.
   1. At pairs of exterior doors, provide sliding weather stripping retained in adjustable strip mortised into door edge.
   2. At exterior doors, provide weather sweeps applied to door bottoms.

D. Prepare components to receive anchor devices. Fabricate anchors.

E. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.

F. Arrange fasteners and attachments to conceal from view.

G. Reinforce components internally for door hardware .

H. Reinforce framing members for imposed loads.

I. Finishing: Apply factory finish to all surfaces that will be exposed in completed assemblies.
   1. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.2 INSTALLATION

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Install anti-walking clips in openings that are more than three frames wide per manufacturers instructions.

I. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.

J. Coordinate attachment and seal of perimeter air and vapor barrier materials.

K. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

L. Metal Protection:
   1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufactuer for this purpose.
   2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
   3. If necessary protect the exterior framing during masonry wash down.

M. Install glass and infill panels in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.

N. Entrances: Install to produce smooth operation and tight fit at contact points.
   1. Exterior Entrances: Install to produce tight fit at weather stripping and weathertight closure.
   2. Field-Installed Hardware: Install surface-mounted hardware according to hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

O. Door Hardware: Install door hardware specified in Division 8 Section "Door Hardware."

P. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.3 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.4 FIELD QUALITY CONTROL

A. Water Spray Test: Before installation of interior finishes has begun, a minimum area of 25 feet by 1 story of aluminum-framed systems designated by Architect shall be tested for water leakage in accordance with AAMA 501.2 and shall not evidence water penetration.

B. Repair or remove work where test results and inspections indicate that it does not comply with specified requirements.

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

3.5 ADJUSTING

A. Adjust operating hardware and sash for smooth operation.

3.6 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

B. Remove excess sealant by method acceptable to sealant manufacturer.

3.7 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 44 13
GLAZED ALUMINUM CURTAIN WALLS

03ADD

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aluminum-framed curtain wall, with vision glazing and glass infill panels.

B. Miscellaneous components.

1.2 RELATED REQUIREMENTS

A. Section 07 42 13 - Composite Wood Veneer Panels.

B. Section 07 42 13.23 - Aluminum Composite Panels.

1.3 REFERENCE STANDARDS

A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.

B. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2013.

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.

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E. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

F. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.

G. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.

H. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.

I. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting two weeks before starting work of this section; require attendance by all affected installers. Preinstallation meeting shall to establish procedures to maintain optimum working conditions, and to coordinate this work with related and adjacent work. Agenda for the meeting shall include, but not limited to, the following:
   1. Requirements for Building Envelope Commissioning.
   2. Review of submittals.
   3. Review of surface preparation, minimum curing period and installation procedures.
   4. Review of special details and flashings.
   5. Sequence of construction, responsibilities and schedule for subsequent operations.
   6. Review of mock-up requirements.
   7. Review of inspection, testing, protection and repair procedures.

C. Provide necessary compatibility information for Building Envelope Commissioning.

1.5 SUBMITTALS

A. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, and infill.

B. Provide stamped structural calculations for curtain wall assemblies and anchorages prepared by a professional engineer licensed in the State of Iowa.

C. Shop Drawings: : Indicate configurations (including plans, elevations and section views), and construction of all parts of the work, including metal and glass thickness, methods of joining, details of all field connections and

anchorage, fastening and sealing methods, metal finishes, and all pertinent information; completed by the curtain wall manufacturer.

1. Submit full size sections when needed for clarity.
2. Clearly indicate relationship to other work.
3. Begin fabrication only after shop drawings for that work have been accepted by the Design Professional.
4. Submit manufacturer's installation instructions.

D. Verification Samples: Include representative samples of the following for approval:
1. Submit three (3) samples of finished aluminum, 6 x 6 inch in size, illustrating specified color and finish for review and approval by the Design Professional.
2. Glass, each type.
3. Frame, mullion and corner sections.
4. Fasteners and anchors.

E. Test Reports: Submit report of full-size mock-up tests for air infiltration, water penetration, and wind performance.

F. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.6 QUALITY ASSURANCE

A. Provide test reports stating the performance as specified in Article 1.05, not more than four (4) years old.

B. Manufacturer test reports shall be accompanied by the curtain wall manufacturer's letter of certification stating that the tested curtain wall meets or exceeds the referenced criteria for the appropriate curtain wall type.

C. Manufacturer: System shall be manufactured and marketed by a firm with a minimum of twenty (20) years experience in the production and sales of curtain wall systems. Manufacturers proposed for use, but not named in these specifications, shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past five (5) years.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.8 FIELD CONDITIONS

A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.9 WARRANTY

A. Provide ten year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

B. Total Curtain Wall System:
1. Provide a total system warranty for performance of the total curtain wall installation for five years after the date of Substantial Completion. This includes the glazing (including insulated units), anchorage and setting system, sealing, flashing, etc. as it relates to air, water, and structural adequacy, and these specifications and approved shop drawings.
2. Any deficiencies due to such elements not meeting the specifications shall be corrected by the responsible contractor at his expense during the warranty period.

PART 2 PRODUCTS

2.1 LEED REQUIREMENTS

A. Recycled Content: Provide highest recycled content available, but not less than minimum postconsumer plus one half of pre-consumer content 35 percent.

B. Comply with Section 07 92 00 "Joint Sealants" for silicone sealants. Coordinate with adjacent curtain wall construction.

C. Provide sealants for use inside of the weatherproofing system that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.2 MANUFACTURERS

A. Glazed Aluminum Curtain Walls: Kawneer Company, Inc.: Product 1600 Wall System 1 / System 2.

B. Acceptable manufacturers:
   1. EFCO Corporation
   2. Oldcastle BuildingEnvelope
   3. Wausau Window and Wall Systems
   4. YKK AP
   5. Tubelite.
   6. Pittco Architectural Metals

2.3 COMPONENTS

A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Outside dry glazed; includes exterior aluminum pressure plate and snap-on mullion cover with interior and exterior dense EPDM preset gasket.
   2. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
      a. Cross-Sections: Sizes and shapes as indicated on the Drawings.
      b. Extrusion Wall Thickness: Minimum 1/8 inch (3 mm); all vertical and horizontal members.
   3. Finish: Superior performing organic coatings.
      a. Factory finish surfaces that will be exposed in completed assemblies.
      b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
      c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
   4. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   5. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   6. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   7. Air and Vapor Seal: Maintain continuous air barrier and vapor retarder throughout assembly, primarily in line with inside pane of glazing and inner sheet of infill panel and heel bead of glazing compound.

B. Entrance Doors: Glazed aluminum.
   1. Basis-of-Design Product: Kawneer Company, Inc.; 190 Standard Entrance.
   2. Acceptable manufacturers:
      a. EFCO Corporation
      b. Oldcastle BuildingEnvelope
      c. Wausau Window and Wall Systems
      d. YKK AP
      e. Tubelite Inc.
      f. Pittco Architectural Metals
   3. Major Extruded Sections: 1-3/4 inch thick; minimum 1/8 inch wall thickness.
      a. Top Rail: Minimum 2-1/4 inches wide.
      b. Vertical Stiles: Minimum 2-1/8 inches wide.
      c. Bottom Rail: Minimum 10 inches wide.
   4. Glazing Method: Dry glazed with extruded pressure-fitting aluminum glazing stops, and a gasket that complies with ASTM E 2203.
   5. Glazing Stops: Square; minimum 0.050 inch thickness. Exterior stops shall be an integral part of the door; interior stops shall be snap-in type.
   6. Finish: Same as curtain wall frames.
   7. Construction: Welded corner. Tie rod only construction is not acceptable.

8. Storefront and Vestibule Framing: Where storefront framing is indicated on drawings, provide storefront framing by same manufacturer as curtain wall in sizes as indicated on drawings.

C. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
   1. Design Wind Loads: Comply with the applicable code.
   2. Movement: Accommodate the following movement without damage to components or deterioration of seals:
      a. Expansion and contraction caused by 180 degrees F surface temperature.
      b. Expansion and contraction caused by cycling temperature range of 170 degrees F over a 12 hour period.
      c. Movement of curtain wall relative to perimeter framing.
      d. Deflection of structural support framing, under permanent and dynamic loads.

D. Water Penetration Resistance: No uncontrolled water on indoor face when tested as follows:
   1. Test Pressure Differential: 10 psf.

E. Air Leakage: Maximum of 0.06 cu ft/min sq ft of wall area, when tested in accordance with ASTM E283 at 6.27 psf pressure differential across assembly.

F. Thermal Performance Requirements:
   1. Condensation Resistance Factor of Framing: 50, minimum, measured in accordance with AAMA 1503.
   2. Overall U-value Including Glazing: 0.36 Btu/(hr sq ft deg F), maximum.

G. COMPONENTS

H. Glazing: As specified in Section 08 80 00.

2.4 MATERIALS

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Sheet Aluminum: ASTM B209 (ASTM B209M).

C. Structural Steel Sections: ASTM A36/A36M; shop primed.

D. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.

E. Concealed Flashings: Stainless steel, 20 gage, 0.032 inch minimum thickness.

F. Curtain Wall Break Metal: Aluminum, minimum 0.064 inch thick, finished to match curtain wall framing.

G. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

H. Glazing Accessories: As specified in Section 08 80 00.

I. Silicone Transision: Provide silicone transition strip at perimeter conditions between composite wood panels, aluminum composite panels, fiber reinforced cementitions panels, thin limestone adhered panels and the work of this section to provide an air and watertight seal. Silicone transition strip must be compatible with the air and vapor barrier being applied to the exterior sheathing withing the exterior cladding systems.
   1. Acceptable Products:
      a. Dow Corning 123 Preformed Silicone Seal
      b. Momentive UltraSpan US1100
      c. Tremco Spectrem Simple Seal

2.5 FINISHES

A. High Performance Organic Coatings: AAMA 2604; multiple coats, thermally cured fluoropolymer system.

B. Color: As indicated on drawings.

PART 3 EXECUTION

03ADD

3.1 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other related work.

B. Verify that curtain wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

C. Verify that anchorage devices have been properly installed and located.

3.2 INSTALLATION

A. Install curtain wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Structural Sealant Glazing (SSG) Adhesive: Install structural sealant glazing adhesive and weatherseal sealant in accordance with manufacturer's instructions.

H. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

I. Silicone Transition Installation:
   1. Coordinate installation methods and sequencing of installation with weather barrier, composite wood panels, aluminum composite panels, fiber reinforced cementitions panels, and thin limestone adhered panel contractors. Silicone transition must be installed and sealed to air/water/vapor barrier within panel walls after air/water/vapor barrier components have been installed and prior to installation of cladding panels.
   2. Clean surfaces where silicone transition is to be applied in accordance with transition boot manufacturer’s written recommendations. Set transition material in a continuous bed of sealant.
   3. Secure silicone transition on both sides of the perimeter joints and provide continuous sealant compatible with air/water/vapor barrier.

3.3 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

3.4 FIELD QUALITY CONTROL

A. Hose Tests
   1. Field hose testing for resistance to water leakage shall be conducted and results interpreted as defined herein. Perform a minimum of five (5) field hose tests. Test areas shall include both curtain wall system(s) and adjacent construction. Coordinate testing of curtain wall areas with adjacent construction contractors as required. Area and time of tests shall be per the direction of the Architect. Initial testing shall be conducted early in the construction schedule. Schedule any out of sequence work necessary, such as out of sequence sealant work, so that selected areas can be tested as specified.
   2. For curtain wall areas, each test area shall be three glass openings wide by two floors high, or 400 ft2, whichever is greater. There shall be no unacceptable water leakage as defined in this Section.
   3. Conduct test with Monarch Type B-25 #6.030 brass nozzle and 3/4 inch diameter hose. Water pressure to nozzle shall be in the range 30 to 35 psi. Working upward from bottom of test area, direct water at 5 foot long segments of glazing seals, frame joints and perimeter joints, moving slowly back and forth on each segment for minimum of 5 minutes. Where a framing member is between two glass units and its width does not exceed 4 inches, both lines of glazing seal may be tested as one segment by centering the spray on one glazing seal while moving in one direction, and centering the spray on the other glazing seal while moving in the opposite direction. Sustained spraying at one point while the nozzle remains stationary is acceptable. Tip of nozzle shall be 12 inches from specimen exterior surface. Nozzle shall generally be perpendicular to specimen surface, but shall be tilted to any angle that maximizes exposure of a given joint to water flow rate and kinetic energy. Continuously check for leakage on indoor side. If necessary to pinpoint leak sources, perform additional testing. Repeated testing of joints is acceptable. The use of masking to pinpoint leaks is acceptable.
   4. Check completed areas below test area, and report any leaks that occur. A test that results in leakage at a completed area below a designated test area is a failure.

