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Addendum

Addendum Number: ADD-02
Addendum Date: 01.25.23

Project Number: 19-040
Project Name: Wentzville Public Works
Owner: City of Wentzville, MO

STATE OF MISSOURI
BRENT M. STEVENS
NUMBER
MO A-2000151419
ARCHITECT

Brent Stevens

Digitally signed by Brent Stevens
DN: C=US, E=brent@hdesigngroup.com, O=H Design Group, OU=Architect, CN=Brent Stevens
Date: 2023.01.25 14:06:32-06'00'

Documents:

1. WPW Pre-Bid Agenda & Meeting Notes
   a. Refer to attached pre-bid agenda and meeting notes from pre-bid conference held 01-19-23.

2. WPW Bidding RFI Responses 01-24-23
   a. Refer to attached requests for information received from bidding contractors through 01-24-23 and corresponding responses.

3. Exhibit D- Scope of Work
   a. Refer to attached document which includes revisions and additional information as a result of pre-bid meeting and E-bidding system questions.

4. Exhibit G- Substitution Procedures & Form
   a. Refer to attached document which includes revised specification sections.

Specifications:

1. 000101 – Table of Contents
   a. Revised to accommodate added sections.
2. 002600 – Procurement Substitution Procedures
   a. Revised requests for substitutions deadline date provided in section 1.4-A-1.
3. 012500 – Substitution Request Form
   a. Revised requests for substitutions deadline date
4. 019113 – General Commissioning Requirements
   a. Added specification section.
5. 042200 – Concrete Masonry Units
   a. Removed section 1.1-A-2 as product is not required for project.
   b. Removed section 1.4-C as product is not required for project.
   c. Revised section 1.5-B to reflect mockup panel requirements using materials required for project.
   d. Revised section 2.2-B to add additional product requirements.
   e. Removed section 2.2-C as product is not required for project.
   f. Revised section 2.4-E-1 mortar color requirements.
   g. Revised section 2.4-I water-repellent location and product requirements.
   h. Removed section 2.7 as materials are not required for product.
6. 064116 – Plastic Laminate Clad Architectural Cabinets
   a. Added specification section.
7. 072100 – Thermal Insulation

THIS ADDENDUM AMENDS THE DRAWINGS AND SPECIFICATIONS OF THE ABOVE-REFERENCED PROJECT AND IS HEREBY INCORPORATED INTO THE CONTRACT DOCUMENTS AS A PART THEREOF.

   a. Revised section 1.1-A to indicate products required for project within specification.
   b. Revised section 2.1 to add product required for project.
   c. Revised section 2.2-B to indicate where product is required for project.
   d. Revised section 2.4-B to indicate correct thickness and R-value noted in section details.
   e. Added section 2.4-C to provide information for product required for project.

8. 074113 – Metal Roof Panels
   a. Added specification section.

9. 074213 – Metal Wall Panels
   a. Added specification section.

10. 099123 – Painting & Coating
    a. Revised section 2.3-A to reference product required for project.

11. 133419 – Metal Building Systems
    a. Revised section 2.5 to reference section 072100 for insulation

12. 230913 – Instrumentation and Control Devices for HVAC
    a. Revised sections 2.5 F & G to clarify that CO and NO2 sensors within the fleet maintenance building shall be provided as part of the vehicle emission monitoring system.

13. 235500 – Fuel Fired Heaters
    a. Added Superior Radiant Products as an acceptable manufacturer for High Intensity Radiant heaters.

14. 323115 – Chain-link Fences & Gates
    a. Revised section 2.2-A to indicate correct requirements.
    b. Revised section 2.2-C to indicate correct requirements.
    c. Removed section 2.6-D as gate padlocks not required for project.
    d. Revised section 2.6-E to indicate correct post type noted in gate drawing details

Drawings:

1. C-001 – General Notes
   a. Revised Earthwork Calculations to match bid instructions for rock.

2. C-300 – Grading Plan, C-400 – Utility Plan, C-500 – Erosion Control Plan, C-600 – Storm Sewer Profiles, C-601 – Storm Sewer Hydraulics
   a. Revised Storm Alignment for 202-200.
   b. Revised Conduit Layout for C-400.

3. C-603 – Detention Basin Details
   a. Revised Basin Alignment Profile due to the revised storm sewer alignment.

4. C-900 – Proposed Drainage Area Map
   a. Revised due to revised storm sewer alignment.

5. S000 – General Notes
   a. Modified: masonry compressive strength to updated ASTM minimum.

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6. S001 – Special Inspections & B.F.D.
    a. Modified: base shear and seismic response coefficients in basis for design.
    b. Modified: basic wind speeds in basis for design.
    c. Added: PEMB deflection criteria to basis for design.

7. S002 – Schedules
    a. Added: concrete pedestal schedule.
    b. Modified: base plate type C, multiple column schedule fields.

8. S003 – Typical Details
    a. Added: V/S003 showing typical detail of exterior steel column foundation at site paving.

9. S101 – Foundation Plan – Overall
    a. Modified: grids and dimensions coordinating with changes on subsequent sheets.

10. S101A – Foundation Plan – Area A
    a. Modified: foundation elevations near watershop and truck loading dock.
    b. Added: multiple concrete pedestals north of truck loading dock.
    c. Added: multiple section cuts to plan.

11. S101B – Foundation Plan – Area B
    a. Added: multiple section cuts to plan.
    b. Added: dimensions to typical slab drains at overhead doors.

12. S101C – Foundation Plan – Area C
    a. Added: multiple section cuts to plan.
    b. Added: plan note at elevated slab for added clarity.
    c. Modified: several pad footing sizes and locations near mezzanine area.
    d. Added: dimensions to typical slab drains at overhead doors.

13. S201 – Foundation Details
    a. Modified: M/S201 reinforcement callout and added text note.
    b. Added: multiple new details (N, P, Q) to sheet

14. S202 – Foundation Details
    a. Modified: F/S201 dowel connection in elevated slab.
    b. Added: multiple new details (G, H, J, K, L) to sheet.

15. S401A – Roof Framing Plan – Area A
    a. Added: pre-engineered canopy to plan.
    b. Added: multiple section cuts to plan.

16. S401B – Roof Framing Plan – Area B
    a. Added: multiple section cuts to plan.
    b. Modified: several detail callouts.

17. S401C – Roof Framing Plan – Area C
    a. Added: multiple section cuts to plans.
    b. Added: plan blowup/callout at mezzanine.

c. Modified: several detail callouts.
d. Modified: elevations of several framing elements, including CMU walls and steel beams.
e. Modified: beam sizes & reactions at crane rail support.

18. S501 – Framing Details
    a. Modified: A/S501 and F/S501, added lateral deflection criteria note for PEMB supplier at crane rail locations.
    b. Added: multiple new details (E, F) to sheet.

19. S502 – Framing Details
    a. Reorganized sheet.
    b. Modified: details A and E to different plan locations.
    c. Modified: details A, C, and D to separate fleet wall panel from low roof deck.

20. S505 – Framing Details
    a. Modified: detail D/S505 to show full kicker connection.
    b. Added: multiple new details (E, F, G, H) to sheet.

21. S506 – Framing Details
    a. Added sheet to set with multiple new framing details

22. E000 Electrical Legend
    a. Revised - low voltage wire to reference specifications for raceway requirements.

23. E100 Electrical Site Plan
    a. Revised - future vehicle charging conduits to be under panel SBAB.
    b. Added - wall pack to water shop corner of building.
    c. Added - keynote and vehicle detector loop to motorized gates.
    d. Revised – parking lot lighting detail to remove structural base dimensions.

24. E100A Electrical Site Photometrics
    a. Revised - exterior lighting due to wall-pack change.

25. E101A Lighting Level 1 RCP – Area A
    a. Added - emergency load control relay to Water Shop.

26. E101B Lighting Level 1 RCP – Area B
    a. Added - emergency load control relay to Sign Shop and Street Storage.

27. E102 Lighting Level 1 RCP – Wash & Salt Storage Buildings
    a. Revised - lighting controls for wash bay to use wet location occ sensors.

28. E201A Power Level 1 Plan – Area A
    a. Added - third section to panel SBAB.
    b. Added - receptacle for second break room microwave.
    c. Added - receptacle and switch for break room garbage disposer.
    d. Revised - air compressor disconnect to 2-pole.

29. E201B Power Level 1 Plan – Area B
    a. Revised - air compressor disconnect to 2-pole.
    b. Revised - overhead door power to include contactor.

30. E201C Power Level 1 Plan – Area C

a. Revised - disconnects for air compressor to fused disconnects.
b. Revised - overhead door power to include contactor.

31. E202 Power Level 1 Plan – Wash & Salt Storage Buildings
    a. Revised - disconnects for equipment in brine control to 2-pole.
    b. Revised - overhead door disconnects to be Nema 4X.

32. E301A Equipment Connection Level 1 Plan – Area A
    a. Revised - location of VAV 1-5.
    b. Removed - Equipment Connection Schedule.

33. E301B Equipment Connection Level 1 Plan – Area B
    a. Added - generator remote shutdown switch in main electrical room.
    b. Removed - Equipment Connection Schedule.

34. E301C Equipment Connection Level 1 Plan – Area C
    a. Revised - connection to MAU-1.
    b. Removed - Equipment Connection Schedule.

35. E302 Equipment Connection Level 1 Plan – Wash & Salt Storage Buildings
    a. Removed - Equipment Connection Schedule.
    b. Revised – wash bay unit heaters to 15KW at 480V.

36. E303B Equipment Connection Roof Plan – Area B
    a. Revised - connection to RTU-1.
    b. Removed - Equipment Connection Schedule.

37. E303C Equipment Connection Roof Plan – Area C
    a. Removed - Equipment Connection Schedule.

38. E400 Lighting Schedules
    a. Revised - illumination for parking lot light fixtures.
    b. Revised - wall pack illumination and internal control.
    c. Revised - standalone high bay occ sensors to be wet location.
    d. Revised - automatic load control relay to include 0-10V override.
    e. Added - alternate manufacturers to various fixture types.

39. E401 Lighting Schedules
    a. Revised - relay panel schedule LCP-EM to remove area's A & B.
    b. Revised - automatic load control detail to include 0-10V dimming override.

40. E500 Electrical One-Line Diagram
    a. Added - third section to panel SBAB.
    b. Added - shunt trip to future PV breaker in SWBD-N.
    c. Revised - wire size to transformer SBBA for voltage drop.

41. E502 Electrical Schedules
    a. Revised - fault current and voltage drop calculation table.

42. E503 Panel Schedules
    a. Added - third section to panel SBAB.
    b. Added - main breaker to panel SBAA.
    c. Added - connections to break room garbage disposer and microwave.
    d. Revised - VAV breakers in panel SBA1.
    e. Revised - connection to RTU-1.
    f. Revised - panel AIC ratings to reference short circuit calculation table.

43. E504 Panel Schedules

a. Revised - connection to MAU-1.
b. Revised - panel AIC ratings to reference short circuit calculation table.
c. Revised - breaker sizes for air compressor circuits SBF1-6,8,10 and SBF1-12,14,16.
d. Revised - breaker sizes for 3 post lift circuit SBF1-18,20,22.

44. E505 Panel Schedules
    a. Revised - wire size for circuit SBW1-1.
    b. Revised - panel SBBA to be Nema 4X.
    c. Revised - panel AIC ratings to reference short circuit calculation table.
    d. Revised - breaker and wire size for power washer circuit SBW1-8,10,12.
    e. Revised - wash bay unit heater connection to match floor plan.

45. E600 Electrical Details and Schedules
    a. Revised - parking lot pole base receptacle detail to show orientation.
    b. Added - overhead door master control panel detail.

46. TN100 Technology Site Plan
    a. Removed – devices in rear parking lot.
    b. Removed – keynote TN31.

47. P101A Plumbing Level 1 Plan – Area A
    a. Added - floor drain for water shop 217
    b. Revised – Sanitary and vent piping to connect to both new floor drain and trench drain
    c. Added – gas piping to route from main building plan south to wash bay

48. P101B Plumbing Level 1 Plan – Area B
    a. Revised – Updated storm inverts
    b. Revised – Updated Sanitary invert for civil
    c. Revised – Updated storm downspout inverts
    d. Revised – Updated gas piping to be no smaller than ¾” and added tags downstream of GPR(s)
    e. Updated – Added IMB and cold water piping with shutoff valve for refrigerator in breakroom
    f. Revised – Added hydrant detail callout

28. P101C Plumbing Level 1 Plan – Area C
    a. Revised – Storm downspout invert
    b. Revised – SOI1 invert for civil
    c. Removed – Sanitary piping for FD that is no longer needed on mezzanine.
    d. Added – Floor drain for warehouse equipment and revised sanitary and vent piping connecting to the mezzanine.
    e. Revised – Removed Floor drain and associated sanitary and vent piping in room 431

29. P102 – Wash and Salt Storage
    a. Added - Routed gas pipe from main building plan north for equipment in wash bay
    b. Revised – Updated SOI2 inverts and sanitary inverts for civil
    c. Revised – Updated vent piping

30. P203B – Plumbing Roof Plan – Area B
    a. Added – Gas piping size

31. P203C – Plumbing Roof Plan – Area C
    a. Removed – VTR and detail callout for mezzanine FD removed
32. P300 – Plumbing Sanitary Riser
    a. Updated – Updated riser sections to reflect new changes for addendum
33. P301 – Plumbing Sanitary Riser
    a. Updated – Updated riser sections to reflect new changes for addendum
34. P400 – Plumbing Enlarged Plans
    a. Added – Hose bibb to Street Storage.
35. P401 – Plumbing Enlarged Plans
    a. Revised – Floor drain in mechanical room revised for clarity
    b. Updated – Added gas pipe tag size and gas load
    c. Updated – Removed garbage disposal
    d. Updated – Added hose bibb to mud room and men's locker room
    e. Updated – Added cold water piping, backflow, and shutoff for Ice Machine
    f. Updated – Added dishwasher callout
    g. Updated – Added WCOs to the fixtures in the women's locker room
    h. Updated – Added shower floor in women's locker room
36. P402 – Plumbing Enlarge Plans
    a. Updated – Sanitary instead of plan south will go plan east to connect to new drain in area A and connect to trench drain in area A.
    b. Removed – Sanitary and vent piping plan south to connect to trench drain
37. P403 – Plumbing Enlarged Plans
    a. Updated – gas piping to MAU on mezzanine with size and tag.
    b. Revised – Updated FD location and added condensate with detail callout
    c. Removed – FD plan north of MAU with associated sanitary and vent
38. P501 – Plumbing Details
    a. Updated – Added new ice machine detail
    b. Removed – Old ice machine detail and beverage dispenser detail
    c. Removed – VTR detail and all associated callouts on P203A, P203B, P203C
39. P600 – Schedules
    a. Updated – Gas pressure regulator schedule to accurately reflect equipment needs
    b. Added – Gas pressure sizing schedule for wash bay gas piping.
    c. Removed – Garbage disposal removed from fixture schedule
    d. Added – DCV to schedule
    e. Added – Shower floor to schedule
40. FP101A – Fire Protection Plan – Area A
    a. Added – TYCHO LFP Antifreeze system to Northeast corner of Water Shop to serve loading docks.
    b. Added -- associated keynotes for antifreeze system
41. FP500 – Fire Protection Details
    a. Added – added detail for Tycho LFP antifreeze system.
42. M101A – Mechanical HVAC Level 1 Plan – Area A
    a. Added – Plan Note M55 requiring an access panel for VAV 1-06.
43. M101B – Mechanical HVAC Level 1 Plan – Area B

a. Revised – Note M45 for revised RA duct size.

44. M101C – Mechanical HVAC Level 1 Plan – Area B
    a. Added – 26”x12” transfer grille and duct.

45. M600 – Mechanical Schedules
    a. Revised – MAU Schedule Note B.

46. M601 – Mechanical Schedules
    a. Revised – Sizes of UH-10 and UH-11.

47. M702 – Mechanical Controls
    a. Revised – Exhaust fan controls.
    b. Added – Generator monitoring controls

Attachments:

Documents
WPW Pre-Bid Agenda & Meeting Notes, WPW Bidding RFI Responses 01-24-23, Exhibit D- Scope of Work, Exhibit G- Substitution Procedures & Form

Specifications
000101, 002600, 012500, 019113, 042200, 064116, 072100, 074113, 074213, 099123, 133419, 230913, 235500, 323115

Drawings
C-100, C-300, C-400, C-500, C-600, C-601, C-603, C-900, S000, S001, S002, S003, S101, S101A, S101B, S101C, S201, S202, S401A, S401B, S401C, S501, S502, S505, S506, E000, E100, E100A, E101A, E101B, E102, E201A, E201B, E201C, E202, E301A, E301B, E301C, E302, E303B, E303C, E400, E401, E500, E502, E503, E504, E505, E600, TN100, P101A, P101B, P101C, P102, P203B, P203C, P300, P301, P400, P401, P402, P403, P501, P600, FP101A, FP500, M101A, M101B, M101C, M600, M601, M702

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NAVIGATE
BUILDING SOLUTIONS

New Public Works Facility
Wentzville, Missouri

Pre-Bid Conference Agenda & Meeting Notes
General Construction Bid Package
January 19, 2023 – 10:00am

1. Introductions
    a. Wentzville, Missouri
        i. Susan Spiegel – Director of Public Works
        ii. Devon Dezort – Assistant Director of Public Works
        iii. Alice Winkelman – Procurement Manager
    b. Navigate Building Solutions, LLC will be the Construction Manager
        i. Jen Kissinger- Director
        ii. Ray Hutsel – Senior Project Manager
    c. hdesigngroup - Architects
        i. Bryon Oster – Project Manager/Associate
2. Project Overview:
    a. The scope of work for the project includes construction and site improvements for a new Wentzville Public Works Facility to be located at 1295 Interstate Drive (site is located southeast of Interstate Drive and Wilmar Road) in Wentzville, Missouri. The project consists of a new 49,000 sf, one story, Public Works building, which will be the new home for the Public Works Administrative offices, the Water, Street, Stormwater, and Signal operations. Also, the Fleet and Facility Operations. The complex will also include a new 2,235 sf Wash Building, a new 10,530 sf, fabric and concrete block Salt Storage structure, and some covered parking.
    b. The project includes several bid alternates that also will be considered for award.
    c. Project will be a single General Contractor bid package. All subcontractors shall submit bids to known GC bidders. Reference City website for list of plan holders.
    d. FULL SCOPE OF WORK ISSUED IN BID DOCUMENTS. BIDDER MUST REVIEW ALL DOCUMENTS PRIOR TO BID.
    e. Contracts will be held by the City.
    f. Project Construction Cost Estimate is $28 to $29 million

3. A non-mandatory site visit for bidders to walk the property will be held following this meeting.

4. **Bidders are required to submit their bid response electronically through the City's E-bidding system no later than 2:00 PM Central Time on February 16th , 2023.**
   Bids received after 2:00 PM will not be accepted.

   Fax or email bids will not be accepted.

   Bids submitted to NAVIGATE's office **will not** be accepted.

   No late bids will be accepted.

5. No public bid opening will be held. Through the City's E-Bidding system, bidders have had the ability to view the bid tabulation from any computer or mobile device as soon as the bid is electronically unsealed / opened.

When the City electronically unseals the bid, the bid tabulation will be immediately available on the E-Bidding system on our website at https://wentzvillemo.ionwave.net/Login.aspx
When you get to the log-in screen, you do not need to log-in. Just click "Closed Bids"; then click that particular bid. (The bid will not show up under "Closed Bids" until after the bid closing date/time.) As you scroll down, you will see "Bid Tabulation".

6. Anticipated Board of Aldermen approval is March 8, 2023. We anticipate the final contract and notice to proceed on March 27, 2023.

7. Please take time to become familiar with the E-bidding platform BEFORE bid day. A lot of information and several documents are required as part of the bidding submission, so **please do not wait** until Bid Day to do this. Uploading of several documents can be done early, so please do.

    a. Attributes Tab
    b. Line Items Tab (Bid Form). All alternate pricing must be submitted at the time of the bid.
    c. Response Attachments Tab:
    d. Upload References Form
    e. Upload Qualifications Form
    f. Upload copy of Bid Bond: Each bid must be accompanied by a cashier's check or certified check, or a Bid Bond executed by the Bidder and an approved surety company payable to the Owner, in an amount not less than five percent (5%) of the sum total of the base bid. A copy must be uploaded into the E-bidding platform. The apparent first and second low bidders are required to submit their original bid bond to the City's Procurement Division within 48 hours after Bid Opening.

8. Bidders are to submit written questions through the E-bidding system. In order to ensure all potential respondents, receive the same information, the City will post its response through the E-bidding system. No verbal interpretation will be recognized; any and all such interpretations shall be confirmed in an addendum to the bid by the City. The final day to submit questions is February 6, 2023. The final addendum will be issued by February 9, 2023.

    Bid Questions will be answered through the E-bidding system and also listed in any subsequent Bid Addenda. No questions will be responded to through emails or phones.

9. Product Substitutions: Requests for product substitutions will be considered during bidding. If Contractor's intends to include substitutions it shall be at the Contractor's risk and responsibility to demonstrate that the substitution is a "functional equivalent" product. Substitution request must be sent directly to Bryon Oster at hdesigngroup via email at bryon@hdesigngroup.com. Refer to the bidding documents for additional requirements. Requests must be received by February 6, 2023. Approved Substitutions will be issued in an addendum. Refer to Exhibit G – Substitution Procedures, Substitution Request Form (during bidding).

10. Bidders are responsible for checking the City's website for the issuance of any addendums. The City of Wentzville's Bidding Opportunities website shall be the official site for information as related to this IFB.

    To ensure fair consideration for all bidders, the City prohibits communication to or with any City department(s), elected officials, or employee(s) during the submission process, except as provided above. Additionally, the City prohibits communications initiated by a bidder to the City official(s) or employee(s) evaluating or considering the bids prior to the time an award decision is made. Any communication between Bidder and the City will be initiated by the appropriate City official(s) or employee(s) in order to obtain information or clarification needed to develop a proper, accurate evaluation of the bid. Such communications initiated by a bidder may be grounds for disqualifying the offending bidder from consideration for award of the bid and/or any future bid(s).

11. A payment bond and performance bond in the amount of one hundred (100%) percent of the bid amount will be required of the selected bidder. **Cost of the bond must be included in the Lump Sum Base Bid amount.**

12. Bids will be held good and may not be withdrawn for a period of 90 calendar days from receipt of bids.

13. Project is tax exempt.

14. This Supplemental Bid Information must be completed and received by the City of Wentzville in its entirety no later than 24 hours following the bid opening. The Supplemental Bid Information (Exhibit C) will be sent to all contractors submitting bids for this project through a separate action via the e-bidding system. The completed Supplemental Bid information is required to be submitted via the e-bidding system within 24 hours of the bid closing date and time (February 17, 2023 by 2:00pm). Bidders are required to submit their bid response electronically through the City's E-bidding system. Faxed or emailed bids will not be accepted. It was clarified further in the meeting that e-bidding will not allow submission of the Supplemental Bid information (form) on the day of the bid. City of Wentzville Procurement Department will send the necessary notice to all submitted bidders directions on how to submit the Supplemental Bid information within 24 hours.

15. The project is prevailing wage. All wages paid for work performed on site must comply with the Missouri Division of Labor Standards Annual Wage Order Number 29 for St. Charles County, Missouri.

16. Certified Payroll will be a requirement of this project.

17. Bidders shall review the City-Contractor Agreement, Scope of Work, Supplemental Contract Terms, and Exhibit F – Modifications/Explanation of the Change Order Fee issued in the bid documents. By submitting a bid, the bidders agrees to the terms in the contract.

18. The Owner will waive the building permit review and permit fees, and the Engineering review and construction permit fees only. Contractors, or subcontractors are responsible for all other fees. Refer to Exhibit D – Scope of Work for more details. Update on permitting provided. Plans and specifications issued for permits on December 15, 2022. Engineering has completed their review, comments received and are, or will be, issued by addendum. Permit is anticipated soon. The Building Permit review is ongoing.

19. The owner will also apply for and obtain the DNR Land Disturbance permit.

20. The Owner shall provide all quality control testing and this contractor will be responsible for coordinating with a testing agency to prepare concrete test cylinders and to perform other onsite testing work as required by the specifications and special inspections requirements. Updated provided. RFQ issued, Statement of Qualifications received, and review is currently in progress. Post Bid Meeting Note: It was mentioned that we will provide the selected firm via addendum, but his will not be possible as the final selection/approval will not be made by 2/9/23.

21. The owner has hired Faith Group as the commissioning agent for the mechanical and electrical systems and the building envelope testing. The GC will be responsible for coordinating with them.

22. Contractor will be responsible for all SWPPP inspections, weekly and/or after a rain events. These will be submitted to the Construction Manager weekly and within 24 hrs. of each weather event. This contractor is also responsible for installation, maintenance, and removal of the silt fence during the course of construction and at the end of construction. It was clarified in the meeting that the City will conduct their own inspections (and provide feedback), but the GCs are responsible for all SWPP inspections.

23. Contractor shall supply and install lockable entry gates and site fence. The contractor is responsible for preparing a Site Logistics Plan and submitting it for final approval by the construction manager and owner. Site gates shall be secured at the end of each day.

24. Contractor parking shall be onsite to the extent available. Contractors are responsible for providing any additional off-site parking/shuttle for construction trades if needed beyond the site availability. No parking on residential adjacent streets is permitted by construction trades. Otherwise, workers shall carpool to the site. Local ride-share lots are available.

25. Builder's Risk to be carried by the General Contractor. Deductibles to be paid by General Contractor.

26. The geotechnical report has been included in the bidding documents. Bidders should review these documents and Exhibit D – Scope of Work for the site clearing, site preparation, site grading, and soil remediation work below the building slab, paving, and footings. Bidders are responsible for all recommended soil remediation indicated as part of their BASE BID.

27. The contractual project duration shall be proposed by bidders in the e-bidding system Bid Form. The proposed duration will be used as key criteria along with other information on the Bid Form to select and award a General Contractor. The project duration will be incorporated into the Contract between the Owner and the General Contractor.

28. Upon execution of this contract, this contractor must submit to the CM a detailed critical path baseline construction schedule outlining each construction activity and phase. This schedule must fall within the Master Project Schedule outlined below and be submitted no later than twenty-one (21) days following execution of the contract.

29. Liquidated Damages do apply to this contract. Liquidated damages will be assigned based on the Master Project Schedule issued in the bid documents and as outlined in the draft Owner Contract.

30. The contractor will be responsible for all project as-built, including as-built surveys certified by the Land Surveyor or Engineer registered in the State of Missouri. Contractor shall provide as-built drawings in accordance with Chapter 11 of the Wentzville Engineering Design Criteria and Division 1100 of the Wentzville Standard Specifications. It was noted that the City of Wentzville requirements will be included by addendum.

31. The Contractor will be required to have a full-time project superintendent on site when their employees or subcontractors are present.

32. Master Project Schedule Milestone Dates (It is the responsibility of the contractor to check the e-bidding system for up to date information.):

Request for Bids	January 12, 2023
Pre-Bid Meeting	January 19, 2023 at 10:00 AM
Last Day for Questions & Product Substitution Requests	February 6, 2023 at 5:00 PM
Last Bid Addenda Issued (if necessary)	February 9, 2023 at 5:00 PM
Bids Due	February 16, 2023 at 2:00 PM
Supplemental Bid Information Due	February 17, 2023 at 2:00 PM
Final Board Approval	March 8, 2023
Anticipated Notice to Proceed / Mobilization	March 27, 2023
Groundbreaking	Date TBD by Owner
Critical Submittals Submitted for Review (30 or 45 calendar days after award- see Exhibit D)	
All Submittals Submitted for Review (120 calendar days after award - see Exhibit D)	
Topping Out Ceremony	Date TBD (Coordinated with Owner)
General Contractor Internal Pre-Punch	6 weeks prior to Substantial Completion

Substantial Completion / Punchlist Populated (Day ___*)
*Based on Bidder's proposed duration
All Life Safety Inspections & Occupancy Inspections to be completed and occupancy permit obtained on or before Substantial Completion date.
Final Completion / Completion of Punchlist
30 calendar days after Substantial Completion
Final Acceptance
90 calendar days after Substantial Completion

33. Contractor accepts all risks associated with adverse weather. No time extensions will be granted related to claims of adverse weather. No claims for extra costs will be granted related to adverse weather and/or taking action to deal with adverse weather and/or the effects of adverse weather. All provisions in the City-Contractor Agreement otherwise respecting weather are superseded by this provision, and are of no force and effect.

34. Contractor must include Professional Liability and errors and omissions insurance (to be provided by Contractor or the responsible subcontractor providing the work) for the delegated design scopes of work that are required by specifications to designed by a professional engineer. Drawings and calculations shall be signed and sealed by a Professional Engineer registered in the State of Missouri. See Scope of Work for full list of Delegated Design Items.

35. The City will cut down all large hardwood trees (greater than 8" diameter)as this work must be completed by March 31, 2023. The GC will be responsible for removing the fallen trees and stumps when completing the site demolition and clearing work. Clarification on the size of trees to be cut down by the City will be included in future addendum.

36. If selected for a pre-award conference, Contractor will be contacted after the bid opening by NAVIGATE. The pre-award conference will be conducted the week of February 20, 2023.

37. Contact for questions about the E-Bidding System:
Contact: Alice Winkelman, Procurement Manager
Phone: (636) 639-2026

38. Some questions have already been received and we are working on answers to be provided in Addendum 2. If not included in Addendum 2, the answers will follow in the next addendum.

39. A copy of the minutes and the Pre-Bid Sign-in Sheet will also be issued by Addendum 2. Pre-Bid Sign-in Sheet is attached.

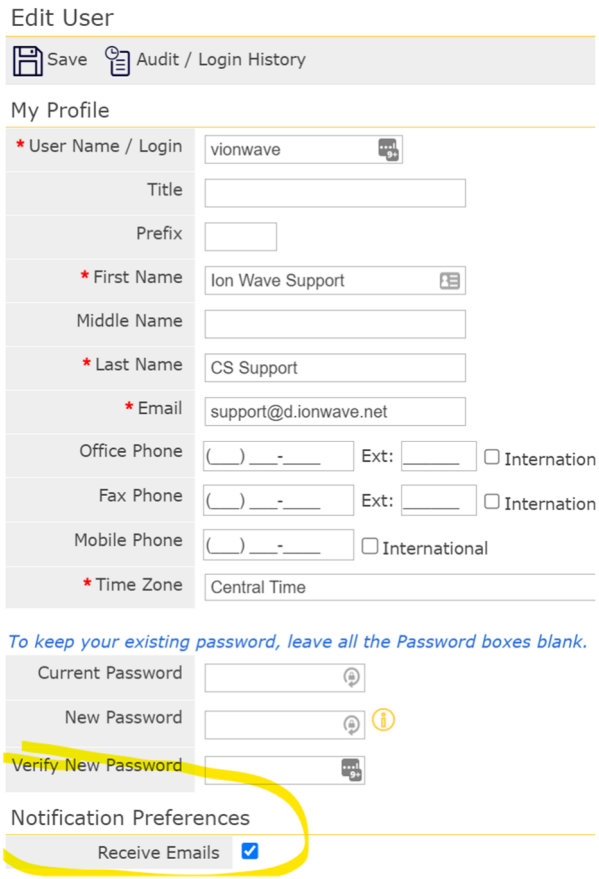
40. Question: If we are going to pursue an Alternate to Trane, does this require the submittal of a substitution request?
Answer: Yes

41. Question: What are the Professional Liability requirements?
Answer: The General Contractors subcontractors who will be delegated responsibility for design must carry a minimum of Professional Liability of $2M per claim.

42. Question: Does the $28 to $29 million include Alternates?
Answer: No.

43. Question: Who pays utility fees?
Answer: The typical property owner/development or service agreement fees from Ameren Electric, Ameren Gas, and Brightspeed are the responsibility of the Owner. Contractor to coordinate with and provide all indicated infrastructure and installations indicated on the plans to support the public utility provided services and equipment.

44. Question: Can the company's e-Bidding registration allow for multiple users to receive email notices of bid addendums?
Answer: Each individual that wants to receive an email need to be a user on the supplier's account. Next, each of those users needs to have "Receive Emails" checked on their profile. See screenshot:



45. Question: Please clarify who pays for the Wentzville Fire Department Site Plan Review and New Construction permit?
Answer: The cost of the Wentzville Fire Department Site Plan Review and New Construction permit will be applied for and paid for by the City of Wentzville. All other permits required by the Wentzville Fire District will be applied for and paid for by the Contractor (subcontractors), i.e.: Fire Main Underground, Fire Sprinkler Systems, Fire Alarm Systems, etc. Reference Exhibit D – Scope of Work #17.

46. Question: Is there any settlement plate observations required?
Answer: Checking with the Geotechnical Engineer. Answer to follow in future addendum.

47. Question: Can you clarify which soil remediations are included in the Base Bid and which are not?
Answer: This question has already been asked via the e-Bidding system. Answer will be provided by addendum.

NOTE: If any of the Pre-Bid Meeting question have not been addressed, please submit them in writing via the e-Bidding system.