5. Contractor performing work of this Section shall provide powered scaffold, hose, water supply, and manpower to perform each test, plus any unsuccessful tests.
6. If failure occurs, revise and retest specimens. Modifications must be realistic in terms of project conditions, must maintain standards of quality and durability and are subject to approval. If failure necessitates retesting, Contractor for Work of this Section shall pay all additional fees associated with retesting, including fees and costs incurred by the testing agent, the Architect, Owner and their representatives.
7. Submit, for information only, reports that contain dates of tests, elevation drawings of test areas with locations relative to grid lines (including any lower areas where leaks occur), and location of each leak.

B. Replace curtain wall components that have failed field testing and retest until performance is satisfactory.

3.5 ADJUSTING

A. Adjust operating sash for smooth operation.

3.6 CLEANING

A. Remove protective material from pre-finished aluminum surfaces.

3.7 PROTECTION

A. Protect installed products from damage until Date of Substantial Completion.

END OF SECTION

SECTION 08 71 00

DOOR HARDWARE

Check all Hardware Sets for Updates. Set 24 was added.

03ADD

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Mechanical door hardware for the following:

   a. Swinging doors.
   b. Sliding doors.

2. Cylinders for door hardware specified in other Sections.
3. Electrified door hardware.

1.2 ACTION SUBMITTALS

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

B. Shop Drawings: Details of electrified door hardware.

C. Samples: For each exposed product and for each color and texture specified.

D. Other Action Submittals:

1. Door Hardware Schedule: Prepared by or under the supervision of Installer, detailing fabrication and assembly of door hardware, as well as installation procedures and diagrams. Coordinate final door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

   a. Format: Use same scheduling sequence and vertical format and use same door numbers as in the Contract Documents.
   b. Content: Include the following information:

      1) Identification number, location, hand, fire rating, size, and material of each door and frame.
      2) Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
      3) Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
      4) Description of electrified door hardware sequences of operation and interfaces with other building control systems.

2. Keying Schedule: Prepared by or under the supervision of Supplier, detailing Owner's final keying instructions for locks.

1.3 QUALITY ASSURANCE

A. Supplier Qualifications: The hardware supplier shall be a corporate member in good standing of The Door and Hardware Institute (DHI), employing at least one Architectural Hardware Consultant (AHC) who is currently participating in DHI's continuing education program (CEP).

B. Source Limitations: Provide electrified door hardware from same manufacturer as mechanical door hardware, unless otherwise indicated.

C. Items of hardware not definitely specified herein but necessary for completion of the work shall be provided. Such items shall be of type and quality suitable to the service required and comparable to the adjacent hardware. Where size and shape of members is such as to prevent the use of types specified, hardware shall be furnished of suitable types having as nearly as practicable the same operation and quality as the type specified. Sizes shall be adequate for the service required.

D. Include such nuances as strike type, strike lip length, raised barrel hinges, mounting brackets, blade stop spacers, special templates, fasteners, shims, and coordination between conflicting products. All doors shall be provided with a stop.

E. Fire-Rated Door Assemblies: Where fire-rated door assemblies are indicated, provide door hardware rated for use in assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C, unless otherwise indicated. Provide positive latching and self-closing, regardless if specified in sets.

F. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meet requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.

1. Air Leakage Rate: Maximum air leakage of0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at the tested pressure differential of 0.3-inch wg (75 Pa) of water.

G. Electrified Door Hardware: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction.

H. Means of Egress Doors: Latches do not require more than 15 lbf (67 N) to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.

I. Accessibility Requirements: For door hardware on doors in an accessible route, comply with ICC/ANSI A117.1.

1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than 5 lbf (22.2 N).
2. Comply with the following maximum opening-force requirements:

    a. Interior, Non-Fire-Rated Hinged Doors: 5 lbf (22.2 N) applied perpendicular to door.
    b. Sliding or Folding Doors: 5 lbf (22.2 N) applied parallel to door at latch.
    c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.

3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than 1/2 inch (13 mm) high.
4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a point 12 degress from the latch, measured to the leading edge of the door.

J. Keying Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver keys and permanent cores to Owner by registered mail or overnight package service.

1.5 WARRANTY

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

1. Warranty Period: Manufacturers' standard warranty period.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. Provide door hardware for each door as scheduled in Part 3 "Door Hardware Schedule" Article to comply with requirements in this Section.

1. Door Hardware Sets: Provide quantity, item, size, finish or color indicated, and named manufacturers' products.
2. Sequence of Operation: Provide electrified door hardware function, sequence of operation, and interface with other building control systems indicated.

B. Designations: Requirements for design, grade, function, finish, size, and other distinctive qualities of each type of door hardware are indicated in Part 3 "Door Hardware Schedule" Article. Products are identified by using door hardware designations, as follows:

1. Named Manufacturers' Products: Manufacturer and product designation are listed for each door hardware type required. Manufacturers' names are abbreviated in Part 3 "Door Hardware Schedule" Article.

2.2 CONTINUOUS HINGES

A. Continuous Hinges: BHMA A156.26; minimum 0.120-inch- (3.0-mm-) thick, hinge leaves with minimum overall width of 4 inches (102 mm); fabricated to full height of door and frame and to template screw locations; with components finished after milling and drilling are complete.

B. Continuous, Gear-Type Hinges: Extruded-aluminum, pinless, geared hinge leaves joined by a continuous extruded-aluminum channel cap; with concealed, self-lubricating thrust bearings.

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

a. Hager Companies.
b. Select Products Limited.
c. Stanley Commercial Hardware; Div. of The Stanley Works.

2.3 MECHANICAL LOCKS AND LATCHES

A. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.

1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
3. Aluminum-Frame Strike Box: Manufacturer's special strike box fabricated for aluminum framing.

B. Bored Locks: BHMA A156.2; Grade 1; Series 4000.

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

a. Best Access Systems; Div. of Stanley Security Solutions, Inc.
b. Corbin Russwin Architectural Hardware; n ASSA ABLOY Group Company.
c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

C. Push-Pull Latches: Mortise, BHMA A156.13; Grade 1; with paddle handles that retract latchbolt; capable of being mounted vertically or horizontally.

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

a. Architectural Builders Hardware Mfg., Inc.
b. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.4 AUXILIARY LOCKS

A. Narrow Stile Auxiliary Locks: BHMA A156.5; Grade 1; with strike that suits frame.

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

a. Adams Rite Manufacturing Co.; an ASSA ABLOY Group company.

2.5 MANUAL FLUSH BOLTS

A. Manual Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.

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

a. Hager Companies.
b. Rockwood Manufacturing Company.
c. Trimco.

2.6 AUTOMATIC AND SELF-LATCHING FLUSH BOLTS

A. Automatic and Self-Latching Flush Bolts: BHMA A156.16; minimum 3/4-inch (19-mm) throw; designed for mortising into door edge.

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

a. Hager Companies.
b. Rockwood Manufacturing Company.
c. Trimco.

2.7 EXIT DEVICES AND AUXILIARY ITEMS

A. Exit Devices and Auxiliary Items: BHMA A156.3.

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

a. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company.
b. Precision Hardware, Inc.; Division of Stanley Security Solutions, Inc.
c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.8 LOCK CYLINDERS

A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.

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

a. Best Access Systems; Div. of Stanley Security Solutions, Inc.

B. Construction Cores: Provide construction cores that are replaceable by permanent cores. Provide 10 construction master keys.

2.9 KEYING

A. Keying System: Factory registered, complying with guidelines in BHMA A156.28, Appendix A. Incorporate decisions made in keying conference.
1. Existing System:

a. Master key or grand master key locks to Owner's existing Best system.

B. Keys: Brass.

1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:

a. Notation: Information to be furnished by Owner.

2. Quantity: In addition to one extra key blank for each lock, provide the following:

a. Cylinder Change Keys: Three.
b. Master Keys: Five.

2.10 KEY CONTROL SYSTEM

A. Key Control Cabinet: BHMA A156.5; metal cabinet with baked-enamel finish; containing key-holding hooks, labels, 2 sets of key tags with self-locking key holders, key-gathering envelopes, and temporary and permanent markers; with key capacity of 150 percent of the number of locks.

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

a. American Key Boxes and Cabinets.
b. GE Security, Inc.

c. HPC, Inc.
d. Lund Equipment Co., Inc.
e. MMF Industries.
f. Tri Palm International.

2. Wall-Mounted Cabinet: Cabinet with hinged-panel door equipped with key-holding panels and pin-tumbler cylinder door lock.

2.11 OPERATING TRIM

A. Operating Trim: BHMA A156.6; stainless steel, unless otherwise indicated.

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

a. Hager Companies.
b. Rockwood Manufacturing Company.
c. Trimco.

2.12 ACCESSORIES FOR PAIRS OF DOORS

A. Coordinators: BHMA A156.3; consisting of active-leaf, hold-open lever and inactive-leaf release trigger; fabricated from steel with nylon-coated strike plates; with built-in, adjustable safety release; and with internal override.

B. Carry-Open Bars: BHMA A156.3; prevent the inactive leaf from opening before the active leaf; provide polished brass or bronze carry-open bars with strike plate for inactive leaves of pairs of doors unless automatic or self-latching bolts are used.

C. Astragals: BHMA A156.22.

2.13 SURFACE CLOSERS

A. Surface Closers: BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written recommendations for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force. Provide extra duty arms at parallel arm closers.

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

a. Corbin Russwin Architectural Hardware; an ASSA ABLOY Group company. DC8000 Series.
b. SARGENT Manufacturing Company; an ASSA ABLOY Group company. 281 Series.
c. Stanley Door Closers; a Division of Stanley Security Solutions, Inc. D-4550 Series.

2.14 MECHANICAL STOPS AND HOLDERS

A. Wall- and Floor-Mounted Stops: BHMA A156.16; polished cast brass base metal.

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

a. Hager Companies.
b. Rockwood Manufacturing Company.

c. Trimco.

2.15 OVERHEAD STOPS AND HOLDERS

A. Overhead Stops and Holders: BHMA A156.8.

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

a. Architectural Builders Hardware Mfg., Inc.
b. Rockwood Manufacturing Company.
c. SARGENT Manufacturing Company; an ASSA ABLOY Group company.

2.16 DOOR GASKETING

A. Door Gasketing: BHMA A156.22; air leakage not to exceed 0.50 cfm per foot (0.000774 cu. m/s per m) of crack length for gasketing other than for smoke control, as tested according to ASTM E 283; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

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

a. Hager Companies.
b. National Guard Products.
c. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
d. Reese Enterprises, Inc.

2.17 THRESHOLDS

A. Thresholds: BHMA A156.21; fabricated to full width of opening indicated.

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

a. Hager Companies.
b. National Guard Products.
c. Pemko Manufacturing Co.; an ASSA ABLOY Group company.
d. Reese Enterprises, Inc.

2.18 METAL PROTECTIVE TRIM UNITS

A. Metal Protective Trim Units: BHMA A156.6; fabricated from 0.050-inch- (1.3-mm-) thick stainless steel; with manufacturer's standard machine or self-tapping screw fasteners.