NAVIGATE
BUILDING SOLUTIONS

Pre-Bid Meeting Attendees

Date: January 19, 2023 @ 10:00 AM

Project: City of Wentzville – New Public Works Facility

Location: Wentzville City Hall – 1001 Schroeder Creek Blvd, Wentzville, MO 63385

Name	Company	Email Address	Phone
Adam Wright	Wright Construction	Bids@Wrightconstruct.com	636-220-6850
Colby Patterson	Wright Construction	Bids@wrightconstruct.com	636-220-6850
Dennis Dyas	K&S Associates	estimating@ksgestl.com	314 647 3535
Jory Moorman	KCI	Jmoorman@kciconstruction.com	314-486-4170
Kevin Miller	McGrath & Assoc.	KMILLER@MCGRATHCONSTRUCTION.com	314-250-5908
Michael Pehse	Haramaee LLC	MICHAEL@HARAMAEELLC.COM	314 568 5016
Andy Kasparic	ATI	andy@automotivetechnology.com	314-406-1359
Jeff Smith	ATI	jeffs@automotivetechnology.com	(314) 739-4404
Alex Herzmann	Bingman Construction	GAH@BINGMANCC.COM	636-394-3378
Jacob Kleekamp	United Construction	JakeK@unitedconst.com	314-280-2493
Brady Wildschute	Elite Mechanical	brady@elitemechanicalllc.com	636-373-2973
Nicholas Krekeler	JTL	nkrekeler@jtlstl.com	314-686-2136
John VanAsdale	McGrath	jvanasdale@mcgrathconstruction.com	314 312 7285
Larry Juergen	Demien Construction	Bids@demienconstruction.com	636-332-5500
Steve Layne	LCS	SLAYNE@LCSCONSTRUCT.COM	636-734-6966
Travis Odneal	Russell	TODNEAL@RUSSELLCO.COM	573-489-8372
Don Klingler	ICS Construction Services	DKLINGLER@ICS-STL.COM	314-534-6664

WPW Bidding RFI Responses 01-24-23

1. Please confirm whether we are to include any site remediation cost in our base bid as it appears that will be handled via unit prices/allowance as needed, however exhibit D item 104 mentions undercutting and filling areas.

    - See revisions to Exhibit D – Scope of Work, Items 102, 103, 104, and 110 for work to be included in the Base Bid, or to be completed on a unit price basis against the allowance.

2. Under temporary facilities and controls in section 3.3 it mentions to install temporary service or connect to owners existing service. Are there any exiting services on site we can connect to?

    - Water, sewer, gas, communication utilities and overhead electrical are on-site near the entry road; however, utility taps are required.

3. Can we set an allowance for the fire protection permit so contractors are bidding apples to apples.

    - No, the cost of the Wentzville Department Site Plan Review and New Construction permit will be applied for and paid for by the City of Wentzville. All other permits required by the Wentzville Fire Protection District will be applied for and paid for by Contractor (subcontractors), i.e.: Fire Main Underground, Fire Sprinkler Systems, Fire Alarm Systems, or any other required permits from the WFPD.

4. Item 84 in exhibit D does not seem feasible in today's construction market. Please revise to 30 or 60 days.

    - City is reviewing this request and will respond in a future addendum.

5. Can you please provide a spec section for casework/millwork

    - Requested specification section 064116 Plastic Laminate Clad Architectural Cabinets is now provided via Addendum 02 package issued 01-24-23 and uploaded to the E-bidding system.

6. Can AISC Certification be waived if they conform to AISC standards?

    - AISC Certification is required and will not be waived.

7. I would like to request spec sections 012200 - Unit Prices and 012300 - Alternates be added to Division 1 - General Requirements.

    - Bid Alternates and Unit Prices have been added to Exhibit D – Scope of Work **for information only**, so that Contractors can distribute for subcontractor/supplier pricing. Contractors must submit Bid Alternates via the e-Bidding system and Unit Prices on Exhibit C – Supplemental Bid Information form.

8. Consider pre-qualifying steel fabricators who are not AISC certified.

    - AISC Certification of steel fabricators is required and will not be waived.

9. Specifications do not contain spec section 079500 - Expansion Control.

- Requested specification section 079500 Expansion Control was provided via Addendum 01 package issued 01-11-23 and uploaded to the E-bidding system.

10. There are no specifications for 074113 - Roof and Wall Panels as referenced in spec section 133419 - Metal Building Systems.

    - Requested specification sections 074113 Metal Roof Panels & 074213 Metal Wall Panels are now provided via Addendum 02 package issued 01-24-23 and uploaded to the E-bidding system.

11. Will 1-5/8" pipe be acceptable for temporary fence framework?

    - Yes, 1-5/8” pipe is acceptable for temporary fence framework.

12. Spec section 323115 2.2A states that steel pipe should comply with ASTM F1043 Group IC - yield strength 50,000psi. Spec section 323115 2.2B has pipe lbs/ft requirements of Group IA which do not match Group IC. Please advise whether to use Group IC or group IA.

    - Specification 323115 section 2.2A revised to indicate ASTM F1043 Group IA requirements to coordinate with section 2.2B requirements.

13. Spec section 323115 3.2C states line posts to be spaced 8' on center. Sheet AS203 of the drawings show line posts spaced at 10' on center. Please advise intended post spacing.

    - 8’ on center spacing indicated in specification 323115 section 3.2C is correct since fencing will be wind bearing. Notations on sheet AS203 will be revised to note 8’ OC spacing to coordinate.

14. Spec section 323115 2.6E states cantilever gate posts shall be 4" OD Grade 1 pipe. Sheet AS203 of the drawings show 4" square SCH40 posts for the cantilever gates. Please advise whether to use 4" round pipe or 4" square tube.

    - Specification 323115 section 2.6E revised to indicate 4” square SCH40 posts to coordinate with sheet AS203 notations.

15. Should the 8' chain link gates be equipped with privacy slats to match fencing?

    - Fencing privacy screening to be fabric screening as detailed and specified, not privacy slats. Fabric privacy screening to be installed on all perimeter chain-link gates and fencing.

16. What color are the privacy slats to be for chain link fence?

    - Fencing privacy screening to be fabric screening as detailed and specified, not privacy slats. Fabric privacy screening is to be black in color.

17. At the prebid it was mentioned Wentzville will cut down all trees, and GC will remove. The civil plans mention The City of Wentzville will complete the removal of trees and vegetation. Please confirm who is removing the trees.

    - Notation on sheet C-101 was revised via Addendum 01 package issued 01-11-23 and uploaded to the E-bidding system. Updated notation indicates “Owner to cut down all large hardwood trees and contractor will be responsible for stump removal, tree removal, haul off and clearing.”

18. Is the GC providing the Brine Storage Containers? If so, could we please have more information on them.

    - Brine storage tanks to be CFCI. Reference specification 111129 Vehicle Shop Equipment section 2.10E Accessories table for storage tank information.

19. I am a resident of Wentzville, and work for a St. Louis based Union company very interested in pursuing the Low Voltage elements of the new Wentzville Public Works.

    Within the Bid Specification of the Supplemental Bid Information “Exhibit C”, it lists the following three elements as a 1 Bid Line Item:

    • Division 26 – Electric
    • Division 27 – Communications (Low Voltage)
    • Division 28 – Safety, Access & Security (Low Voltage)

    As these Divisions carry completely different skillsets, certifications, and are separated in the Wentzville Specifications Manual, should they not be collected independently, per Division?

    With all three lumped together, there will be no way for Wentzville to determine if they are getting a competitive response for these individual efforts.

    There are a variety of local Union "Low Voltage" (Non-Electrical) Companies that would be happy to give Wentzville a competitive solution for Div. 27 and/or 28.

    - The City has not packaged any of the individual spec sections as separate bid packages. The entire project is being bid to General Contractors (GCs). It is up to the GCs to determine how they package their bid packages and how they evaluate and select subcontractors. It is in the GCs best interest to provide the most competitive and complete bid for each specification. We suggest the inquiring bidder provide competitive bids for their preferred scope of work/spec sections to all potential GCs who are bidding the project for consideration. Subcontractors can inquire with our Owner Representative Navigate Building Solutions for a list of potential GCs who are looking at the project or refer to the list of Plan Holders on the e-Bidding system

Exhibit D
Scope of Work for General Contractor for the New Wentzville Public Works Facility
Updated 1/25/23 for Addendum 2

The Construction Manager (CM) referred to below is Navigate Building Solutions, LLC. The Owner referred to below is the City of Wentzville. The Contractor referred to below is the General Contractor. This bid package includes, but is not limited to, the following:

1. Scope shall include all work outlined by the project documents (plans and specifications) issued by H-Design Group dated January 12, 2023.

2. This contractor shall include in the base bid price an unknown site conditions allowance of $200,000. Allowance shall include all overhead, profit, and fees as is allowed for Change Orders in contract Exhibit F, Modification/Explanation of Change Order Fee. Unit prices provided on the Supplemental Bid Information Form shall be used where applicable to work paid from the Allowance. Any savings to this allowance shall be reconciled via a deduct Change Order which shall include the associated overhead, profit, and fees. This allowance may only be used at the sole discretion of the CM and Owner. This allowance may not be used to address the effects of weather conditions. Allowance amount is pre-entered into the eBidding system line item.

3. Contractor is aware of the potential for Liquidated Damages. Contractor shall be responsible to maintain scheduled items for the Contractor's work as included in the Master Project Schedule below. Contractor shall reference the City-Contractor Agreement included in the bid documents. Contractor agrees to pay the Owner, or to deduct from the Contract Sum, not as a penalty, but as liquidated damages, the amounts listed in the contract drafts provided.

4. Upon execution of this contract, this contractor must submit to the CM a detailed critical path baseline construction schedule outlining each construction activity and phase. This schedule must fall within the Master Project Schedule outlined below and be submitted no later than twenty-one (21) days following execution of the contract. Contractors are required to provide updated work schedules at a minimum on a monthly basis with each pay application. Contractor's detailed activity schedule/critical path schedule shall adhere to the Master Project Schedule and shall provide for expeditious and practicable execution of the Work. Should the Contractor fall behind schedule by more than 5 workdays due to the fault of this Contractor, the Contractor shall provide a recovery schedule to the CM within 5 days of request by the CM.

Master Project Schedule Milestone Dates (It is the responsibility of the contractor to check the e-bidding system for up to date information for Items a – g):

a.	Issue Request for Bids	January 12, 2023
b.	Pre-Bid Meeting and Site Visit	January 19, 2023
c.	Last Bidder Questions & Requests for Substitutions Due	February 6, 2023
d.	Last Bid Addenda Issued	February 9, 2023
e.	Bids Due	February 16, 2023 at 2:00 PM
f.	Supplemental Bid Information Due	February 17, 2023 at 2:00 PM
g.	Final Board Approval	March 8, 2023
h.	Anticipated Notice to Proceed / Mobilization	March 27, 2023

(18 days after BOA approval)

i.	Groundbreaking	Date TBD by Owner
j.	Critical Submittals Submitted for Review	
	(Retaining Wall, Footings/Foundations, HVAC	
	Equipment, Electric Gear, & Generator	30 days after NTP
	PEMB	45 days after NTP
k.	All Remaining Submittals Submitted for Review	120 days after NTP
l.	Topping Out Ceremony	Date TBD (Coordinated with Owner)
	● Main Public Works Building 'Dry-In':	Based on Bidder's Schedule
	● Watertight roof	
	● Exterior wall air barrier in place	
	● All windows / storefront / curtainwall installed, or openings filled with temporary watertight construction	
m.	Internal Contractor Internal Pre-Punch	6 wks. prior to Sub. Comp.
n.	Substantial Completion / Punchlist Populated (Day ___*) Schedule Note: All Life Safety Inspections & Occupancy Inspections to be completed on or before Substantial Completion date.	*Based on Bidder's
o.	Final Completion / Completion of Punchlist	30 calendar days after Subst. Completion

5. The contractual project duration shall be proposed by bidders in the e-bidding system Bid Form. The proposed duration will be used as key criteria along with other information submitted via the eBidding system to select and award a General Contractor. The project duration will be incorporated into the Contract between the Owner and the General Contractor.

6. Contractor accepts all risks associated with adverse weather. No time extensions will be granted related to claims of adverse weather. No claims for extra costs will be granted related to adverse weather and/or taking action to deal with adverse weather and/or the effects of adverse weather. All provisions in the City-Contractor Agreement otherwise respecting weather are superseded by this provision, and are of no force and effect.

7. Any claims for delay to critical path activities shall be submitted to the Construction Manager within 24 hours of occurrence, identifying the event and the impacted critical path activity. The Construction Manager will review to determine if the claim will be considered a valid delay. Each day claimed shall be tracked on a log for review at the bi-weekly Owner meetings.

8. Contractor is required to provide detailed work schedule (short term schedule) on a weekly basis. Contractor's detailed work schedule shall adhere to the Master Project Schedule and the accepted contractual project duration. Contractor shall meet the requirements of the Master Project Schedule.

9. Provide all supervision, labor, tools, equipment, and materials to complete the work.

10. Perform all unloading, loading, distribution and hoisting of materials for this scope of work.

11. Furnish, install, maintain, and remove temporary on-site trailers and storage containers as required to perform the work. Trailer shall include a conference room with table and chairs for Owner and Architect meetings, and other meetings as needed.

12. Perform all work in accordance with OSHA standards (including OSHA 10-hour requirement). This Contractor is responsible for OSHA required safety railings (installation, maintenance, and removal) including appropriate OSHA approved system for roof edge protection for all trades.

13. Provide ladders for all contractors to access the upper floor until the stairs are in place and available for use.

14. The Owner will provide the MO DNR Land Disturbance permit. The Contractor will comply with all requirements of the MO DNR Land Disturbance permit.

15. The Contractor will apply for and obtain the City of Wentzville Building permit. The City of Wentzville will waive the building permit review and building permit fees. The Contractor is still responsible for scheduling and obtaining all City of Wentzville building inspections and final approvals, temporary and final occupancy permits.

16. The City of Wentzville will waive the Engineering review fees and construction permit fees only. The Contractor is responsible to include all other required City of Wentzville engineering and utilities inspection costs, tap fees, connection fees, etc.

17. The cost of the Wentzville Fire Department Site Plan Review and New Construction permit will be applied for and paid for by the City of Wentzville. All other permits required by the Wentzville Fire District will be applied for and paid for by the Contractor (subcontractors), i.e.: Fire Main Underground, Fire Sprinkler Systems, Fire Alarm Systems, etc. Coordinate with Fire District for inspection of fire lines and fire hydrants. Site fire line into the building shall be flushed prior to interior drywall construction.

18. This Contractor (or its subcontractors) are responsible for all other permits, if required and fees required by state, county, local, regional, and federal authorities, and agencies associated with this scope of work, i.e.: mechanical, electrical, plumbing permits, pre-engineered building, and canopies, retaining wall, etc. and all permit requirements and inspection requirements associated with such items of work.

19. This Contractor is also required to obtain a Business License from the City of Wentzville if required.

20. The City of Wentzville will cut down all large hardwood trees (greater than 8”) as this work must be completed by March 31, 2023. Contractor will be responsible for removing the fallen trees, stumps, and all remaining smaller trees and vegetation.

21. Coordinate all work with the Construction Manager’s representative.

22. Bi-weekly meetings at the jobsite will be held with the Owner Representative. The work of this contractor must be performed in accordance with the decisions and schedules formulated at these meetings so as not to delay the work. The Contractor’s Project Manager and Foreman/Superintendent must be present at these meetings. This contractor shall keep minutes of these meetings and forward them to the CM for review within 4 working days after the meeting.

23. Weekly meetings at the jobsite MUST be held with this contractor and its subcontractor’s Foreman/Project Managers to coordinate installation of all systems. The Owner, Architect and the CM shall be invited to all of these meetings and will attend at their discretion. This contractor shall keep minutes of these meetings and forward them to the CM for review weekly.

24. General Contractor and its HVAC, Plumbing, Fire Protection, Electrical, and Equipment subcontractors will be expected to coordinate above-ceiling work prior to installation, including the creation of drawing overlays to identify and address interferences prior to installation as needed.

25. This Contractor shall provide all surveying and layout required to complete the work.

26. Review all drawings and specifications and accept responsibility for requirements, general notes, notes, specifications, and details as they relate to this scope of work.

27. General Contractor will install, maintain, and remove all SWPPP scope of work. Contractor will provide all SWPPP reports per MDNR standards. Provide SWPPP reports to the CM on a weekly basis and immediately following each rain event.

28. This Contractor is responsible for locating all public and private utilities.

29. Provide street cleaning to remove dirt, mud, and debris generated by the project site as needed to maintain a clean surface at existing drives, parking lots and public roads.

30. Take note of nearest water source and the schedule for water line installation; if no water is available on site, provide alternate means for tire wash down of trucks prior to leaving the site.

31. Provide barricades, signage, flagging and flagman for traffic control and public safety during the execution of the work. Coordination of all road closures (full or partial) with CM and city officials.

32. Protect adjacent properties and utilities as required during the execution of this work. Provide shoring or underpinning as required for safe excavations to meet OSHA requirements and to protect adjacent streets, sidewalks, utilities, and existing structure(s). If this requires engineered shoring systems, this Contractor will provide as needed for this scope of work.

33. This Contractor to cleanup all rubbish and debris from site and building on a daily basis. This includes off-site disposal of all rubbish and debris along with excess spoils, unsuitable materials, excess materials such as concrete, sand and masonry materials. Trucks or dumpsters to haul off material by this Contractor.

34. This Contractor shall furnish all dumpsters for the entire project and shall include cost to haul offsite and legally dispose of all construction rubbish and debris.

35. This contractor to broom clean all floors at least once a week to ensure housekeeping stays up to par.

36. This Contractor shall provide a heavy construction cleaning prior to punch list creation so all surfaces can be observed by the design team. Clean exterior and interior surfaces exposed to view; remove temporary labels, stains, putty, soil, paint and foreign substances from all surfaces, including glass and painted surfaces; polish transparent and glossy surfaces; clean equipment and fixtures to a sanitary condition; replace air filters in mechanical equipment; clean roofs, gutters, and downspouts; remove obstructions and flush debris from drainage systems; clean site; sweep paved areas and rake clean other surfaces; remove trash and surplus materials from the site; clean and polish all floors; clean and polish all hardware; and repair all Work damaged during cleaning.

37. Provide final cleaning of all buildings and site prior to occupancy.

38. Contractor will provide temporary construction toilets for the project for all Contractors, visitors, etc.

39. Contractor will provide ice, cups and distribute drinking water as needed for workers performing this scope of work.

40. This Contractor and all subcontractors will be responsible to review all specifications and drawings.

41. Contractor must not burn in the concrete at the carpet tile, vinyl, or other resilient flooring locations. Contractor to ensure floors are kept dry and clean so that the concrete can dry in order to accept adhesive for flooring products. Include moisture mitigation as required by the specifications.

42. The Owner, Architect, and CM will be very stringent on the quality of exposed concrete floors during punch list. It is ultimately in this Contractor's scope of work to protect all finish products through education, signage, and temporary protection. Proper concrete protection from staining must be observed and will be enforced. Steel must not be placed on slab to avoid staining. Diaper hydraulic powered equipment to avoid oil and gasoline staining. Pipe cutting machines shall not be used on the concrete slabs where the exposed concrete finishes are scheduled. Any rubber-tired traffic shall be kept at a minimum and shall be protected with drop cloths.

43. Plan concrete floor pours such that a single pour covers any continuous area of sealed concrete floors.

44. No lignite to be allowed in any interior or exterior flatwork concrete.

45. Contractor to furnish first aid and safety supplies as needed for this scope of work.

46. Contractor is solely responsible for site/project safety for this scope of work.

47. Contractor to maintain Site Specific Safety Plan which shall be completed and kept in their job trailer at all times.

48. Contractor to grout fill frames per architectural details and notes.

49. Provide code compliant seismic support and bracing as required by the contract documents.

50. Provide fire stop systems as required for the installation of this scope of work.

51. Provide stenciling of rated walls according to the AHJ requirements.

52. Include cost to furnish and install toilet accessories as indicated.

53. Include wall blocking as needed for ALL specialty items (toilet accessories, signage, wall mounted furniture, TV's, etc. regardless of OFCI, OFOI, or CFCI status.

54. Contractor to provide and maintain weather protection for material and work as required by the project schedule. Contractor to also provide any cold or hot weather measures for weather sensitive materials like concrete, masonry, roofing materials, air/vapor barrier, etc. This shall include but is not limited to tenting and heating for masonry installation. Delays will not be awarded for construction activities impacted by hot/cold temperatures. If wet site conditions are hindering the progress onsite and access for trades, this Contractor shall provide temporary rock access to those areas to maintain the project schedule.

55. Include water pumping and dewatering necessary to proceed with work being performed under this bid package. Refer to Geotechnical Report for anticipated groundwater.

56. This Contractor is responsible for securing the building once it is reasonably possible to do with temporary or permanent measures at the close of every day. Any temporary openings in walls are to be secured at the end of the work day.

57. This Contractor to supply, install, maintain, move, and remove temporary site fence with gates. Contractor shall submit their own proposed Site Logistics Plan for review. The Owner, CM, Contractor, and Architect will meet to review and discuss site logistics and finalize an agreed upon plan of action for construction parking, office/storage containers, temporary toilets, temporary site fence, etc.

58. Provide and remove temporary rock parking for visitors to the site, temporary construction parking, staging, and laydown areas. Location of all staging/trailer placement/access to be coordinated and approved by the Construction Manager.

59. General Contractor shall place rock around the building perimeter to create an all-weather access path for crane access and exterior wall construction as needed to maintain schedule.

60. Contractor is responsible for any coordination of staging or relocation for materials for this scope of work after initial unloading.

61. Soil testing, concrete testing and the Special Inspections listed on structural plans shall be performed by Owner's consultant and paid for by Owner. Contractor will assist and coordinate/schedule with the agency to perform onsite testing work as needed/required by the documents. If the agency must re-test or re-inspect for failed tests/inspections or if the Contractor fails to notify the testing agency of a cancelled test/inspection, this Contractor shall compensate the Owner for such tests.

62. The Owner will utilize the Faith Group as the third party Commissioning agent for the mechanical and electrical systems and exterior envelope. General Contractor to assist with coordinating and scheduling such inspections, start-ups, testing, and final owner demonstration, training sessions, etc. .

63. No smoking shall be allowed inside the building once interior construction begins.

64. Full-time onsite superintendent is required when any Work is taking place. Contractors shall consider the size and complexity of this project when determining the balance of the project's project management staff. Contractor shall assign staff as needed to maintain project progress and oversight. Contractor shall assign project manager/engineer/superintendent to the project with relative similar industry and project-type experience, availability, and workload capacity.

65. The contractor shall use Procore Project Management software program for coordination of project RFIs, submittals, change orders, etc. Contractor shall be the administrator and maintain all records in the program, and shall grant access to the Owner, CM, and design team members. Include the cost associated with the use of such program. Alternate Submittal Exchange may be requested, and must be a cloud-based system that can be accessed by multiple users including the contractor, design team, construction manager, and owner for collaboration of document exchange for the project.

66. This Contractor shall produce a submittal log at the beginning of the project that is populated with all of the required submittals for this scope of work and assign due dates for submission to the Architect and due dates for return from the Architect. This log must be submitted to the CM and Architect for review on a Bi-weekly basis.

67. The Project Milestone Dates identify when all submittals shall be submitted for review. This milestone does not relieve the Contractor of completing select submittals sooner, as needed to meet the overall project schedule for installation of the work.

68. This Contractor shall maintain an RFI log for this scope of work. This log must be submitted to the CM and Architect for review on a Bi-weekly basis. Log to include:

    a. RFI number
    b. Topic of RFI
    c. Date submitted
    d. Date requested response by
    e. Date returned
    f. Status- Open or Closed

69. This Contractor must prepare and make available upon request, a procurement log for this scope of work for all long lead materials and equipment. Procurement log must include date of order, date of confirmation of order, expected delivery date, actual delivery date, and comments noting any changes to dates and reasons for change.

70. This Contractor shall organize and arrange for pre-installation meetings for this scope of work for all major scopes of work with the subcontractors and manufacturers prior to commencement of those activities and invite the Owner, Architect, and CM to all pre-installation meetings (must give at least 2 weeks' notice of meetings). This contractor shall keep minutes of those meetings and forward to the CM and Architect for review.

71. This Contractor will be responsible for submitting daily logs containing the number of workers, equipment, work accomplished, daily weather, deliveries, visitors to the site, any inspections passed or failed, problems encountered, and other relevant data as may be required. These reports must be emailed to the CM daily, within 24 hours of work performance, utilizing an Apple iPad app called Construction Superintendent.

72. Provide photographs of all below slab, in slab, and in-wall rough in prior to cover-up. Organize photos electronically and label with location on corresponding floor plan. Submit 'rough in photograph' package at the end of the project. CM may ask for progress photos during project as needed for reference or coordination.

73. This Contractor shall arrange, schedule, organize and video tape as it pertains to this scope of work all equipment start-ups and Owner Training sessions per contract documents. These training sessions shall be recorded professionally by a videographer, including lapel mics for person providing the training, etc. A DVD including copies of each training session (organized as individual Chapters) shall be provided as part of the closeout documents. All Owner Demonstration and Training sessions will be scheduled to occur between Substantial Completion and Final Completion.

74. This Contractor must populate a closeout log and submit to the CM and Architect for review to verify that all required items have been included. Once approved, this log will be used to track required closeout items prior to final payment. This contractor is highly encouraged to submit O&M requirements as soon as possible in advance of final acceptance to help eliminate delay in payment.

75. This Contractor is responsible for any temporary heating/cooling, humidifying/dehumidifying as needed to maintain the project schedule and as needed prior to starting the permanent HVAC equipment. Use of the new HVAC system will not be allowed during construction. Contractor is also responsible for any extended warranties needed to provide the Owner with the required contractual warranty durations.

76. This Contractor shall be responsible for the cost of temporary utilities usage for all trades during the course of construction including but not limited to gas, electric, sewer, water. Contractor is responsible for any backflow preventer costs/water usage costs for hydrant use. Upon Substantial Completion, CM will work with Contractor and Owner to transfer all utilities into the Owner's name.

77. Contractor shall coordinate, furnish, and install temporary transformer according to Ameren requirements.

78. Prepare subgrade/pad for the Ameren transformer per Ameren UE Specifications. Ameren will furnish, deliver, and install the transformer pad and transformer.

79. Provide fuel for generator testing. At turnover of emergency generator, this Contractor is to completely fill generator fuel tank.

80. Clean all HVAC equipment and replace all filters with new filters at the time of building turnover to the Owner.

81. All ductwork ends are to be sealed before arriving at site and seals at end of runs to be maintained.

82. This Contractor will compile for the Owner a 'record set' of all documents and drawings, as it pertains to this scope of work, for the project at Substantial Completion. This shall be 'red-lined' copies of all project changes throughout the course of the project to identify all systems as they were actually installed on the project for the Owner's records. These must be electronically recorded and submitted to the Owner in pdf format.

83. As-built Surveys will be required by this Contractor at the Completion of the Project, including for Site Utilities, rain gardens, detention basins, etc. to submit to Utility company/department or City/County for final approval. A portion of retainage will be held until all surveyed as-builts have been submitted and accepted by the utility company and authorities having jurisdiction. As-built surveys must be prepared by a Land Surveyor or Engineer registered in the State of Missouri. Contractor shall also provide as-built drawings in accordance with Chapter 11 of the Wentzville Engineering Design Criteria and Division 11 of the Wentzville Standard Specifications.

84. Contractor is required to hold their alternate pricing that was included in the bid form for 3 months after the bid date, unless noted otherwise in the alternate description. Contractor will notify CM when decisions need to be made regarding the acceptance of bid alternates in order to maintain deliveries, installation, and the master project schedule.

85. The Master Project Milestone Dates include all work proposed in the Bid Alternates. No time extensions will be granted for accepted Alternates.

86. Unit prices provided on the Bid Form and incorporated into the contract shall apply to the condition described in the unit price, regardless of which subcontractor performs the work or when the work is being performed.

87. Construction work shall only be allowed during hours permitted by the City of Wentzville. If Contractor opts to work outside of those hours, they must contact the CM/City/Owner to obtain permission.

88. During the warranty period of the project, this Contractor shall document, maintain, and update a Warranty Log of all warranty items, weekly, to be shared with the Client and CM. Contractor shall acknowledge the Owner's warranty call within 4 hours and keep the Owner apprised of the resolution status. Any roof or building envelope leaks or elevator issues or any issue that interferes with regular building operations shall be considered as urgent / emergencies. Contractor to provide a 24-hour on-call service for such urgent or emergency items.

89. Builder's Risk to be carried by the General Contractor. Deductibles to be paid by General Contractor.

90. Contractor is required to maintain access to the work as needed to maintain schedule.

91. No change orders will be issued for material cost increases or impacts of tariffs that occur during the project.

92. The Owner will provide and maintain two time-lapse cameras to record progress of construction. General Contractor to provide two sturdy 20-foot tall mounting posts in location to be coordinated with the Owner. General Contractor to mount cameras on pole. Provide access to the pole for periodic maintenance once a month for the duration of the project. Remove poles at the completion of the project. Turn over cameras to the Owner.

93. This Contractor shall provide an opportunity for a ground-breaking ceremony. General Contractor to provide a twelve-inch high mound of lose dirt, three feet wide and forty feet long, to be removed after ceremony.

94. This Contractor shall provide an opportunity for a topping out ceremony. General Contractor to coordinate with Owner to provide location, parking, accessible steel beam and hoisting for ceremony.

95. If this contractor chooses to backfill foundation walls prior to that time which is approved/allowed by the structural engineer, this Contractor is responsible for designing, installing, rental (and eventual removal) of all temporary shoring of foundation walls prior to backfill.

96. Provide housekeeping pads.

97. Provide site bollards complete with footing, anchoring, concrete fill, painting, and plastic covers.

98. Signage – Contractor to furnish and install the equipment signage called for on the Equipment plans and specifications. Also, the parking lot handi-cap signs. All other signage will be provided by the owner. Contractor is responsible for coordinating building construction with the signage requirements including required blocking and any required electrical rough-in.

99. Remove remaining fallen trees and stumps and complete all required site demolition work. Strip all vegetation, roots, soft, organic, frozen, and unsuitable soils in the construction areas and either haul off or stockpile for later use in non-bearing areas.

100. Strip topsoil, stockpile, and stabilize until ready for use. Spread topsoil to the depth required by civil and landscape drawings and landscape specifications.

101. All areas must be left at the end of each day so that there is no standing water. Grade temporary swales to drain site, if necessary, to achieve this requirement.

102. After stripping of site and completion of initial cuts to required subgrades (-1' below paving section in the parking/drive areas and -3' below slab on grade section in the building areas), and prior to fill operations, proof roll the structure and parking areas.

     Replace of areas that rut or deflect (greater than 1") with properly compacted fill. Scarify and compact the subgrade soils to a depth of at least 6" below the surface in accordance with the geotechnical report recommendations. If remediation of the existing soils is required after completing the site stripping and initial cuts, this work will be completed on a unit price basis, and is should not be included in the base bid.

103. After subgrade preparation, complete site grading and compacted fill placement to three feet below the building and one foot below parking area required subgrades Contractor to determine the final fill material quantities and types. If onsite materials are utilized, Contractor is responsible for any additional work (moisture conditioning) to achieve required compaction and this work should be included in the Base Bid.

104. Include in the base bid imported, 1" minus gradation crushed limestone fill to a depth of 3' below building slab subgrades and 1' below parking and drive areas pavement subgrades. Include also 2' below the bearing level of footings/column pads. Lien concrete can also be utilized for remediation under the footings.

105. Include recompacting of the bottom of footing excavations, as directed by the materials testing agency, if the footing excavation has disturbed the compacted subgrade materials.

106. Proof roll subgrade again, prior to placing base rock for the final paving.

107. Provide properly compacted fill in all utility trenches within the building and parking areas.

108. Utilize equipment as recommended in the geotechnical report as weather and site conditions require.

109. If more or less remediation is required beyond what is included as outlined above, the change in work will be addressed by Unit Prices included on the Bid Form. In such case, unit quantities must be tracked by the Contractor and confirmed by the Materials Testing agency.

110. Lime stabilization of all pavement areas. Clarify. Moisture conditioning, if required, is to be included in the Base Bid. See Item 103.

111. No change orders will be awarded for additional forming or additional concrete in over excavated footings.

112. Pressure test and chlorinate site water lines. Provide test reports to Owner verifying acceptable pressures and chlorination. Coordinate with utility company / fire district and obtain approval from those parties as required.

113. Verify that all plumbing fixtures are mounted at ADA height required by AHJ.

114. Include all caulking and sealants for all systems and materials furnished and installed on the bid documents.

115. Provide access panels needed for all work installed under this contract.

116. Provide a mockup per documents of the building envelope materials and construction techniques. The mockup should reflect the project document details and be installed exactly as indicated on

the drawings. The purpose of the mockup is to not only review and achieve an approval of the materials, but also to ensure the transition of the materials results in a good water tight condition. Contractor to follow the mockup guidelines outlined in the project documents. If the Contractor questions a detail provided, it should be submitted as an RFI and discussed with the project team prior to the construction of the mockup.

117. Contractor (or the responsible subcontractor providing the delegated design) must include Professional Liability and errors and omissions insurance for the design-build, or delegated design scopes of work that are required by specifications to designed by a professional engineer. The General Contractor or subcontractor providing the design must carry a minimum of Professional Liability of $2M per claim. Drawings and calculations shall be signed and sealed by a Professional Engineer registered in the State of Missouri. The following items are delegated design by this Contractor:

    a. Heavy duty, simulated stone look vinyl fencing and footings
    b. Site retaining wall
    c. Pre-engineered metal building
    d. Pre-engineered/prefabricated covered parking structures.
    e. Salt Building Fabric Structure
    f. Fire Suppression System (including hangers, seismic restraints, etc.)
    g. Fire Alarm System (including wiring diagrams, etc.)
    h. Plumbing trapeze hangers and the seismic restraints
    i. Mechanical hangers and supports and seismic restraints
    j. Electrical hanger and supports and seismic restraints
    k. Structural Steel Connections (See Spec Section 051200)
    l. Cold Formed Metal Framing (See Spec Section 054000)
    m. Guardrails for mezzanine and truck dock areas
    n. Aluminum-Framed Storefronts (See Spec Section 084113)
    o. Glazed Aluminum Curtain Walls (See Spec Section 084113)
    p. Glazing (Spec Section 08800)

118. Review with the Owner/Fire Marshall before ordering the Knox box. Verify/obtain final location of the Knox box prior to installation.

119. The CONTRACTOR shall provide one project sign. The sign will include the Owner's logo, design team logos, Construction Manager logo and the CONTRACTOR logo. They shall also include the project rendering, the project name and expected completion timeframe. No other project signs will be allowed on the project for advertisement unless approved in advance by the owner. The sign needs to a minimum of 4' by 8'. The sign will be installed at a location to be approved by the Owner.

120. All disturbed landscape areas must be replaced to their pre-construction condition at the end of the project unless noted otherwise on the Project Documents. This includes areas disturbed by this Contractor outside of the parcel boundary, on adjacent properties, and along the ROW.

121. Contractor will submit to the CM a detailed Schedule of Values for review and approval prior to the submission of the first pay application.

122. Contractor must reference and comply with all City Standards in construction of the new facilities.

123. The typical property owner/development or service agreement fees from Ameren Electric, Ameren Gas, and Brightspeed are the responsibility of the Owner. Contractor to coordinate with and provide all indicated infrastructure and installations indicated on the plans to support the public utility provided services and equipment.

124. Mechanical, electrical, and plumbing subcontractors will assist Owner's Representative with completing Ameren BizSavers Program Incentive documentation within 30 days of Substantial Completion, including backups for labor and material costs for mechanical equipment, light fixtures, lighting controls, and other electric equipment which qualifies for incentives. Subcontractors shall also provide all invoices from suppliers for these items as required by Ameren for backup.

125. BID ALTERNATES (PROVIDE Lump Sum ADD or DEDUCT Amount)

Provided for information only. Contractor to provide all Alternate Bids via e-Bidding system.

Alternate 1 – Eliminate covered parking at the Main Building to include the prefabricated canopy structure, related storm piping, and lighting.

Alternate 2 – Provide medium duty EMPC concrete paving (Note 26 - Detail 13/C700) in lieu of areas called out to be light duty asphalt paving (Note 27 – Detail 12/C700) and medium duty asphalt paving (Note 15 – Detail 14/C700) at the North Parking Lot.

Alternate 3 – Provide approved substitute manufacturer to Trane as requested in Specifications Sections 230923 (Direct-Digital Control for HVAC), 237413 (Indoor Indirect-Fired Heating & Ventilating Units, and 237413 (Outdoor Packaged Heating & Cooling Units).

Alternate 4 – Provide engineered quartz tops at wet areas (Rooms 108, 119, 120, 123, 213, 214, 301, and 411) in lieu of solid surface tops.

Alternate 5 – Provide plastic laminate tops at dry areas (Rooms 112, 117, 211, 216, 308, and 403) in lieu of solid surface tops in accordance with the Finish Drawings

126. **UNIT PRICES:** The unit rates below are to include all general conditions, overhead, and profit. Rates are to be applied either as add or deduct rates; the same rate will apply for either condition. There will be only one rate allowed per unit price regardless of when in the construction process the rate is being applied or what trade is performing it.

Provided for information only. Contractor to submit all Unit Prices on Exhibit C – Supplemental Bid Information Form.

Unit Price No. 1: Removal and haul-off of rippable rock. Per CY

Unit Price No. 2: Removal and haul-off of non-rippable rock. Per CY

Unit Price No. 3: Removal and haul-off of trench rock. Per CY

Unit Price No. 4: Removal and disposal of existing buried concrete man-made structures. Per CY

Unit Price No. 5: Removal, haul-off and disposal of unsuitable soils and placement of lean concrete for soil remediation. Per CY

Unit Price No. 6: Removal, haul-off and disposal of unsuitable soils and import & compaction of 1" granular material for soil remediation per recommendations in Geotechnical Report. Per CY

Unit Price No. 7: Removal, haul-off and disposal of unsuitable soils and import & compaction of suitable soils per recommendations in Geotechnical Report. Per CY

Unit Price No. 8: Lime treatment of on-site unsatisfactory soils, tilled into a depth directed by Geotechnical Engineer. Include tilling, spreading and recompaction of treated soil. Per CY

Unit Price No. 9: Moisture conditioning existing subgrade material by aerating soil with a disk and allowing to air dry. Include spreading and recompaction. Per CY

Unit Price No. 10: Load and haul-off of surplus soils. Per CY

Unit Price No. 11: Import, placement and compaction of suitable soil. Per CY

Unit Price No. 12: 1" clean rock placement and compaction Per CY

Unit Price No. 13: 1" minus rock placement and compaction Per CY

Unit Price No. 14: Eliminate seed/straw, furnish, and install additional sod. Per SF

Unit Price No. 15: Furnish and install enhanced flooring adhesive capable of withstanding up to 99% Relative Humidity of slabs (compatible with flooring products) on new concrete slabs. Per SF

Unit Price No. 16: Furnish and install additional heavy duty, simulated stone vinyl fence. Per LF

Unit Price No. 17: Eliminate chain link/fabric screen fence. Per LF

SECTION 002600 - PROCUREMENT SUBSTITUTION PROCEDURES

1.1 DEFINITIONS

A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.

B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 012500 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

1.2 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.3 PROCUREMENT SUBSTITUTIONS

A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.

B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise, requests will be returned without action:
   1. Extensive revisions to the Contract Documents are not required.
   2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
   3. The request is fully documented and properly submitted.

1.4 SUBMITTALS

A. Procurement Substitution Request: Submit to Architect. Procurement Substitution Request must be made in writing by prime contract Bidder only in compliance with the following requirements:
   1. Requests for substitution of materials and equipment will be considered if received no later than February 6, 2023.
   2. Submittal Format: Submit one copy of each written Procurement Substitution Request, using form bound in Project Manual.
      a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and drawing numbers.
      b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:
         1) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.

2) Copies of current, independent third-party test data of salient product or system characteristics.
3) Samples where applicable or when requested by Architect.
4) Detailed comparison of significant qualities of the proposed substitute with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
5) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
6) Research reports, where applicable, evidencing compliance with building code in effect for Project, from ICC-ES.
7) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will become necessary to accommodate the proposed substitute.

c. Provide certification by manufacturer that the substitute proposed is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated.

d. Bidder, in submitting the Procurement Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the Procurement Substitution Request.

B. Architect's Action:

1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify all bidders of acceptance of the proposed substitute by means of an Addendum to the Procurement and Contracting Documents.

C. Architect's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.

END OF DOCUMENT 002600

SECTION 012500 - SUBSTITUTION REQUEST FORM

This form is to be used to submit product(s) for Architect or Engineers approval. Requests for substitution will be considered if received no later than February 6, 2023. Submit this document to Architect per section 012500.

To: _____

We hereby submit for your consideration the following product instead of the specified items for the above project:

Specification Section: _____

Proposed Substitution: _____

Attach complete Product description, drawings, photographs, performance and test data, and other information necessary for evaluation.

A. Will changes be required to building design in order to properly install proposed substitution?

YES ____ NO ____

If yes, explain _____

_____

B. What difference exists between proposed substitution and specified item?

_____

_____

C. Does manufacturer's warranty of proposed substitution differ from that specified?

YES ____ NO ____

If yes, explain _____

D. Will maintenance and service parts be locally available for substitution?

YES ____ NO ____

If yes, explain _____

_____
COMPANY NAME

_____
CONTACT PERSON TELEPHONE

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

B. Related Requirements:

1. Document 002600 "Procurement Substitution Procedures" for requirements for substitution requests prior to award of Contract.
2. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

B. Comparable Products: Naming of specified items on the Drawings and in the specifications, means that such named items are specifically required by the Architect and/or Owner. When the words “or comparable product” follows such named item(s), a substitution request must be submitted when proposing a product other than the named product. Requests for substitutions must be received by the Architect within the time frame set hereinafter.

1.3 ACTION SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Substitution Request Form: Use form provided in Project Manual . All Substitutions to the Project must be submitted for review prior to use on the Project, and be submitted on a fully executed request form with appropriate documentation.
   a. Prior to Bidding: Use CSI Form 1.5C, Substitution Request Form During the Bidding Phase.
   b. After Bidding Phase: Use CSI Form 13.1A, Substitution Request Form After the Bidding Phase.
2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
   a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
   b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
   c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
   d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
   e. Samples, where applicable or requested.
   f. Certificates and qualification data, where applicable or requested.
   g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
   h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
   i. Research reports evidencing compliance with building code in effect for Project, from ICC-ES .
   j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
   k. Cost information, including a proposal of change, if any, in the Contract Sum.
   l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
   m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
3. Architect's Action (or Design Team member's action): If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
   a. Forms of Acceptance: Addenda, Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
   b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.
   c. Architect (or member of the design team) will note action taken.

d. Architect (or member of the design team) is not obligated nor required to review any and all Substitution requests.
e. Architect (or member of the design team) is not obligated to inform Proposers of Substitutions of incomplete and/or non-accepted requests for Substitution.

1.4 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.5 PROCEDURES

A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.6 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
   a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
   b. Substitution request is fully documented and properly submitted.
   c. Requested substitution will not adversely affect Contractor's construction schedule.
   d. Requested substitution has received necessary approvals of authorities having jurisdiction.
   e. Requested substitution is compatible with other portions of the Work.
   f. Requested substitution has been coordinated with other portions of the Work.
   g. Requested substitution provides specified warranty.
   h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
   i. Specified product or method of construction cannot be provided within the Contract Time.
   j. Specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.

k. Specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution will provide the specified warranty.

2. Acceptance of Substitutions for Cause. Architect (or member of the design team) will review proposed Substitution in time indicated in previous Sections. If necessary, Architect (or member of the design team) will request additional information or documentation for evaluation purposes. Only acceptable substitutions will receive notification of status. Substitutions shall be considered unacceptable unless a form of acceptance is received by the Proposer.
   a. Forms of Acceptance for Substitutions of Cause: Change Order, Construction Change Directive, or Supplemental Instructions for minor changes in the Work.

B. Substitutions for Convenience: Architect will consider requests for substitution if received within 60 days after the Notice to Proceed . Requests received after that time may be considered or rejected at discretion of Architect.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
   a. Substitutions for Convenience will only be reviewed once - no additional information may be submitted after initial review.
   b. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
   c. Requested substitution does not require extensive revisions to the Contract Documents.
   d. Requested substitution is consistent with the Contract Documents and will produce indicated results.
   e. Substitution request is fully documented and properly submitted.
   f. Requested substitution will not adversely affect Contractor's construction schedule.
   g. Requested substitution has received necessary approvals of authorities having jurisdiction.
   h. Requested substitution is compatible with other portions of the Work.
   i. Requested substitution has been coordinated with other portions of the Work.
   j. Requested substitution provides specified warranty.
   k. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
2. Acceptance of Substitution for Convenience: Architect (or member of the design team) will release accepted substitutions in Addendum and by no other means.

C. The Contractor’s submittal and Architect’s acceptance of Shop Drawings, Product Data or Samples that relate to construction activities not complying with the Contract Documents does not constitute an acceptance or validate request for substitution, nor does it constitute approval.

D. Under no circumstances does the Architect’s and/or Owner’s acceptance of any such substitution relieve the Contractor from timely, full and proper performance of the Work.

1.7 ARCHITECT'S REVIEW PROCESS

A. Submittal requests for proposed substitutions will be processed using the following procedures:

1. Submittals will be dated upon arrival and reviewed in the order they were received.
2. Submittals will be placed by receiving person in a designated folder for the purpose of Substitution Reviews.
3. Submittals will be reviewed by a member of the design team's staff (or respective consultant). Reviewer(s) will not be designated until after receipt of submittal of substitutions.
4. Reviewer's General Attitude will be the following:
   a. Burden of proof is upon the Proposer or Submitter of the Substitution.
   b. Reviewer will not review the submittal and will deem it "Not Approved" if the Substitution does not indicate all required options to meet the requirements of the Contract Documents (i.e. Reviewer will not select options between models and/or lines of products).
   c. Reviewer should not be required to conduct an exhaustive review of the submittal. Submittal of a Manufacturer's catalogs which do not clearly indicate proposed product and/or product options will be immediately rejected.
   d. Reviewer should not be required to seek information from Manufacturer's literature on file in the office, from an improperly submitted electronic submittal, or information from other locations or sources.
   e. Substitute must meet or exceed the requirements and performance of the specified or indicated item(s) within the Contract Documents.
   f. Review is complete when, in the Reviewer's opinion, significant deficiency(ies) are established. In such case, review of data covering other points of the Specifications is not required.
5. Reviewer will note action taken from list below, the date, and his/her initials or name:
   a. Substitution Approved
   b. Substitution Approved As Noted
   c. Substitution Rejected
   d. Substitution Request Received Too Late
   e. If no action has been taken, the Contractor shall deem the Substitution "Not Approved."
6. Substitutions will be filed in the Architect's office until completion of the Project.

1.8 ELECTRONIC SUBMITTAL OF SUBSTITUTIONS

A. Substitution Request submittals will be accepted for review when submitted electronically under the following conditions; Substitution Request submittals may be rejected immediately at Architect (or member of design team) which are not submitted in accordance with the criteria below:

1. A fully executed Substitution Request form must accompany each Substitution Request submittal.
2. Submittals shall be submitted to the Architect of Record as reference in the Project Team Directory. Submittals directed to the attention of anyone other than the person named will not be considered.

3. Submittals of Substitutions for any reason must be received within the indicated time limits set forth by this Document.
4. Documentation requirements as set forth in this Section are applicable to Electronic Submittals.
    a. Submittals in which the Manufacturer's entire catalog is submitted will be immediately rejected.

PART 2 - PRODUCTS (Not Used)

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1.1 DEFINITIONS

A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.

B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 012500 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

1.2 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.3 PROCUREMENT SUBSTITUTIONS

A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.

B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise, requests will be returned without action:
   1. Extensive revisions to the Contract Documents are not required.
   2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
   3. The request is fully documented and properly submitted.

1.4 SUBMITTALS

A. Procurement Substitution Request: Submit to Architect. Procurement Substitution Request must be made in writing by prime contract Bidder only in compliance with the following requirements:
   1. Requests for substitution of materials and equipment will be considered if received no later than February 6, 2023.
   2. Submittal Format: Submit one copy of each written Procurement Substitution Request, using form bound in Project Manual.
      a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and drawing numbers.
      b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:
         1) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.

2) Copies of current, independent third-party test data of salient product or system characteristics.
3) Samples where applicable or when requested by Architect.
4) Detailed comparison of significant qualities of the proposed substitute with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
5) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
6) Research reports, where applicable, evidencing compliance with building code in effect for Project, from ICC-ES.
7) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will become necessary to accommodate the proposed substitute.

c. Provide certification by manufacturer that the substitute proposed is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated.

d. Bidder, in submitting the Procurement Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the Procurement Substitution Request.

B. Architect's Action:

1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify all bidders of acceptance of the proposed substitute by means of an Addendum to the Procurement and Contracting Documents.

C. Architect's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.

END OF DOCUMENT 002600

SECTION 012500 - SUBSTITUTION REQUEST FORM

This form is to be used to submit product(s) for Architect or Engineers approval. Requests for substitution will be considered if received no later than February 6, 2023. Submit this document to Architect per section 012500.

To: _____

We hereby submit for your consideration the following product instead of the specified items for the above project:

Specification Section: _____

Proposed Substitution: _____

Attach complete Product description, drawings, photographs, performance and test data, and other information necessary for evaluation.

A. Will changes be required to building design in order to properly install proposed substitution?

YES ____ NO ____

If yes, explain _____

_____

B. What difference exists between proposed substitution and specified item?

_____

_____

C. Does manufacturer's warranty of proposed substitution differ from that specified?

YES ____ NO ____

If yes, explain _____

D. Will maintenance and service parts be locally available for substitution?

YES ____ NO ____

If yes, explain _____

_____
COMPANY NAME

_____
CONTACT PERSON TELEPHONE

SECTION 019113 - GENERAL COMMISSIONING REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. General requirements for coordinating and scheduling commissioning activities.
2. Commissioning meetings.
3. Commissioning reports.
4. Use of commissioning process test equipment, instrumentation, and tools.
5. Construction checklists, including, but not limited to, installation checks, startup, performance tests, and performance test demonstration.
6. Commissioning tests and commissioning test demonstration.
7. Adjusting, verifying, and documenting identified systems and assemblies.

B. Related Requirements:

1. Section "Submittal Procedures" for submittal procedure requirements for commissioning process.
2. Section "Closeout Procedures" for Certificate of Construction-Phase Commissioning Process Completion submittal requirements.
3. Section "Operation and Maintenance Data" for preliminary operation and maintenance data submittal requirements.

C. References:

1. Commissioning is performed in accordance with relevant criteria documented in the ACG Commissioning Guideline for Building Owners, Design Professionals, and Commissioning Service Providers (AABC Commissioning Group) ISBN 0-910289-04-02.

1.3 DEFINITIONS

A. Acceptance Criteria: Threshold of acceptable work quality or performance specified for a commissioning activity, including, but not limited to, construction checklists, performance tests, performance test demonstrations, commissioning tests, and commissioning test demonstrations.

B. Basis-of-Design Document: A document prepared by Architect that records concepts, calculations, decisions, and product selections used to comply with Owner's Project Requirements and to suit applicable regulatory requirements, standards, and guidelines.

C. Commissioning Plan: A document, prepared by Commissioning Authority, that outlines the organization, schedule, allocation of resources, and documentation of commissioning requirements.

D. Commissioning: A quality-focused process for verifying and documenting that the facility and all of its systems and assemblies are planned, designed, installed, and tested to comply with Owner's Project Requirements. The requirements specified here are limited to the construction phase commissioning activities. The scope of the commissioning process is defined in the Preliminary Commissioning Plan.

E. Construction-Phase Commissioning-Process Completion: The stage of completion and acceptance of commissioning process when resolution of deficient conditions and issues discovered during commissioning process and retesting until acceptable results are obtained has been accomplished.

1. Commissioning process is complete when the Work specified of this Section and related Sections has been completed and accepted, including, but not limited to, the following:

a. Completion of tests and acceptance of test results.
b. Resolution of issues, as verified by retests performed and documented with acceptance of retest results.
c. Comply with requirements in Section "Demonstration and Training."
d. Completion and acceptance of submittals and reports.

F. Owner's Project Requirements: A document that details the functional requirements of a project and the expectations of how it will be used and operated, including Project goals, measurable performance criteria, cost considerations, benchmarks, success criteria, and supporting information. This document is prepared either by the Owner or for the Owner by the Architect or Commissioning Authority.

G. Owner's Witness: Commissioning Authority, Owner's Project Manager, or Architect-designated witness authorized to authenticate test demonstration data.

H. "Systems," "Assemblies," "Subsystems," "Equipment," and "Components": Where these terms are used together or separately, they shall mean "as-built" systems, assemblies, subsystems, equipment, and components.

I. Test: Performance tests, performance test demonstrations, commissioning tests, and commissioning test demonstrations.

1.4 COMPENSATION

A. If Architect, Commissioning Authority, other Owner's witness, or Owner's staff perform additional services or incur additional expenses due to actions of Contractor listed below, compensate Owner for such additional services and expenses.

1. Failure to provide timely notice of commissioning activities schedule changes.
2. Failure to meet acceptance criteria for test demonstrations.

1.5 COMMISSIONING TEAM

A. Members Appointed by Contractor(s):

1. Commissioning Coordinator: A person or entity employed by Contractor to manage, schedule, and coordinate commissioning process.
2. Project superintendent and other employees that Contractor may deem appropriate for a particular portion of the commissioning process.
3. Subcontractors, installers, suppliers, and specialists that Contractor may deem appropriate for a particular portion of the commissioning process.
4. Appointed team members shall have the authority to act on behalf of the entity they represent.

B. Members Appointed by Owner:

1. Commissioning Authority, plus consultants that Commissioning Authority may deem appropriate for a particular portion of the commissioning process.
2. Owner representative(s), facility operations and maintenance personnel, plus other employees, separate contractors, and consultants that Owner may deem appropriate for a particular portion of the commissioning process.
3. Architect, plus employees and consultants that Architect may deem appropriate for a particular portion of the commissioning process.

1.6 INFORMATIONAL SUBMITTALS

A. Comply with requirements in Section "Submittal Procedures" for submittal procedure general requirements for commissioning process.

B. Commissioning schedule.

C. Two-week look-ahead schedules.

D. Commissioning Coordinator Letter of Authority:

1. Within 10 days after approval of Commissioning Coordinator qualifications, submit a letter of authority for Commissioning Coordinator, signed by a principal of Contractor's firm. Letter shall authorize Commissioning Coordinator to do the following:

a. Make inspections required for commissioning process.
b. Coordinate, schedule, and manage commissioning process of Contractor, subcontractors, and suppliers.
c. Obtain documentation required for commissioning process from Contractor, subcontractors, and suppliers.
d. Report issues, delayed resolution of issues, schedule conflicts, and lack of cooperation or expertise on the part of members of the commissioning team.

E. Commissioning Coordinator Qualification Data: For entity coordinating Contractor's commissioning activities to demonstrate their capabilities and experience.

1. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of three previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

F. Test Reports:

1. Templates: Immediately following submittal approval, submit original equipment manufacturer's installation and startup requirements. Such requirements may be included in the submittal of the Installation, Operation and Maintenance (IOM) manual.
2. Installing Contractors' Quality Assurance Process: Immediately following submittal approval, submit the forms used as part of the installing contractor's quality assurance process.
3. Pre-Startup Report: Prior to startup of equipment or a system, submit signed, completed construction checklists.
4. Test Data Reports: At the end of each day in which tests are conducted, submit test data for tests performed.
5. Commissioning Issue Reports: Daily, at the end of each day in which tests are conducted, submit commissioning issue reports for tests for which acceptable results were not achieved.
6. Weekly Progress Report: Weekly, at the end of each week in which tests are conducted, submit a progress report.

G. Construction Checklists

1. Templates: Construction Checklist templates shall be submitted immediately following the equipment submittal approval, before the start of the field commissioning process.
2. Completed Construction Checklists: Submitted each checklist immediately following completion of the field commissioning process.
3. Submit for:

a. Material checks.
b. Installation checks.
c. Startup procedures, where required.

H. Commissioning Final Report:

1. The CxA shall provide a final report following the completion of Testing, excluding seasonal and deferred Tests. Seasonal and deferred test results shall be attached to or inserted in the final report in a clear and readily identified manner. The report is to outline compliance and non-compliance with the construction documents, as well as identify concerns relative to future performance

PART 2 - PRODUCTS

2.1 TEST EQUIPMENT, INSTRUMENTATION, AND TOOLS

A. Test equipment and instrumentation required to perform the commissioning process shall remain the property of Contractor unless otherwise indicated.

B. Test equipment and instrumentation required to perform commissioning process shall comply with the following criteria:

1. Be manufactured for the purpose of testing and measuring tests for which they are being used and have an accuracy to test and measure system performance within the tolerances required to determine acceptable performance.
2. Calibrated and certified.

a. Calibration performed and documented by a qualified calibration agency according to national standards applicable to the tools and instrumentation being calibrated. Calibration shall be current according to national standards or within test equipment and instrumentation manufacturer's recommended intervals, whichever is more frequent, but not less than within six months of initial use on Project. Calibration tags shall be permanently affixed.
b. Repair and recalibrate test equipment and instrumentation if dismantled, dropped, or damaged since last calibrated.

3. Maintain test equipment and instrumentation.
4. Use test equipment and instrumentation only for testing or monitoring Work for which they are designed.

2.2 PROPRIETARY TEST EQUIPMENT, INSTRUMENTATION, AND TOOLS

A. Proprietary test equipment, instrumentation, and tools are those manufactured or prescribed by tested equipment manufacturer and required for work on its equipment as a condition of equipment warranty, or as otherwise required to service, repair, adjust, calibrate, or perform work on its equipment.

1. Identify proprietary test equipment, instrumentation, and tools required in the test equipment identification list submittal.
2. Proprietary test equipment, instrumentation, and tools shall become the property of Owner at Substantial Completion.

2.3 CONSTRUCTION CHECKLISTS FORMAT AND ORGANIZATION

A. Commissioning Report:

1. Include a table of contents and an index to each test.
2. Include major tabs for each Specification Section.
3. Include minor tabs for each test.
4. Within each minor tab, include the following:

    a. Test specification.
    b. Pre-startup reports.
    c. Approved test procedures.
    d. Test data forms, completed and signed.
    e. Commissioning issue reports, showing resolution of issues, and documentation related to resolution of issues pertaining to a single test. Group data forms, commissioning issue reports showing resolution of issues, and documentation related to resolution of issues for each test repetition together within the minor tab, in reverse chronological order (most recent on top).

B. General Format and Organization

1. Construction Checklists shall be submitted in portable document format (PDF); with outline-organized bookmarks for major and minor tabs and tab contents itemized for specific reports.
2. PDF Files shall be organized using a logical filing structure based on the following categories.

    a. Division
    b. Location
    c. Project Phasing
    d. Application
    e. Chronology

C. Tracking

1. Maintain a log that tracks each Construction Checklist by:

    a. Division.
    b. Section.
    c. Location.
    d. Application.
    e. Date completed.
    f. Date submitted.

2. Issue timely transmittals that notify the Commissioning Authority of updates to the Construction Checklists.

PART 3 - EXECUTION

3.1 COMMISSIONING PLAN

A. A Preliminary Commissioning Plan shall be developed by the Commissioning Authority.

3.2 EQUIPMENT

A. Division 22

1. Domestic Water Heaters
2. Domestic Water Heater Pumps
3. Expansion/Storage Tanks

B. Division 23

1. Roof Top Units (RTU)
2. Aquatic Air Handling Units (PAHU)
3. Variable Air Volume Units (VAV)
4. Supply Air Valves
5. Return Air Valves
6. Exhaust Air Valves
7. Exhaust Fans
8. Hot Water Boilers
9. Pool Boilers
10. Heating Water Pumps
11. Hydronic Cabinet Unit Heaters
12. Air Seperator
13. Building Automation System (BAS)

C. Division 26

1. Lighting controls
2. Variable frequency drives (VFDs)

3.3 PREPARATION

A. Review preliminary construction checklists and preliminary test procedures and data forms.

3.4 CONSTRUCTION CHECKLISTS

A. Construction checklists cannot modify or conflict with the Contract Documents.

B. Create construction checklists based on actual systems and equipment to be included in Project.

C. Material Checks: Compare specified characteristics and approved submittals with materials as received. Include factory tests and other evaluations, adjustments, and tests performed prior to shipment if applicable.

1. Service connection requirements, including configuration, size, location, and other pertinent characteristics.
2. Included optional features.
3. Delivery Receipt Check: Inspect and record physical condition of materials and equipment on delivery to Project site, including agreement with approved submittals, cleanliness, and lack of damage.
4. Installation Checks:

    a. Location according to Drawings and approved Shop Drawings.
    b. Configuration.
    c. Compliance with manufacturers' written installation instructions.
    d. Attachment to structure.
    e. Access clearance to allow for maintenance, service, repair, removal, and replacement without the need to disassemble or remove other equipment or building elements. Access coordinated with other building elements and equipment, including, but not limited to, ceiling and wall access panels, in a manner consistent with OSHA fall-protection regulations and safe work practices.
    f. Utility connections are of the correct characteristics, as applicable.
    g. Correct labeling and identification.
    h. Startup Checks: Verify readiness of equipment to be energized. Include manufacturer's standard startup procedures and forms.

D. Startup: Perform and document initial operation of equipment to prove that it is installed properly and operates as intended according to manufacturer's standard startup procedures, at minimum.

E. Performance Tests:

1. Static Tests: As specified elsewhere, including, but not limited to, duct and pipe leakage tests, insulation-resistance tests, and water-penetration tests.
2. Component Performance Tests: Tests evaluate the performance of an input or output of components under a full range of operating conditions.
3. Equipment and Assembly Performance Tests: Test and evaluate performance of equipment and assemblies under a full range of operating conditions and loads.
4. System Performance Tests: Test and evaluate performance of systems under a full range of operating conditions and loads.
5. Intersystem Performance Tests: Test and evaluate the interface of different systems under a full range of operating conditions and loads.

F. Deferred Construction Checklists: Obtain Owner approval of proposed deferral of construction checklists, including proposed schedule of completion of each deferred construction checklist, before submitting request for Certificate of Construction-Phase Commissioning Process Completion. When approved, deferred construction checklists may be completed after date of

Construction-Phase Commissioning Completion. Include the following in a request for Certificate of Construction-Phase Commissioning Process Completion:

1. Identify deferred construction checklists by number and title.
2. Provide a target schedule for completion of deferred construction checklists.
3. Written approval of proposed deferred construction checklists, including approved schedule of completion of each deferred construction checklist.

G. Delayed Construction Checklists: Obtain Owner approval of proposed delayed construction checklists, including proposed schedule of completion of each delayed construction checklist, before submitting request for Certificate of Construction-Phase Commissioning Process Completion. When approved, delayed construction checklists may be completed after date of Construction-Phase Commissioning Completion. Include the following in a request for Certificate of Construction-Phase Commissioning Process Completion:

1. Identify delayed construction checklist by construction checklist number and title.
2. Provide a target schedule for completion of delayed construction checklists.
3. Written approval of proposed delayed construction checklists, including approved schedule of completion of each delayed construction checklist.

3.5 GENERAL EXECUTION REQUIREMENTS

A. Schedule and coordinate commissioning process with the Construction Schedule.

B. Perform activities identified in construction checklists, including tests, and document results of actions as construction proceeds.

C. Report test data and commissioning issue resolutions.

D. Schedule personnel to participate in and perform Commissioning-Process Work.

E. Installing contractors' commissioning responsibilities include, but are not limited to, the following:

1. Operating the equipment and systems they install during tests.
2. In addition, installing contractors may be required to assist in tests of equipment and systems with which their work interfaces.

3.6 COMMISSIONING COORDINATOR RESPONSIBILITIES

A. Management and Coordination: Manage, schedule, and coordinate commissioning process, including, but not limited to, the following:

1. Coordinate with subcontractors on their commissioning responsibilities and activities.
2. Obtain, assemble, and submit commissioning documentation.
3. Conduct periodic on-site start-up and commissioning meetings.

4. Develop and maintain the commissioning schedule. Integrate commissioning schedule into the Construction Schedule. Update Construction Schedule at specified intervals.
5. Review and comment on preliminary test procedures and data forms.
6. Report inconsistencies and issues in system operations.
7. Verify that tests have been completed and results comply with acceptance criteria, and that equipment and systems are ready before scheduling test demonstrations.
8. Direct and coordinate test demonstrations.
9. Coordinate witnessing of test demonstrations by Owner's witness.
10. Coordinate and manage training. Be present during training sessions to direct video recording, present training, and direct the training presentations of others. Comply with requirements in Section "Demonstration and Training."
11. Prepare and submit specified commissioning reports.
12. Track commissioning issues until resolution and retesting is successfully completed.
13. Retain original records of Commissioning-Process Work, organized as required for the commissioning report. Provide Owner's representative access to these records on request.

3.7 COMMISSIONING TESTING

A. Quality Control: Construction checklists, including tests, are quality-control tools designed to improve the functional quality of Project. Test demonstrations evaluate the effectiveness of Contractor's quality-assurance process.

B. Owner's witness will be present to witness commissioning work requiring the signature of an owner's witness, including, but not limited to, test demonstrations. Owner's project manager will coordinate attendance by Owner's witness with Contractor's published Commissioning Schedule. Owner's witness will provide no labor or materials in the commissioning work. The only function of Owner's witness will be to observe and comment on the progress and results of commissioning process.

C. Construction Checklists:

1. Complete construction checklists as Work is completed.
2. Distribute construction checklists to installing contractors before they start work.
3. Installers:

    a. Verify installation using approved construction checklists as Work proceeds.
    b. Complete and sign construction checklists weekly for work performed during the preceding week.