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

a. Hager Companies.
b. Rockwood Manufacturing Company.
c. Trimco.

2.19 AUXILIARY DOOR HARDWARE

A. Auxiliary Hardware: BHMA A156.16.

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

    a. Hager Companies.
    b. Rockwood Manufacturing Company.
    c. Stanley Commercial Hardware; Div. of The Stanley Works.
    d. Trimco.

2.20 AUXILIARY ELECTRIFIED DOOR HARDWARE

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

1. Securitron Magnalock Corporation; an ASSA ABLOY Group company.
2. Hanchett Entry Systems, Inc.; an ASSA ABLOY Group company.
3. Trine Access Technology.

2.21 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended, except aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware, unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:

    a. Wood or Machine Screws: For the following:

        1) Hinges mortised to doors or frames; use threaded-to-the-head wood screws for wood doors and frames.
        2) Strike plates to frames.
        3) Closers to doors and frames.

    b. Steel Through Bolts: For the following unless door blocking is provided:

        1) Surface hinges to doors.
        2) Closers to doors and frames.
        3) Surface-mounted exit devices.

3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
4. Fasteners for Wood Doors: Comply with requirements in DHI WDHS.2, "Recommended Fasteners for Wood Doors."
5. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.22 FINISHES

A. Provide finishes complying with BHMA A156.18 as indicated in door hardware schedule.

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

PART 3 - EXECUTION

3.1 INSTALLATION

A. Steel Doors and Frames: For surface applied door hardware, drill and tap doors and frames according to ANSI/SDI A250.6.

B. Wood Doors: Comply with DHI WDHS.5 "Recommended Hardware Reinforcement Locations for Mineral Core Wood Flush Doors."

C. Mounting Heights: Mount door hardware units at heights to comply with the following unless otherwise indicated or required to comply with governing regulations.

1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."

D. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.

1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.

E. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than the number recommended by manufacturer for application indicated or one hinge for every 30 inches (750 mm) of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.

F. Lock Cylinders: Install construction cores to secure building and areas during construction period.

1. Replace construction cores with permanent cores as directed by Owner.

G. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.

H. Boxed Power Supplies: Locate power supplies as indicated or, if not indicated, in equipment room. Verify location with Architect.

1. Configuration: Provide least number of power supplies required to adequately serve doors with electrified door hardware.

I. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."

J. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they will impede traffic.

K. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.

L. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.

M. Door Bottoms: Apply to bottom of door, forming seal with threshold when door is closed.

N. Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.2 DOOR HARDWARE SCHEDULE

HARDWARE SET 1

1	EA	CONTINUOUS HINGE	780-112HD	628	HAG
1	EA	ELECTRIC STRIKE	9600	630	HES
1	EA	SMART PAC	2005M3		HES
1	EA	EXIT DEVICE	2103CD X CA-03	630	PRE
2	EA	CYLINDER	AS REQUIRED	626	BES
1	EA	PULL	BF157	630	ROC
1	EA	OVERHEAD STOP	1000	630	ABH
1	EA	AUTO OPERATOR	MAC-LL1C-R	628	MOT
1	EA	ACTUATOR	10PBS1	630	BEA
1	EA	WEATHER RING	10WRSQ475		BEA
1	EA	BOLLARD	10BOLLARDSLV	689	BEA
1	EA	THRESHOLD	8425	719	NGP
1	EA	SWEEP	200NA	628	NGP
1	SET	WEATHERSTRIPPING	BY DOOR AND FRAME MANUFACTURER		
1	EA	CARD READER	BY SECURITY CONTRACTOR		

OPERATIONAL DESCRIPTION: Door normally closed, locked and exterior actuator is deactivated. Valid credential allows entry and use of exterior actuator. Vestibule actuator always active for use. Door remains closed and locked upon loss of power. Free egress at all times.

HARDWARE SET 2

1	EA	CONTINUOUS HINGE	780-112HD	628	HAG
1	EA	DUMMY BAR	674DR	630	PRE
1	EA	PULL	BF157	630	ROC
1	EA	AUTO OPERATOR	MAC-ML1C-R	628	MOT
1	EA	ACTUATOR	10PBDGP1	630	BEA
1	EA	ACTUATOR	10PBS1	630	BEA
2	EA	MOUNTING BOX	10BOX475SQFM	BLK	BEA
1	EA	WALL STOP	403	626	ROC

HARDWARE SET 3

1	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	ELECTRIC STRIKE	1500	630	HES
1	EA	STOREROOM	9K3 7D 14C S3	626	BES
1	EA	CLOSER	D-4551	689	STA
1	EA	KICK PLATE	10” X 2” LDW	630	ROC
1	EA	WALL STOP	403	626	ROC
1	EA	CARD READER	BY SECURITY CONTRACTOR		

OPERATIONAL DESCRIPTION: Door normally closed and locked. Valid credential allows entry. Door remains closed and locked upon loss of power. Free egress at all times.

HARDWARE SET 4

HARDWARE BY DOOR SUPPLIER

HARDWARE SET 5

1	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	PRIVACY	9K3 0L 14C S3	626	BES
1	EA	WALL STOP	403	626	ROC

HARDWARE SET 6

1	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	OFFICE	9K3 7AB 14C S3	626	BES
1	EA	WALL STOP	403	626	ROC
1	SET	SEALS	5050	BLK	NGP

HARDWARE SET 7

1	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	STOREROOM	9K3 7D 14C S3	626	BES
1	EA	CLOSER	D-4551	689	STA
1	EA	KICK PLATE	10” X 2” LDW	630	ROC
1	EA	WALL STOP	403	626	ROC

HARDWARE SET 8

1	EA	CONTINUOUS HINGE	780-112HD	628	HAG
1	EA	ELECTRIC STRIKE	9600	630	HES
1	EA	SMART PAC	2005M3		HES
1	EA	EXIT DEVICE	2103CD X CA-03	630	PRE
2	EA	CYLINDER	AS REQUIRED	626	BES
1	EA	PULL	BF157	630	ROC
1	EA	OVERHEAD STOP	1000	630	ABH
1	EA	DROP PLATE	P45-180	689	STA
1	EA	CLOSER	D-4550	689	STA
1	EA	THRESHOLD	8425	719	NGP
1	EA	SWEEP	200NA	628	NGP
1	SET	WEATHERSTRIPPING	BY DOOR AND FRAME MANUFACTURER		
1	EA	CARD READER	BY SECURITY CONTRACTOR		

OPERATIONAL DESCRIPTION: Door normally closed and locked. Valid credential allows entry. Door remains closed and locked upon loss of power. Free egress at all times.

HARDWARE SET 9

1	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	STOREROOM	9K3 7D 14C S3	626	BES
1	EA	CLOSER	D-4550 CS	689	STA
1	EA	KICK PLATE	10” X 2” LDW	630	ROC
1	EA	THRESHOLD	8425	719	NGP
1	EA	SWEEP	200NA	628	NGP
1	SET	WEATHERSTRIPPING	9700A	628	NGP
1	EA	DRIP CAP	16A	628	NGP

HARDWARE SET 10

1	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	CLASSROOM	9K3 7R 14C S3	626	BES
1	EA	KICK PLATE	10” X 2” LDW	630	ROC
1	EA	WALL STOP	403	626	ROC

HARDWARE SET 11

1	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	PASSAGE	9K3 0N 14C S3	626	BES
1	EA	CLOSER	D-4551 DA H	689	STA
1	EA	KICK PLATE	10" X 2" LDW	630	ROC
1	EA	WALL STOP	403	626	ROC

HARDWARE SET 12

1	EA	CONTINOUS HINGE	780-224HD	628	HAG
1	EA	PUSH PLATE	70F 8" X 16" LDW	630	ROC
1	EA	PULL PLATE	BF111 X 70C 4" X 16" LDW	630	ROC
1	EA	OVERHEAD STOP	4400	630	ABH
1	EA	CLOSER	D-4551	689	STA
1	EA	KICK PLATE	10" X 2" LDW	630	ROC
1	SET	SEALS	5050	BLK	NGP
1	EA	AUTO DOOR BOTTOM	423N	628	NGP

HARDWARE SET 13

1	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	EXIT DEVICE	2101	630	PRE
1	EA	CLOSER	D-4550 CS	689	STA
1	EA	KICK PLATE	10" X 2" LDW	630	ROC
1	EA	THRESHOLD	8425	719	NGP
1	EA	SWEEP	200NA	628	NGP
1	SET	WEATHERSTRIPPING	9700	628	NGP
1	EA	DRIP CAP	16A	628	NGP

HARDWARE SET 14

2	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	FLUSH BOLT	555	626	ROC
1	EA	CLASSROOM	9K3 7R 14C S3	626	BES
2	EA	OVERHEAD STOP	4400	630	ABH

HARDWARE SET 15

1	EA	CONTINUOUS HINGE	780-112HD	628	HAG
1	EA	DEADLATCH	2190-4-1-1-1-01	630	ADA
1	EA	CYLINDER	AS REQUIRED	626	BES
1	EA	ADA THUMBTURN CYLINDER	AS REQUIRED	626	BES
1	EA	OVERHEAD HOLDER	1000	630	ABH
1	EA	DROP PLATE	P45-180	689	STA
1	EA	CLOSER	D-4550	689	STA
1	EA	THRESHOLD	8425	719	NGP
1	EA	SWEEP	200NA	628	NGP
1	SET	WEATHERSTRIPPING	BY DOOR AND FRAME MANUFACTURER		

HARDWARE SET 16

1	EA	CONTINUOUS HINGE	780-112HD	628	HAG
1	EA	EXIT DEVICE	2108CD X 4908D	630	PRE
2	EA	CYLINDER	AS REQUIRED	626	BES
1	EA	CLOSER	D-4551	689	STA
1	EA	WALL STOP	403	626	ROC
1	EA	THRESHOLD	8425	719	NGP
1	EA	SWEEP	200NA	628	NGP
1	SET	WEATHERSTRIPPING	BY DOOR AND FRAME MANUFACTURER		

HARDWARE SET 17

1	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	ELECTRIC STRIKE	1500	630	HES
1	EA	STOREROOM	9K3 7D 14C S3	626	BES
1	EA	CLOSER	D-4551	689	STA
1	EA	WALL STOP	403	626	ROC
1	EA	CARD READER	BY SECURITY CONTRACTOR		

OPERATIONAL DESCRIPTION: Door normally closed and locked. Valid credential allows entry. Door remains closed and locked upon loss of power. Free egress at all times.

HARDWARE SET 18

2	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	FLUSH BOLT	555	626	ROC
1	EA	STOREROOM	9K3 7D 14C S3	626	BES
2	EA	OVERHEAD STOP	4400	630	ABH

HARDWARE SET 19

1	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	PRIVACY	9K3 0L 14C S3	626	BES
1	EA	OVERHEAD STOP	4400	630	ABH

HARDWARE SET 20

1	EA	BYPASS HARDWARE	HBP200A	628	PEM
1	EA	BYPASS FASCIA	F134C	628	PEM
2	EA	FLUSH PULL	BF97L	630	ROC

HARDWARE SET 21

1	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	EXIT DEVICE	2108CD X 4908D	630	PRE
2	EA	CYLINDER	AS REQUIRED	626	BES
1	EA	CLOSER	D-4550 CS	689	STA
1	EA	KICK PLATE	10” X 2” LDW	630	ROC

HARDWARE SET 22

1	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	ELECTRIC STRIKE	9600	630	HES
1	EA	SMART PAC	2005M3		HES
1	EA	EXIT DEVICE	2103CD X CA-03	630	PRE
2	EA	CYLINDER	AS REQUIRED	626	BES
1	EA	PULL	BF157	630	ROC
1	EA	CLOSER	D-4550 CS	689	STA
1	EA	THRESHOLD	8425	719	NGP
1	EA	SWEEP	200NA	628	NGP
1	SET	WEATHERSTRIPPING	9700A	628	NGP
1	EA	DRIP CAP	16A	628	NGP
1	EA	CARD READER	BY SECURITY CONTRACTOR		

OPERATIONAL DESCRIPTION: Door normally closed and locked. Valid credential allows entry. Door remains closed and locked upon loss of power. Free egress at all times.