4. Provide Commissioning Authority access to construction checklists.

D. Installation Compliance Issues: Record as an installation compliance issue Work found to be incomplete, inaccessible, at variance with the Contract Documents, nonfunctional, or that does not comply with construction checklists. Record installation compliance issues on the construction checklist at the time they are identified. Record corrective action and how future Work should be modified before signing off the construction checklist.

E. Pre-Startup Audit: Prior to executing startup procedures, review completed installation checks to determine readiness for startup and operation. Report conditions, which, if left uncorrected, adversely impact the ability of systems or equipment to operate satisfactorily or to comply with acceptance criteria. Prepare pre-startup report for each system.

F. Test Procedures and Test Data Forms:

1. Test procedures shall define the step-by-step procedures to be used to execute tests and test demonstrations.
2. Test procedures shall be specific to the make, model, and application of the equipment and systems being tested.
3. Completed test data forms are the official records of the test results.
4. Commissioning Authority will provide to Contractor preliminary test procedures and test data forms for performance tests and commissioning tests after approval of Product Data, Shop Drawings, and preliminary operation and maintenance manual.
5. Instead of the Commissioning Authority providing test procedures and test data forms, Commissioning Authority may elect to use original equipment manufacturers' installation and startup requirements, or tests that are a part of the installing contractor's internal quality assurance process.
6. Review preliminary test procedures and test data forms, and provide comments within 14 days of receipt from Commissioning Authority. Review shall address the following:

    a. Equipment protection and warranty issues, including, but not limited to, manufacturers' installation and startup recommendations, and operation and maintenance instructions.
    b. Applicability of the procedure to the specific software, equipment, and systems approved for installation.

G. Performance of Tests:

1. The sampling rate for tests is 100 percent. The sampling rate for test demonstrations is 100 percent unless otherwise indicated. (Reference commissioning plan for sampling rates).
2. Perform and complete each step of the approved test procedures in the order listed.
3. Record data observed during performance of tests on approved data forms at the time of test performance and when the results are observed.
4. Record test results that are not within the range of acceptable results on commissioning issue report forms in addition to recording the results on approved test procedures and data forms according to the "Commissioning Compliance Issues" Paragraph in this Article.
5. On completion of a test, sign the completed test procedure and data form. Tests for which test procedures and data forms are incomplete, not signed, or which indicate performance that does not comply with acceptance criteria will be rejected. Tests for which test procedures and data forms are rejected shall be repeated and results resubmitted.

H. Performance of Test Demonstration:

1. Perform test demonstrations on the first test for any equipment type or class, and on a sample of subsequent tests. The sampling rate for test demonstrations shall be 100 percent unless otherwise indicated in the individual test specification.
2. Notify Owner's witness at least one week in advance of each test demonstration.
3. Perform and complete each step of the approved test procedures in the order listed.
4. Record data observed during performance of test demonstrations on approved data forms at the time of demonstration and when the results are observed.
5. Provide full access to Owner's witness to directly observe the performance of all aspects of system response during the test demonstration. On completion of a test demonstration, sign the completed data form and obtain signature of Owner's witness at the time of the test to authenticate the reported results.
6. Test demonstration data forms not signed by Contractor and Owner's witness at the time of the completion of the procedure will be rejected. Test demonstrations for which data forms are rejected shall be repeated and results shall be resubmitted.

    a. Exception for Failure of Owner's Witness to Attend: Failure of Owner's witness to be present for agreed-on schedule of test demonstration shall not delay Contractor. If Owner's witness fails to attend a scheduled test, Contractor shall proceed with the scheduled test. On completion, Contractor shall sign the data form for Contractor and for Owner's witness, and shall note the absence of Owner's witness at the scheduled time and place.

7. False load test requirements are specified in related sections.

    a. Where false load testing is specified, provide temporary equipment, power, controls, wiring, piping, valves, and other necessary equipment and connections required to apply the specified load to the system. False load system shall be capable of steady-state operation and modulation at the level of load specified. Equipment and systems permanently installed in this work shall not be used to create the false load without Architect's written approval.

I. Deferred Tests:

1. Deferred Test List: Identify proposed deferred tests and provide a target schedule for completion of deferred tests. When approved, deferred tests may be completed after the date of Construction-Phase Commissioning Completion.
2. Schedule and coordinate deferred tests. Schedule deferred tests when specified conditions are available. Notify Architect and Commissioning Authority at least one week (minimum) in advance of tests.
3. Where deferred tests are specified, coordinate participation of necessary personnel and of Architect, Commissioning Authority, and Owner's witness. Schedule deferred tests to minimize occupant and facility impact. Obtain Architect's approval of the proposed schedule.

J. Commissioning Compliance Issues:

1. Test results that are not within the range of acceptable results are commissioning compliance issues.

2. Track and report commissioning compliance issues until resolution and retesting are successfully completed.
3. If a test demonstration fails, determine the cause of failure. Direct timely resolution of issue and then repeat the demonstration. If a test demonstration must be repeated due to failure caused by Contractor work or materials, reimburse Owner for billed costs for the participation in the repeated demonstration.
4. Test Results: If a test demonstration fails to meet the acceptance criteria, perform the following:

    a. Complete a commissioning compliance issue report form promptly on discovery of test results that do not comply with acceptance criteria.
    b. Submit commissioning compliance issue report form within two days of the test failure.
    c. Determine the cause of the failure.
    d. Establish responsibility for corrective action if the failure is due to conditions found to be Contractor's responsibility.

5. Commissioning Compliance Issue Report: Provide a commissioning compliance issue report for each issue. Do not report multiple issues on the same commissioning compliance issue report.

    a. Exception: If an entire class of devices is determined to exhibit the identical issue, they may be reported on a single commissioning compliance issue report. (For example, if all return-air damper actuators that are specified to fail to the open position are found to fail to the closed position, they may be reported on a single commissioning issue report. If a single commissioning issue report is used for multiple commissioning compliance issues, each device shall be identified in the report, and the total number of devices at issue shall be identified.

6. Diagnose and correct failed test demonstrations as follows:

    a. Perform diagnostic tests and activities required to determine the fundamental cause of issues observed.
    b. Record each step of the diagnostic procedure prior to performing the procedure. Update written procedure as changes become necessary.
    c. Record the results of each step of the diagnostic procedure.
    d. Record the conclusion of the diagnostic procedure on the fundamental cause of the issue.
    e. Determine and record corrective measures.
    f. Include diagnosis of fundamental cause of issues in commissioning compliance issue report.

7. Retest:

    a. Schedule and repeat the complete test procedure for each test demonstration for which acceptable results are not achieved. Obtain signature of Owner's witness on retest data forms. Repeat test demonstration until acceptable results are achieved. Except for issues that are determined to result from design errors or omissions, or

other conditions beyond Contractor's responsibility, compensate Owner for direct costs incurred as the result of repeated test demonstrations to achieve acceptable results.

b. For each repeated test demonstration, submit a new test data form, marked "Retest."

8. Do not correct commissioning compliance issues during test demonstrations.

a. Exceptions will be allowed if the cause of the issue is obvious and resolution can be completed without noticeable delays to the test process. If corrections are made under this exception, note the deficient conditions on the test data form.

3.8 COMMISSIONING MEETINGS

A. Schedule and conduct commissioning meetings. Comply with requirements in Section "Project Management and Coordination."

3.9 SEQUENCING

A. Sequencing of Commissioning Verification Activities: For a particular material, item of equipment, assembly, or system, perform the following in the order listed unless otherwise indicated:

1. Construction Checklists:

a. Material checks.
b. Installation checks.
c. Startup, as appropriate. Some startup may depend on component performance. Such startup may follow component performance tests on which the startup depends.
d. Performance Tests:

1) Static tests, as appropriate.
2) Component performance tests. Some component performance tests may depend on completion of startup. Such component performance tests may follow startup.
3) Equipment and assembly performance tests.
4) System performance tests.
5) Intersystem performance tests.

2. Commissioning tests.

B. Before performing commissioning tests, verify that materials, equipment, assemblies, and systems are delivered, installed, started, and adjusted to perform according to construction checklists.

C. Verify readiness of materials, equipment, assemblies, and systems by performing tests prior to performing test demonstrations. Notify Architect if acceptable results cannot be achieved due to conditions beyond Contractor's control or responsibility.

D. Commence tests as soon as installation checks for materials, equipment, assemblies, or systems are satisfactorily completed. Tests of a particular system may proceed prior to completion of other systems, provided the incomplete work does not interfere with successful execution of test.

3.10 SCHEDULING

A. Commence commissioning process as early in the construction period as possible.

B. Commissioning Schedule: Integrate commissioning activities into Construction Schedule. See Section "Construction Progress Documentation."

1. Include detailed commissioning activities in monthly updated Construction Schedule and short-interval schedule submittals.
2. Schedule the start date and duration for the following commissioning activities:

    a. Submittals.
    b. Preliminary operation and maintenance manual submittals.
    c. Installation checks.
    d. Startup, where required.
    e. Third party tests.
    f. Performance tests.
    g. Performance test demonstrations.
    h. Commissioning tests.
    i. Commissioning test demonstrations.

3. Schedule shall include a line item for each installation check, startup, and test activity specific to the equipment or systems involved.
4. Determine milestones and prerequisites for commissioning process. Show commissioning milestones, prerequisites, and dependencies in monthly updated critical-path-method construction schedule and short-interval schedule submittals.

C. Two-Week Look-Ahead Commissioning Schedule:

1. Two weeks prior to the beginning of tests, submit a detailed two-week look-ahead schedule. Thereafter, submit updated two-week look-ahead schedules weekly for the duration of commissioning process.
2. Two-week look-ahead schedules shall identify the date, time, beginning location, Contractor personnel required, and anticipated duration for each startup or test activity.
3. Use two-week look-ahead schedules to notify and coordinate participation of Owner's witnesses.

D. Owner's Witness Coordination:

1. Coordinate Owner's witness participation via Architect.
2. Notify Architect of commissioning schedule changes at least two work days in advance for activities requiring the participation of Owner's witness.

3.11 COMMISSIONING REPORTS

A. Test Reports:

1. Pre-startup reports include observations of the conditions of installation, organized into the following sections:

    a. Equipment Model Verification: Compare contract requirements, approved submittals, and provided equipment. Note inconsistencies.
    b. Preinstallation Physical Condition Checks: Observe physical condition of equipment prior to installation. Note conditions including, but not limited to, physical damage, corrosion, water damage, or other contamination or dirt.
    c. Preinstallation Component Verification Checks: Verify components supplied with the equipment, preinstalled or field installed, are correctly installed and functional. Verify external components required for proper operation of equipment correctly installed and functional. Note missing, improperly configured, improperly installed, or nonfunctional components.
    d. Summary of Installation Compliance Issues and Corrective Actions: Identify installation compliance issues and the corrective actions for each. Verify that issues noted have been corrected.
    e. Evaluation of System Readiness for Startup: For each item of equipment for each system for which startup is anticipated, document in summary form acceptable to Owner completion of equipment model verification, preinstallation physical condition checks, preinstallation component verification checks, and completion of corrective actions for installation compliance issues.

2. Test data reports include the following:

    a. "As-tested" system configuration. Complete record of conditions under which the test was performed, including, but not limited to, the status of equipment, systems, and assemblies; temporary adjustments and settings; and ambient conditions.
    b. Data and observations, including, but not limited to, data trend logs, recorded during the tests.
    c. Signatures of individuals performing and witnessing tests.
    d. Data trend logs accumulated overnight from the previous day of testing.

3. Commissioning Compliance Issue Reports: Report as commissioning compliance issues results of tests and test demonstrations that do not comply with acceptance criteria. Report only one issue per commissioning compliance issue report. Use sequentially numbered facsimiles of commissioning compliance issue report form included in this Section, or other form approved by Owner. Distribute commissioning compliance issue reports to parties responsible for taking corrective action. Identify the following:

a. Commissioning compliance issue report number. Assign unique, sequential numbers to individual commissioning compliance issue reports when they are created, to be used for tracking.
b. Action distribution list.
c. Report date.
d. Test number and description.
e. Equipment identification and location.
f. Briefly describe observations about the performance associated with failure to achieve acceptable results. Identify the cause of failure if apparent.
g. Diagnostic procedure or plan to determine the cause (include in initial submittal)
h. Diagnosis of fundamental cause of issues as specified below (include in resubmittal).
i. Fundamental cause of unacceptable performance as determined by diagnostic tests and activities.
j. When issues have been resolved, update and resubmit the commissioning issue report forms by completing Part 2. Identify resolution taken and the dates and initials of the persons making the entries.
k. Schedule for retesting.

4. Weekly progress reports include information for tests conducted since the preceding report and the following:

   a. Completed data forms.
   b. Equipment or system tested, including test number, system or equipment tag number and location, and notation about the apparent acceptability of results.
   c. Activities scheduled but not conducted per schedule.
   d. Commissioning compliance issue report log.
   e. Schedule changes for remaining Commissioning-Process Work, if any.

5. Data trend logs shall be initiated and running prior to the time scheduled for the test demonstration.

   a. Trend log data format shall be multiple data series graphs. Where multiple data series are trend logged concurrently, present the data on a common horizontal time axis. Individual data series may be presented on a segmented vertical axis to avoid interference of one data series with another, and to accommodate different axis scale values. Graphs shall be sufficiently clear to interpret data within the accuracy required by the acceptance criteria.
   b. Attach to the data form printed trend log data collected during the test or test demonstration.
   c. Record, print out, and attach to the data form operator activity during the time the trend log is running. During the time the trend log is running, operator intervention not directed by the test procedure invalidates the test results.

6. System Alarm Logs: Record and print out a log of alarms that occurred since the last log was printed. Evaluate alarms to determine if the previous day's work resulted in any conditions that are not considered "normal operation."

a. Conditions that are not considered "normal operation" shall be reported on a commissioning issue report attached to the alarm log. Resolve as necessary. The intent of this requirement is to discover control system points or sequences left in manual or disabled conditions, equipment left disconnected, set points left with abnormal values, or similar conditions that may have resulted from failure to fully restore systems to normal, automatic control after test completion.

B. Test Reports Format:

1. Hard copy test reports shall comply with requirements in Section “Submittal procedures”.
2. Electronic test reports shall comply with requirements in Section “Submittal procedures”.

C. Digital Test Reports

1. Digital Test Reports are completed on-site using test report software operating on a mobile platform (eg: cell-phones, tablets, laptops).
2. Digital Test Reports may be used to replace hand-written field data, subject to approval by Commissioning Authority and Owner.

D. Commissioning Final Report:

1. The CxA shall provide a final report following the completion of Testing, excluding seasonal and deferred Tests. Seasonal and deferred test results shall be attached to or inserted in the final report in a clear and readily identified manner. The report is to outline compliance and non-compliance with the construction documents, as well as identify concerns relative to future performance

3.12 COMMISSIONING PROCESS COMPLETION

A. When Contractor considers that construction-phase commissioning process, or a portion thereof which Owner agrees to accept separately, is complete, Contractor shall prepare and submit to Owner and Commissioning Authority through Architect a comprehensive list of items to be completed or corrected. Failure to include an item on such list does not alter Contractor's responsibility to complete commissioning process.

B. On receipt of Contractor's list, Commissioning Authority will make an inspection to determine whether the construction-phase commissioning process or designated portion thereof is complete. If Commissioning Authority's inspection discloses items, whether included on Contractor's list, which is not sufficiently complete as defined in "Construction-Phase Commissioning Process Completion" Paragraph in the "Definitions" Article, Contractor shall complete or correct such items on notification by Commissioning Authority. In such case, Contractor shall then submit a request for another inspection by Commissioning Authority to determine construction-phase commissioning process completion.

C. Contractor shall promptly correct deficient conditions and issues discovered during commissioning process. Costs of correcting such deficient conditions and issues, including additional testing and inspections, the cost of uncovering and replacement, and compensation

for Architect's and Commissioning Authority's services and expenses made necessary thereby, shall be at Contractor's expense.

END OF SECTION 019113

SECTION 042200 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Interior and Exterior concrete masonry units
2. (Removed)
3. Mortar and grout.
4. Steel reinforcing bars.
5. Masonry joint reinforcement.
6. Ties and anchors.
7. Miscellaneous masonry accessories.

1.2 RELATED SECTION

A. Thermal Insulation

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: General Contractor will engage a qualified independent testing agency to perform preconstruction testing indicated below. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
1. Concrete Masonry Unit Test: For each type of unit required, according to ASTM C 140 for compressive strength.
2. Mortar Test (Property Specification): For each mix required, according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
3. Mortar Test (Property Specification): For each mix required, according to ASTM C 780 for compressive strength.
4. Grout Test (Compressive Strength): For each mix required, according to ASTM C 1019.
5. Prism Test: For each type of construction required, according to ASTM C 1314.

1.4 SUBMITTALS

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

B. Shop Drawings:
1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. (Removed)

D. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
1. Submittal is for information only. Neither receipt of list nor approval of mockup constitutes approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.

E. Material Certificates: For each type and size of the following:
   1. Masonry units.
      a. Include data on material properties.
      b. For masonry units used in structural masonry, include data and calculations establishing average net-area compressive strength of units.
   2. Cementitious materials. Include brand, type, and name of manufacturer.
   3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
      a. Grout mixes. Include description of type and proportions of ingredients.
      b. Reinforcing bars.
      c. Joint reinforcement.
      d. Anchors, ties, and metal accessories.

F. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
   1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
   2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

G. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

H. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

A. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602, Quality Assurance to be equal to Level B.

B. Sample Panels: Build sample “mock up” panel on site with selected masonry materials.
   1. Build sample panels approximately 48” high by 48” wide of CMU block. Mock up to include typical installation of thru-wall flashing, ties, horizontal reinforcing, mortar net, weeps, expansion joint and caulking method.

C. Sample panel construction will be reviewed and approved by owner and architect for quality to be maintained during the construction of the buildings. Mock up to remain on site until wall construction is completed.

1.6 PROJECT CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

C. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
   1. Extend cover a minimum of 24 inches down both sides of walls and hold cover securely in place.
   2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

D. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.

E. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
   1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
   2. Protect sills, ledges, and projections from mortar droppings.
   3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
   4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

F. Cold Weather Protection:
   1. Do not lay masonry when the temperature of outside air is below 40 deg. F, unless means are provided to heat and maintain the temperature of the masonry materials and protect the completed work from freezing, and as may be permitted with the use of non-chloride accelerator. Protection shall consist of heating and maintaining the temperature of the masonry materials to at least 40 deg F, and maintaining an air temperature above 40 deg. F on both sides of the masonry for at least 48 hours as follows:
      a. Cold-Weather Construction: Heat mixing water and sand to produce mortar and grout temperatures between 40 and 120 deg F (4 and 49 deg C). Maintain mortar and grout above freezing. Heat masonry units to 40 deg F (4 deg C) if grouting.
      b. Cold-Weather Protection: Cover masonry with insulating blankets or provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) for 48 hours after construction. Install wind breaks when wind velocity exceeds 15 mi./h (25 km/h).
   2. Do not lay masonry units which are wet or frozen. Do not build on frozen subgrade or setting beds.
   3. Remove any ice or snow formed on masonry bed by carefully applying heat until top surface is dry to the touch.
   4. Remove and replace masonry damaged by freezing conditions.
   5. Do not use additives or accelerators with calcium chloride. Other accelerators may be used but only with approval of Architect.

G. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

H. Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 100 deg F and above

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.

B. Standard Concrete Masonry Units:

1. Unit size: Thickness as shown on plans with nominal face dimensions of 8 x 16" ASTM C 90
2. Compressive Strength: Provide units with minimum average net-area compressive strength of 2800 minimum psi
3. Density Classification:
   a. Lightweight units less than 105 lbs/cubic foot. Acceptable for all walls not directly exposed to exterior.
   b. Normal weight units greater than 125 lbs/cubic foot. Acceptable for all walls exposed to exterior or for use below grade.
4. Color: Standard gray
5. All block used for exterior and wash bay applications shall contain water repellant admix to improve unit/wall performance.
6. Water Repellant Sealer: See specification 099123 Painting & Coating.

C. (Removed)

D. Approved Manufacturers
1. Acme Brick Company
2. Building Products
3. LeMay Block
4. Midwest Products Group
5. Joplin Building Material Company

2.3 MASONRY LINTELS

A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs with reinforcing bars placed as indicated and filled with coarse grout.

2.4 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I. Provide natural color or white cement as required to produce mortar color to match surrounding units.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Masonry Cement: ASTM C 91.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Capital Materials Corporation; Flamingo Color Masonry Cement.
      b. Cemex S.A.B. de C.V.; Brikset Type N, Citadel Type S, Dixie Type S, Kosmortar Type N.
      c. Holcim (US) Inc.; Mortamix Masonry Cement, Rainbow Mortamix Custom Buff Masonry Cement, White Mortamix Masonry Cement.
      d. Lafarge North America Inc.; Magnolia Masonry Cement, Lafarge Masonry Cement, Trinity White Masonry Cement.
      e. Lehigh Cement Company; Lehigh Masonry Cement, Lehigh White Masonry Cement.
      f. National Cement Company, Inc.; Coosa Masonry Cement.

E. Mortar Cement: ASTM C 1329.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Lafarge North America Inc.; Lafarge Mortar Cement or Magnolia Superbond Mortar Cement.
         1) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.
         2) Color to be standard gray mortar.

F. Aggregate for Mortar: ASTM C 144.
   1. For joints less than 1/4 inch thick, use aggregate graded with 100 percent passing the No. 16 sieve.
   2. White-Mortar Aggregates: Natural white sand or crushed white stone.

G. Aggregate for Grout: ASTM C 404.

H. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Euclid Chemical Company (The); Accelguard 80.
      b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.
      c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.

I. Water-Repellent Admixture (exterior and wash bay walls only): Liquid water-repellent mortar admixture intended for use with concrete masonry units, containing integral water repellent. See specification 099123 Painting & Coating for water repellant coating requirements.

2.5 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 420 (Grade 60).

B. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.
   1. Interior Walls: Hot-dip galvanized, carbon steel.
   2. Exterior Walls: Hot-dip galvanized, carbon steel.

3. Wire Size for Side Rods: 0.148-inch diameter.
4. Wire Size for Cross Rods: 0.148-inch diameter.
5. Wire Size for Veneer Ties: 0.148-inch.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches o.c.
7. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

C. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

2.6 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.
1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
2. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
3. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- (6.35-mm-) diameter, hot-dip galvanized steel wire.
2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.

C. Adjustable Anchors for Connecting to Concrete: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.
1. Connector Section: Dovetail tabs for inserting into dovetail slots in concrete and attached to tie section; formed from 0.060-inch- (1.52-mm-) thick, steel sheet, galvanized after fabrication.
2. Tie Section: Triangular-shaped wire tie, sized to extend within 1 inch (25 mm) of masonry face, made from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire.
3. Corrugated Metal Ties: Metal strips not less than 7/8 inch (22 mm) wide with corrugations having a wavelength of 0.3 to 0.5 inch (7.6 to 12.7 mm) and an amplitude of 0.06 to 0.10 inch (1.5 to 2.5 mm) made from 0.060-inch- (1.52-mm-) thick, steel sheet, galvanized after fabrication with dovetail tabs for inserting into dovetail slots in concrete and sized to extend to within 1 inch (25 mm) of masonry face.

D. Partition Top anchors: 0.105-inch- (2.66-mm-) thick metal plate with 3/8-inch- (9.5-mm-) diameter metal rod 6 inches (152 mm) long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

E. Rigid Anchors: Fabricate from steel bars 1-1/2 inches (38 mm) wide by 1/4 inch (6.35 mm) thick by 24 inches (610 mm) long, with ends turned up 2 inches (51 mm) or with cross pins unless otherwise indicated.
1. Corrosion Protection: Hot-dip galvanized to comply with ASTM A 153/A 153M.

F. Anchor Bolts: Headed or L-shaped steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers; hot-dip galvanized to comply with ASTM A 153/A 153M, Class C; of dimensions indicated.

2.7 (Removed)

A. (Removed)

B. (Removed)

2.8 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.

B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
      b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
      c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
      d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

2.9 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, accelerators, retarders, water-repellent agents or other admixtures unless otherwise indicated.
   1. Do not use calcium chloride in mortar or grout.
   2. Use portland cement-lime, masonry cement, or mortar cement mortar unless otherwise indicated.
   3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by strength to ensure accurate properties, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
   1. For masonry below grade or in contact with earth, use Type M or Type S. Minimum Mortar strength: Type M 2500 psi, Type S 1800 psi.
   2. For mortar parge coats, use Type M or Type S.
   3. For exterior, above-grade, load-bearing walls and parapet walls, use Type S.
   4. For interior non-load-bearing partitions and exterior 4” veneers, use Type N.

D. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.
2. Proportion grout in accordance with ASTM C 476, paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 3000 psi (20.6 MPa)].
3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143/C 143M.

PART 3 - EXECUTION

3.1 TOLERANCES

A. Dimensions and Locations of Elements:
1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch or minus 1/4 inch .
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch .
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch in a story height or 1/2 inch total.

B. Lines and Levels:
1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet , or 1/2 inch maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet , 1/4 inch in 20 feet , or 1/2 inch maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet , 3/8 inch in 20 feet , or 1/2 inch maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet , 1/4 inch in 20 feet , or 1/2 inch maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet, 3/8 inch in 20 feet, or 1/2 inch maximum.

C. Joints:
1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch , with a maximum thickness limited to 1/2 inch.
2. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch or minus 1/4 inch.
3. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch.

3.2 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

C. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in stack bond; do not use units with less than nominal 4-inch horizontal face dimensions at corners or jambs.

D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

G. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

3.3 MORTAR BEDDING AND JOINTING

A. Lay hollow CMUs as follows:
   1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
   2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
   3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
   4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.

3.4 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
   1. Space reinforcement not more than 16 inches o.c.
   2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
   3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.5 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:
   1. Provide an open space not less than 1/2 inch wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.

3.6 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
   1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
   2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.

B. Placing Reinforcement: Comply with requirements in ACI 530.1/ASCE 6/TMS 602.

C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
   1. Comply with requirements in ACI 530.1/ASCE 6/TMS 602 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
   2. Limit height of vertical grout pours to not more than 4 feet for un-inspected walls. Grout pours over 4 feet must be inspected and comply with requirements of ACI 530.1/ASCE 6 TMS 602.

3.7 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to meet specified requirements shall be done at Contractor's expense. Provide written report to Architect and Engineer.

B. Inspections: Provide Level 1 special inspections according to the International Building Code and Level B Quality Assurance per TMS 402-11/ACI 530-11/ASCE 5-11.
   1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
   2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
   3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Testing Prior to Construction: One set of tests.

D. Testing Frequency: One set of tests for each 2,000 sq. ft. of wall area or portion thereof.

E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.

F. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.

G. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.8 PARGING

A. Parge exterior faces of below-grade masonry walls, where indicated, in 2 uniform coats to a total thickness of 3/4 inch .

B. Use a steel-trowel finish to produce a smooth, flat, dense surface. Form a wash at top of parging and a cove at bottom.

C. Damp-cure parging for at least 24 hours and protect parging until cured.

3.9 REPAIRING, POINTING, AND CLEANING

A. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

B. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows.
   1. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.
      a. Acceptable product:
         1) Eaco Chem: NMD 80
         2) Prosoco: Safety Clean
      b. Muratic acid may not be used to clean masonry.
   2. Seal architectural masonry per painting specifications. Architect must approved final cleaning of architectural block prior to sealing.

3.10 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
   3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
   4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.

3.11 MASONRY WASTE DISPOSAL

A. All masonry waste shall be removed from site.

END OF SECTION 042200

SECTION 064116 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Plastic-laminate-clad architectural cabinets.
2. Cabinet hardware and accessories.
3. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings:

1. Include plans, elevations, sections, and attachment details.
2. Apply AWI Quality Certification Program label to Shop Drawings.

C. Samples: For each exposed product and for each color and texture specified.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Research reports.

C. Field quality control reports.

1.5 CLOSEOUT SUBMITTALS

A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

1.6 QUALITY ASSURANCE

A. Manufacturer's Qualifications: Employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

1. Manufacturer's Certification: Manufacturer shall meet and fabricate to AWI Quality Standards without having to provide labels or certificates.

B. Installer Qualifications: Installer shall meet and install to AWI Quality Standards without having to provide labels or certificates.

1.7 FIELD CONDITIONS

A. Environmental Limitations without Humidity Control: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature and relative humidity at levels planned for building occupants during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.

B. Architectural Woodwork Standards Grade: Premium.

C. Type of Construction: Frameless.

D. Door and Drawer-Front Style: Flush overlay.

E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.

1. Basis-of-Design Product: Subject to compliance with requirements, provide specified Wilsonart LLC laminate; or comparable product by one of the following:
   a. Formica Corporation.
   b. Nevamar/Panolam Surface Systems.

F. Laminate Cladding for Exposed Surfaces:

1. Horizontal Surfaces: Grade HGS.
2. Postformed Surfaces: Grade HGP.
3. Vertical Surfaces: Grade VGS.

4. Edges: Grade VGS.
5. Pattern Direction: As indicated.

G. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

H. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

I. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As selected by Architect from laminate manufacturer's full range in the following categories:
   a. Solid colors, matte finish.
   b. Solid colors with core same color as surface, matte finish.
   c. Wood grains, matte finish.
   d. Patterns, matte finish.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 4 to 9 percent.

B. Composite Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.

1. Medium-Density Fiberboard (MDF): ANSI A208.2, Grade M-2 Exterior Glue.

2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets.

B. Butt Hinges: 2-3/4-inch, five-knuckle steel hinges made from 0.095-inch- thick metal, and as follows:

1. Semiconcealed Hinges for Flush Doors: ANSI/BHMA A156.9, B01361.
2. Semiconcealed Hinges for Overlay Doors: ANSI/BHMA A156.9, B01521.

C. Frameless Concealed Hinges (European Type): ANSI/BHMA A156.9, B01602, 170 degrees of opening, self-closing.

D. Back-Mounted Pulls: ANSI/BHMA A156.9, B02011.

E. Wire Pulls: Back mounted, solid metal, 4 inches long, 5/16 inch in diameter.

F. Catches: Push-in magnetic catches, ANSI/BHMA A156.9, B03131 Ball friction catches, ANSI/BHMA A156.9, B03013.

G. Adjustable Shelf Standards and Supports: ANSI/BHMA A156.9, B04071; with shelf rests, B04081.

H. Shelf Rests: ANSI/BHMA A156.9, B04013; plastic.

I. Drawer Slides: ANSI/BHMA A156.9.

1. Heavy-Duty (Grade 1HD-100 and Grade 1HD-200): Side mount.
   a. Type: Full extension.
   b. Material: Zinc-plated ball bearing slides.

J. Slides for Sliding Glass Doors: ANSI/BHMA A156.9, B07063; aluminum.

K. Door Locks: ANSI/BHMA A156.11, E07121.

L. Drawer Locks: ANSI/BHMA A156.11, E07041.

M. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.

N. Float Glass for Cabinet Doors: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.

1. Thickness: 6.0 mm.

O. Grommets for Cable Passage: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Color: To be selected my architect.

P. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.

1. Dark, Oxidized, Satin Bronze, Oil Rubbed: ANSI/BHMA 613 for bronze base; ANSI/BHMA 640 for steel base; match Architect's sample.
2. Bright Brass, Clear Coated: ANSI/BHMA 605 for brass base; ANSI/BHMA 632 for steel base.
3. Bright Brass, Vacuum Coated: ANSI/BHMA 723 for brass base; ANSI/BHMA 729 for zinc-coated-steel base.
4. Satin Brass, Blackened, Bright Relieved, Clear Coated: ANSI/BHMA 610 for brass base; ANSI/BHMA 636 for steel base.

5. Satin Chromium Plated: ANSI/BHMA 626 for brass or bronze base; ANSI/BHMA 652 for steel base.
6. Bright Chromium Plated: ANSI/BHMA 625 for brass or bronze base; ANSI/BHMA 651 for steel base.
7. Satin Stainless Steel: ANSI/BHMA 630.

Q. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln-dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement Resorcinol.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.5 FABRICATION

A. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

B. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

C. Install glass to comply with applicable requirements in Section 088000 "Glazing" and in GANA's "Glazing Manual."

1. For glass in frames, secure glass with removable stops.
2. For exposed glass edges, polish and grind smooth.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

B. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.

C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.

D. Install cabinets level, plumb, and true in line to a tolerance of 1/8 inch in 96 inches using concealed shims.

1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips.

3.2 FIELD QUALITY CONTROL

A. Inspections: Provide inspection of installed Work through AWI's Quality Certification Program certifying that woodwork, including installation, complies with requirements of the Architectural Woodwork Standards for the specified grade.

1. Inspection entity shall prepare and submit report of inspection.

END OF SECTION 064116

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Glass-fiber blanket exterior wall insulation
2. Glass-fiber blanket interior wall sound batt insulation.
3. Metal building wall & roof insulation

1.2 SUBMITTALS

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

B. Product test/evaluation reports.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION-exterior wall cavities

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. CertainTeed Corporation.
2. Guardian Building Products, Inc.
3. Johns Manville.
4. Knauf Insulation.
5. Owens Corning.

B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
1. Provide R-19 unfaced insulation in all exterior framed wall cavities.
2. Thickness: 6” for 6” metal studs as noted on plans.

2.2 GLASS-FIBER BLANKET INSULATION-interior wall cavities (sound batt)

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. CertainTeed Corporation.
2. Guardian Building Products, Inc.
3. Johns Manville.
4. Knauf Insulation.
5. Owens Corning.

B. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.
1. Provide sound batt insulation equal to QuietzAone Owens Corning in all interior wall locations.

2. Thickness: 3.5” for 3-5/8” metal stud walls note on plans and 6” for 6” metal studs as noted on plans.
3. Thickness for above acoustical celing tile: 6”

2.3 RIGID INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C 578, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E 84.
1. Provide Extruded-Polystyrene board equal to STYROFOAM CAVITYMATE as manufactured by DOW Chemical Company.
2. Thickness: 2”
3. Fasteners: Per manufacturers requirements
4. Installation: Provide insulation at locations below vehicle lift in Fleet Service building per lift manufacturers guidelines. Install per manufacturers written installation instructions.

2.4 VINYL FACED METAL BUILDING INSULATION- Fleet Service Building

A. Vinyl Faced Insulation: Insulation shall be equal to Owens-Corning Certified R Metal Building Insulation as manufactured by Owens-Corning, One Owens Corning Parkway, Toledo, OH 43659. Insulation at metal roof and wall panels shall be laminated with a vapor retarder listed below. Insulation shall be installed in strict accordance with manufacturer’s recommendations.

B. Roof Insulation: Beneath standing seam metal roof of Fleet Service Building, install 8” R-25 vinyl faced insulation, draping over the top of the z-purlins at each z-purlin location, with thermal blocks over each purlin. Insulation shall be draped sufficiently to allow 6” of insulation to be snugly placed between the purlins and the metal roof panel. (Do not leave airspace). WMP-10 .0015” white metalized polypropylene film, tri directional scrim reinforcing, and 14# Kraft white paper backing.

C. Wall Insulation: At exterior walls of Fleet Service Building, install 8” R-25 vinyl faced insulation. WMP-10 .0015” white metalized polypropylene film, tri directional scrim reinforcing, and 14# Kraft white paper backing.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thickness, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF RIGID INSULATION

A. Mechanically fasten board to masonry wall with purposed-made plastic friction fit fasteners or use adhesive equal to CGSB 71-BP-24M, Type 1.

B. Install insulation boards over air/vapor barrier membrane starting at the top of footing and extending vertically to top of wall per section details.

C. Place boards in a method to maximize contact with bedding, staggering end joints. Butt edges and ends tight to adjacent bards and to protrusions. Fit insulation board tight around masonry brick ties.

D. If adhesive is used for attachment provide a 6 mm bead of adhesive in a grid pattern to prevent potential air movement behind board. Apply adhesive fully around protrusions.

E. If plastic friction fit fasteners are used place fasteners securely against board to hold boards firmly in place.

F. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

G. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

3.3 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Glass-Fiber Insulation: Install in cavities formed by framing members according to the following requirements:
   1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
   2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
   3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
   4. Install eave ventilation troughs between roof framing members in insulated attic spaces at vented eaves.
   5. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:

END OF SECTION 072100

SECTION 074113 - METAL ROOF PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Standing-seam metal roof panels.
   2. Snow/ice guard system.

B. Related Sections:
   1. Division 07 Section "Sheet Metal Roofing" for custom-fabricated and on-site, roll-formed sheet metal roofing.

1.2 PERFORMANCE REQUIREMENTS

A. U.L. Class 90 Rating: The roof system shall carry a U.L. wind uplift classification Class 90 as determined according to UL 580 Tests for Uplift Resistance of Roof Assemblies to ensure structural integrity and possible reduction of insurance rates.

B. FM Global (Factory Mutual): The roof system has been tested according to FMRC Standard 4471 and approved as a Class 1 Panel Roof. The building manufacture shall provide specific assemblies to meet the required Wind Rating per FM Global.

C. ASTM E 1592: The roof system shall be tested according to ASTME 1592 Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air pressure difference. See structural plans for wind, snow and deflection limits

D. Air Inflitration per ASTM E1680

E. Water Penetration per ASTM E1646

F. Class A Fire Rating when tested in accordance with test procedure ASTM E108

1.3 SUBMITTALS

A. Product Data: For product indicated.

B. Shop Drawings: Show fabrication and installation layouts of metal roof panels; details of edge conditions, side-seam and endlap joints, panel profiles, corners, anchorages, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.

C. Coordination Drawings: Roof plans, drawn to scale, based on input from installers of the items involved.

D. Warranties: Samples of special warranties.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Fire-Resistance Ratings: Where indicated, provide metal roof panels identical to those of assemblies tested for fire resistance per ASTM E 119 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Combustion Characteristics: ASTM E 136.

C. Preinstallation Conference: Conduct conference at project site.

1.5 WARRANTY

A. Weather Tightness Warranty: Provide a single source manufacturers 20 year warranty with, “no dollar limit”. For a period of 20 years from the date of substantial completion certified by the architect, the roof panel manufacturer shall warrants the building owner that the roof panels, flashin, and relatd items tuse to fasten the roof panels and flashing (including roof jacks and curb attachments pre-approved, in writing by Manufacturer)to the roof structure will not allow the intrusion of water from the exterior of the Manufacturer Roof System into the building envelope, when exposed to ordinary weather conditions and ordinary wear and usage.

B. Exterior Material and Finish Warranty: Provide manufacturers 20 year finish warranty.

1.6 PANEL MATERIALS

A. Roof Panel
   1. Roof panel shall be equal to factory roll-formed MR-24 roof system panel as manufactured by Butler Manufacturing Company; 24" wide, with 2 major corrugations, 2" high (2-3/4" including seam), 24" on center. The flat of the panel shall contain cross flutes 6" on center perpendicular to the major corrugations the entire length of the panel to reduce wind noise and improve walkability.
   2. Panel material as specified shall be 24-gauge galvanized steel, G90 coating, ASTM A 653, G90. Paint with exterior colors of “Butler-Cote” finish system, full-strength, 70 percent “Kynar 500” or “Hylar 5000” fluoropolymer (PVDF) coating. PVDF Coating Warranty: Metal building system manufacturer shall warrant coating for 25 years.
   3. Panel of maximum possible length shall be used to minimize endlap; eave panel shall extend beyond the structural line of the sidewall
   4. Panel shall be factory prepunched at panel end to match prepunched holes in the eave structural member. Panel end splice shall be factory prepunched and prenotched. Panel end splice shall be floating and allow the roof panel to expand and contract with roof panel temperature change.
   5. Ridge assembly shall be designed to allow roof panels to move lengthwise with expansion/contraction as the roof panel temperature changes. Parts shall be factory prepunched for correct field assembly. Panel closure and interior reinforcing strap shall be installed to seal the panel end at the ridge. The attachment fasteners shall not be exposed on the weather side. A lockseam plug shall be used to seal the lockseam portion of the panel. A hi-tensile steel ridge cover shall span from panel closure to panel closure and flex as the roof system expands and contracts

B. Approved Equals: Conforming to the requirements specified in this specifications section the following manufactures are approved.
   1. Berridge Metal Roofing
   2. DMI (Dimensional Metals, Inc)
   3. Englert, Inc.

4. PAC-CLAD Peterson Aluminum:
5. MBCI
6. Varco Pruden Building

C. Panel Sealants:
1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing; 1/2 inch wide and 1/8 inch thick.
2. Joint Sealant: ASTM C 920; as recommended in writing by metal roof panel manufacturer.
3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

D. Fasteners:
1. Connection of roof system panel-to-structural member, except at eave, shall be made with clips with movable stainless steel tabs that are seamed into the standing seam sidelap..
2. Panel clip shall be fastened to structural member with Scrubolt™ fastener as per manufacturer's erection drawings, using factory prepunched hole in structural member. Scrubolt fastener shall contain a metal backed rubber washer which serves as a torque indicator.
3. Roof system panel-to-panel connection shall be made with a positive, field-formed standing double-lock seam, formed by a special seaming machine. The machine field forms the final 180 degrees of a 360 degree Pittsburgh double-lock standing seam; all sidelap sealant shall be factory applied.

E. Accessories
1. Thermal blocks: Provide 25 psi ¾”x4” pre-engineered thermal blocks at top of roof purlins as manufactured by Chardan Specialities (419) 636-6900. Install thermal blocks continuous at top of purlins with adhesive as recommended by manufacturers.

1.7 FIELD-INSTALLED THERMAL INSULATION

A. Refer to Division 07 Section "Thermal Insulation."

1.8 STANDING-SEAM METAL ROOF PANELS

A. General: All components of the roof system paneling shall be designed in accordance with sound engineering methods and practices.

B. Roof system paneling shall be designed in accordance with AISI "Specifications for the Design of Light-Gage, Cold-Formed Steel Structural Members" or CAN/CSAS136 "Cold-Formed Steel Structural Members" - latest edition.

C. All endwall trim and roof transition flashing shall allow the roof panel to move relative to the wall panel and/or the parapet as the roof expands and contracts with temperature change.

D. Provide factory-formed metal roof panels designed to be installed by lapping and interconnecting raised side edges of adjacent panels with joint type indicated and mechanically attaching panels to supports using concealed clips in side laps. Include clips, cleats, pressure plates, and accessories required for weathertight installation.

E. The roof shall provide for thermal expansion/contraction without detrimental effect to the roof panel when there is a ±100°F. temperature difference between the inside structural framework of

the building and the temperature of the roof panels.

F. Provision for thermal expansion movement of the MR-24 roof system panel shall be accomplished by the use of clips with a movable tab. The stainless steel tab shall be factory centered on the roof clip when installed to assure full movement in either direction. A force of no more than 8 pounds will be required to initiate tab movement. Each clip shall accommodate a minimum of 1.25" in either direction.

1.9 FABRICATION

A. Fabricate and finish metal roof panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes and as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

B. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of panel.

C. Fabricate metal roof panel side laps with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will seal weathertight and minimize noise from movements within panel assembly.

D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

PART 2 - EXECUTION

2.1 PREPARATION

A. Miscellaneous Framing: Install subpurlins, eave angles, furring, and other miscellaneous roof panel support members and anchorage according to metal roof panel manufacturer's written instructions.

2.2 METAL ROOF PANEL INSTALLATION

A. Lap-Seam Metal Roof Panels: Fasten metal roof panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacturer.
   1. Apply panels and associated items for neat and weathertight enclosure. Avoid "panel creep" or application not true to line.
   2. Lap ribbed or fluted sheets one full rib corrugation.
   3. Provide metal-backed neoprene or EPDM washers under heads of exposed fasteners bearing on weather side of metal roof panels.
   4. Locate and space exposed fasteners in uniform vertical and horizontal alignment. Use proper tools to obtain controlled uniform compression for positive seal without rupture of washer.
   5. Install screw fasteners with power tools having controlled torque adjusted to compress washer tightly without damage to washer, screw threads, or panels. Install screws in predrilled holes.
   6. Provide sealant tape at lapped joints of metal roof panels and between panels and protruding equipment, vents, and accessories.
   7. Apply a continuous ribbon of sealant tape to weather-side surface of fastenings on end laps, and on side laps of nesting-type panels; on side laps of corrugated nesting-type,

ribbed, or fluted panels; and elsewhere as needed to make panels weatherproof to driving rains.

8. At panel end splices, nest panels with minimum 6-inch end lap, sealed with butyl-rubber sealant and fastened together by interlocking clamping plates.

B. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint at location, spacing, and with fasteners recommended by manufacturer.
   1. Install clips to supports with self-drilling-fasteners.
   2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
   3. Snap Joint: Nest standing seams and fasten together by interlocking and completely engaging factory-applied sealant.
   4. Seamed Joint: Crimp standing seams with manufacturer-approved, motorized seamer tool so clip, metal roof panel, and factory-applied sealant are completely engaged.

2.3 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal roof panel assembly including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
   2. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
   3. Provide elbows at base of downspouts to direct water away from building.

2.4 CLEANING

A. Remove temporary protective coverings and strippable films, if any, as metal roof panels are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of metal roof panel installation, clean finished surfaces as recommended by metal roof panel manufacturer. Maintain in a clean condition during construction.

END OF SECTION 074113

SECTION 074213 – METAL WALL PANELS

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Metal wall panels

B. Accessories including fasteners, perimeter trim and penetration treatments.

1.2 REFERENCES

A. ASTM International.
1. ASTM A792 – Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
2. ASTM B209; Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate..
3. ASTM C920 – Standard Specification for Elastomeric Joint Sealants.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer current technical literature for each type of product.

B. Delegated Design: Design metal wall panel assembly, submit comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

C. Shop Drawings - Submit detailed drawings showing:
1. Profile
2. Gauge of panel
3. Location, layout and dimensions of panels
4. Location and type of fasteners
5. Shape and method of attachment of all trim
6. Locations and type of sealants
7. Installation sequence.
8. Other details as may be required for a weathertight installation

D. Samples: Architect may request contractor to provide nominal 3 x 5 inch metal samples of available colors for final color selection/approval.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall have a minimum of ten (10) years experience in the production of metal wall panels. Manufacturer shall demonstrate past experience with examples of projects of similar type and exposure.

B. Installer Qualifications: Installer shall be authorized by the manufacturer and the work shall be supervised by a person having successfully completed a manufacturer training seminar regarding proper installation of the specified product.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver panel materials and components in manufacturer's original, unopened, undamaged packaging with identification labels intact.

B. Store wall panel materials on dry, level, firm, and clean surface. Elevate one end of bundle to allow moisture run-off, cover and ventilate to allow air to circulate and moisture to escape.

1.6 WARRANTY

A. Material Warranty: Standard form in which manufacturer agrees to repair or replace items that fail in materials or workmanship within specified warranty period. The items covered by the warranty include structural performance and finish performance.
   1. Warranty Period: Two (2) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Exterior walls shall be equal to Butlerib II panels as furnished by Butler Manufacturing Company and installed in accordance with the manufacturer's instructions.

B. Approved Manufacturer's
   1. MBCI
   2. Morin –Kingspan Group
   3. Firestone Building Products
   4. Alliance Steel Building Systems
   5. ATAS

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal wall panel systems designed to resist the following. Testing shall be done based on ASTM E330:
   1. Wind Loads: Determine loads based on the following minimum design wind pressures:
      a. Uniform pressure as indicated on drawings.
   2. Deflection Limits: Metal wall panel assemblies shall withstand horizontal deflections no greater than L/180 of the span.

B. Water Penetration under Static Pressure: Provide metal wall panel systems designed to resist penetration of water under static pressure. Testing shall be based on ASTM E331.

C. Air Infiltration: Provide metal wall panel assemblies designed to resist air infiltration. Testing shall be done based on ASTM E283.

2.3 WALL PANEL MATERIALS

A. Steel:
   1. Panels shall be 26 gage, 3' wide with four major corrugations, 1-1/2 " high 12" on center with two minor corrugations between each of the major corrugations the entire length of the panel.
   2. Panels shall be one piece from base to building eave.

3. The upper end of panels shall be fabricated with a square cut for all other roof panels and slopes
4. Wall panels shall be factory punched or field drilled at panel ends and shall match factory punched or field drilled holes in structurals for proper alignment
5. Panel material as specified shall be 26-gauge or 24-gauge painted Galvalume aluminum-zinc alloy (approximately 55 percent aluminum, 45 percent zinc), ASTM A 792. Paint with exterior colors of "Butler-CoteTM" finish system, full-strength, 70 percent "Kynar 500" or "Hylar 5000" fluoropolymer (PVDF) coating. PVDF Coating Warranty: Metal building system manufacturer shall warrant coating for 25 years.

2.4 ACCESSORIES

A. Wall panel accessories: Provide accessories as required for a complete installation. Accessories shall be as indicated on approved shop drawings and per manufacturer's approved standard details. All accessory material shall be 26 gage and finish of metal wall panels.
   1. Wedged ends: Factory crimped end laps.
   2. Closure Strips: Provide closed cell closure strips, minimum 1 inch thick matching metal wall panel profile.

B. Trim:
   1. Fabricate trim from same material as wall panels. Finish to match metal wall panels.
   2. Locations include, but are not limited to the following: Drips, sills, jambs, corners, framed openings, parapet caps, reveals and fillers.

C. Panel Sealant:
   1. Joint Sealant: ASTM C920 as recommended in writing by metal wall panel manufacturer.
   2. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C1311.

D. Fasteners

1. Wall panel-to-structural connections shall be made with Torx head Scrubolt fasteners.

2. Wall panel-to-panel connections shall be made with Torx head self-drilling screws.

3. Fastener locations shall be as shown on erection drawings as furnished by the Butler Manufacturing Company.

4. All exposed fasteners shall be factory painted to match wall color.

2.5 FABRICATION

A. Metal wall panels shall be formed to interconnect with edges of adjacent panels which are then mechanically attached through panel to supports using concealed fasteners.

B. Fabricate metal wall panels to eliminate condensation on interior side of panel and with joints between panels designed to form weathertight seals.

C. Metal wall panels shall have factory-installed sealant at panel joints to provide a tight seal and minimize noise from movements within panel assembly.

D. Panels shall be factory formed. Field formed or breakformed panels are not acceptable.

E. Trim Accessories: Fabricate steel trim accessories to comply with recommendations outlined in SMACNA's "Architectural Sheet Metal Manual".

F. Trim Accessories: Provide manufacturer's standard extruded trim.

G. Mitered Corners: Structurally bonded horizontal outside or inside trimless corners matching metal wall panel material, profile and factory applied finish shall be fabricated by metal wall panel manufacturer.
   1. Welded, riveted or field fabricated corners do not meet the requirements of this specification.

2.6 FINISHES

A. Paint Finish:
   1. The panel material as specified shall be coated both sides with a layer of (galvalume®)aluminum-zinc alloy (approximately 55% aluminum, 45% zinc) applied by the continuous hot dip method. Triple-spot minimum 0.55 ounce per square foot as determined by the triple-spot test per ASTM Specification A-792.26 with exterior colors of a full strength, 70% Kynar 500®.
   2. Manufacturer shall warrant that coating shall not peel, crack or chip for 25 years. For a period of 25 years chalking shall not exceed ASTM D4214 #8 rating and will not fade more than 5 color difference units per ASTM D2244.
   3. Color to be selected by architect.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Provide field measurements to manufacturer as required to achieve proper fit of the metal wall panels to building envelope. Measurements shall be provided in a timely manner so that there is no impact to construction or manufacturing schedule.

B. Supporting Steel: All structural supports required for installation of panels shall be by others. Support members shall be installed within the following tolerances:
   1. Plus or minus 1/8 inch in 5 feet in any direction along plane of framing.
   2. Plus or minus ¼ inch cumulative in 20 feet in any direction along plane of framing.
   3. Plus or minus ½ inch from framing plane on any elevation.
   4. Plumb or level within 1/8 inch at all changes of transverse for performed corner panel applications.
   5. Verify that bearing support has been provided behind vertical joints of horizontal panel systems and vertical joints of horizontal panel systems. Width of support shall be as recommended by manufacturer.

C. Examine individual panels upon removing from the bundle; notify manufacturer of panel defects. Do not install defective panels.

3.2 PANEL INSTALLATION

A. Apply sealant to vertical joints at concealed fasteners, per manufacturer's recommendations and approved shop drawings.

B. Installation shall be in accordance with manufacturer's installation guidelines and recommendations.

C. Install panels plumb, level, and true-to-line to dimensions and layout indicated on approved shop drawings.

D. Cutting and fitting of panels shall be neat, square and true. Torch cutting is prohibited.

3.3 TRIM INSTALLATION

A. Place trim and trim fasteners only as indicated per details on the approved shop drawings.

B. Apply sealant tape at trim, per manufacturer's details and approved shop drawings, for weather tight installation.

3.4 SEALANT INSTALLATION FOR EXPOSED JOINTS

A. Clean and prime surfaces to review exterior exposed sealants in accordance with sealant manufacturer's recommendations.

B. Follow sealant manufacturer's recommendations for joint width-to-depth ratio, application temperature range, size and type of backer rod, and compatibility of materials for adhesion.

3.5 CLEANING AND PROTECTION

A. Remove protective film immediately after installation.

B. Touch-up, repair or replace metal panels and trim that have been damaged.

C. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

END OF SECTION 074213

SECTION 099123 - PAINTING AND COATING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes surface preparation and the application of paint systems and coatings on the following interior substrates:
   1. Concrete masonry units (CMU).
   2. Steel.
   3. Galvanized metal.
   4. Aluminum (not anodized or otherwise coated).
   5. Spray-textured ceilings.

B. This Section includes surface preparation and the application of paint systems and coatings on the following exterior substrates:
   1. Brick
   2. Steel
   3. Aluminum

1.2 SUBMITTALS

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

B. Samples: For each finish and for each color and texture required.

C. Product List: Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.3 QUALITY ASSURANCE

A. MPI Standards:
   1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
   2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
      a. Wall and Ceiling Surfaces: Provide samples of at least 100 sq. ft.
      b. Other Items: Architect will designate items or areas required.
   2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
   3. Final approval of color selections will be based on benchmark samples.
      a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.4 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.
   1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer:
   The Sherwin-Williams Company or Approved Equal- "Pro Green"
   101 Prospect Avenue NW
   Cleveland, OH 44115
   Tel: (800) 321-8194
   Fax: (216) 566-1392
   www.sherwin-williams.com
   Other acceptable Manufacturers: KWAL, Benjamin Moore, ICI, PPG Pittsburgh Paints
   1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

B. Substitutions: Requests for substitution will be considered in accordance with provisions of section 012500 product requirements. When submitting requests for substitution, provide complete product data specified above under submittals, for each substitute product.

C. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
   1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
   2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
   3. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
   4. Floor Coatings: VOC not more than 100 g/L.
   5. Shellacs, Clear: VOC not more than 730 g/L.
   6. Shellacs, Pigmented: VOC not more than 550 g/L.
   7. Flat Topcoat Paints: VOC content of not more than 50 g/L.
   8. Nonflat Topcoat Paints: VOC content of not more than 150 g/L.
   9. Anti-Corrosive and Anti-Rust Paints Applied to Ferrous Metals: VOC not more than 250 g/L.
   10. Floor Coatings: VOC not more than 100 g/L.
   11. Shellacs, Clear: VOC not more than 730 g/L.
   12. Shellacs, Pigmented: VOC not more than 550 g/L.
   13. Primers, Sealers, and Undercoaters: VOC content of not more than 200 g/L.
   14. Dry-Fog Coatings: VOC content of not more than 400 g/L.
   15. Zinc-Rich Industrial Maintenance Primers: VOC content of not more than 340 g/L.
   16. Pre-Treatment Wash Primers: VOC content of not more than 420 g/L.

D. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:
   1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
   2. Restricted Components: Paints and coatings shall not contain any of the following:
      a. Acrolein.
      b. Acrylonitrile.
      c. Antimony.
      d. Benzene.
      e. Butyl benzyl phthalate.
      f. Cadmium.
      g. Di (2-ethylhexyl) phthalate.
      h. Di-n-butyl phthalate.
      i. Di-n-octyl phthalate.
      j. 1,2-dichlorobenzene.
      k. Diethyl phthalate.
      l. Dimethyl phthalate.
      m. Ethylbenzene.
      n. Formaldehyde.
      o. Hexavalent chromium.
      p. Isophorone.
      q. Lead.
      r. Mercury.
      s. Methyl ethyl ketone.
      t. Methyl isobutyl ketone.
      u. Methylene chloride.
      v. Naphthalene.
      w. Toluene (methylbenzene).
      x. 1,1,1-trichloroethane.
      y. Vinyl chloride.

E. Colors**:** As selected by Architect from manufacturer's full range.

2.2 INTERIOR PAINTING and COATING
(2.5 - 3 mils dry per coat)

A. MASONRY CMU'S (all areas except Wash Bay)

1. Epoxy Systems

a. Low Luster Finish

1st Coat:	S-W Heavy Duty Block Filler
2nd Coat:	S-W Pro Industrial- Hi-Bild-waterbased catalyzed epoxy, B71- V110 (2.5 - 3 mils dry per coat)
3rd Coat:	S-W Pro Industrial- Hi-Bild-waterbased catalyzed epoxy, B71-V110 (2.5 - 3 mils dry per coat)

B. MASONRY CMU'S (Wash Bay)- Epoxy Block Filler / Epoxy Intermediate Coat / Epoxy or Polysiloxane Finish Coat

1. Epoxy Systems

a. Low Luster Finish
1st Coat: B42W400 Kem Cati-Coat HS Epoxy Filler
2nd Coat: B58W610 Macropoxy 646 Fast Cure Epoxy tinted to the choice of color.
(2.5 - 3 mils dry per coat)
3rd Coat: B58W610 Macropoxy 646 Fast Cure Epoxy tinted to the choice of color.
(2.5 - 3 mils dry per coat)

C. METAL (Railing Systems, Door and Door frames)
1. Acrylic Systems
a. LOWER ODOR/LOW VOC: Semi-Gloss Finish
1st Coat: S-W Pro Industrial Pro-Cryl® Universal Primer, B66-310 Series
(5-10 mils wet, 2-4 mils dry per coat)
2nd Coat: S-W Pro Industrial 0 VOC Acrylic, B66-650 Series
3rd Coat: S-W Pro Industrial 0 VOC Acrylic, B66-650 Series
(7 mils wet)

D. METAL (steel deck, angles, joists, beams, ductwork, conduit, water & gas piping, etc.)

1. Dryfall Systems

a. Flat Finish
1st Coat: S-W Pro Industrial Pro-Cryl® Universal Primer, B66-310 Series
(5-10 mils wet, 2-4 mils dry per coat)
2nd Coat: S-W Waterborne Acrylic Dry Fall Flat White, B42W1 Series
3rd Coat: S-W Waterborne Acrylic Dry Fall Flat White, B42W1 Series
(7-11 mils wet, 3-4.5 mils dry per coat

E. METAL (exposed structural columns)
1. Alkyd System, Gloss Finish
a. 1st Coat: S-W Kem Kromik Universal Metal Primer, B50Z Series
b. 2nd Coat: S-W Industrial Enamel B54 Series
c. 3rd Coat: S-W Industrial Enamel B54 Series
(2.5-4 mils wet, 2.2-3.5 mils dry)

F. EXPOSED CONCRETE FLOORS
1. Provide sealer over all exposed concrete floors not covered with floor covering or indicated as polished concrete or hardener/densifer.
2. Sealer to be equal to Infusion Water Based Clear Sealer as supplied by H & C Concrete/Sherwin Williams. 1-800-867-8246 or www.hcconcrete.com.

3. Sealer is to be applied to new concrete surface. Moisture cure or apply clear non-residual curing compound.
4. See finish schedule for locations requiring sealer

2.3 EXTERIOR PAINTING AND COATINGS

A. CMU BLOCK
1. All exposed surfaces of masonry shall receive a proper application of Siloxane WB by Sure Klean as manufacturer by Prosoco, Inc., 3741 Greenway Circle, Lawrence, KS 66046; phone (800) 255-4255. The material shall be applied as follows:
   a. Painting contractor shall apply two coats of weather seal to all masonry surfaces, including mortar joints and other exposed concrete and masonry surfaces.
   b. Both coatings of materials shall be installed in accordance with the manufacturer's recommendations and the quality of material to be used per square foot of area.

B. MISCELLANEOUS METALS (Lintels, bollard, gas piping, etc.)
1. Alkyd System, Gloss Finish
   a. 1st Coat: S-W Kem Kromik Universal Metal Primer, B50Z Series
   b. 2nd Coat: S-W Industrial Enamel B54 Series
   c. 3rd Coat: S-W Industrial Enamel B54 Series
      (2.5-4 mils wet, 2.2-3.5 mils dry

2.4 MATERIALS

A. Paints and Coatings - General:
1. Unless otherwise indicated, provide factory-mixed coatings. When required, mix coatings to correct consistency in accordance with manufacturer's instructions before application. Do not reduce, thin, or dilute coatings or add materials to coatings unless such a procedure is specifically described in manufacturer's product instructions. VOC numbers need to be confirmed by using the products MSDS sheets.

2.5 ACCESSORIES

A. Coating Application Accessories:
1. Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required per manufacturers specifications.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Do not begin application of coating until substrates have been properly prepared. Notify Architect of unsatisfactory conditions before proceeding.

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

C. Proceed with work only after conditions have been corrected and approved by all parties otherwise application of coatings will be considered and acceptance of surface conditions.

3.2 SURFACE PREPARATION

A. Proper product selection, surface preparation, and application affect coating performance. Coating integrity and service life will be reduced because of improperly prepared surfaces. Selection and implementation of proper surface preparation ensures coating adhesion to the substrate and prolongs the service life of the coating system.

B. Selection of the proper method of surface preparation depends on the substrate, the environment, and the expected service life of the coating system. Economics, surface contamination, and the effect on the substrate will also influence the selection of surface preparation methods.

C. Pressure wash/clean all surfaces to be painted to remove all dirt, grease, chalk, loose paint and surface contaminates.

D. The surface must be dry and in sound condition. Remove oil, dust, dirt, loose rust, peeling paint or other contamination to ensure good adhesion.

E. Remove mildew before painting by washing with a solution of one (1) part liquid household bleach and three (3) parts of warm water. Apply the solution and scrub the mildewed area. Allow the solution to remain on the surface for 10 minutes; however, do not allow the solution to dry on the surface. Rinse thoroughly with clean water and allow the surface to dry 48 hours before painting. Wear protective glasses or goggles, waterproof gloves, and protective clothing. Quickly wash off any of the mixture that comes in contact with your skin. Do not add detergents or ammonia to the bleach/water solution.

F. No painting should take place when the interior temperature is below 50°F unless the specified product is designed for the marginal conditions.

G. If the surfaces to be painted are heavily contaminated with grease or oil, clean the highly contaminated areas with Great Lakes Laboratories Extra Muscle Prepaint Cleaner.

H. Methods
   1. Aluminum: Remove all oil, grease, dirt, oxide and other foreign material by cleaning per SSPC-SP1, Solvent Cleaning.
   2. Block: Remove all loose mortar and foreign material. Surface must be free of laitance, concrete dust, dirt, form release agents, moisture curing membranes, loose cement, and hardeners. Concrete and mortar must be cured at least 30 days at 75°F unless the manufactures products are designed for application prior to the 30-day period. The pH of the surface should be between 6 and 9, unless the products are designed to be used in high pH environments. On tilt-up and poured-in-place concrete, commercial detergents and abrasive blasting may be necessary to prepare the surface. Fill bug holes, air pockets, and other voids with a cement patching compound.
   3. Concrete: This standard gives requirements for surface preparation of concrete by mechanical, chemical, or thermal methods prior to the application of bonded protective coating or lining systems. The requirements of this standard are applicable to all types of cementitious surfaces including cast-in-place concrete floors and walls, precast slabs, masonry walls, and shotcrete surfaces. An acceptable prepared concrete surface should be free of contaminants, laitance, loosely adhering concrete, and dust, and should provide a sound, uniform substrate suitable for the application of protective coating or lining systems.
   4. Galvanized Metal: Clean per SSPC-SP1 using detergent and water or a degreasing cleaner to remove greases and oils. Apply a test area, priming as required. Allow the

coating to dry at least one week before testing. If adhesion is poor, Brush Blast per SSPC-SP7 is necessary to remove these treatments.

5. Steel: Structural, Plates, etc.: Clean per SSPC-SP1, solvent cleaning. Solvent cleaning is a method for removing all visible oil, grease, soil, drawing and cutting compounds, and other soluble contaminants. Solvent cleaning does not remove rust or mill scale. Change rags and cleaning solution frequently so that deposits of oil and grease are not spread over additional areas in the cleaning process. Be sure to allow adequate ventilation. On ferrous metal surfaces remove all loose corrosion by using SSPC–SP2 Hand Tool Cleaning and SSPC-SP3 Power Tool Cleaning.

3.3 INSTALLATION

A. Apply all coatings and matrials with manufacturer specifications in mind. Mix and thin coatings according to manufacturer's recommendations.

B. Do not apply to wet or damp surfaces.
   1. Wait at least 30 days before applying to new concrete or masonry. Or follow manufacturer's procedures to apply appropriate coatings prior to 30 days.
   2. Test new concrete for moisture content.

C. Apply coatings using methods recommended by manufacturer.

D. Uniformly apply coatings without runs, drips, or sags, without brush marks and with the consistent sheen.

E. Apply coatings at spreading rate required to achieve the manufacturer's recommended dry film thickness.

F. Dark colors and deep clear colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

G. Inspection: The coated surface must be inspected and approved by the Architect or Engineer just prior to each coat.

3.4 PROTECTION

A. Protect finished coatings from damage until completion of project.

B. Touch-up damaged coating after substantial completion, following manufacturer's recommendations for touch up or repair of damaged coatings. Repair any defects that will hinder the performance of the coatings.

END OF SECTION 099123

SECTION 133419 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Structural-steel framing.
2. Thermal roof insulation.
3. Accessories.

1.2 SUBMITTALS

A. Product Data: For each type of metal building system component.

B. Shop Drawings: For metal building system components. Include plans, elevations, sections, details, and attachments to other work.