HARDWARE SET 23

1	EA	CONTINUOUS HINGE	780-224HD	628	HAG
1	EA	OFFICE	9K3 7AB 14C S3	626	BES
1	EA	CLOSER	D-4550	689	STA

1	EA	KICK PLATE	10" X 2" LDW	630	ROC
1	EA	WALL STOP	403	626	ROC
1	SET	SEALS	5050	BLK	NGP

HARDWARE SET 24

1	EA	EXIT DEVICE	2408CD X 4908D	630	PRE
2	EA	CYLINDER	AS REQUIRED	626	BES

REMAINING HARDWARE BY DOOR MANUFACTURER

ADD 3

END OF SECTION 087100

SECTION 08 80 00
GLAZING

03ADD

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Insulating glass units.

B. Glazing units.

C. Plastic films.

D. Glazing compounds and accessories.

1.2 RELATED REQUIREMENTS

A. Section 08 11 13 - Hollow Metal Doors and Frames: Glazed lites in doors and borrowed lites.

B. Section 08 14 16 - Flush Wood Doors: Glazed lites in doors.

C. Section 08 43 13 - Aluminum-Framed Storefronts: Glazing furnished as part of storefront assembly.

D. Section 08 44 13 - Glazed Aluminum Curtain Walls: Glazing furnished as part of wall assembly.

1.3 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.

C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2015).

D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014a.

E. ASTM C1036 - Standard Specification for Flat Glass; 2016.

F. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.

G. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

H. ASTM C1376 - Standard Specification for Pyrolytic and Vacuum Deposition Coatings on Flat Glass; 2015.

I. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.

J. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.

K. GANA (GM) - GANA Glazing Manual; 2009.

L. GANA (SM) - GANA Sealant Manual; 2008.

M. ITS (DIR) - Directory of Listed Products; current edition.

N. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2014.

O. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014.

P. NFRC 300 - Test Method for Determining the Solar Optical Properties of Glazing Materials and Systems; 2014.

Q. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

1.4 SUBMITTALS

A. Product Data on Insulating Glass Unit, Glazing Unit, and Plastic Film Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.

B. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

C. Samples: Submit two samples 12 by 12 inch in size of glass units.

D. Certificate: Certify that products of this section meet or exceed specified requirements.

E. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with GANA (GM) and GANA (SM) for glazing installation methods.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Adhesion and Compatibility Testing: Test each glazing material type, tape sealant, gasket, glazing accessory, and glass-framing member for adhesion to and compatibility with elastomeric glazing sealants.
   1. Testing will not be required if data are submitted based on previous testing of current sealant products and glazing materials matching those submitted.

1.7 WARRANTY

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Float Glass Manufacturers:
   1. Cardinal Glass Industries: www.cardinalcorp.com.
   2. Guardian Industries Corp: www.sunguardglass.com.
   3. Pilkington North America Inc: www.pilkington.com/na.
   4. PPG Industries, Inc: www.ppgideascapes.com.

B. Fire-Protection-Rated Glass Manufacturers: Provide products as required to achieve indicated fire-rating period.
   1. SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite I-XL: www.safti.com/sle.
   2. Technical Glass Products; FireLite Plus: www.fireglass.com.

2.2 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES

A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
   1. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
   2. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
   3. Glass thicknesses listed are minimum.

B. Vapor Retarder and Air Barrier Seals: Provide completed assemblies that maintain continuity of building enclosure vapor retarder and air barrier.
   1. In conjunction with vapor retarder and joint sealer materials described in other sections.

C. Thermal and Optical Performance: Provide glass products with performance properties as indicated. Performance properties are in accordance with manufacturer's published data as determined with the following procedures and/or test methods:
   1. Center of Glass U-Value: Comply with NFRC 100 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
   2. Center of Glass Solar Heat Gain Coefficient (SHGC): Comply with NFRC 200 using Lawrence Berkeley National Laboratory (LBNL) WINDOW 6.3 computer program.
   3. Solar Optical Properties: Comply with NFRC 300 test method.

2.3 GLASS MATERIALS

A. Float Glass: Provide float glass based glazing unless noted otherwise.
   1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
   2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and FT.
   3. Fully Tempered Safety Glass: Complies with ANSI Z97.1 and 16 CFR 1201 criteria.
   4. Thicknesses: As indicated; provide greater thickness as required for exterior glazing wind load design.

2.4 INSULATING GLASS UNITS

A. Manufacturers:
1. Fabricator certified by glass manufacturer for type of glass, coating, and treatment involved and capable of providing specified warranty.
2. Cardinal Glass Industries: www.cardinalcorp.com.
3. Guardian Industries Corp: www.sunguardglass.com.
4. Pilkington North America Inc: www.pilkington.com/na.
5. PPG Industries, Inc: www.ppgideascapes.com.
6. Viracon, Apogee Enterprises, Inc: www.viracon.com.

B. Insulating Glass Units: Types as indicated.
1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
2. Coated Glass: Comply with requirements of ASTM C1376 for pyrolytic (hard-coat) or magnetic sputter vapor deposition (soft-coat) type coatings on flat glass; coated vision glass, Kind CV; coated overhead glass, Kind CO; or coated spandrel glass, Kind CS.
3. Metal Edge Spacers: Aluminum, bent and soldered corners.
4. Spacer Color: Aluminum.
5. Edge Seal:
   a. Dual-Sealed System: Provide polyisobutylene sealant as primary seal applied between spacer and glass panes, and silicone, polysulfide, or polyurethane sealant as secondary seal applied around perimeter.
6. Color: Black.
7. Purge interpane space with dry air, hermetically sealed.

2.5 INSULATING GLASS UNITS

A. Insulating Glass Units: Vision glazing, with Low-E coating.
1. Applications: Exterior insulating glass glazing unless otherwise indicated.
2. Space between lites filled with air.
3. Total Thickness: 1 inch.
4. Thermal Transmittance (U-Value), Winter - Center of Glass: 0.29, nominal.
5. Visible Light Transmittance (VLT): 70 percent, nominal.
6. Solar Heat Gain Coefficient (SHGC): 0.39, nominal.
7. Glazing Method: Dry glazing method, gasket glazing.
8. Basis of Design - PPG Industries, Inc: www.ppgideascapes.com.
9. Outboard Lite: Heat-strengthened float glass, 1/4 inch thick, minimum. Provide fully tempered units where saftety glass is required.
   a. Low-E Coating: PPG Solarban 60 on #2 surface.
10. Inboard Lite: Heat-strengthened float glass, 1/4 inch thick. Provide fully tempered units where saftety glass is required.
    a. Coating: No coating on inboard lite.

B. Spandrel Insulating Glass Unit: Same as Insulating Glass Unit specified above, but with spandrel glass in lieu of clear glass on inboard lite.
1. Spandrel Glass Color: To be selected by Architect from manufacturer's full range.

2.6 GLAZING UNITS

A. Fire-Protection-Rated Glazing: Type, thickness, and configuration of glazing that contains flame, smoke, and does not block radiant heat, as required to achieve indicated fire-rating period of 45 minutes or less.
1. Applications:
   a. Glazing in fire-rated door assembly.
   b. Glazing in fire-rated window assembly.
   c. Other locations as indicated on drawings.
2. Provide products listed by ITS (DIR) or UL (DIR) and approved by authorities having jurisdiction.
3. Safety Glazing Certification: 16 CFR 1201 Category II.
4. Fire-Rating Period: As indicated on drawings.
5. Manufacturers:
   a. SAFTIFIRST, a division of O'Keeffe's Inc; SuperLite I: www.safti.com/sle.

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b. SCHOTT North America Inc; Pyran Platinum: www.us.schott.com.
c. Technical Glass Products; Firelite Plus: www.fireglass.com.

B. Monolithic Safety Glazing: Non-fire-rated.
1. Applications:
a. Glazed lites in doors, except fire doors.
b. Glazed sidelights to doors, except in fire-rated walls and partitions.
c. Other locations required by applicable federal, state, and local codes and regulations.
d. Other locations indicated on drawings.
2. Glass Type: Fully tempered safety glass as specified.
3. Tint: Clear.
4. Thicknesses:
a. For glass units with fully captured edges: 1/4" unless otherwise indicated.
b. For glass units with top and bottom captured edges, butt-glazed sides:
1) Up to 5' in height: 1/4".
2) Over 5' up to 8' in height: 3/8"
3) Over 8' up to 10' in height:1/2"
4) Over 10' up to 12' in height: 5/8"
5) Over 12' up to 14' in height: 3/4"
6) Over 14' up to 16' in height: 7/8"
7) Over 16' up to 18' in height: 1"

2.7 GLAZING COMPOUNDS

A. Silicone Sealant: Single component; neutral curing; capable of water immersion without loss of properties; non-bleeding, non-staining; ASTM C920, Type S, Grade NS, Class 25, Uses M, A, and G; with cured Shore A hardness range of 15 to 25; color as selected.

2.8 ACCESSORIES

A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Tape: Closed cell polyvinyl chloride (PVC) foam, coiled on release paper over adhesive on two sides, maximum water absorption by volume of 2 percent, designed for compression of 25 percent to effect an air barrier and vapor retarder seal.

D. Glazing Splines: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; color black.

E. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

3.2 INSTALLATION, GENERAL

A. Install glazing in compliance with written instructions of glass, gaskets, and other glazing material manufacturers, unless more stringent requirements are indicated, including those in glazing referenced standards.

B. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.

C. Do not exceed edge pressures around perimeter of glass lites as stipulated by glass manufacturer.

D. Set glass lites of system with uniform pattern, draw, bow, and similar characteristics.

E. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.

F. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

3.3 INSTALLATION - DRY GLAZING METHOD (GASKET GLAZING)

A. Application - Exterior and/or Interior Glazed: Set glazing infills from either the exterior or the interior of the building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

3.4 INSTALLATION - PRESSURE GLAZED SYSTEMS

A. Application - Exterior Glazed: Set glazing infills from the exterior of the building.

B. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

D. Install pressure plates without displacing glazing gasket; exert pressure for full continuous contact.

3.5 INSTALLATION - STRUCTURAL SILICONE GLAZING

A. Follow basic guidelines of structural silicone glazing for glazing application.
   1. Two-Sided Structural: Glass structurally adhered to vertical mullions with horizontal sides captured in glazing pockets.

B. Provide design review of the glazing system and project details, adhesion testing, proper surface preparation, training and a quality service program.

C. Provide only structural silicone sealant, tested and manufactured for structural glazing.

END OF SECTION

SECTION 10 21 23
CUBICLE CURTAINS AND TRACK

03ADD

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Surface mounted overhead metal curtain track and guides.

B. Curtains.

1.2 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Blocking and supports for track.

1.3 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2016.

B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2015.

1.4 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for curtain fabric characteristics and _____.

C. Shop Drawings: Indicate a reflected ceiling plan view of curtain track, hangers and suspension points, attachment details, schedule of curtain sizes.

D. Samples: Submit 12 by 12 inch sample patch of curtain cloth with representative top, bottom, and edge hem stitch detail, heading with reinforcement, bottom weight, and carrier attachment to curtain header.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept curtain materials on site and inspect for damage.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Cubicle Track and Curtains:

2.2 TRACKS AND TRACK COMPONENTS

A. Track: Extruded aluminum sections; one piece per cubicle track run; I-beam profile.
   1. Finish on Exposed Surfaces: Clear anodized finish.

2.3 CURTAINS

A. Curtain Materials:
   1. Curtain: Maharam Increment; color selected from manufacturer's standard range.

B. Curtain Fabrication:

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that surfaces and supports above ceiling are ready to receive work of this Section.