C. Samples: For each type of exposed finish required.

D. Delegated-Design Submittal: For metal building systems indicated to comply with performance requirements and design criteria, including analysis data and calculations signed and sealed by the qualified professional engineer responsible for their preparation. Details and plans outline basic connection types between metal building components and structural steel components. Beam to Beam and Beam to Column connections shall be sized by metal building professional engineer as standard AISC, Type 2, Bearing connections capable of supporting reactions developed by maximum uniform load capacity on a simple span for beam and beam span given.

E. Welding certificates.

F. Metal Building System Certificates: For each type of metal building system, from manufacturer.
1. Letter of Design Certification: Signed and sealed by a qualified professional engineer. Include the following:
a. Name and location of Project.
b. Order number.
c. Name of manufacturer.
d. Name of Contractor.
e. Building dimensions including width, length, height, and roof slope.
f. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
g. Governing building code and year of edition.
h. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
i. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
j. Building-Use Category: Indicate category of building use and its effect on load importance factors.

G. Material test reports.

H. Source quality-control reports.

I. Field quality-control reports.

J. Maintenance data.

K. Warranties: Sample of special warranties.

1.3 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer.
   1. Engineering Responsibility: Preparation of Shop Drawings and comprehensive engineering analysis by a qualified professional engineer.

B. Erector Qualifications: An experienced erector who specializes in erecting and installing work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

C. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
   2. AWS D1.3, "Structural Welding Code - Sheet Steel."

D. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings," for design requirements and allowable stresses.

E. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.

F. Preinstallation Conference: Conduct conference at Project site.

1.4 WARRANTY
   1. Manufacturer’s standard one year warranty on materials and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. A&S Building Systems, Inc.; Division of NCI Building Systems, L.P.
   2. Alliance Steel
   3. American Buildings Company; A Nucor Company
   4. Butler Manufacturing Company; a BlueScope Steel company.
   5. CBC Steel Buildings; A Nucor Company
   6. Ceco Building Systems; Division of NCI Building Systems, L.P.
   7. Garco Building Systems; Division of NCI Building Systems, L.P..
   8. Mesco Building Solutions; Division of NCI Building Systems, L.P.
   9. Metallic Building Company; Division of NCI Building Systems, L.P.
   10. Metco Metal Supply.
   11. Mid-West Steel Building Company; Division of NCI Building Systems, L.P.
   12. Nucor Building Systems A Nucor Company.
   13. Olympia Steel Building Systems.
   14. Pinnacle Structures, Inc.
   15. Star Building Systems; an NCI company.
   16. United Structures of America
   17. VP Buildings; a BlueScope Steel Company

18. Vulcan Steel Structures, Inc.

2.2 METAL BUILDING SYSTEM PERFORMANCE

A. Delegated Design: Design metal building system, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance: Metal building systems shall be designed according to procedures in MBMA's "Metal Building Systems Manual."
   1. Design Loads: As indicated on Drawings.
   2. Deflection Limits: Design metal building system assemblies to withstand design loads with deflections no greater than the following:
      a. Purlins and Rafters: Vertical deflection of 1/240 of the span.
      b. Girts: Horizontal deflection of 1/360 of the span.
      c. Metal Roof Panels: Vertical deflection of 1/240 of the span.
      d. Metal Wall Panels: Horizontal deflection of 1/240 of the span.
      e. Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.
   3. Drift Limits: Engineer building structure to withstand design loads with drift limits no greater than the following:
      a. Lateral Drift: Maximum of 1/400 of the building height for systems directly supporting masonry or other brittle wall systems.
   4. Metal panel assemblies shall withstand the effects of gravity loads and loads and stresses within limits and under conditions indicated according to ASTM E 1592.

C. Seismic Performance: Metal building systems shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

D. Thermal Movements: Allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change (Range): 120 deg F, material surfaces.

2.3 STRUCTURAL-STEEL FRAMING

A. Primary Framing: Manufacturer’s Rigid Frame (RF Series) solid web framing consisting of tapered or uniform depth rafters rigidly connected to tapered or uniform depth columns. System to be designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; connections; and wind bracing.
   1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly.

B. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly.

C. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating.

D. Bolts: Provide plain-finish bolts for structural-framing components that are primed or finish painted. Provide zinc-plated or hot-dip galvanized bolts for structural-framing components that are galvanized.

E. Wind Bracing: Portal, torsional, diagonal bracing or diaphragm in accordance with manufacturer's standard design practices; utilizing rods, angles, and other members, with minimum yield strengths as required for design but in most cases, 50 ksi.

F. Primary Frame Flange Bracing: Attached from purlins or girts to the primary framing, minimum yield strength as required for design but in most cases 60 ksi.

G. Finish: Factory primed. Apply specified primer immediately after cleaning and pretreating.

2.4 MISCELLANEOUS FRAMING

A. Base Angles: 2 inch by 3 inch by 0.059 inch (50 mm by 75 mm by 1.5 mm) galvanized steel angles, with minimum yield strength of 55 ksi (380 MPa), anchored to the floor slab or grade beam with power driven fasteners or equivalent at a maximum spacing of 4 feet (1220 mm) on center and not more than 6 inches (150 mm) from the end of any angle member. Anchors are not provided by the metal building manufacturer.

B. Door Headers and Jambs: Zee- or Cee-shaped; depth as required; with minimum yield strength of 60 ksi (410 MPa).

2.5 INSULATION

A. See section 072100 for insulation.

2.6 METAL ROOF PANELS

A. See section 074113 for metal roof panels.

2.7 METAL WALL PANELS

A. See section 074213 for metal wall panels.

2.8 METAL LINER PANELS

A. See section 074215 for metal liner panels.

2.9 ACCESSORIES this section may deleted if covered in section 076200

A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
   1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.

B. Flashing and Trim: Formed from 0.022-inch nominal-thickness, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match adjacent metal panels.

C. Gutters: 24 gage verify to match accessories in metal panel spec., metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- long sections, sized according to SMACNA's "Architectural Sheet Metal Manual."
   1. Gutter Supports: Fabricated from same material and finish as gutters.
   2. Strainers: Bronze, copper, or aluminum wire ball type at outlets.

D. Downspouts: 24 gage verify to match accessories in metal panel spec, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match metal wall panels. Fabricate in minimum 10-foot- long sections, complete with formed elbows and offsets.
   1. Mounting Straps: Fabricated from same material and finish as gutters.
      .
   2. Continuous or Sectional-Ridge Type: Factory-engineered and -fabricated, continuous unit; 24 gage, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating; finished to match metal roof panels. Fabricated in minimum 10-foot- long sections. Provide throat size and total length indicated, complete with side baffles, ventilator assembly, end caps, splice plates, and reinforcing diaphragms.
      a. Bird Screening: Galvanized steel or aluminum

E. Interior metal liner panels: select one less expensive 26 ga Butlerib® II panels exposed fasteners as furnished by Butler Manufacturing Company and installed in accordance with the manufacturer's instructions. more expensive Equal to Pac-Clad 11” wide 24 gage flush panels with concealed fastening. Panel height to be 8’-0” and attached to metal building system girts. Finish to be Kynar 500 and selected from standard colors.

F. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

2.10 SOURCE QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified testing agency to evaluate field welds and bolt connections as required per International Building Code.

B. Special Inspector: Contractor will engage a qualified special inspector to perform the following tests and inspections and to submit reports. Special inspector will verify that manufacturer maintains detailed fabrication and quality-control procedures and will review the completeness and adequacy of those procedures to perform the Work.
   1. Special inspections will not be required if fabrication is performed by manufacturer registered and approved by authorities having jurisdiction to perform such Work without special inspection.
      a. After fabrication, submit copy of certificate of compliance to authorities having jurisdiction, certifying that Work was performed according to Contract requirements.

C. Testing: Test and inspect field connections for metal buildings according to the following:
   1. Bolted Connections: Shop-bolted connections shall be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
   2. Field Welded Connections: In addition to visual inspection, connections shall be tested and inspected according to AWS D1.1/D1.1M and the following inspection procedures, at inspector's option:
      a. Liquid Penetrant Inspection: ASTM E 165.

b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
c. Ultrasonic Inspection: ASTM E 164.
d. Radiographic Inspection: ASTM E 94.

D. Product will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

2.11 FABRICATION

A. General: Design components and field connections required for erection to permit easy assembly.
1. Mark each piece and part of the assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.
2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members shall be free of cracks, tears, and ruptures.

B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.

C. Primary Framing: Shop fabricate framing components to size and section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.

D. Secondary Framing: Shop fabricate framing components to size and section by roll-forming or break-forming. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

PART 3 - EXECUTION

3.1 ERECTION OF STRUCTURAL FRAMING

A. Erect metal building system according to manufacturer's written erection instructions and erection drawings.

B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.

C. Set structural framing accurately in locations and to elevations indicated, according to AISC specifications referenced in this Section. Maintain structural stability of frame during erection.

D. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials and roughen surfaces prior to setting plates. Clean bottom surface of plates.
1. Set plates for structural members on wedges, shims, or setting nuts as required.
2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
   1. Level and plumb individual members of structure.
   2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.

F. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than seven days after placement.
   1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for bolt type and joint type specified.
      a. Joint Type: Snug tightened or pretensioned.

G. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.
   1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
   2. Locate and space wall girts to suit openings such as doors and windows.
   3. Locate canopy framing as indicated.
   4. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.

H. Steel Joists: Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Standard Specifications and Load Tables for Steel Joists and Joist Girders," joist manufacturer's written instructions, and requirements in this Section.
   1. Before installation, splice joists delivered to Project site in more than one piece.
   2. Space, adjust, and align joists accurately in location before permanently fastening.
   3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
   4. Bolt joists to supporting steel framework using carbon-steel bolts unless high-strength structural bolts are required by the manufacturer.
   5. Comply with RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for high-strength structural bolt installation and tightening requirements.
   6. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

I. Bracing: Install bracing in roof and sidewalls where indicated on erection drawings.
   1. Tighten rod and cable bracing to avoid sag.
   2. Locate interior end-bay bracing only where indicated.

J. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical work. Securely attach to structural framing.

K. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.2 ACCESSORY INSTALLATION some of this section may deleted if covered in section 076200

A. General: Install accessories with positive anchorage to building and weathertight mounting and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
   2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
   3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible and set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently watertight and weather resistant.
   1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with mastic sealant (concealed within joints).

C. Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size, but not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

D. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1 inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
   1. Provide elbows at base of downspouts to direct water away from building.
   2. Tie downspouts to underground drainage system indicated.

E. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

END OF SECTION 133419

SECTION 230913 - INSTRUMENTATION AND CONTROL DEVICES FOR HVAC

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Control panels.

B. Control dampers.

C. Operators.

D. Flow measuring apparatus.

E. Input/Output sensors and transmitters.

F. Output control devices.

G. Power Supplies.

H. Thermostats.

1.2 DEFINITIONS

A. BAS: Building Automation System.

B. Control Wiring: Includes conduit, wire and wiring devices to install complete control systems including motor control circuits, interlocks, thermostats, EP and IP switches and like devices. Includes all wiring from Intelligent Devices and Controllers to all sensors and points defined in the input/output summary shown on the drawings or specified herein and required to execute the sequence of operations

C. Cv: Design Valve Flow Coefficient.

D. DDC: Direct Digital Control.

E. EPDM: Ethylene Propylene Diene Monomer.

F. High voltage: 50 volts or higher.

G. Low voltage: Below 50 volts.

H. PTFE: Polytetrafluoroethylene.

I. TEFZEL: A modified ETFE (ethylene tetrafluoroethylene) fluoroplastic.

1.3 CONTRACTOR RESPONSIBILITIES

A. Reference Division 23 Section ”Electrical Coordination for Mechanical Equipment” for contractor responsibilities.

B. BAS Contractor:

1. Installation of the BAS shall be by the BAS Contractor or his subcontractors.
2. Low voltage control wiring.
3. Coordinate high voltage control wiring to instrumentation and control devices with Division 26. Where high voltage power is required for instrumentation and control devices that is in addition to what is shown on the drawings, the BAS contractor shall cover the cost of providing this wiring.
4. All interlock wiring regardless of voltage (e.g., exhaust fan interlocked to supply fan).
5. Coordinate with Division 26 that motor starters are provided with auxiliary contacts as required for interlocks.
6. Coordinate power wiring to BAS controllers and instrumentation and control devices with Division 26.
7. Coordinate installation of back-box rough-in for wall-mounted control devices sensors, etc. with Division 26. Coordinate with mechanical contractor all locations, quantities, and sizes required for installation by Division 26.

C. Sheet Metal Contractor:

1. Installation of automatic control dampers, smoke control dampers, and necessary blank off plates.
2. Access doors where and as required.

D. Mechanical Contractor:

1. Coordinate conduit and wall box rough-in, power wiring and magnetic starter requirements for controls and mechanical equipment with Division 26.

1.4 SUBMITTALS

A. Refer to Division 01 for submittal procedures.

B. Product Data: Provide description and engineering data for each control system component. Include dimensions, capacities, size, performance characteristics, electrical characteristics, and finishes of materials.

C. Shop Drawings: Indicate complete operating data, system drawings, wiring diagrams, and written detailed operational description of sequences. Submit schedule of valves indicating size, flow, and pressure drop for each valve. For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.

D. Manufacturer's Instructions: Provide for all manufactured components.

E. Operation and Maintenance Data: Include inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.

F. Project Record Documents: Record actual locations of control components, including panels, thermostats, and sensors. Accurately record actual location of control components, including panels, thermostats, and sensors.

G. Warranty: Submit manufacturer warranty and ensure forms have been filled out in Owner s name and registered with manufacturer.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

C. Measurement devices and sensors shall be calibrated using NIST traceable standards.

1.6 WARRANTY

A. Correct defective Work within a one year period after Substantial Completion.

B. Provide extended warranty for control devices and equipment as specified herein.

PART 2 - PRODUCTS

2.1 CONTROL PANELS

A. Construction:

1. Panel shall be UL 508A listed.
2. NEMA 250, general purpose utility enclosures with enameled finished face panel.
3. NEMA 4X utility enclosure for outdoor or wash-down applications.
4. Provide common keying for all panels.

2.2 CONTROL DAMPERS

A. Dampers shall be factory fabricated and sized as shown on drawings and as specified.

B. Individual damper sections shall not be larger than 48 inches x 60 inches. Provide a minimum of one damper actuator per section.

C. Performance: Test in accordance with AMCA 500-D.

1. Pressure Drop: Unless otherwise scheduled or indicated on the Drawings, size control dampers as follows:
   a. Modulating Dampers: Provide dampers with linear flow characteristics. Size modulating dampers based on the smaller of the following.
      1) Maximum velocity of 1,500 feet per minute.
      2) Maximum Full-open air pressure drop of 0.1 inches W.C.
   b. Two Position Dampers: Dampers shall be full duct size and selected to minimize pressure drop.
2. Leakage:

a. Motorized dampers shall not exceed 4.0 CFM/square foot in full closed position at 1 inch W.G. pressure differential across damper.

D. Frames: Galvanized steel, extruded aluminum, or stainless steel, welded or riveted with corner reinforcement.

1. Use minimum 16 gauge for rectangular dampers.
2. Use minimum 20 gauge for round dampers.
3. For aluminum frames, use 1/8 inch thick material.
4. All damper frames shall have a flange for duct mounting.
5. Reference Part 3 Execution for application of the material type.

E. Blades: Galvanized steel, extruded aluminum, or stainless steel, maximum blade size 6 inches wide, 48 inches long, attached to minimum 1/2 inch shafts with set screws.

1. Use minimum 16 gauge for rectangular dampers.
2. Use minimum 16 gauge for round dampers.
3. For aluminum blades, use 1/8 inch thick material.
4. The blades shall be suitable for the air velocities to be encountered in the system.
5. Dampers longer than the maximum blade length shall be fabricated in sections.
6. Reference Part 3 Execution for application of the material type.

F. Blade Seals: Synthetic elastomeric inflatable or Neoprene, mechanically attached, field replaceable.

1. Installed along the top and bottom of the frame and on all mating surfaces.

G. Jamb Seals: Spring stainless steel.

1. Installed inside the frame sides.

H. Shaft Bearings: One of the following as recommended by manufacturer for the application:

1. Oil impregnated sintered bronze.
2. Graphite impregnated nylon sleeve with thrust washers at bearings.
3. Lubricant free, stainless steel, single row, ground, flanged, radial, antifriction type with extended inner race.
4. Molded synthetic bearings.

I. Linkage Bearings: One of the following as recommended by manufacturer for the application:

1. Oil impregnated sintered bronze
2. Graphite impregnated nylon.

J. Maximum Pressure Differential: 6 inches wg.

K. Temperature Limits: -40 to 200 degrees F.

L. Manufacturers:

1. Greenheck.
2. CESCO.
3. Pottorff.
4. Nailor.

5. Ruskin.

M. Reference the Damper Schedule in Part 3 for basis of design damper model and material for the application.

2.3 OPERATORS

A. General:

1. Voltage: Voltage selection shall be as required to achieve the required torque for the application.
   a. Reference Part 3 for Damper Operator Voltage Schedule.
2. Type: Motor operated, with or without gears. Motor type shall be continuous duty.
3. Construction:
   a. For Actuators Less Than 100 W: Fiber or reinforced nylon gears with steel shaft, copper alloy or nylon bearings, and pressed steel enclosures.
   b. For Actuators from 100 to 400 W: Gears ground steel, oil immersed, shaft hardened steel running in bronze, copper alloy or ball bearings. Operator and gear trains shall be totally enclosed in dustproof cast-iron, cast-steel or cast-aluminum housing.
   c. For Actuators Larger Than 400 W: Totally enclosed reversible induction motors with auxiliary hand crank and permanently lubricated bearings.
4. Field Adjustment:
   a. Spring Return Actuators: Easily switchable from fail open to fail closed in the field without replacement.
   b. Gear Type Actuators: External manual adjustment mechanism to allow manual positioning when the actuator is not powered.
5. Two-Position Actuators: Single direction, spring return or reversing type. End-switches shall be integral to the actuator to determine actuator status.
6. Modulating Actuators:
   a. Operation: Capable of stopping at all points across full range, and starting in either direction from any point in range.
   b. Control Input Signal:
      1) Three Point, Tristate, or Floating Point: Clockwise and counter-clockwise inputs. One input drives actuator to open position and other input drives actuator to close position. No signal of either input remains in last position.
      2) Proportional: Actuator drives proportional to input signal and modulates throughout its angle of rotation. Suitable for zero- to 10-Vdc or 2- to 10-Vdc and 4- to 20-mA signals.
      3) Pulse Width Modulation (PWM): Actuator drives to a specified position according to pulse duration (length) of signal from a dry contact closure, triac sink, or source controller.
   c. Programmable Multi-Function:
      1) Control Input, Position Feedback, and Running Time: Factory or field programmable.
      2) Diagnostic: Feedback of hunting or oscillation, mechanical overload, mechanical travel, and mechanical load limit.
      3) Service Data: Include, at a minimum, number of hours powered and number of hours in motion.
7. Position Feedback:
   a. Where indicated on the controls drawings, equip two-position actuators with limits switches or other positive means of a position indication signal for remote monitoring of open and close position.
   b. Where indicated on the controls drawings, equip modulating actuators with a position feedback through current or voltage signal for remote monitoring.
   c. Actuator shall contain position indicator and graduated scale indicating open and closed travel limits.

8. Integral Overload Protection:
   a. Provide against overload throughout the entire operating range in both directions.
   b. Electronic overload, digital rotation sensing circuitry, mechanical end switches, or magnetic clutches are acceptable methods of protection.
9. Attachment:
   a. Unless otherwise required for valve interface, provide an actuator designed to be directly coupled to device without the need for connecting linkages.
   b. Attach actuator to device drive shaft in a way that ensures maximum transfer of power and torque without slippage.
10. Temperature and Humidity:
   a. Temperature: Suitable for operating temperature range encountered by application.
   b. Humidity: Suitable for humidity range encountered by application, non-condensing.
11. Enclosure:
   a. Suitable for ambient conditions encountered by application.
   b. NEMA 4 for indoor wash-down or wet locations.
   c. NEMA 4X, Belimo ZS-300, or equivalent; for outdoor applications.
12. Stroke Time:
   a. Coordinate with stroke time indicated on the control drawings.
   b. Unless otherwise noted, select operating speed to be compatible with equipment and system operation.

B. Damper Operators:

1. Controls contractor shall size damper operator.
2. Sizing: Provide smooth proportional control with sufficient power for air velocities 20 percent greater than maximum design velocity and to provide tight seal against maximum system pressures. Provide spring return for two position control and for fail safe operation.
   a. Provide sufficient number of operators to achieve unrestricted movement throughout damper range.
   b. Provide one operator for maximum 20 sq ft damper section or maximum 7 in-lb/sq ft damper area.
3. Fail Positions:
   a. Spring return to normal position as indicated on freeze, fire, temperature, or loss of power protection. Normal positions are indicated on the control drawings.
      1) Return air damper, normally open.
      2) Outside air damper, normally closed.
      3) Exhaust/Relief air damper, normally closed.
   b. Operator shall fail in place for all other applications not listed under spring return.

C. Manufacturers:

1. Damper Operators:
   a. Belimo.
   b. Honeywell.
   c. Johnson Controls.
   d. Schneider Electric (Invensys).
   e. Siemens.

2.4 FLOW MEASURING APPARATUS

A. Airflow Measuring Stations

1. Sensor quantity and spacing shall comply with the Equal-Area or Log-Tchebycheff method as defined in the ASHRAE Handbook of Fundamentals.
2. Element Construction: Non-corrosive material such as stainless steel, aluminum, or cadmium-plated.
3. Stations and insertion elements utilizing thermal dispersion technology shall utilize hermetically sealed thermistors for each sensor and shall be factory calibrated to NIST traceable standards.
4. Stations and insertion elements using velocity pressure shall be tested and certified in accordance with AMCA 611.
5. Air Inlet Measuring Stations:
   a. Intended for location within an air inlet to equipment, such as a hood or louver.
   b. The air inlet measuring station shall utilize the uniform static differential pressure field created by air moving across a fixed inlet that has a factory calibrated and AMCA certified flow equation. The system shall use the actual air stream temperature and absolute pressure to provide Actual and Standardized instantaneous airflow rate information.
   c. Transmitter:
      1) The transmitter shall be housed in a NEMA 1 enclosure with an integral graphic display and keypad for use during the configuration and field characterization process. The display shall be configurable to indicate four measured process variables (volume, velocity, temperature, pressure) during normal operation.
      2) The transmitter shall utilize a pair of stacked transducers for each channel.
      3) The transmitter shall incorporate an absolute pressure sensing system in order to provide automatic airflow compensation at the installed elevation.
      4) The transmitter shall incorporate temperature sensor input(s) as required to perform continuous airflow density compensation for each channel.
      5) The Transmitter shall provide BACnet MS/TP (MODBUS RTU) and four field configurable analog outputs designed to interface with the building automation system (BAS). The ability to perform configuration changes and field characterization shall be accomplished via the user interface/display, the need for additional utility software shall not be required.
   d. Elements:
      1) Element constructed of 316 stainless steel, factory mounted in a circular puck constructed of 14 gauge galvanized steel. Housing shall meet NEMA 1.
      2) Element shall not induce a measurable pressure drop, adversely affect fan performance or amplify the sound level within the fan system by its presence in the airstream.
      3) Element shall not be affected by the presence of moisture, dirt, or debris in the airstream and shall be unaffected by gusting wind.
      4) Density corrected for ambient temperature variances and atmospheric pressure due to altitude.
   e. Range: Minimum 100 to 2,400 fpm.
   f. Accuracy: Plus/minus 5.0 percent of reading within the calibrated airflow range.
   g. Manufacturers:
      1) Air Monitor Corporation.
      2) Approved equal.
6. Signal Processor:
   a. Microprocessor-based, field programmable, capable of local display of the measured airflow rate.
   b. Factory calibrated to NIST traceable standards.
   c. Accuracy: 0.1 percent of full scale, including linearity, hysteresis, dead band, and repeatability.
   d. Output: 0 to 10 Vdc or 4-20 mA scaled output signal for remote monitoring.

2.5 INPUT/OUTPUT SENSORS AND TRANSMITTERS

A. General:

1. Performance Requirements:
   a. Device must be compatible with project DDC controllers.
   b. Elements used shall be general-purpose type.
   c. Provide transmitters or transducers with sensors as required, with range suitable for the system encountered.
      1) Transmitters and transducers shall have offset and span adjustments.
      2) Shock and vibration shall not harm the transmitter or transducer.
      3) Transmitters and transducers shall have a zeroing capability of readjusting the transmitter zero.
   d. Accuracy requirements shall include the combined effects of linearity, hysteresis, repeatability, and the transmitter.
2. Output: Linear, proportional type over shielded cable pair, 4 - 20 mA or 0 – 10 Vdc signal.
3. Input Power: Low voltage, nominal 24 Vdc.

B. Temperature Sensors:

1. Use thermistor or RTD type temperature sensing elements with characteristics resistant to moisture, vibration, and other conditions consistent with the application without affecting accuracy and life expectancy. Sensor shall be UL 873 listed for temperature equipment.
2. Performance Requirements:
   a. Thermistor:
      1) Accuracy (All): Plus/minus 0.36 degrees F minimum.
      2) Temperature Differential Accuracy: Plus/minus 0.15 degrees F minimum.
      3) Resolution: Plus/minus 0.2 degrees F minimum.
      4) Heat Dissipation Constant: 2.7 mW per degree C.
      5) Drift: 0.04 degree F after 10 years within temperature range.
   b. RTD:
      1) Construct RTD of nickel or platinum with base resistance of 1000 ohms at 70 degrees F. 100 ohm platinum RTD is acceptable if used with project DDC controllers.
      2) Accuracy (All): Plus/minus 1 degree F minimum, unless otherwise noted below.
         a) Room Sensor Accuracy: Plus/minus 0.5 degrees F minimum.
         b) Chilled Water Accuracy: Plus/minus 0.5 degrees F minimum.
         c) Temperature Differential Accuracy: Plus/minus 0.15 degrees F minimum.
      3) Resolution: Plus/minus 0.2 degree F.
      4) Drift: 0.04 degrees F after 10 years within temperature range.
   c. Sensing Range:
      1) Provide limited range sensors if required to sense the range expected for a respective point.
      2) Use RTD type sensors for extended ranges beyond minus 30 degrees F to 230 degrees F.
   d. Wire Resistance:
      1) Use appropriate wire size to limit temperature offset due to wire resistance to 1.0 degree F or use temperature transmitter when offset is greater than 1.0 degree F due to wire resistance.
      2) Compensate for wire resistance in software input definition when feature is available in the DDC controller.
3. Outside Air Sensors: Watertight inlet fitting shielded from direct rays of the sun.
4. Room Temperature Sensors:
   a. Construct for surface or wall box, or enclosure with insulated backing suitable for exterior wall mounting.
   b. Provide the following features:
      1) Setpoint reset slide switch, dial wheel, or push-button interface with an adjustable temperature range.

2) Momentary override request push button for activation of after-hours operation.
3) Locking cover where noted on the drawings.

5. Temperature Averaging Elements:
   a. Use on duct sensors for ductwork 10 sq ft or larger.
   b. Use averaging elements where prone to stratification with sensor length range between 16-22 ft.
   c. Provide for all mixed air and heating coil discharge sensors regardless of duct size.
6. Insertion Elements:
   a. Use in ducts not affected by temperature stratification or smaller than 10 sq ft.
   b. Provide dry type, insertion elements for liquids, installed in immersion wells, with minimum insertion length of 2.5 inches for pipe sizes greater than 4 inches.
   c. Immersion Well Housing: 1/2 inch NPT brass or stainless steel. Stainless steel required for piping 6 inch and larger.

C. Humidity Sensors:

1. Elements: Accurate within 3 percent full range with linear output.
   a. Accuracy shall include temperature effects.
2. Resolution: Plus/minus 1 percent.
3. Drift: Less than 1 percent full scale per year.
4. Sensing Range: 0 to 100 percent relative humidity.
5. Duct Sensors: Insertion type probe with mounting plate. Housing shall be metal, NEMA 250, Type 1.
6. Outside Air Sensors: With element guard and mounting plate.

D. Pressure Transmitters:

1. Duct Static Pressure:
   a. Type: Unidirectional, fixed range.
   a. Performance Characteristics:
      1) Accuracy: Plus/minus one percent of full scale.
      2) Thermal Effects: Temperature compensated over a minimum 40 to 120 F range. Zero and span shift of plus/minus 0.06 percent or less of full scale per degree F.
      3) Sensing Range: Select sensor so that the high end of the nominal sensor range is not less than 150 percent and not more than 300 percent of maximum expected input.
      4) Long Term Thermal Stability: Plus/minus one percent full scale per year.
   b. Construction:
      1) Insertion or traverse type sensor suitable for use in flat oval, rectangular, and round duct configurations.
      2) Insertion length selected as appropriate for duct size.
      3) Traverse sensors shall have at least one pickup point every 6 inches.
      4) Element: Variable capacitance sensing technology.
      5) Housing: Fire retardant glass-filled polyester, brass, stainless steel, or aluminum.
2. Space Static Pressure:
   a. Type: Bi-directional, fixed range.
   b. Performance Characteristics:
      1) Accuracy: Plus/minus 0.5 percent of full scale.
      2) Thermal Effects: Temperature compensated over a minimum 40 to 120 F range. Zero and span shift of plus/minus 0.06 percent or less of full scale per degree F.
      3) Sensing Range: Select sensor so that the high end of the nominal sensor range is not less than 150 percent and not more than 300 percent of maximum expected input.
      4) Long Term Thermal Stability: Plus/minus 0.5 percent full scale per year.
   c. Construction:

1) Sensing Port Wall Mounting: Wall plate with integral sensor, sized to fit standard single gang electrical box. Back of sensor plate fitted with union fitting for tubing connection.
2) Sensing Port Ceiling Mounting: Round plate with union fitting for tubing connection.
3) Sensor Element: Variable capacitance sensor technology.
4) Sensor Housing: Fire retardant glass-filled polyester, brass, stainless steel, or aluminum.

d. Construction:
1) Suitable for the media temperature and pressure.
2) Element: Diaphragm type, stainless steel.
3) Housing: Fire retardant glass-filled polyester, stainless steel, or aluminum.

E. Equipment Operation Sensors:

1. Status Inputs for Electric Motors:
a. Analog Current Transducer:
1) Type: Split core design, cable of being installed or removed without dismantling the primary bus cables.
2) Performance Characteristics:
a) Accuracy: Plus/minus 2 percent of selected range.
b) Range: Multi-range device, suitable for the amperage encountered with internal zero and span adjustment.
3) Construction:
a) 24 V or Self-powered.
b) Provide with integral command relay.
c) Device shall accept overcurrent up to twice its trip into range.
d) Enclosure: UL 94 approved thermoplastic, rated for V-0. No metal parts shall be exposed other than the terminals.

b. Binary Current Sensing Relay:
1) Type: Split core with current transformers, adjustable and set to 175 percent of rated motor current.
2) Self-powered with solid-state circuitry and a dry contact output.
3) Adjustable trip point.
4) Contact Type: Single-pole, double-throw (SPDT).
5) LED indicating the on or off status.
6) A conductor of the load shall be passed through the window of the device.
7) Device shall accept overcurrent up to twice its trip into range.

F. Carbon Monoxide Detectors:

1. Carbon monoxide detectors located within the fleet maintenance building shall be provided as part of the Vehicle Emission Monitoring System. Refer to specification 230915 for more information on these devices.
2. Factory calibrated, single or multichannel dual level detectors, using solid state sensors with three year minimum life. Sensor replacement shall take maximum 15 minutes. Suitable over temperature range of 23 to 130 degrees F.
3. Provide individual indicators and contractors for each level, initially calibrated for 25 ppm and 200 ppm.
4. Maximum response time to 100 ppm CO calibration gas: Two minutes.
5. Accuracy: Plus/minus 5 ppm or plus/minus 5 percent of reading, whichever is lower.
6. Drift: Certified by manufacturer to drift no more than 5 percent per year.
7. Calibration: Certified by manufacturer to require calibration no more frequently than once per year.

G. Nitrogen Dioxide Sensors:

1. Nitrogen dioxide sensors located within the fleet maintenance building shall be provided as part of the Vehicle Emission Monitoring System. Refer to specification 230915 for more information on these devices.
2. Single or multichannel dual level detectors, using solid state sensors with three year minimum life. Sensor replacement shall take maximum 15 minutes. Suitable over temperature range of 23 to 130 degrees F.
3. Provide individual indicators and contractors for each level, initially calibrated for 1 ppm and 3 ppm.
4. Accuracy: Plus/minus 5 percent of reading.

2.6 OUTPUT CONTROL DEVICES

A. Control Relays:

1. Provide relay with contact rating, configuration, and coil voltage that is suitable for the application.
2. Provide NEMA 1 enclosure when relay is not installed in a local control panel.
3. Control relays shall be UL listed plug-in type with dust cover and LED “energized” indicator.
4. Time delay relays shall be UL listed solid-state plug-in type with adjustable time delay. Delay shall be adjustable plus/minus 200 percent minimum from setpoint.

B. Fan Speed Controllers:

1. Solid-state model providing field-adjustable proportional control of motor speed. Equip with filtered circuit to eliminate radio interference.