3.2 INSTALLATION

A. Install curtain track to be secure, rigid, and true to ceiling line.

B. See Section 06 10 00 for track supports above ceiling.

C. Secure track to ceiling system.

D. Install curtains on carriers ensuring smooth operation.

END OF SECTION

SECTION 10 28 00

TOILET ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Toilet accessories.

B. Shower and bath accessories.

C. Utility room accessories.

1.2 RELATED REQUIREMENTS

A. Section 09 30 00 - Tiling: Ceramic washroom accessories.

B. Section 10 21 13.19 - Plastic Toilet Compartments.

1.3 REFERENCE STANDARDS

A. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015.

B. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.

C. ASTM C1036 - Standard Specification for Flat Glass; 2016.

D. ASTM C1503 - Standard Specification for Silvered Flat Glass Mirror; 2008 (Reapproved 2013).

1.4 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement to receive anchor attachments.

1.5 SUBMITTALS

A. Product Data: Provide data on accessories describing size, finish, details of function, attachment methods.

B. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. All items of each type to be made by the same manufacturer.

2.2 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.

B. Keys: Provide six keys for each accessory to Owner; master key all lockable accessories.

C. Stainless Steel Sheet: ASTM A666, Type 304.

D. Stainless Steel Tubing: ASTM A269, Type 304 or 316.

E. Mirror Glass: Annealed float glass, ASTM C1036 Type I, Class 1, Quality Q2, with silvering, protective and physical characteristics complying with ASTM C1503.

F. Adhesive: Two component epoxy type, waterproof.

G. Fasteners, Screws, and Bolts: Hot dip galvanized, tamper-proof, security type.

2.3 FINISHES

A. Stainless Steel: No. 4 satin brushed finish, unless otherwise noted.

2.4 Toilet Accessories

A. Toilet Paper Dispenser:

1. Product: Owner furnished, contractor installed

B. Surface Mounted Toilet Paper Dispenser:
   1. Product: Owner furnished, contractor installed

C. Waste Receptacle: Stainless steel, freestanding style with swing top.
   1. Liner: Removable, heavy-duty vinyl liner, attached at a minimum of 3 points with stainless steel grommets and hooks.
   2. Minimum capacity: 10 gallons.

D. Soap Dispenser: Owner Furnished, Contractor Installed.

E. Framed Mirrors: Stainless steel framed, 6 mm thick float glass mirror.
   1. Size: As indicated on drawings.
   2. Frame: 0.05 inchchannel shapes, with mitered corners, and tamperproof hanging system; No.4 finish.
   3. Backing: Full-mirror sized, minimum 0.03 inch galvanized steel sheet and nonabsorptive filler material.

F. Grab Bars: Stainless steel, nonslip grasping surface finish.
   1. Standard Duty Grab Bars:
      a. Push/Pull Point Load: 250 pound-force, minimum.
      b. Dimensions: 1-1/2 inch outside diameter, minimum 0.05 inch wall thickness, concealed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
      c. Length and Configuration: As indicated on drawings.
      d. Product: Bobrick, B-6806.

2.5 SHOWER ACCESSORIES

A. Shower Curtain Rod: Stainless steel tube, 1-1/4 inch outside diameter, 0.04 inch wall thickness, satin-finished, with 3 inch outside diameter, minimum 0.04 inch thick satin-finished stainless steel flanges, for concealed mounting.

B. Shower Curtain: Manufacturer's standard shower curtain with stainless steel grommets for hook attachment to curtain rod
   1. Material: [], 0.006 inch thick, matte finish,[] flameproof and stain-resistant.
   2. Size: Minimum 12 inches wider than opening by 72 inches high.
   3. Shower curtain hooks: Chrome-plated or stainless steel spring wire designed for snap closure. Provide one hook per curtain grommet.

ADD3

C. Folding Shower Seat: Wall-mounted surface; welded tubular seat frame, structural support members, hinges and mechanical fasteners of Type 304 stainless steel, rectangular seat.
   1. Seat: Teakwood slats secured to supporting frame members with stainless steel screws. Ease edges of each slat.

D. Robe Hook: Heavy-duty stainless steel, double-prong, rectangular-shaped bracket and backplate for concealed attachment, satin finish.

2.6 Utility Room Accessories

A. Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, hat-shaped channel.
   1. Length: Manufacturer's standard length for number of holders.

ADD 3

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

3.2 PREPARATION

A. Deliver inserts and rough-in frames to site for timely installation.

B. Provide templates and rough-in measurements as required.

3.3 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on the drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

END OF SECTION

SECTION 23 74 23.13
GAS FIRED MAKE-UP AIR UNITS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Direct Fired Make-Up Air Unit.

1.2 QUALITY ASSURANCE

A. Comply with applicable regulations and have local Gas Company approval.

B. Factory test to check construction, controls, and operation of unit and provide certification.

C. Test operation after installation.

D. Provide with complete one (1) year warranty. Warranty period begins at date of initial startup.

E. Conform to ASHRAE 90.1.

F. All air handling and distribution equipment mounted outdoors shall be designed to prevent rain intrusion into the airstream when tested at design airflow and with no airflow, using the rain test apparatus described in Section 58 of UL 1995.

1.3 SUBMITTALS

A. Submit shop drawings per Section 23 05 00 showing dimensions, connections, arrangement, accessories, electrical service and duct connections, and controls.

B. Submit manufacturer's installation instructions.

C. Submit operation and maintenance data including manufacturer's descriptive literature, maintenance and repair data, and parts listing.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Protect units from physical damage by storing off-site until ready for installation.

PART 2 - PRODUCTS

2.1 DIRECT FIRED MAKE-UP AIR UNIT

A. Acceptable Manufacturers:

1. Greenheck.
2. Modine

B. Manufactured Units:

1. Self-contained direct-fired make-up air unit with burner, inlet damper, gas controls, unit controls, and all accessories noted or required for complete installation.

2. Units shall bear a UL, ETL or AGA label indicating that the units have been tested and comply with Standard ANSI Z83.4.

3. Suspended mounted inside building.

ADD 3

4. Unit to consist of direct-fired gas burner, unit cabinet and frame, direct drive supply fan, and all unit and burner safety and control devices.

5. Controls shall include terminal connections for ~~setpoint adjustment and system enable/disable.~~ ...burner modulation and supply fan start/stop and vfd alarm.

6. Furnish non-fused disconnect switch, short circuit protection of all internal electrical components, and all necessary motor starters, contactors, and over-current protection.

C. Fabrication:

1. Construct heater casing and components of 18 gauge steel panels, reinforced with angles and channels for rigidity. Provide access panels to burner and blower motor assemblies.

2. Locate port on burner section for observing main and pilot flames.

3. Insulate indoor units up to burner section with 1" thick neoprene faced glass fiber insulation.

4. Finish casing and components with heat resistant baked enamel.

D. Filters:

1. Provide filter section complete with removable 4" thick MERV 13 pleated filter. Refer to 23 40 00 for requirements.

E. Burner:

1. Provide natural gas burner with modulating turndown ratio of 30:1. Adjustable profile plate, stainless steel baffles, cast aluminum burner tube.

2. Gas Burner: Forced draft type burner with adjustable combustion air supply, pressure regulator, gas valves, manual shutoff, intermittent spark, flame sensing device, and automatic 100 percent shutoff pilot.

3. Gas Burner Safety Controls: Energize ignition, limit time for establishment of flame, prevent opening of gas valve until pilot flame is proven, stop gas flow on ignition failure, energize blower motor, and after airflow proven and slight delay, allow gas valve to open.

4. High Limit Control: Temperature sensor with fixed stop at maximum permissible setting, de-energize burner on excessive bonnet temperature and energize burner when temperature drops to lower safe value.

F. Fan:

1. Provide statically and dynamically balanced direct drive centrifugal fan. Extend any grease lines to access doors.

G. Unit Controls:

1. Pre-wire unit so connection of power supply and field wiring to unit's terminal strip makes unit operative. Wiring and control enclosures shall meet NEC and local codes. Provide pre-wired, numbered terminal strips for field wiring connections to Building Automation System.

2. Provide the following safety controls: air flow switch, electronic flame safety relay, high temperature limit switch, starter interlock, high gas pressure switch, low gas pressure switch, low discharge temperature control with bypass timer.

H. Gas Manifold:

1. Pilot line shall include: gas shutoff valve, gas regulator, pilot gas valve.

2. Main gas line shall include: gas shutoff valve, gas regulator, main gas valve (2 required), modulating gas valve, leakage test valve, low pressure gas switch, high pressure gas switch, vent valve between the two main gas valves and all required test valves.

3. Gas train shall meet FIA/IRI, local utility, and Owner's insurance company requirements.

4. Provide piping from vent valve to outside the building.

5. Provide additional regulator if the incoming gas pressure exceeds 2 psig.

6. Locate all valves and components in a unit mounted enclosure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that area is ready to receive work and opening dimensions are as indicated on the shop drawings and illustrated by the manufacturer.

B. Verify that proper power supply is available.

3.2 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. All field wiring shall be per the National Electrical Code.

3.3 MANUFACTURER'S FIELD SERVICES

A. Provide initial start-up and shutdown during first year of operation, including routine servicing and check-out.

END OF SECTION

SECTION 31 26 00
STEEL HELICAL PILES

PART 1 - GENERAL

1.1 DESCRIPTION:

A. The General and Supplementary Conditions of the Construction Contract and Division 1 - General Requirements apply to the work specified in this section.

B. The work includes all items required for executing and completing the steel helical pile work and related work shown on the drawings or specified herein.

C. Structural notes indicated on the drawings regarding steel helical piles should be considered a part of this specification.

D. No substitutions will be allowed without the Engineer of Record's approval.

1.2 QUALITY ASSURANCE

A. Codes and Standards: Comply with the provisions of the following codes, specifications, and standards except where more stringent requirements are shown or specified herein:

1. ASCE 20 - Standard Guidelines for the Design and Installation of Pile Foundations.
2. ASME B18.2.1 - Square, Hex, Heavy Hex, and Askew Head Bolts and Hex, Heavy Hex, Hex Flange, Lobed Head, and Lag Screws (Inch Series).
3. ASTM A29 - Standard Specification for General Requirements for Steel Bars, Carbon and Alloy, Hot-Wrought.
4. ASTM A36 - Standard Specification for Carbon Structural Steel.
5. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
6. ASTM A123 - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
7. ASTM A153 - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware.
8. ASTM A193 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for High Temperature or High Pressure Service and Other Special Purpose Applications.
9. ASTM A252 - Standard Specification for Welded and Seamless Steel Pipe Piles.
10. ASTM A320 - Standard Specification for Alloy-Steel and Stainless Steel Bolting for Low-Temperature Service.
11. ASTM A500 - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
12. ASTM A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
13. ASTM A536 - Standard Specification for Ductile Iron Castings.

14. ASTM A572 - Standard Specification for High-Strength Low-Alloy Columbium-Vanadium Structural Steel.

15. ASTM A618 - Standard Specification for Hot-Formed Welded and Seamless High-Strength Low-Alloy Structural Tubing.

16. ASTM A656 - Standard Specification for Hot-Rolled Structural Steel, High-Strength Low-Alloy Plate with Improved Formability.

17. ASTM A958 - Standard Specification for Steel Castings, Carbon, and Alloy, with Tensile Requirements, Chemical Requirements Similar to Standard Wrought Grades.

18. ASTM A1018 - Standard Specification for Steel, Sheet and Strip, Heavy-Thickness Coils, Hot-Rolled, Carbon, Commercial, Drawing, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.

19. ASTM D1143 - Standard Test Methods for Deep Foundations Under Static Axial Compressive Load.

20. ASTM D3689 - Standard Test Methods for Deep Foundations Under Static Axial Tensile Load.

21. ASTM D3966 - Standard Test Methods for Deep Foundations Under Lateral Load.

22. ASTM F3125 - Standard Specification for High Strength Structural Bolts, Steel and Alloy Steel, Heat Treated, 120 ksi and 150 ksi Minimum Tensile Strength, Inch Dimensions.

23. AWS B2.1 - Specification for Welding Procedure and Performance Qualification.

24. AWS D1.1 - Structural Welding Code.

25. AWS D1.4 - Structural Welding Code – Reinforcing Steel.

26. ICC AC358 - Acceptance Criteria for Helical Piles Systems and Devices.

27. OSHA Excavation Safety Guidelines.

28. SAE J429 - Mechanical and Material Requirements for Externally Threaded Fasteners.

B. Comply with all local building code requirements which are more stringent than those listed above. All referenced codes or standards shall be the most currently adopted as of the date for Receipt of Proposal.

C. Where any provision of other pertinent codes and standards conflict with this specification, the more stringent provision shall govern.

D. Fabrication and Installation Qualifications:

1. All welding of structural steel shall be performed by operators who have been recently qualified as prescribed in “Qualification Procedures” of the American Welding Society (AWS).

2. The Steel Helical Pile Contractor shall be fully experienced in all aspects of helical pile design and construction, and shall furnish all necessary materials, skilled labor, and supervision to carry out the contract. The Contractor shall not have less than five (5) years of continuous experience in fabrication and installation of steel helical pile work. Job supervisor shall have a minimum of three (3) years of method specific experience.

3. Upon request of the Architect/Engineer, Helical Pile Contractor shall submit evidence of successful installation of steel helical piles under similar project scope and size.

4. The Steel Helical Pile Contractor shall not sublet the whole or any part of the contract without the express permission in writing of the Owner.

E. Inspector shall keep a record or log of each pile as installed. Records shall show location, top and bottom elevations, shaft diameters, date installed, type of strata encountered, rated load capacity, grout pressure attained and any other pertinent information. A copy of this record shall be submitted to the Architect and Engineer for their record files.

F. Helical Pile Contractor shall schedule and provide time and means for the Inspection Agency to inspect, take samples, and make tests.

1.3 TESTING AND INSPECTION

A. Inspection and Testing:

1. The Contractor shall employ an Inspection Agency to perform the duties and responsibilities specified below.

2. Refer to architectural, civil, mechanical, and electrical specifications for testing and inspection requirements of non-structural components.

3. Work performed on the premises of a fabricator approved by the building official need not be tested and inspected per the table below. The fabricator shall submit a certificate of compliance that the work has been performed in accordance with the approved plans and specification to the building official and the Architect and Engineer of Record.

4. Duties of the Inspection Agency:

   a. Perform all testing and inspection required per approved testing and inspection program.

   b. Furnish inspection reports to the building official, the Owner, the Architect, the Engineer of Record, and the General Contractor. The reports shall be completed and furnished within 48 hours of inspected work.

   c. Submit a final signed report stating whether the work requiring Inspection was, to the best of the Inspection Agency's knowledge in conformance with the approved plans and specifications.

5. Structural Component Testing and Inspection Schedule for Section 31 26 00 is as follows:

Steel Helical Piles	Continuous	Periodic
Verify element materials, sizes, and lengths comply with the requirements.	X	
Determine capacities of test elements and conduct additional load tests, as required.	X	
Observe drilling operations and maintain complete and accurate records for each element.	X	
Verify placement locations and plumbness, confirm type and size of jack, record pressure per foot of penetration, determine required penetration to achieve design capacity, record tip and butt elevations and document any damage to foundation element.	X	

1.4 DEFINITIONS

A. A partial list follows:

1. Bearing Stratum: The soil or highly weathered rock layer that provides the axial tension resistance for the installed helical pile.

2. Brackets: Cap plate, angle, thread bar, or other termination device that is bolted or welded to the end of a helical pile after completion of installation to facilitate attachment to structures or embedment in cast-in-place concrete.

3. Crowd: Axial compressive force or pressure applied to the helical pile as needed during installation to ensure the pile advances into the ground a minimum of 80% of the distance equal to the helix pitch for each revolution.

4. Deflection: The axial displacement of the pile as measured at the pile head under applied load.

5. Effective Torsional Resistance: The average installation torque typically taken over a distance equal to the last three diameters of penetration of the largest helix plate as close to or in the specified bearing stratum.

6. Extension Section: Helical pile component connecting the lead section to the load transfer device. Extension sections may be plain without helix plates or helical including one or more helix plates.

7. Factored Load: Service load times the required load factor.

8. Geotechnical Capacity: The maximum load that can be resisted through the bearing of the helix plates in the soil or highly weathered rock in which they are embedded as characterized by the available subsurface soils, rock and groundwater information, and geotechnical testing data, without exceeding the specified performance criteria.

9. Helical Pile: Consists of one or more helix plates attached to a central shaft and load transfer device for attachment to a structure. May also include surface coating or other corrosion protection means.

10. Helical Anchor: Same as a Helical Pile. Term generally used when axial tension is the primary service load.

11. Helix Plate (Helices): Generally round steel plate formed into a helical spiral and welded to the central steel shaft.

12. Installation Angle: Angle of inclination between the longitudinal axis of the helical pile and the horizontal.

13. Lead Section: The first helical pile component installed into the soil. It consists of one or more helical plates welded to the central steel shaft.

14. Limit State: A condition beyond which a helical pile component or interface becomes no longer useful for its intended function (serviceability limit state) or to be unsafe (strength limit state).

15. Loads: Forces or other actions as defined that must be resisted by the piles. Permanent loads are those loads in which variations over time are rare or of small magnitude. All other loads are variable loads. Refer also to Service Load below.

16. Load Factor: A factor that accounts for deviations of the actual load from the service load (load resistance factor design).

17. Load Test: A procedure to test the capacity and relation of load to deflection by applying a compression, tension, and/or lateral load on the helical pile.

18. Mechanical Strength: The maximum compressive, tension, and/or lateral load capable of being resisted by the structural elements of a helical pile.

19. Pile Design Professional: Individual or firm responsible for the design of helical piles, helical anchors, and brackets.

20. Reveal: The distance from ground surface to the end of the last installed extension of a pile, measured along the pile's longitudinal axis.

21. Pitch: The distance measured along the axis of the shaft between the leading and trailing edges of the helix plate.

22. Safety Factor: The ratio of the ultimate resistance to the service load used for the design of any helical pile component or interface.

23. Service Load: The total magnitude of the unfactored loads, determined by the Owner's Representative, that must be resisted by the piles.

24. Torque: The measure of the rotational force times the moment arm needed to overcome the shear strength of the soil measured in ft-lb. Torque is used as an empirical approach for predicting the ultimate capacity of a helical pile.

25. Ultimate Resistance: Limit state based on the lesser of mechanical strength or geotechnical capacity of the helical pile defined as the point at which no additional load can be applied without exceeding the specified performance criteria.

1.5 DESIGN

A. Helical pile design shall be designed to meet the specified loading as shown on the drawings and deflection criteria of 1/2" differential settlement and 1" total settlement. Calculations and drawings required from the Helical Pile Contractor shall be submitted to the Architect/Engineer.

B. Helical pile design shall include overall pile length, helix length, and helix configuration. If static load testing is performend, pile design to include a minimum factor of safety of 2.0. If static load testing is not performend, pile design to include a minimum factor of safety of 3.0.

C. Except where noted in the drawings, all pile components shall be designed to provide a minimum safety factor for mechanical strength of 2.0.

D. Except where noted in the drawings, each pile shall be designed to meet a corrosion service life of 50 years.

E. The helical pile design shall take into account pile spacing, soil stratification, long-term soil consolidation, corrosion, settlement, and strain compatibility issues as are present for the project.

F. The helical pile top attachment shall effectively distribute the design load to the concrete foundations such that the concrete bearing stress does not exceed those in the ACI Building Code and the bending stress in the steel plates does not exceed AISC allowable stresses for steel members.

G. If on-site load testing is to be performed, the piles shall be designed such that the maximum test load does not exceed 90% of the manufacturer's rated mechanical strength of any pile component or load transfer device.

1.6 BID REQUIREMENTS

A. Steel Helical Piles: Bids shall be provided for the lump sum amount based on the number of piles, estimated length, and total footage as shown in the drawings and/or specifications.

B. The Pile Contractor shall examine the construction site and conditions under which piles are to be installed, and notify the General Contractor and Architect in writing prior to bidding of any conditions detrimental to proper and timely completion of work.

C. Helical Pile Length: Base the length of the helical piles on the length listed on the drawings and in the Geotechnical Engineering Report. The elevation identifying the bottom of the shaft is an approximate length for consistent bidding purposes only. The actual length will be determined in the field from the actual elevation of the bearing stratum to be verified by the Inspection Agency.

D. Unit prices shall be issued to the Architect prior to construction as part of the submittal package.

E. ~~Adjustments in the Contract Price will be made due to changes in the number and length of piles, based on unit prices established in Section 01 21 00 Allowances~~ as follows:

ADD 3: ...provided on the proposal page,... — ADD 3

1. Payment for helical piles will be made on the total length of helical piles installed and accepted. Actual length and shaft diameter may change due to job conditions. Adjusted payment will be made on the basis of net variations to the total quantities, based on design dimensions.

2. Provide the following unit costs in the event that additions to, or deductions from, work, are required and authorized in writing by Architect/Engineer:

   a. Additional length of helical pile ($/per foot)
   b. Subtracted length of helical pile ($/per foot)
   c. Load test (lump sum per test)

1.7 SUBMITTALS

A. Shop Drawings:

1. Prepare and submit to the Architect/Engineer, for review and approval, working drawings and relevant structural design calculations for the helical pile system or systems intended for use. All design submittal shall be sealed by a Registered Professional Engineer currently licensed in the state where the project is located.

2. Product Data:

   a. Product designations for helix sections, extension sections, and all ancillary products to be supplied at each helical pile location.
   b. Evaluation approved by the applicable building code authority (e.g., International Code Council Evaluation Services (ICC-ES)).
   c. Corrosion protection and pile top attachment.
   d. Manufacturer's published mechanical strengths for the pile assemblies, including load transfer devices per current ICC-ES report, calculations, and/or full scale testing.

3. Design Data:

   a. Calculated geotechnical capacity of piles based on geotechnical information. The design submittal prepared by the pile designer shall indicate that the selected piles can be installed to achieve the performance requirements.
   b. Minimum effective torsional resistance criteria.
   c. Maximum allowable installation torque of pile.
   d. Proposed production quality control plan, including method and equipment to be used to measure torsional resistance during installation.

e. Procedures and acceptance criteria for any proposed performance and/or proof testing.

4. Submit a detailed description of the construction procedures proposed for use to the Architect/Engineer for review. This shall include a schedule of major equipment resources.

5. The working drawings shall include helical pile installation details giving:

a. Helical pile number, location, and pattern by assigned identification number
b. Helical pile design load
c. Type and size of central steel shaft
d. Number and diameter of helix plates
e. Minimum overall length
f. Minimum effective installation torque
g. Inclination of helical pile
h. Helical pile attachment to structure relative to grade beam, pile cap, etc.
i. Cutoff elevation

6. Submit shop drawings for all structural steel, including the helical pile components, corrosion protection system, pile top attachment, and helix details, to the Architect/Engineer for review and approval.

7. Submit for review and acceptance the proposed helical pile load testing procedure. The testing program shall be provided two (2) weeks prior to starting the load testing. This helical pile verification load testing proposal shall be in general conformance with ASTM D1143 and/or D3689, and shall indicate the minimum following information:

a. Type and accuracy of apparatus for measuring load
b. Type and accuracy of apparatus for applying load
c. Type and accuracy of apparatus for measuring the pile deformation
d. Type and capacity of reaction load system, including sealed design drawings
e. Hydraulic jack calibration report

8. Submit to the Architect/Engineer calibration reports for each test jack, pressure gauge, and master pressure gauge to be used. The calibration tests shall have been performed by an independent testing laboratory, and tests shall have been performed within one year of the date submitted. Testing shall not commence until the Architect/Engineer has approved the jack, pressure gauge, and master pressure gauge calculations.