2.7 POWER SUPPLIES

A. Reference Division 23 Section “Direct Digital Controls for HVAC” for DC power supply requirements.

B. Control power transformers shall meet NEMA/ANSI standards.

C. Control power transformers shall be UL listed for Class 2 current-limited service or provided with over-current protection on both primary and secondary circuits for Class 2 current-limited service.

D. Connected load on the transformer shall not exceed 80 percent of the transformer’s rated capacity.

E. The core and windings shall be completely encased in a UL approved thermoplastic. No metal parts shall be exposed other than the terminals.

F. Performance Characteristics:

1. Accuracy: Plus/minus 1 percent at 5.0 A full scale output.

G. Provide a disconnect switch for each transformer.

2.8 THERMOSTATS

A. General:

1. Non-programmable with the following features:

a. Button or touch-screen Interface:
   1) Temperature information display.
   2) Setpoint display and adjust.
b. Override.
c. Lockout.

2. Performance Requirements:
   a. Accuracy: Plus/minus 1.0 degree F minimum.
   b. Resolution: Plus/minus 0.2 degrees F.
   c. Range:
      1) Operating Temperature: 32 degrees F to 122 degrees F minimum.
      2) Operating Humidity: 0 percent to 95 percent relative humidity, non-condensing.
      3) Setpoint Control:
         a) Cooling: 54 degrees to 100 degrees F.
         b) Heating: 40 degrees to 90 degrees F.
   d. Multi-stage as required to match unit cooling and heating stages scheduled on the drawings.

B. Line Voltage Thermostats:

1. Integral manual On/Off/Auto selector switch, single or two pole as required.
2. Dead band: Maximum 2 degrees F.
3. Covers: Locking with set point adjustment and indication.
4. Setpoint functional range: 45 degrees F to 90 degrees F.
5. Rating: Motor load.

C. Room Thermostat Accessories:

1. Thermostat Covers: Plastic.
2. Insulating Bases: For thermostats located on exterior walls.
3. Thermostat Guards: Locking transparent plastic mounted on separate base.
4. Adjusting Key: As required for device.
5. Aspirating Boxes: Where indicated for thermostats requiring flush installation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that systems are ready to receive work.

C. Beginning of installation means installer accepts existing conditions.

D. Sequence work to ensure installation of components is complementary to installation of similar components in other systems.

E. Coordinate installation of system components with installation of mechanical systems equipment such as air handling units and air terminal units.

3.2 INSTALLATION

A. Cooperate with other contractors performing work on this project as necessary to achieve a complete and coordinated installation. Each Contractor shall consult the Drawings and Specifications for all trades to determine the nature and extent of others work.

B. General Workmanship:

1. Install equipment, piping, and wiring/raceway parallel to building lines wherever possible.
2. Provide sufficient slack and flexible connections to allow for vibration of piping and equipment.
3. Install all equipment in readily accessible locations.
4. All installations shall comply with industry specifications and standards for performance, reliability, and compatibility and be executed in strict adherence to local codes and standard practices.
5. Install all products in accordance with manufacturer's instructions.

C. Sensors:

1. Mount sensors rigidly and adequately for the environment within which the sensor operates.
2. Room temperature sensors shall be installed on concealed junction boxes properly supported by the wall framing.
3. All wires attached to sensors shall be air sealed in their raceways or in the wall to stop air transmitted from other areas affecting sensor readings.
4. Sensors used in mixing plenums and hot and cold decks shall be of averaging type. Averaging sensors shall be installed in a serpentine manner vertically across the duct. Each bend shall be supported with a capillary clip.
5. Do not install temperature sensors within the vapor plume of a humidifier. If installing a sensor downstream of a humidifier, install it at least 10 feet downstream.
6. Install temperature, humidity, and smoke detectors for both supply air and return air applications a minimum of 10’-0” downstream or upstream of the air handling unit and prior to any branch duct takeoffs.
7. Install outdoor air temperature sensors on north wall, complete with sun shield where shown on the plans. If not shown, locate sensors in an accessible location, a minimum of 15 feet away from exhaust or relief air locations.
8. Differential air static pressure.
   a. Supply Duct Static Pressure: Pipe the high-pressure tap to the duct using a pitot tube. Pipe the low-pressure port to a tee in the high-pressure tap tubing of the corresponding building static pressure sensor (if applicable) or to the location of the duct high-pressure tap and leave open to the plenum.
   b. Building Static Pressure: Pipe the low-pressure port of the pressure sensor to the static pressure port located on the outside of the building. Pipe the high-pressure port to a location suitable to sense common building pressure or as indicated on the drawings.
      1) Panel mount the transducer adjacent to its associated building automation system controller. Provide an independent manometer gauge next to transducer for calibration.
   c. The piping to the pressure ports on all pressure transducers shall contain a capped test port located adjacent to the transducer.
   d. All pressure transducers, other than those controlling VAV boxes, shall be located in field device panels, not on the equipment monitored or on ductwork. Mount transducers in a location accessible for service without use of ladders or special equipment.
   e. All air and water differential pressure sensors shall have gauge tees mounted adjacent to the taps. Water gauges shall also have shutoff valves installed before the tee.

9. Check and verify location of thermostats, humidistats, and exposed control sensors with plans and room details before installation. Locate 48 inches above floor. Align with adjacent lighting switches and humidistats.
    a. Install devices to meet ADA requirements unless otherwise noted on the plans.
10. Mount outdoor reset thermostats and outdoor sensors indoors, with sensing elements outdoors with sun shield.
11. Provide separable sockets for liquids and flanges for air bulb elements.
12. Provide thermostats in aspirating boxes in areas where flush mounting is required.
13. Provide guards on thermostats in areas indicated on the drawings.
14. Calibrate each instrument installed that is not factory calibrated and provided with calibration documentation.

D. Control Dampers:

1. Install dampers with extruded aluminum or stainless steel frames and blades in corrosive environments and areas with high humidity.
2. Install smooth transitions, not exceeding 30 degrees, to dampers smaller than adjacent duct. Install transitions as close to damper as possible but at distance to avoid interference and impact to performance. Consult manufacturer for recommended clearance.
3. Clearance:
    a. Locate dampers for easy access and provide separate support of dampers that cannot be handled by service personnel without hoisting mechanism.
    b. Install dampers with at least 24 inches of clear space on sides of dampers requiring service access.
4. Service Access:
    a. Dampers and actuators shall be accessible for visual inspection and service.
    b. Install access door(s) in duct or equipment located upstream of damper to allow service personnel to hand clean any portion of damper, linkage, and actuator. Comply with requirements in Division 23 Section, “Air Duct Accessories.”.
5. Duct openings shall be free of any obstruction or irregularities that might interfere with blade or linkage rotation or actuator mounting.
6. Install dampers straight and true, level in all planes, and square in all dimensions. Install supplementary structural steel reinforcement for large multiple-section dampers if factory support alone cannot handle loading.
7. Provide mixing dampers of parallel blade construction arranged to mix streams. Where shown on the drawings, provide separate minimum outside air damper section adjacent to return air dampers with separate damper motor.
8. Provide isolation (two position) dampers of parallel blade construction.
9. Provide opposed blade damper configuration for all other applications.
10. Install damper motors on outside of duct in warm areas. Do not install motors in locations at outdoor temperatures.
11. After installation of low-leakage dampers and seals, caulk between frame and duct or opening to prevent leakage around perimeter of damper.

E. Operators:

1. Mount and link control damper actuators according to manufacturer’s instructions.
    a. To compress seals when spring-return actuators are used on normally closed dampers, power actuator to approximately 5 degrees open position, manually close the damper, and then tighten the linkage.
    b. Check operation of damper/actuator combination to confirm that actuator modulates damper smoothly throughout stroke to both open and closed positions.
    c. Provide all mounting hardware and linkages for actuator installation.

2. Dampers: Actuators shall be direct-mounted on damper shaft or jackshaft unless shown as a linkage installation. For low-leakage dampers with seals, the actuator shall be mounted with a minimum 5 degree available for tightening the damper seals.

F. Control Panels:

1. Install control panels where shown on the drawings and where required to house controllers for the controlled systems and equipment.
2. Mount control panels adjacent to associated equipment on vibration free walls or free standing angle iron supports. One cabinet may accommodate more than one system in same equipment room. Provide engraved plastic nameplates for instruments and controls inside cabinet and engraved plastic nameplates on cabinet face.
3. Coordinate 120V power requirements with Division 26 to panels used for the building automation system and transformers for low voltage power to controllers.

G. Install "hand/off/auto" selector switches to override automatic interlock controls when switch is in "hand" position.

H. Provide an insulation standoff on control devices, cables, and other items that do not require flush mounting to ductwork, piping, or equipment.

3.3 MAINTENANCE

A. Refer to Division 01 closeout requirements for additional requirements relating to maintenance service.

B. Provide service and maintenance of control system for one year from Date of Substantial Completion.

C. Provide complete service of controls systems, including call backs, and submit written report of each service call.

3.4 STARTUP AND DEMONSTRATION

A. Control Dampers:

1. Stroke and adjust control dampers following manufacturer's recommended procedure, from 100 percent open to 100 percent closed back to 100 percent open.
2. Check and document open and close cycle times for applications with a cycle time of less than 30 seconds.
3. For control dampers equipped with positive position indication, check feedback signal at multiple positions to confirm proper position indication.
4. Verify that all two-position dampers operate properly and that the normal positions are correct.
5. Verify that all modulating dampers are functional, that the start and span are correct, that direction and normal positions are correct, and that they achieve proper closure.

3.5 DAMPER SCHEDULE

SERVICE	RUSKIN MODEL	MATERIAL
Outside Air Control	CD-50	Aluminum
Corrosive Environments	CD-35	Aluminum or Stainless steel

All Other	CD-35	Galvanized Steel

3.6 DAMPER OPERATOR VOLTAGE SCHEDULE

SERVICE	VOLTAGE
Interlocked with HVAC fans	120V
Multi-section dampers	120V
Large dampers (> 60 inches in any dimension)	120V
All other operators control wiring	24V

1. Note: Coordinate with Division 26 if 120V power is required for operator to achieve appropriate torque requirements for damper actuation.

END OF SECTION 230913

SECTION 235500 - FUEL FIRED HEATERS

PART 1 - GENERAL REQUIREMENTS

1.1 SUMMARY

A. This Section includes the following:

1. Gas-fired unit heaters
2. High-Intensity, Gas-Fired, Radiant Heaters

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 22 Section “Natural Gas Systems” for natural gas equipment connection requirements.
2. Division 23 Sections for breechings, temperature controls, and other mechanical equipment not specified in this Section, but required for a complete installation.
3. Division 26 Sections for electrical work including motor starters, disconnects, wires/cables, raceways, and other electrical equipment devices not specified in this Section, but required for a complete installation.

1.2 SUBMITTALS

A. General: Submit the following in accordance with Division 1 and Division 23 Section “Common Work Results for HVAC”.

1. Product data including weights, dimensions, metal gages, and data on features and components. Include plan and elevation views of units, minimum clearances, data on ratings and capacities and installation instructions.
2. Maintenance data for products for inclusion in "Operating and Maintenance Manual" specified in Division 1.
3. Wiring diagrams from manufacturers detailing requirements for electrical power and control wiring for heaters. Include ladder-type wiring diagrams for interlock and control wiring required for field installation. Differentiate between portions of wiring that are factory installed and portions that are to be field installed.

1.3 QUALITY ASSURANCE

A. Comply with NFPA 70, "National Electrical Code."

1.4 SPARE PARTS

A. General: Furnish spare parts matching products installed, as described below, packaged with protective covering for storage, and identified with labels clearly describing contents.

1. Infrared Heat Igniter: 4 hot-surface burner igniters.

PART 2 - PRODUCTS AND MATERIALS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following:

1. Unit Heaters, Gas, Propeller Fan:
   a. Dunham-Bush, Inc.
   b. Hartzell Fan, Inc.
   c. Hastings Industries, Inc.
   d. Lennox Industries, Inc.
   e. Modine Mfg. Co.
   f. Rapid Engineering
   g. Reznor.
   h. Sterling Heating Equipment Div.
   i. The Trane Co.
2. High-Intensity, Gas, Infrared Heaters:
   a. Detroit Radiant
   b. Modine
   c. Perfection-Schwank, Inc.
   d. Reznor.
   e. Roberts-Gordon, Inc.
   f. Solaronics, Inc.
   g. Space-Ray Div.
   h. Superior Radiant Products.

2.2 FUEL-FIRED HEATERS, GENERAL

A. Types, Minimum Ratings, Locations, and Mountings: As indicated.

1. Gas-Fired Heaters and Accessory Items: NFPA 54, "National Fuel Gas Code."
   a. AGA Approval: Heaters design certified and labeled by the American Gas Association.
   b. Type of Gas: Heaters designed and built to burn natural gas with characteristics the same as those of the gas available at the Project site.

B. Assembly and Wiring: Heaters factory assembled, piped, wired, and tested.

C. Heater Electrical Rating: 115 V a.c. except as otherwise indicated.

D. Propeller Fans: Factory-balanced, resilient-mounted, with aluminum blades and 100-percent steel blade guard.

E. Motors: Totally enclosed with internal thermal overload protection and complying with Division 15 Section "Motors," except as otherwise indicated.

1. Heater Motors: Energy efficient types as defined in Division 23 section "Common Motor Requirements for HVAC Equipment."

F. Concentric Terminal Vent Assembly: Combined combustion air inlet and power vent outlet. Include adapter assembly for connection to inlet and outlet pipes, and flanges for wall penetration.

G. Control Transformer: Integrally mounted. 120 V a.c./24 V a.c.

2.3 GAS-FIRED UNIT HEATERS, HIGH EFFICIENCY

A. General: Comply with ANSI Z83.8, "Gas Unit Heaters."

B. Housing: Steel, with integral motorized vent exhauster and inserts for suspension mounting rods.

C. Ignition: Electronically controlled spark with flame sensor.

D. Burners: Cast iron or aluminized steel.

E. Automatic Fan Thermal Switch: Delays fan start until discharge air is heated. Delays fan shutdown until air cools to comfort threshold.

F. Heat Exchanger: Stainless steel.

G. Unit Fan Type: Propeller.

H. Automatic Gas Control: Two-stage, 24 V a.c. valve.

I. Separated Combustion Air Supply: Combustion and heat exchange chambers isolated from heated space atmosphere.

J. Discharge Louvers: Independently adjustable horizontal blades.

2.4 HIGH INTENSITY GAS INFRARED HEATERS

A. General: Comply with ANSI Z83.19A, "Gas Fired High Intensity Infrared Heaters." and ANSI/NFPA 88B “Standard for Repair Garages”.

B. Electric Ignition: 115 V a.c. rating.

C. Main Housing: Continuous, one-piece, aluminized-steel unit without gaps between housing and reflectors.

D. Burner Assembly: Modular, aluminized steel with powder-coat or similar finish plenum chamber secured with stainless steel retainers.

E. Emitter: Perforated ceramic tiles.

F. Reflector: Polished aluminum, 97 percent minimum reflectivity.

G. Parabolic Reflector: Same material as reflectors

H. Connections to External Piping, Tubing, Vents, or Ducts: Flexible units, AGA-approved for the purpose.

I. Heater Type: Gravity vented, power burner.

J. Burner/Ignition: Direct Spark, solid-state ignition module with spark electrode and flame sensor.

K. Control:

1. External thermostat: Two-stage, wall-mounted type with 40 to 90 deg F operating range and fan on switch.
2. Integrally mounted control transformer.

L. Accessories:

1. Protective screen and heat-deflector shield.
2. Stainless-steel flexible connector with manual valve for gas supply.
3. Hanger chain with "S" hooks.
4. Preassembled chain suspension kit.

5. Rigid mounting kits.
6. Clearance warning plaque.
7. Two-stage operation.

2.5 TEMPERATURE CONTROL

A. Wires and cables are specified in Division 26.

B. Thermostats and Components: Specified in other Division 23 sections.

2.6 FINISHES

A. External Casings and Cabinets: Baked enamel over corrosion-resistant treated surface.

PART 3 - EXECUTION

3.1 INSTALLATION AND CONNECTION

A. Installation and connection of gas-fired heaters and associated fuel and vent features and systems installed and connected in accordance with NFPA 54, applicable local codes and regulations, and manufacturer's printed installation instructions.

1. Connect gas piping to furnace according to requirements of Division 22 Section "Natural Gas Systems." Provide union with sufficient clearance for burner removal and service.
2. Connect vents in accordance with Division 23 Section "Breechings, Chimneys and Stacks."

B. Suspended Units: Suspend from substrate using threaded rods, spring hangers, and building attachments. Secure rods to unit hanger attachments. Adjust hangers so unit is plumb and level.

1. Spring hangers are specified in Division 23 section "Vibration Isolation for HVAC Piping and Equipment."

C. Controls: Wiring and connections are specified in Division 26.

D. Maintain manufacturer’s recommended clearance for combustibles.

E. Install controls as specified in Division 23 Controls section.

3.2 IDENTIFICATION

A. Identify heaters and connections in accordance with Division 23 section "Identification for HVAC Piping and Equipment."

3.3 STARTUP

A. Test functions, operations, and control sequences and protective features. Adjust to assure operation is in accordance with design.

B. Correct deficiencies identified by tests and observations and retest until specified requirements are met.

3.4 CLEANING AND ADJUSTING

A. Cleaning: Upon completion of installation, inspect heaters and associated components. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish. Clean unit internally using methods and materials recommended by manufacturer.

B. Adjusting: Make burner and other unit adjustments for optimum heating performance and efficiency. Adjust heat distribution features, including louvers, vanes, shutters, dampers, and reflectors, to provide optimum heat distribution for objects, personnel, and spaces served.

3.5 TRAINING

A. General: At a time mutually agreed upon between the Construction Manager, Commissioning Agent, and Engineer, provide the services of a factory trained and authorized representative to train Construction Manager, Commissioning Agent, and Engineer for a minimum of two hours on the operation and maintenance of the equipment provided under this section.

B. Content: Training shall include but not be limited to:

1. Overview of the system and/or equipment as it relates to the facility as a whole.
2. Operation and maintenance procedures and schedules related to startup and shutdown, troubleshooting, servicing, preventive maintenance and appropriate operator intervention.
3. Review data included in the operation and maintenance manuals. Refer to Division 1 Section "Operating and Maintenance Data."

C. Certification: Contractor shall submit to the Engineer a certification letter stating that the Owner's designated representative has been trained as specified herein. Letter shall include date, time, attendees and subject of training. The certification letter shall be signed by the Contractor and the Owner's representative indicating agreement that the training has been provided.

D. Schedule: Schedule training with Owner with at least 7 days' advance notice.

END OF SECTION 235500

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SECTION 323115 –CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Fence framework, fabric, and accessories.
2. Excavation and anchorages for post bases.
3. Manual gates and related hardware.
4. Electric operated sliding gates.

1.2 SUBMITTALS

A. Submit the following under provisions of Section 013300.

B. Product Data: Include descriptive literature and installation instructions.

1.3 QUALITY ASSURANCE

A. Manufacturer: Company having manufacturing facilities in the United States with a minimum 5 years experience specializing in manufacturing of chain link fence products.

B. Fence contractor: Contractor having 5 years experience installing similar projects in accordance with ASTM F567.

C. Tolerances: ASTM current specification and tolerances apply and supersede any conflicting tolerance.

D. Substitutions: Alternate chain link products may be acceptable by the architect as equal if approved in writing ten days prior to bidding provided that the items submitted meet the specifications contained in this document.

E. Single source: To ensure system integrity obtain the chain link system, framework, fabric, fittings, gates and accessories from a single source.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Subject to compliance with specifications, use products of one of the following:
1. Allied Tube and Conduit Corp.
2. Master Halco, Inc.
3. United States Steel.
4. Approved alternate manufacturer.

2.2 MATERIALS

A. Fence Framework-Steel pipe Type II: Cold formed electric resistance welded steel pipe complying with ASTM F1043 Group IA having minimum steel yield strength of 30,000 psi. External protective coating F1043 Type B, 0.9 oz/ft² (270 g/m²) minimum hot-dip zinc coating plus a chromate conversion and a clear polymer coating. Internal coating F1043 Type D, 81% nominal

zinc pigmented coating minimum 3 mils (0.0076 mm) thick or Type B, minimum 0.9 oz/ft² (275 g/m²) zinc.

B. Materials
1. End, Corner, and Pull Posts: Galvanized steel; minimum sizes and weights as follows:
   a. Up to 6 foot fabric height: 2.375 inch outside diameter pipe, 3.65 lbs/lin ft or 3.5 x 3.5 inch roll formed section, 4.85 lbs/lin ft.
   b. Over 6 foot fabric height: 4-inch outside diameter pipe, 5.79 lbs/lin ft; or 3.5 x 3.5 inch roll formed section, 4.85 lbs/lin ft.
2. Line Posts: Galvanized steel; minimum sizes and weights as follows:
   a. Up to 6 foot fabric height: 1.90 inch outside diameter pipe, 2.70 lbs/lin ft; or 1.875 x 1.625 inch C-section, 2.78 lbs/lin ft.
   b. 6 foot to 8 foot fabric height: 2.375 inch outside diameter pipe, 3.65 lbs/lin ft; or 2/25 x 1.875 inch H-section, 2.64 lbs/lin ft.
   c. Over 8 foot fabric height: 4-inch outside diameter pipe, 5.79 lbs/lin ft; or 2.25 x 1.875 H section, 3.26 lbs/lin ft.
3. Gate Posts: Galvanized steel; for single gate or one leaf of double gate, as follows:
   a. Up to 6 foot height; 2.875 inch outside diameter pipe, 5.79 lbs/lin ft; or 3.5 x 3.5 roll formed section, 4.85 lbs/lin ft.
   b. 6 foot to 13 foot height: 4 inch outside diameter pipe, 9.11 lbs/lin ft.
4. Top Rail and Intermediate Rails: Galvanized steel, manufacturer's longest lengths.
   a. Typical: 1.66 inch outside diameter pipe, 2.27 lbs/lin ft; or 1.625 x 1.25 inch roll formed section, 1.35 lbs/lin ft.
   b. Couplings: Expansion type, approximately 6 inches long.
   c. Attaching Devices: Means of attaching top rail securely to each gate, corner, pull, and end post.
   d. At 18 foot tall fence, provide bottom rail, intermediate rails at 6' & 12', and top rail.

C. Fabric: Type II Zinc-Coated Class 4 weight of zinc coating 1.2 oz/square foot No. 7 gauge galvanized steel wire in 2 inch mesh, with both top and bottom selvages knuckled.

2.3 FITTINGS

A. Post caps: ASTM F626 galvanized pressed steel, malleable iron, or aluminum alloy weather tight closure cap for tubular posts. Provide one cap for each post. "C" shaped line post without top rail do not require post caps. When top rail is specified provide line post loop tops to secure top rail.

B. Rail ends: Galvanized pressed steel per ASTM F626, for connection of rails to post using a brace band.

C. Top rail sleeves: 7" (178 mm) galvanized steel sleeve per ASTM F626.

D. Wire ties: 9 gauge (0.148") galvanized steel wire for attachment of fabric to line posts and rails. Pre-formed hog ring ties to be 9 gauge (0.148") galvanized steel or aluminum for attachment of fabric to tension wire. Tie wire and hog rings per ASTM F626.

E. Brace and tension (stretcher bar) bands: ASTM F626 galvanized 12 gauge (0.105") pressed steel by 3/4" formed to a minimum 300 degree profile curvature for post attachment. Secure bands using minimum 5/16" galvanized carriage bolt and nut.

F. Tension (stretcher) bars: Galvanized steel one piece length equal to 2 inches (50 mm) less than full height of fabric with a minimum cross-section of 3/16" x 3/4" per ASTM F626. Provide tension (stretcher) bars where chain link fabric is secured to the terminal post.

G. Truss rod assembly: Galvanized steel minimum 5/16” diameter truss rod with pressed steel tightener, in accordance with ASTM F626.

H. Carriage bolts and nuts: Galvanized of commercial quality.

2.4 TENSION WIRE

A. Tension wire: ASTM A824 Type II, zinc coated (galvanized) steel wire, 7 gauge, (0.177”) diameter wire having a tensile strength of 75,000 psi (517 MPa).
1. Class 4 1.20 oz/ft² (366 g/m²)

2.5 CHAIN LINK SWING GATE

A. Swing gates size per plans. Fabricate chain link swing gates in accordance with ASTM F900. Gate frame to be of welded construction. Weld areas to be protected with zinc-rich paint per ASTM A780. The gate frame members are to be spaced no greater than 8’ 0” apart horizontally or vertically. Exterior members to be 1.900” OD pipe, interior members when required shall be 1.660” OD pipe. Pipe to be Grade 1 ASTM F1083 per section 2.03. Chain link fabric to match specification of fence system. Fabric to be stretched tightly and secured to vertical outer frame members using tension bar and tension bands spaced 12” on center and tied to the horizontal and interior members 12” on center using 9 gauge galvanized steel ties per section 2.04.

B. Hinges, hot dip galvanized pressed steel or malleable iron, structurally capable of supporting gate leaf and allow opening and closing without binding. Non-lift-off type hinge design shall permit gate to swing 180° (3.14 rad)

C. Latch: Surface mount punch gate lock equal to Lockey Sumo GL2 with CL2LINX Adapter for Chain Link.

D. Gate posts: Grade 1 pipe ASTM F1083 per section 2.03, size per table below

E.

Gate fabric height over 6 ft. to 12 ft. (1.2m to 2.4m)	
Gate leaf width	Outside Diameter
Up to 6 ft.	2.875 in.
Over 6 ft. to 12 ft.	4.000 in.
Over 12 ft. to 18 ft.	6.625 in.
Over 18 ft. to 24 ft.	8.625 in.

2.6 CHAIN LINK INTERNAL TRACK ALUMINUM CANTILEVER SLIDE GATE

A. Aluminum cantilever slide gate single leaf 7’ high x length per plan shall be of the internal roller design per ASTM F1184 Type II Class 2. Cantilever slide gate to be constructed of ASTM B221 aluminum members welded and designed for maximum structural integrity. Vertical external and internal members minimum 4” square, spaced maximum 8’ 0” on center. Gates having fabric

greater than 8’ 0” in height require a horizontal member. The top horizontal member shall be a one-piece precision extruded structural framing member having an integral enclosed track. Bottom horizontal member to be minimum 2” x 4”. Adjustable diagonal X trusses shall be installed in each gate panel to transfer the alternating forces as the gate slides. The gate opening portion shall be filled with chain link fabric stretched taut and secured to the frame members. Chain link fabric shall match the fence system specification. The overall gate structure shall be a minimum of 40% larger than the gate opening to support the cantilevered portion of the gate in the closed position with minimum deflection per ASTM F1184. Electrically operated gates per ASTM F2200 and UL 325 required the back frame to be filled with fabric. Single leaf cantilever design for openings larger than 30’ 0” (9.15 m) up to 40’ 0” shall be fabricated by welding together two horizontal top structural/track members creating a dual track system. Single track gates up to 30’ 0” (9.15 m) opening require two support posts and two internal truck assemblies. Dual track gates over 30’ 0” (9.15 m) up to 40’ 0” (12.2 m) require two sets of dual posts and four internal truck assemblies.

B. Internal truck assemblies shall be capable of swiveling to accommodate gate movement and ensure full contact of the four support wheels and two guide wheels to the internal track surface. The galvanized steel truck assembly post bracket, truck assembly vertical support axle as well as the support wheels shall be designed to handle static and dynamic forces required to support and operate the gate. The truck assembly, support axle and internal wheels shall be comprised of stainless steel or galvanized steel components.

C. Galvanized steel bottom guide roller brackets containing two 3” rubber wheels shall be supplied to keep the bottom of the gate plumb and in proper alignment.

D. (Removed)

E. Cantilever gate posts shall be 4” square SCH40. Single leaf cantilevers up to 30’ 0” require three 4” square posts, dual track single leaf cantilevers over 30’ 0” up to 40’ 0” require two sets of pre fabricated dual 4” square support posts and one 4” (101.6 mm) latch post. (Gate is supported in the center of the dual posts.)

2.7 POST SETTING MATERIALS

A. Concrete: Minimum 28 day compressive strength of 3,000 psi (20 MPa).

PART 3 - EXECUTION

3.1 SITE EXAMINATION

A. Ensure property lines and legal boundaries of work are clearly established.

B. Survey of fence location to be provided by general contractor.

C. Verify areas to receive fencing are completed to final grade.

3.2 CHAIN LINK FRAMEWORK INSTALLATION

A. Install chain link fence system in accordance with ASTM F567 and manufacturer’s instructions.

B. Locate terminal post at each fence termination and change in horizontal or vertical direction of 30° or more.

C. Space line posts uniformly 8’ (2438 mm) on center

D. Concrete set posts: Excavate holes in firm, undisturbed or compacted soil. Holes shall have diameter 4 times greater than outside dimension of post, and depths approximately 6” deeper than post bottom. Excavate deeper as required for adequate support in soft and loose soils, and for posts with heavy lateral loads. Set post bottom 36” below surface when in firm, undisturbed soil. Place concrete around posts in a continuous pour. Trowel finish around post and slope to direct water away from posts. Drive Anchor set line posts: With protective cap, drive post 36” into ground. Excavate a 6” diameter by 6” deep section around post to accommodate the drive anchor shoe clamp. Drive the 2 diagonal drive anchor angle blades into the soil and securely tighten the angle blades to post via the shoe clamp, backfill hole.

E. Check each post for vertical and top alignment, and maintain in position during placement and finishing operations.

F. Bracing: Install horizontal brace and truss assembly at mid-height or above for fences 6’ and over at each fabric connection to the terminal post. The diagonal truss rod is installed at the point where the brace rail is attached to the terminal post and diagonally down to the bottom of the adjacent line post. Place the truss rod in tension by adjusting the turnbuckle.

G. Tension wire: Install tension wires so that it will be located 4” up from bottom the fabric. If top rail is not specified, install the tension wire so that it will be located 4” down from the top of the fabric. Stretch and install tension wire before installing the chain link fabric and attach it to each post using wire ties.

H. Top rail: Install in lengths of 21’. Connect ends with sleeves forming a rigid connection, allow for expansion and contraction.

I. Center Rails: Install mid rails between line posts and attach to post using rail end or line rail clamps. A center rail is required for fabric height 12’ and over.

J. Bottom Rails: Install bottom rails between posts and attach to post using rail end or line rail clamps.

3.3 CHAIN LINK FABRIC INSTALLATION

A. Fabric: Install fabric on security side, pull fabric taut; thread the tension bar through fabric and attach to terminal posts with tension bands spaced maximum of 15” on center and attach so that fabric remains in tension after pulling force is released. Install fabric so that it is 2” +/- 1” above finish grade.

B. Secure fabric using wire ties to line posts at 15” on center and to rails and braces 24” on center, and to the tension wire using hog rings 24” on center. Tie wire shall be secured to the fabric by wrapping it two 360 degree turns around the chain link wire pickets. Cut off any excess wire and bend back so as not to protrude so as to avoid injury if a pedestrian may come in contact with the fence.

3.4 CHAIN LINK INSTALLATION

A. Swing gates: Installation of swing gates and gate posts shall be per ASTM F567. Direction of swing shall be as shown on drawings Gates shall be hung plumb in the closed position with minimal space from grade to bottom of gate leaf. Double gate drop bar receiver shall be set in a

minimum concrete footing 6” diameter by 24” deep. Gate leaf holdbacks shall be installed on all double gates and all gate leafs greater than 5’ in width.

B. Cantilever slide gates: Install cantilever horizontal slide gates and gate posts in accordance with ASTM F567. Cantilever sliding gates shall be plumb in the closed position with minimal ground clearance and slide with an initial force of 40 lbs. (18.14 kg). Double gate drop bar receiver shall be set in a minimum concrete footing 6” diameter by 24” deep. Install top and bottom safety roller covers and adjacent safety guide posts on ASTM F1184 Type II Class 2 external roller cantilever slide gate applications

3.5 ELECTRICAL GROUNDING

A. Grounding when required shall be the responsibility of a licensed electrical contractor and included in Contract Section 337900.