9. Work shall not begin until the appropriate submittals have been received, reviewed, and approved in writing by the Architect/Engineer. Note that any additional time required due to incomplete or unacceptable submittals shall not be cause for delay or impact claims. All costs associated with incomplete or unacceptable submittals shall be the responsibility of the Contractor.

10. Welding certificates.

11. Unit costs: Submit as outlined in this section.

12. The Contractor shall submit to the Architect copies of calibration reports for each torque indicator or torque motor, and all load test equipment to be used on the project. The calibration tests shall have been performed within 45 working days of the date submitted. Helical pile installation and testing shall not proceed until the Architect/Engineer has received the calibration reports. These calibration reports shall include, but are not limited to, the following information:

a. Name of project and Contractor
b. Name of testing agency
c. Identification (serial number) of device calibrated
d. Description of calibrated testing equipment

e. Date of calibration
f. Calibration data

13. Installation Reports: The installing contractor shall provide the Owner, or his authorized representative, copies of individual helical pile installation records within 24 hours after each installation is completed. Formal copies shall be submitted within 48 hours after installation. These installation records shall include, but are not limited to, the following information:

a. Name of project and Contractor
b. Name of Contractor's supervisor during installation
c. Date and time of installation
d. Installation equipment type and operator name
e. Type of torque indicator used
f. Location of helical pile or helical anchor by grid location, diagram, or assigned identification number
g. Pile reveal
h. Type and configuration of lead section with length of shaft and number and size of helical bearing plates
i. Type and configuration of extension sections with length and number and size of helical bearing plates, if any
j. Final elevation of top of shaft and cutoff length, if any
k. Total length of installed pile
l. As-built installation angle of pile
m. Torque measurements at three-foot depth intervals
n. Final installation torque
o. Effective torsional resistance and calculated geotechnical capacity based on effective torsional resistance and/or as derived from the pre-production test program
p. Comments pertaining to interruptions, obstructions, or other relevant information
q. Unless specified otherwise on the drawings or by local codes, the pile design professional, or an inspection agency accepted by the Architect/Engineer, shall observe and document at least 10 percent of helical pile and helical anchor installations.

B. LEED Certification: Submit manufacturer's certification for each steel product including the following:

1. LEED Credit MRc 4.1/4.2 – Recycled content, including percentage of pre-consumer (post-industrial) and post-consumer recycled content. Also provide manufacturer's name, product cost and steel processing furnace type.

2. LEED Credit MRc 5.1/5.2 – Location of manufacturing plant, manufacturer's name, product cost and location of extraction or harvest of raw materials.

C. Post Construction:

1. The following records shall be prepared for the Owner. The records shall be completed within 24 hours after each pile installation is completed. The records shall include the following minimum information:

a. Pile drilling duration and observations
b. Information on soil and rock encountered, including description of strata, water, etc.
c. Approximate final tip elevation
d. Cutoff elevation
e. Rated load capacities
f. Description of unusual installation behavior or conditions
g. Any deviations from the intended parameters
h. Torque attained, where applicable
i. Pile materials and dimensions
j. Helical pile test records, analysis, and details

2. Submit as-built drawings showing the location of the piles, their depth and inclination, and details of their composition.

1.8 SUBSURFACE CONDITIONS

A. The Geotechnical Report, including logs of soil borings as shown on the boring location plan, shall be considered to be representative of the in-situ subsurface conditions likely to be encountered on the project site. Said Geotechnical Report shall be the used as the basis for helical pile design using generally accepted engineering judgment and methods.

B. The Geotechnical Report shall be provided for purposes of bidding. If, during helical pile installation, subsurface conditions of a type and location are encountered of a frequency that were not reported, inferred, and/or expected at the time of preparation of the bid, the additional costs required to overcome such conditions shall be considered as extras to be paid for by the Owner.

1.9 PILE LOAD TESTING

A. If pile testing is required, the Installing Contractor shall furnish all labor, equipment, and pre-production helical piles necessary to accomplish the testing as shown in the previously submitted and approved pile design submittals. The Installing Contractor shall apply the specified loads for the specified durations and record the specified data for the specified number of piles. No deviations from the test plan(s) will be allowed without explicit approval in writing from the Owner/Owner's Representative. Pile testing shall be in accordance with the load testing procedures and performance requirements deemed suitable for the application by the Owner/Owner's Representative, or pile designer.

removed Addendum 3

B. Helical Pile Compression Tests:

1. ~~Contractor shall perform the number of compression tests shown on the drawings.~~

2. Compression tests shall be performed following the "quick test" procedure described in ASTM D1143 specifications.

3. Load tests shall be observed and documented by the Inspection Agency.

4. Unless otherwise shown on the drawings, the maximum test load shall be 200% of the allowable load shown on the drawings.

5. The locations of helical piles to be tested shall be determined by the Contractor, unless noted on the drawings.

6. Installation methods, procedures, equipment, products, and final installation torque shall be identical to the production helical piles to the extent practical, except where otherwise approved by the Owner or Architect/Engineer.

7. A load test shall be deemed acceptable provided the maximum test load is applied without helical pile failure and the deflection of the pile head at the design load is less than 1-inch, unless noted otherwise on the drawings. Failure is defined when continuous jacking is required to maintain the load.

C. If a load test fails the foregoing acceptance criteria, the Contractor shall modify the helical pile or helical anchor design and/or installation methods and retest the modified pile or anchor as directed by the Owner or Architect/Engineer. These modifications include, but are not limited to, de-rating the load capacity, modifying the installation methods and equipment, increasing the minimum final installation torque, changing the helical configuration, or changing the product (e.g., duty). Modifications that require changes to the structure shall have prior review and acceptance of the Owner. Any modifications of design or construction procedures, and any retesting required, shall be at the Contractor's expense.

D. The Contractor shall provide the Owner and Architect/Engineer copies of load test reports confirming configuration and construction details within one (1) week after completion of the load tests. This written documentation will either confirm the load capacity as required on the working drawings or propose changes based on the results of the tests. At a minimum, the documentation shall include, but is not limited to, the following information:

1. Name of project and installing contractor
2. Name of installing contractor's supervisor during installation
3. Name of third party test agency, if any
4. Type of test, pre-production or production test
5. Date, time, and duration of test
6. Unique identifier and location of helical pile tested
7. Test procedure (ASTM D1143, D3689, or D3966)
8. List of any deviations from procedure
9. Test criteria, performance or proof
10. Description of calibrated testing equipment and test setup
11. Testing equipment calibration data
12. Type and configuration of helical pile or helical anchor including lead section, number and type of extension sections, and manufacturer's product identification numbers
13. Load steps and duration of each load increment
14. Incremental and cumulative pile-head movement at each load step
15. Comments pertaining to test procedure, equipment adjustments, or other relevant information
16. Reaction frame/pile installation and verification data, as required by Owner or pile designer
17. Incremental and cumulative pile-head movement at each load step
18. Signatures as required by local jurisdiction

1.10 PRODUCT DELIVERY, STORAGE AND HANDLING

A. All helical pile, helical anchor, and bracket assemblies shall be free of structural defects and protected from damage. Store helical piles, helical anchors, and bracket assemblies on wood pallets or supports to keep from contacting the ground. Damage to materials shall be cause for rejection.

PART 2 - PRODUCTS

2.1 MANUFACTURER

ADD 3
Added Techno Metal Post and Helical Anchors Inc.

A. AB Chance Company, a subsidiary of Hubbel Corp., 210 North Allen Street, Centralia, MO 65240-1395; or Aluma-Form/Dixie, 3625 Old Getwell Road, Memphis, TN 38118.

B. Foundation Supportworks®, Inc., 12330 Cary Circle, Omaha, NE 68128.

C. Pier Tech Systems, 17813 Edison Avenue, Suite 100, Chesterfield, MO 63005.

D. Magnum Piering, Inc., 6082 Schumacher Park Drive, West Chester, OH 45069.

2.2 LEED CREDIT

A. LEED Credit MRc 4.1/4.2:

1. Steel products shall be made using an electric arc furnace and shall have a minimum recycled content of 80%, including at least 65% post-consumer recycled content and 15% post-industrial recycled content.

2. Steel products made using a basic oxygen furnace shall have a minimum recycled content of 25%, including at least 20% post-consumer recycled content and 5% post-industrial recycled content.

B. LEED Credit MRc 5.1/5.2:

1. Steel products shall be manufactured within 500 miles of project site. Recycled scrap products shall be procured from within 500 miles of the project site.

PART 3 - EXECUTION

3.1 SITE CONDITIONS

A. Prior to commencing helical pile installation, the Contractor shall inspect the work of all other trades and verify that all said work is completed to the point where helical piles may commence without restriction.

B. The Contractor shall verify that all helical piles may be installed in accordance with all pertinent codes and regulations regarding such items as underground obstructions, right-of-way limitations, utilities, etc.

C. In the event of a discrepancy, the Contractor shall notify the Architect/Engineer. The Contractor shall not proceed with helical pile installation in areas of discrepancies until said discrepancies have been resolved. All costs associated with unresolved discrepancies shall be the responsibility of the Owner.

3.2 INSTALLATION

A. Installing Contractor shall furnish and install all helical piles per the project plans and approved pile design submittals. In the event of conflict between the project plans and the approved pile design documentation, the Installing Contractor shall not begin construction on any affected items until such conflict has been resolved.

B. Installation of helical piles may be observed by representatives of the Owner for quality assurance purposes. The Installing Contactor shall notify the Owner's Representative at least 24 hours prior to pile installation operations. All helical pile sections and ancillary products shall be marked as necessary to allow correlation with the pile design submittals before shipment from the manufacturer.

C. The helical pile installation technique shall be such that it is consistent with the geotechnical, logistical, environmental, and load carrying conditions of the project. The lead section shall be positioned at the location as shown on the pile design drawings. Inclined helical piles can be positioned perpendicular to the ground to assist in initial advancement into the soil before the required installation angle shall be established. After initial penetration, the required installation angle shall be established. The helical pile sections shall be engaged and advanced into the soil in a smooth, continuous manner at a rate of rotation of 5 to 25 rpm. Sufficient crowd shall be applied to uniformly advance the helical pile sections a minimum of 80% of the distance equal to the pitch of the helix plate per revolution. The rate of rotation and magnitude of crowd shall be adjusted for different soil conditions and depths. Extension sections shall be provided to obtain the required minimum overall depth/length and minimum effective torsional resistance as shown on the project plans.

3.3 TERMINATION CRITERIA

A. The specified minimum overall depth/length criteria and minimum effective torsional resistance criterion must be satisfied prior to terminating the helical pile installation. In the event any helical pile fails to meet these production quality control criteria, the following pre-qualified remedies are authorized:

1. If the installation fails to meet the minimum effective torsional resistance criterion at the minimum embedment depth/length:

a. Continue the installation to greater depth/length in the specified bearing stratum until the effective torsional resistance criterion is met, provided continued installation does not exceed any applicable maximum length. or,

b. Demonstrate acceptable pile performance through load testing. or,

c. Replace the pile with one having a different helix configuration. The replacement pile must not exceed any applicable maximum embedment length and either be embedded to a length that places its last helix at least three times its own diameter beyond the position of the first helix of the replaced pile and meet the minimum effective torsional resistance criterion, or pass load testing.

2. If the torque measured during installation reaches the helical pile's allowable torque rating prior to reaching the minimum embedment depth/length criterion, with approval from the Owner/Owner's Representative, terminate the installation, then proceed with one of the following recommended actions:

a. Replace the pile with one having a shaft with a higher torsional strength rating. This replacement pile must be installed to satisfy the minimum embedment depth/length criterion. It must also be embedded to a depth/length that places its last helix at least three times its own diameter beyond the position of the first helix of the replaced pile without exceeding any applicable maximum embedment depth/length requirements, and it must meet the minimum effective torsional resistance criterion. or,

b. Replace or modify the pile with one having a different helix configuration. This replacement or modified pile must be installed to satisfy the minimum embedment depth/length criterion. It must also be embedded to a depth/length that places its last helix at least three times its own diameter beyond the position of the first helix of the replaced pile without exceeding any applicable maximum embedment depth/length requirements, and it must meet the minimum effective torsional resistance criterion. or,

c. If allowed or approved by the Owner/Owner's Representative, remove and reinstall the pile at a position at least three times the diameter of the largest helix away from the initial location. Original minimum embedment depth/length and effective torsional resistance criteria must be met for the repositioned pile. This pile repositioning may require the installation of additional helical piles with service loads adjusted for these spacing changes.

3. If the installation reaches a specified maximum embedment depth/length without achieving the minimum effective torsional resistance criterion:

a. If approved by the Owner/Owner's Representative, remove and reinstall the pile at a position at least three times the diameter of the largest helix away from the initial location. Original minimum installation depth/length and effective torsional resistance criteria must be met for the repositioned pile. This pile repositioning may require the installation of additional helical piles with service loads adjusted for these spacing changes. or,

b. Demonstrate acceptable pile performance through load testing. or,

c. Reduce the load capacity of the helical pile and install additional pile(s) as necessary. The reduced capacity and additional pile location shall be subject to the approval of the Owner/Owner's Representative. or,

d. Replace the pile with one having a different helix configuration. This replacement pile must be embedded to a depth/length that places its last helix at least three times its own diameter beyond the position of the first helix of the replaced pile. This replacement pile must be installed to satisfy the minimum embedment depth/length criterion, and it must meet the minimum effective torsional resistance criterion.

4. If a helical pile fails to meet acceptance criteria in a load test:

a. Install the pile to a greater depth/length and installation torque and re-test, provided any maximum embedment depth/length criterion is not exceeded. or,

b. Replace the pile with one having more and/or larger helix plates. It must be embedded to a depth/length that places its last helix at least three times its own diameter beyond the position of the first helix of the replaced pile without exceeding any applicable maximum embedment depth/length requirements. This replacement pile must be re-tested. or,

c. If approved by the Owner's Representative, de-rate the load capacity of the helical pile and install additional piles. Additional piles must be installed at positions at least three times the diameter of the largest helix away from any other pile locations and approved by the Owner's Representative. Piles installed in cohesive soils shall not be spaced closer than four helix diameters.

5. Load testing to qualify a helical pile under any of the remedial actions outlined in Article 1.9 shall not be used to satisfy load testing frequency requirements shown in the project plans or the approved design submittals.

6. If a helical pile fails a production quality control criterion for any other reason, including damage during installation, any proposed remedy must be approved by the Owner/Owner's Representative prior to implementation.

3.4 TOLERANCES

A. When helical pile placement is shown on the project plans, production piles shall be placed such that the pile head is within 3 inches laterally and longitudinally and 1/2 inch vertically to plan; and the pile shaft alignment is within 1 degree of the installation angle shown on the project plans. When pile placement is not shown on the project plans, the placements, alignments, and their respective tolerances shall be included as part of the design submittal.

3.5 CLEANUP

A. The Installing Contractor shall remove any and all material, equipment, tools, building materials, concrete forms, debris, or other items belonging to the Installing Contractor or used under the Installing Contractor's direction.

END OF SECTION

SECTION 32 11 23.33
DENSE GRADED BASE

PART 1 - GENERAL

1.1 SCOPE

A. This section includes information common to dense graded base using crushed stone or crushed gravel and applies to all sections in this Division.

1.2 REFERENCE STANDARDS

A. Work under this section depends on applicable provisions from other sections and the plan set in this contract. Examples of related sections include, but are not limited to:

1. Division 31 — Earthwork

B. Wherever WisDOT or SSHSC appears in this specification it shall be construed to mean the pertinent sections of the State of Wisconsin, Department of Transportation, Standard Specifications for Highway and Structure Construction (SSHSC), current edition, and all supplemental and interim supplemental specifications, as they may pertain, except this contract shall be a lump sum contract and measurement and basis of payment methods shall not apply.

C. Dense Graded Base shall conform to City of Madison standard specification Article 401 – Crushed Aggregate Base Course.

1.3 SUBMITTALS

A. Provide copies of record drawings.

B. Provide copies of material testing reports.

C. Provide the following prior to construction:

1. Manufacturers product information (cut sheets)

2. Mix designs and specifications

3. Aggregate Gradations

D. Materials conforming to the WisDOT Standard Specifications for Highway and Structure Construction (Latest Edition, hereafter called “Standard Specifications for Highway Construction” and supplied from a WisDOT approved source need not be tested. The contractor shall furnish evidence of such WisDOT approval to the A/E and/or Construction Representative.

E. Maintain record drawings showing actual locations of utilities and other features encountered, modifications to proposed grades and site features, and other deviations from the original design.

PART 2 - PRODUCTS

2.1 GENERAL

A. Use dense graded base. Materials shall conform to Section 301.2 of the WisDOT Standard Specifications for Highway and Structure Construction. Material gradations shall conform to Section 305.2.2 of the WisDOT Standard Specifications for Highway and Structure Construction unless specified elsewhere in the contract documents.

B. Base Course Gradation: 1-1/4" Crushed Aggregate

C. Materials shall conform to Gradation No. 2 per the City of Madison specification 401.1(b).

2.2 BREAKER RUN AGGREGATE

A. Crushed stone, rock or gravel meeting the requirements of either Breaker Run or Select Crushed material as defined in Section 311.2 or Section 312.2 of Standard Specifications for Highway Construction, respectively.

PART 3 - EXECUTION

3.1 CONSTRUCTION

A. Preparing The Pavement Foundation (Sub-Grade):

1. Prepare the foundation, or resurface the previously placed base layer, as specified in WisDOT Section 211 before placing base. Do not place base foundations that are soft, spongy, or covered by ice or snow. Water and rework or re-compact dry foundations as necessary to ensure proper compaction, or as the representative designates.

    a. In proposed pavement areas, all organic solid shall be removed.

    b. Excavation shall be reasonably free of water prior to beginning filling. Do not place material on frozen surfaces or use frozen material.

    c. In areas of existing pavement to be modified or adjusted in grade, the existing pavement section shall be removed by an acceptable method. The new pavement section shall match the construction details.

    d. Place and compact material to minimize settlement and avoid damage to structures, pipes, utility lines and other features. Hand place and compact material as necessary.

    e. Moisture condition backfill material as necessary to achieve density required for given use.

    f. Compact fill material as required for the given use.

    g. It is the responsibility of the Contractor to provide all necessary compaction equipment and other grading equipment that may be required to obtain the specified density. Vibratory plate or tamping type walk behind compactors will be required whenever backfill is placed adjacent to structures, pipes, utility lines and other features.

    h. Where additional filling or excavation is necessary, or placement of base course will be delayed, roll surface of proposed roadway or parking lot with a smooth drum roller to provide relatively impervious surface and promote drainage.

2. Proof-roll all subgrade areas that are to receive aggregate base or pavement. Proof-roll with a loaded dump truck prior to the placement of base courses to locate soft spots that yield under loading. Overexcavate (undercut) areas of soft subgrade that will not compact readily when proof-rolled or tamped. Backfill with breaker run or select crushed material as approved by the project representative.

    a. Prior to undercutting or excavating below subgrade (EBS) or placing any base course, contact the Construction Representative to schedule inspection of subgrade and proof-rolling. Provide minimum of 24 hrs confirmed notice. All proof-rolling shall be completed in the presence of the Construction Representative and Geotechnical Consultant.

b. To complete proof-rolling, entire roadway subgrade shall be provided with a relatively smooth surface, suitable for observing soil reaction during proof-rolling.

c. Contractor shall schedule and provide a fully loaded tri-axle dump truck for proof-rolling. Loaded truck shall have a minimum gross operating weight of 30 tons. Test shall be conducted with “tag” or “pusher” axles retracted from the ground.

d. Test-rolling shall be accomplished in a series of traverses parallel to the centerline of the street or parking area. The truck shall traverse the length of the street or parking area once for each 12’ of width. Additional passes along the traverse shall be completed as directed by the Geotechnical Consultant, to further define unsatisfactory subgrade.

e. Soft areas, yielding areas, cracked areas or areas where rolling or wave action is observed shall be considered indicative of an unsatisfactory subgrade. Such areas shall be undercut as outlined in Section 31 05 00.

f. Once the subgrade has been proof-rolled and approved, protect the soils from becoming saturated, frozen, or adversely altered.

g. Contractor shall assume 15% of proposed paved areas may require undercutting. This work shall be included in base bid. Undercut as outlined in Section 31 05 00.

B. Stockpiling:

1. If continuous compliance with material specifications is questionable, the project representative may require the contractor to supply material from a stockpile of previously tested material. Maintain a sufficiently large stockpile to preclude the use of material not previously approved.

2. Build and maintain stockpiles using methods that minimize segregation and prevent contamination. If the contract specifies location, place stockpiles where specified. Clear and prepare stockpile areas to facilitate the recovery of the maximum amount of stockpiled material.

C. Constructing Base:

1. Place aggregate in a manner that minimizes hauling on the subgrade. Do not use vehicles or operations that damage the subgrade or in-place base. Deposit material in a manner that minimizes segregation.

2. Construct the base to the width and section the plans show. Shape and compact the base surface to within 0.04 feet (12 mm) of the plan elevation.

3. Ensure there is adequate moisture in the aggregate during placing, shaping, and compacting to prevent segregation and achieve adequate compaction.

4. Maintain the base until paving over it, or until the project representative accepts the work, if paving is not part of the contract. The contractor is not responsible for maintaining material placed on detours.

D. Standard Compaction: Compact the base until there is no appreciable displacement, either laterally or longitudinally, under the compaction equipment. Route hauling equipment uniformly over previously placed base. Compact each layer before placing a subsequent layer. If the material is too dry to readily attain the required compaction, add water as necessary to achieve compaction

E. Special Compaction: If the contract requires special compaction, compact each layer to 95 percent of maximum density, or more, before placing the subsequent layer. The geotechnical engineer will determine the maximum density according to AASHTO T 99 method C or D and in-place density according to AASHTO T 191.

F. Controlling Dust: Apply water or other engineer-approved dust control materials to control dust during construction and maintenance of the base and shoulders.

3.2 COMPACTION

A. Compact each base layer, including shoulder foreslopes, with equipment specified in WisDOT Section 301.3.1. Use standard compaction conforming to WisDOT Section 301.3.4.2. Final shaping of shoulder foreslopes does not require compaction.

B. Compacting 1 1/4-Inch Base and 3/4-Inch Base. If using a pneumatic roller, do not exceed a compacted thickness of 6 inches (150 mm) per layer. For the first layer placed over a loose sandy subgrade, the contractor may, with the geotechnical engineer's approval, increase the compacted layer thickness to 8 inches (200 mm). If using a vibratory roller, do not exceed a compacted thickness of 8 inches (200 mm) per layer.

C. Compacting 3-Inch Base: Compact with a vibratory or pneumatic roller. Do not exceed a compacted thickness of 9 inches (225 mm) per layer.

3.3 UNDERCUTTING/EXCAVATION BELOW SUBGRADE (EBS)

A. Undercutting/EBS shall be completed only when directed by the Geotechnical Consultant. The Contractor shall not be compensated for any unauthorized undercutting/EBS. Measure and document undercut areas and depths in consultation with Geotechnical Consultant. Work shall comply with Section 31 05 00. Contractor shall assume 50% of proposed driveway paved areas may require undercutting. This work shall be included in unit prices with bid item 90002.

ADD 3

3.4 CLEANUP

A. After the project is completed, thoroughly clean up all debris that may have accumulated during the placement of dense graded base. Replace or repair as required, all surfaces and/or landscape features damaged or disturbed under this item of work.

END OF SECTION