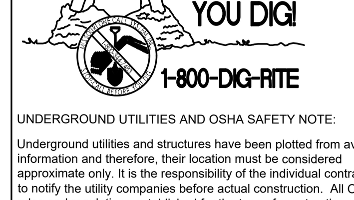
3.6 SITE CLEAN UP

A. Clean up area adjacent to fence line from debris and unused material created by fence installation.

END OF SECTION 323115

SITE PLAN NOTES:

1. BASIS OF BEARINGS FOR THIS SURVEY WAS ADOPTED FROM THE MISSOURI STATE PLANE COORDINATE SYSTEM, NAD 1983, EAST ZONE.
2. REFERENCE BENCHMARK: MISSOURI DEPARTMENT OF TRANSPORTATION VRS NETWORK, NAVD 88.
3. BUILDING HEIGHT, SITE LIGHTING AND SIGNAGE SHALL BE IN ACCORDANCE WITH THE CITY OF WENTZVILLE REQUIREMENTS.
4. ALL DIMENSIONS ARE TO FACE OF CURB OR FACE OF BUILDING UNLESS NOTED OTHERWISE.
5. REFER TO ARCHITECTURAL PLANS FOR BUILDING DIMENSIONS AND DETAILS.
6. ALL PROPOSED IMPROVEMENTS SHALL BE CONSTRUCTED TO MEET THE CITY OF WENTZVILLE SPECIFICATIONS.
7. PROPOSED CONTOURS DEPICTED ARE AT FINISHED GRADE.DRIVE ENTRANCES ARE TO BE CONSTRUCTED IN ACCORDANCE WITH THE CITY OF WENTZVILLE SPECIFICATIONS.
8. ALL PARKING LOT LIGHTING SHALL BE FULL CUT-OFF. NO WALL-PACK FLOODLIGHTS WILL BE USED ON THE BUILDING. ALL LIGHT FIXTURES ATTACHED TO THE BUILDING SHALL BE DECORATIVE AND APPROVED BY THE CITY'S PLANNING COMMISSION.
9. SIDEWALKS ALONG ACCESSIBLE ROUTE SHALL NOT HAVE A SLOPE EXCEEDING 1:20. SLOPES GREATER THAN 1:20 MUST BE DESIGNED AS A RAMP.
10. SIDEWALKS, CURB RAMPS, RAMPS AND ACCESSIBLE PARKING SPACES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE CURRENT APPROVED "AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES" (ADAAG) ALONG WITH THE REQUIRED GRADES, CONSTRUCTION MATERIALS, SPECIFICATIONS AND SIGNAGE. IF ANY CONFLICT OCCURS BETWEEN THE ADAAG GUIDELINES AND THE INFORMATION ON THE PLANS, THE ADAAG GUIDELINES SHALL TAKE PRECEDENCE AND THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER PRIOR TO ANY CONSTRUCTION.
11. ALL PUBLIC IMPROVEMENTS SHALL BE REQUIRED TO MEET ADAAG 2010 AND CITY OF WENTZVILLE DESIGN STANDARDS.
12. ALL UTILITIES SHOWN HAVE BEEN LOCATED BY THE ENGINEER FROM AVAILABLE RECORDS. THEIR LOCATION SHOULD BE CONSIDERED APPROXIMATE. THE CONTRACTOR HAS THE RESPONSIBILITY TO NOTIFY ALL UTILITY COMPANIES PRIOR TO CONSTRUCTION TO HAVE EXISTING UTILITIES FIELD LOCATED. THE CONTRACTOR SHALL BE ON RECORD WITH THE MISSOURI ONE CALL SYSTEM. ALL PROPOSED UTILITIES TO BE UNDERGROUND.
13. ALL UTILITY TAPS AND CONNECTIONS ARE TO BE PERFORMED PER UTILITY SERVICE PROVIDER SPECIFICATIONS.
14. ALL PROPOSED IMPROVEMENTS, STORM SEWERS, SANITARY SEWERS, WATER MAIN, GRADING AND DRAINAGE SHALL BE IN CONFORMANCE WITH THE CITY OF WENTZVILLE DETAILS AND SPECIFICATIONS.
15. ALL EXISTING ON-SITE IMPROVEMENTS WITHIN THE DISTURBED AREA LIMITS SHALL REMOVED OR ADJUSTED TO GRADE UNLESS NOTED OTHERWISE.
16. APPROVAL OF THIS PLAN DOES NOT CONSTITUTE APPROVAL OF SIGNAGE.
17. ALL HVAC AND MECHANICAL EQUIPMENT SHALL BE SCREENED ON ALL SIDES FROM PUBLIC VIEW.
18. NO STEPS ARE ALLOWED AT ACCESSIBLE ENTRANCE DOORS.
19. FLOOD AREA: PER FEMA FIRM 29183C0215G, DATED JANUARY 20, 2016 - THE PROPERTY IS ZONE X WHICH IS DESCRIBED AS "AREA OF MINIMAL FLOOD HAZARD".
20. ALL PROPOSED PUBLIC UTILITIES SHALL BE INSTALLED WITHIN THE PUBLIC RIGHT-OF-WAY OR WITHIN THE BOUNDARIES OF THE PROPOSED EASEMENTS. THE CITY OF WENTZVILLE ENGINEERING DESIGN CRITERIA SHALL BE IN EFFECT FOR THIS DEVELOPMENT.
21. ANY RETAINING WALLS THAT ARE OVER 3.5 FEET IN HEIGHT SHALL BE DESIGNED BY A RETAINING WALL ENGINEER AND GEOTECHNICAL SERVICES SHALL BE OBTAINED TO DETERMINE A GLOBAL AND FOUNDATION STABILITY ANALYSIS OF THE PROPOSED RETAINING WALL.
22. A DRAINLAYER PERMIT IS REQUIRED BY THE CITY OF WENTZVILLE FOR ALL STORM SEWERS.
23. STORMWATER SHALL BE DISCHARGED AT ADEQUATE NATURAL DISCHARGE POINTS. SINKHOLES ARE NOT ADEQUATE NATURAL DISCHARGE POINTS.
24. ALL LANDSCAPING SHALL BE PROVIDED AS REQUIRED BY THE CITY OF WENTZVILLE. REFERENCE LANDSCAPE PLAN.
25. NO ON-SITE ILLUMINATION SOURCE SHALL BE SO SITUATED THAT LIGHT IS CAST DIRECTLY ON ADJOINING PROPERTIES OR PUBLIC ROADWAYS. ILLUMINATION LEVELS SHALL COMPLY WITH THE PROVISIONS OF THE LIGHTING SECTION, CITY OF WENTZVILLE SECTION 410.320. THEREBY LIGHTING INTENSITY SHALL NOT EXCEED 0.5 FOOT CANDLES AT ALL EXTERIOR PROPERTY LINES AND 8.0 F.C. AT THE BASE OF LIGHT STANDARDS.
26. ELECTRIC SERVICE SHALL BE LOCATED UNDERGROUND.
27. ALL OFFSITE AREAS DISTURBED BY UTILITY REMOVALS, SITE PROPERTY (BUSHES, FENCES, MAILBOXES, ETC., ABANDONMENT OF UTILITIES OR OTHER WORK SHALL BE RESTORED TO A STABILIZED CONDITION. THE GENERAL CONTRACTOR SHALL PROVIDE NOTICE AT LEAST 72 HOURS IN ADVANCE FOR ANY WORK THAT IS COMPLETED ON OFFSITE PROPERTY.
28. THE G.C. WILL BE REQUIRED TO OBTAIN THE BUILDING PERMIT FROM THE CITY PRIOR TO COMMENCING ANY WORK. THERE MAY BE SOME TIMES WHEN THE CITY WILL REQUIRE THAT ALL THE SUBCONTRACTORS BE KNOWN IN ORDER TO COMPLETE THE PERMIT APPLICATION. WHEN ASKED, THE G.C. WILL PROVIDE A LIST TO THE DEVELOPER WITH COMPANY NAMES, ADDRESSES, PHONE/FAX NUMBERS, CONTACT NAMES AND STATE LICENSE NUMBERS.
29. ALL OFFSITE WORK WILL BE COORDINATED WITH THE ADJACENT PROPERTY OWNERS AND WILL NOT COMMENCE WITHOUT THEIR WRITTEN AUTHORIZATION.
30. THE G.C. IS TO FILE A "NOTICE OF COMMENCEMENT" AS REQUIRED BY THE LAWS GOVERNING THE STATE THAT THE PROJECT FALLS IN AND SUBMIT ALL PAPERWORK TO THE CITY OF WENTZVILLE.
31. SIGNAGE SHOWN FOR REFERENCE ONLY, SIGNAGE TO BE REVIEWED AND PERMITTED SEPARATELY FROM SITE PLAN PER SIGNAGE REGULATIONS.



UNDERGROUND UTILITIES AND OSHA SAFETY NOTE:

Underground utilities and structures have been plotted from available information and therefore, their location must be considered approximate only. It is the responsibility of the individual contractors to notify the utility companies before actual construction. All O.S.H.A rules and regulations established for the type of construction required by these plans shall be strictly followed (ie. trenching, blasting, etc.)

GENERAL NOTES:

1. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE CITY OF WENTZVILLE SPECIFICATIONS, ST. CHARLES COUNTY "STANDARD DETAILS", LATEST EDITION, THE PROJECT SPECIFICATIONS BOOK, AND THESE CONSTRUCTION PLANS. IN CASE OF CONFLICTING SPECIFICATIONS FOR DETAILS, THE CIVIL ENGINEER SHALL BE CONTACTED PRIOR TO CONSTRUCTION, GENERALLY, THE MOST STRINGENT SPECIFICATION SHALL APPLY.
2. DURING THE CONSTRUCTION OF THESE IMPROVEMENTS, ANY INTERPRETATION OF THE STANDARD SPECIFICATIONS, AND ANY MATTER WHICH REQUIRES THE APPROVAL OF THE OWNER, MUST BE APPROVED BY THE CITY OF WENTZVILLE ENGINEERING DIVISION BEFORE ANY CONSTRUCTION INVOLVING THAT DECISION COMMENCES. ASSUMPTIONS ABOUT WHAT THESE DECISIONS MIGHT BE WHICH ARE MADE DURING THE BIDDING PHASE WILL HAVE NO BEARING ON THE DECISION.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING ALL MATERIAL AND LABOR TO CONSTRUCT THE FACILITY AS SHOWN AND DESCRIBED IN THE CONSTRUCTION DOCUMENTS IN ACCORDANCE WITH THE APPROPRIATE APPROVING AUTHORITIES, SPECIFICATIONS AND REQUIREMENTS. CONTRACTOR SHALL VISIT THE SITE PRIOR TO BIDDING TO DETERMINE EXISTING CONDITIONS.
4. ALL EXISTING UTILITIES SHOWN ARE LOCATED ACCORDING TO THE INFORMATION AVAILABLE TO THE ENGINEER AT THE TIME THE DRAWINGS WERE PREPARED AND HAVE NOT BEEN INDEPENDENTLY VERIFIED BY THE OWNER OR THE ENGINEER. GUARANTEE IS NOT MADE THAT ALL EXISTING UNDERGROUND UTILITIES ARE SHOWN OR THAT THE LOCATION OF THOSE SHOWN ARE ACCURATE. THE LOCATIONS SHOWN ARE FOR BIDDING PURPOSES ONLY. FINDING THE ACTUAL LOCATION OF ANY EXISTING UTILITIES IS THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE DONE BEFORE COMMENCEMENT OF ANY WORK (INCLUDING ORDERING OF MATERIALS) IN THE VICINITY. FURTHERMORE, THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES DUE TO THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UNDERGROUND UTILITIES. THE OWNER OR CEC WILL ASSUME NO LIABILITY FOR ANY DAMAGES SUSTAINED OR COST INCURRED BECAUSE OF THE OPERATIONS IN THE VICINITY OF EXISTING UTILITIES OR STRUCTURES, NOR FOR TEMPORARY BRACING AND SHORING OF SAME. IF IT IS NECESSARY TO SHORE, BRACE, SWING OR RELOCATE A UTILITY, THE UTILITY COMPANY OR DEPARTMENT AFFECTED SHALL BE CONTACTED BY THE CONTRACTOR AND THEIR PERMISSION OBTAINED REGARDING THE METHOD TO USE FOR SUCH WORK.
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE VARIOUS UTILITY COMPANIES WHICH MAY HAVE BURIED OR AERIAL UTILITIES WITHIN OR NEAR THE CONSTRUCTION AREA BEFORE COMMENCING WORK. THE CONTRACTOR SHALL PROVIDE 72 HOURS MINIMUM NOTICE TO ALL UTILITY COMPANIES PRIOR TO BEGINNING CONSTRUCTION. A LIST OF THE UTILITY COMPANIES WHICH THE CONTRACTOR MUST CALL BEFORE COMMENCING WORK IS PROVIDED ON THE COVER SHEET OF THESE CONSTRUCTION PLANS. THIS LIST SERVES AS A GUIDE ONLY AND IS NOT INTENDED TO LIMIT THE UTILITY COMPANIES WHICH THE CONTRACTOR MAY WISH TO NOTIFY.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL REQUIRED CONSTRUCTION PERMITS, 3-WAY CONTRACTS, AND BONDS PRIOR TO CONSTRUCTIONS.
7. THE CONTRACTOR SHALL HAVE AVAILABLE AT THE JOB SITE AT ALL TIMES ONE COPY OF THE CONTRACT DOCUMENTS INCLUDING PLANS, SPECIFICATIONS AND SPECIAL CONDITIONS, COPIES OF ANY REQUIRED CONSTRUCTION PERMITS, AND EROSION CONTROL PLANS AND INSPECTION REPORTS (SWPPP).
8. ANY DISCREPANCIES ON THE DRAWINGS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE OWNER & CIVIL ENGINEER BEFORE COMMENCING WORK. NO FIELD CHANGES OR DEVIATIONS FROM DESIGN ARE TO BE MADE WITHOUT PRIOR APPROVAL BY THE OWNER AND NOTIFICATION TO THE ENGINEER. NO CONSIDERATION WILL BE GIVEN TO CHANGE ORDERS FOR WHICH THE OWNER AND CIVIL ENGINEER WERE NOT CONTACTED PRIOR TO CONSTRUCTION OF THE AFFECTED ITEM.
9. ALL COPIES OF COMPACTION, CONCRETE AND OTHER REQUIRED TEST RESULTS ARE TO BE SENT TO THE CIVIL ENGINEER OF RECORD AND THE CITY OF WENTZVILLE ENGINEERING DIVISION DIRECTLY FROM THE TESTING AGENCY. ALL TESTING IS TO BE CONTRACTED BY THE OWNER.
10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING TO THE CIVIL ENGINEER AND TO CITY A CERTIFIED RECORD SURVEY SIGNED AND SEALED BY A PROFESSIONAL LAND SURVEYOR REGISTERED IN THE STATE OF MISSOURI DEPICTING THE ACTUAL FILED LOCATION OF ALL CONSTRUCTED IMPROVEMENTS THAT ARE REQUIRED BY THE JURISDICTIONAL AGENCIES FOR THE CERTIFICATION PROCESS. ALL SURVEY COSTS WILL BE THE CONTRACTORS RESPONSIBILITY.
11. ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES, JURISDICTIONAL AGENCIES AND/OR UTILITY SERVICE COMPANIES SHALL BE PERFORMED PRIOR TO ANNOUNCED BUILDING POSSESSION AND THE FINAL CONNECTION OF SERVICES.
12. CONTRACTORS SHALL VERIFY BENCHMARKS AND DATUMS PRIOR TO COMMENCING CONSTRUCTION OR STAKING OF IMPROVEMENTS.
13. CONTRACTOR SHALL REPLACE ANY FENCING, CURBING, ETC. THAT IS DESTROYED OR DAMAGED DUE TO THE CONSTRUCTION ACTIVITIES.
14. CONTRACTOR IS RESPONSIBLE FOR TRAFFIC CONTROL DEVICES AND PLANS FOR ANY STREET WORK.
15. ALL CONTRACTORS MUST CONFINE THEIR ACTIVITIES TO THE WORK AREA. NO ENCROACHMENTS ONTO DEVELOPED OR UNDEVELOPED AREAS WILL BE ALLOWED. ANY DAMAGE RESULTING SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR.
16. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING A TRENCH SAFETY PLAN TO THE DEVELOPER AT THE TIME OF THE PRE-CONSTRUCTION MEETING, OR PRIOR TO BEGINNING CONSTRUCTION OF THESE IMPROVEMENTS. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING TRENCH SAFETY REQUIREMENTS IN ACCORDANCE WITH MISSOURI STATE LAW AND O.S.H.A. STANDARDS FOR ALL EXCAVATION IN EXCESS OF FIVE FEET IN DEPTH. NO OPEN TRENCHES WILL BE ALLOWED OVERNIGHT. ONSITE SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
17. TO THE MAXIMUM EXTENT PRACTICAL, CONSTRUCTION STAGING, WORKER PARKING, AND ANY OTHER POTENTIALLY NOISY OR OFFENSIVE CONSTRUCTION ACTIVITY SHOULD BE LOCATED AS FAR FROM THE RESIDENTIAL NEIGHBORS AS POSSIBLE.
18. CONTRACTOR SHALL KEEP THE CONSTRUCTION SITE SECURE FROM TRESPASSERS AT ALL TIMES.
19. CONTRACTOR SHALL CONTACT CITY BUILDING OFFICIAL TO LEARN OF ANY UNUSUAL CONSTRUCTION SEQUENCING REQUIREMENTS THAT THE CITY MAY REQUIRE. THE CONTRACTOR IS CAUTIONED THAT THIS AND PERHAPS OTHER SUCH REQUIREMENTS MAY EXIST AND IT IS THE CONTRACTOR'S RESPONSIBILITY TO INVESTIGATE AND COMPLY WITH THEM.
20. CONTRACTOR IS RESPONSIBLE FOR OBTAINING ANY NECESSARY FENCE OR WALL PERMITS FROM THE CITY.
21. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ADEQUATE TRAFFIC CONTROL PER CITY OF WENTZVILLE STANDARDS.

PAVING, GRADING, AND DRAINAGE NOTES:

1. ALL PAVING, CONSTRUCTION MATERIALS, AND WORKMANSHIP WITHIN CITY OR COUNTY RIGHT-OF-WAY SHALL BE IN ACCORDANCE WITH THE CITY OF WENTZVILLE STANDARD SPECIFICATIONS AND DETAILS.
2. ALL AREAS IN EXISTING RIGHTS-OF-WAY DISTURBED BY SITE CONSTRUCTION SHALL BE RE-GRADED AND LANDSCAPED OR PAVED, (WHATEVER WAS THERE BEFORE DISTURBANCE). ALL DISTURBED AREAS SHALL BE REPAIRED TO THE SAME CONDITION OR BETTER THAN BEFORE AREA WAS DISTURBED.
3. TRAFFIC CONTROL ON ALL STATE, CITY AND COUNTY RIGHTS-OF-WAY SHALL MEET THE REQUIREMENTS OF THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES (U.S. DOT/FHA) AND THE REQUIREMENTS OF THE STATE AND ANY LOCAL AGENCY HAVING JURISDICTION . IN THE EVENT THAT THE CONTRACT DOCUMENTS AND THE JURISDICTIONAL AGENCY REQUIREMENTS ARE NOT IN AGREEMENT, THE MOST STRINGENT SHALL GOVERN.
4. THE CONTRACTOR SHALL GRADE THE SITE TO THE ELEVATIONS INDICATED AND SHALL RE-GRADE ANY WASHOUTS WHERE THEY OCCUR AFTER EVERY RAINFALL EVENT UNTIL SOIL IS STABILIZED.
5. ALL AREAS INDICATED AS PAVEMENT SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE TYPICAL PAVEMENT SECTIONS AS INDICATED ON THE DRAWINGS AND THE PROJECT SPECIFICATIONS.
6. WHERE EXISTING PAVEMENT IS INDICATED TO BE REMOVED AND REPLACED, THE CONTRACTOR SHALL SAW CUT TO FULL DEPTH OF EXISTING PAVEMENT. CONTRACTOR SHALL PREPARE A SMOOTH, SOUND, VERTICAL FACE AND MATCH THE EXISTING PAVEMENT ELEVATION UNLESS OTHERWISE NOTED. CONTRACTOR SHALL INSTALL LONGITUDINAL BUTT JOINTS WHEN CONNECTING TO EXISTING CONCRETE PAVEMENT.
7. THE CONTRACTOR SHALL ENSURE THAT ALL PLANTING AREAS ARE NOT OVERLY COMPACTED AND DO NOT CONTAIN LIMEROCK, TRASH DEBRIS OR OTHER DELETERIOUS MATTER. THE CONTRACTOR SHALL EXCAVATE AND REMOVE ALL UNDESIRABLE MATERIAL FROM ALL AREAS ON THE SITE TO BE PLANTED.
8. ALL DRAINAGE STRUCTURES SHALL BE DE-SILTED AS REQUIRED DURING AND AT THE END OF CONSTRUCTION TO PROVIDE POSITIVE DRAINAGE FLOWS.
9. STRIP TOPSOIL AND ORGANIC MATTER AND PAVING MATERIAL FROM ALL AREAS UNDER BUILDING. TOPSOIL MAY BE STOCKPILED ON SITE FOR REPLACEMENT IN GREEN AREAS.
10. FIELD DENSITY TESTS SHALL BE TAKEN AT A FREQUENCY AS REQUIRED IN THE PROJECT SPECIFICATIONS.
11. IN NO CASE SHALL HANDICAP RAMP SLOPES EXCEED 1 VERTICAL TO 12 HORIZONTAL. IN NO CASE SHALL SIDEWALK CROSS SLOPES EXCEED 2.0 PERCENT. IN NO CASE SHALL LONGITUDINAL SIDEWALK SLOPES EXCEED 5.0 PERCENT. CONTRACTOR SHALL CONTACT ARCHITECT AND CIVIL ENGINEER PRIOR TO PAVING IF ANY EXCESSIVE SLOPES ARE ENCOUNTERED. NO CONTRACTOR CHANGE ORDERS WILL BE ACCEPTED FOR A.D.A. COMPLIANCE ISSUES.
12. CONTRACTOR ADJUSTMENT TO SPOT GRADES TO MAINTAIN POSITIVE DRAINAGE IS ALLOWED, ONLY WITH THE PRIOR APPROVAL OF THE CIVIL ENGINEER. CONTRACTOR SHALL CONTACT THE CIVIL ENGINEER PRIOR TO PAVING IF ANY AREAS OF POOR DRAINAGE ARE ENCOUNTERED.
13. SPOT ELEVATIONS SHOWN ARE TO TOP OF PAVING SURFACE OR FINISHED EARTH GRADE UNLESS NOTED OTHERWISE. WHERE APPLICABLE, ADD 0.50 FEET TO SPOT GRADES SHOWN FOR TOP OF CURB ELEVATIONS.
14. ALL SLOPES AND AREAS DISTURBED BY CONSTRUCTION SHALL BE GRADED SMOOTH. THE AREAS SHALL THEN BE STABILIZED AS SPECIFIED IN THE PLANS AND MAINTAINED UNTIL SOIL IS STABILIZED IN ALL AREAS. ANY AREAS DISTURBED FOR ANY REASON PRIOR TO FINAL ACCEPTANCE OF THE JOB SHALL BE CORRECTED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE OWNER.
15. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CONTROL OF DUST AND DIRT RISING AND SCATTERING IN THE AIR DURING CONSTRUCTION AND SHALL PROVIDE WATER SPRINKLING OR OTHER SUITABLE METHODS OF CONTROL. THE CONTRACTOR SHALL COMPLY WITH ALL GOVERNING REGULATIONS PERTAINING TO ENVIRONMENTAL PROTECTION.
16. THE CONTRACTOR TAKE ALL MEASURES NECESSARY TO CONTROL TURBIDITY, INCLUDING BUT NOT LIMITED TO, THE INSTALLATION OF BMP'S AT ALL LOCATIONS WHERE THE POSSIBILITY OF TRANSFERRING SUSPENDED SOLIDS INTO THE RECEIVING WATER BODY EXISTS DUE TO THE PROPOSED WORK. BMP'S MUST BE MAINTAINED IN EFFECTIVE CONDITION AT ALL LOCATIONS UNTIL CONSTRUCTION IS COMPLETED AND DISTURBED SOIL AREAS ARE STABILIZED. THEREAFTER, THE CONTRACTOR MUST REMOVE THE TEMPORARY BARRIERS, AT NO TIME SHALL THERE BE ANY OFF-SITE DISCHARGE WHICH VIOLATES LOCAL, STATE, OR FEDERAL WATER QUALITY STANDARDS.
17. THE CONTRACTOR MUST REVIEW AND MAINTAIN A COPY OF THE STORM WATER PERMIT COMPLETE WITH ALL CONDITIONS, ATTACHMENTS, EXHIBITS, AND PERMIT MODIFICATIONS, IN GOOD CONDITION, AT THE CONSTRUCTION SITE. THE COMPLETE PERMIT MUST BE AVAILABLE FOR REVIEW UPON REQUEST BY JURISDICTIONAL AGENCIES.
18. IF ANY EXISTING STRUCTURES, FACILITIES, OR IMPROVEMENTS (PUBLIC OR PRIVATE) TO REMAIN ARE DAMAGED DURING CONSTRUCTION, IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO REPAIR AND/OR REPLACE THE EXISTING STRUCTURE, FACILITY, OR IMPROVEMENT AS NECESSARY TO RETURN IT TO EXISTING CONDITIONS OR BETTER.
19. REFERENCE THE SWPPP INCLUDED IN THIS PLAN SET AND IN THE PROJECT SPECIFICATIONS FOR THIS PROJECT.
20. ALL PIPE AND BENDS LESS THAN 42" DIAMETER MUST BE FACTORY MANUFACTURED BENDS.
21. ALL WORK SHALL BE DONE IN COMPLIANCE WITH THE PROJECT GEOTECHNICAL SERVICE REPORT FOR THIS SITE.
22. NO SLOPES SHALL EXCEED 3 (HORIZONTAL) TO 1 (VERTICAL), UNLESS JUSTIFIED BY A GEOTECHNICAL REPORT, THAT HAS BEEN ACCEPTED/APPROVED BY THE CITY OF WENTZVILLE.
23. ALL GRADED AREAS SHALL BE PROTECTED FROM EROSION BY EROSION CONTROL DEVICES AND/OR SEEDING AND MULCHING AS REQUIRED BY THE CITY OF WENTZVILLE.
24. SEEDING, SODDING, MULCHING, AND PLANTINGS FOR ALL DISTURBED AREAS SHALL BE SPECIFIED ON THE LANDSCAPE PLAN.
25. ANY LAND DISTURBANCE ACTIVITY INVOLVING MORE THAN ONE(1)ACRE OR MORE OF LAND IS A MAJOR LAND DISTURBANCE AND THE APPROPRIATE PERMITS MUST BE OBTAINED FROM THE MISSOURI DEPARTMENT OF NATURAL RESOURCES.
26. ALL ELEVATIONS SHOWN ON THE GRADING PLAN ARE TO TOP OF PAVEMENT OR FINISHED GROUND UNLESS NOTED OTHERWISE. ELEVATIONS TO POINTS OTHER THAN THE TOP OF PAVEMENT ARE NOTED AS FOLLOWS:

    TP=TOP OF PAVEMENT
    TC=TOP OF CURB
    TW=TOP OF WALL
    BW=FINISHED GROUND AT FACE OF WALL
    GRND=FINISHED GROUND AT YARD DRAINS

ADA NOTES:

1. CONTRACTOR SHALL CONFIRM ALL EXISTING SLOPES FOR ACCESSIBLE ROUTES AS WELL AS THE ACCESSIBLE PARKING STALLS AND ACCESSIBLE AISLES WITH A SLOPE METER TO CONFIRM MAXIMUM SLOPES ARE NOT EXCEEDED.
2. CONTRACTOR IS REQUIRED TO PROVIDE AS-BUILT SPOT ELEVATIONS ALONG THE ACCESSIBLE ROUTES SHOWN ON THIS PLAN EVERY 10 FEET IN ORDER TO CONFIRM MAXIMUM (2%) CROSS-SLOPE AND MAXIMUM (5%) SLOPES IN THE DIRECTION OF TRAVEL. IN ADDITION, SPOT ELEVATIONS ARE REQUIRED ON ALL CORNERS AND MIDPOINTS OF ACCESSIBLE PARKING STALLS AND ACCESSIBLE AISLES TO CONFIRM MAXIMUM 2% SLOPES ARE NOT EXCEEDED IN ALL DIRECTIONS. THIS INFORMATION SHALL BE PROVIDED, A MINIMUM OF 2 WEEKS BEFORE STORE TURNOVER.
3. THE GENERAL AND CONCRETE CONTRACTOR SHALL FIELD VERIFY ADA SLOPES DURING CONCRETE POUR. A 2' SMART LEVEL WITH AN ACCURACY TO .029 PERCENT SHALL BE USED FOR VERIFYING SLOPES. ANY SLOPES IN THE ADA AREAS THAT EXCEED A 2% CROSS SLOPE ALONG THE BUILDING, ADA STALLS AND/OR SIDEWALK, 5% RUNNING SLOPE FOR SIDEWALKS AWAY FROM THE PROPOSED CVS BUILDING, AND EXCEED 8.3% ON RAMPS SHALL BE REMOVED AND REPLACED AT THE CONCRETE CONTRACTOR'S EXPENSE. THE SURVEYOR FOR STAKING CAN PROVIDE A REFERENCE FOR ELEVATION HOWEVER CONFIRMATION IS REQUIRED BY SLOPE LEVEL DURING CONSTRUCTION.

ESTIMATED EARTHWORK QUANTITIES

02

CUT = 36,106 CUBIC YARDS
FILL = 42,220 CUBIC YARDS (1.12 FILL FACTOR)
= 6,114 CY OFF ADDITIONAL FILL NEEDED

EARTHWORK QUANTITY NOTES:

1. THE CUT AND FILL QUANTITIES SHOWN ON THIS PLAN ARE FOR PERMITTING PURPOSES ONLY. THE GRADING CONTRACTOR IS CAUTIONED THAT THE QUANTITIES SHOWN ARE THE ENGINEER'S ESTIMATE FOR PERMITTING PURPOSES ONLY. THE GRADING CONTRACTOR SHALL COMPLETE HIS/HER OWN ESTIMATE WHEN BIDDING. NO ADDITIONAL COSTS WILL BE ALLOWED FOR GRADING WITHOUT JUSTIFICATION DUE TO PLAN CHANGES OR REVISIONS.
2. TRUCKS SHALL NOT EXCEED POSTED WEIGHT LIMITS FOR THE ST. CHARLES COUNTY AND MODOT BRIDGES DURING HAUL OPERATIONS.

TOTAL AREA TO BE DISTURBED = 10.37 ACRES .

GENERAL CONTRACTOR SHALL REFERENCE FINAL GEOTECHNICAL REPORT FOR ADDITIONAL REQUIREMENTS. ALL SITE WORK, PAVING, AND BUILDING PAD PREPARATION IS TO COMPLY WITH GEOTECHNICAL RECOMMENDATIONS AND REQUIREMENTS.

STORM SEWER NOTES:

1. ALL CONCRETE PIPE SHALL BE REINFORCED, AND CONFORM TO A.S.T.M. DESIGNATION C76-80 CLASS III UNLESS OTHERWISE NOTED.
2. ALL SEWER CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CITY OF WENTZVILLE STANDARD SPECIFICATIONS AND CONSTRUCTION DETAILS.
3. TYPE "C" BEDDING PER CITY OF WENTZVILLE STANDARDS IS REQUIRED FOR PIPES IN ROCK.
4. ALL TRENCHES UNDER AREAS TO BE PAVED AND UNDER EXISTING PAVING SHALL BE GRANULARLY FILLED WITH 3/4" MINUS CRUSHED LIMESTONE ONLY. BACKFILL SHALL BE PLACED IN ACCORDANCE WITH CITY OF WENTZVILLE STANDARDS.
5. ALL TRENCH BACKFILLS UNDER PAVEMENT WITHIN PUBLIC RIGHT-OF-WAY SHALL BE GRANULAR BACKFILLED. TRENCH BACKFILLS UNDER PAVED AREAS, OUTSIDE OF PUBLIC RIGHT-OF-WAY SHALL BE GRANULAR BACKFILL IN LIEU OF THE EARTH BACKFILL COMPACTED TO 95 PERCENT OF THE STANDARD AASHTO T-99 COMPACTION TEST A.S.T.M. D-698.
6. ALL DIMENSIONS ARE TO THE CENTERLINE OF STRUCTURE EXCEPT FOR END OF PIPES OR FLARED ENDS. FLARED END DIMENSIONS VARY. CONTRACTOR SHALL VERIFY LENGTHS FOR FLARED END SECTIONS PER PROPOSED TYPE OF FLARED END SUBMITTED.
7. PLUMBING CONTRACTOR AND SURVEYOR SHALL CONFIRM STRUCTURES PROPOSED ON THESE PLANS MATCH THE PROPOSED STRUCTURES THAT ARE ONSITE. DUE TO CHANGE OF ELEVATIONS, AND LOCATIONS DEPENDING ON THE STRUCTURE AND TYPE, THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR ANY ISSUES FOR PROPOSING A DIFFERENT TYPE OF STRUCTURE OR PIPE THAN WHAT IS ON THESE PLANS. GENERAL CONTRACTOR SHALL REIMBURSE CIVIL ENGINEER FOR ANY TIME AND MATERIALS TO ADDRESS CHANGES TO STRUCTURES TO REDUCE OVERALL CONSTRUCTION COSTS.

SANITARY SEWER NOTES:

1. ALL SEWER CONSTRUCTION AND MATERIALS SHALL BE IN ACCORDANCE WITH THE CITY OF WENTZVILLE STANDARD SPECIFICATIONS AND CONSTRUCTION DETAILS.
2. ALL LATERAL SEWER CONSTRUCTION METHODS TO CONFORM TO LATEST STANDARDS AND SPECIFICATIONS FOR THE CITY OF WENTZVILLE STANDARD SPECIFICATIONS AND CONSTRUCTION DETAILS.
3. ALL TRENCHES UNDER AREAS TO BE PAVED AND UNDER EXISTING PAVING SHALL BE GRANULARLY FILLED WITH 3/4" MINUS CRUSHED LIMESTONE ONLY. BACKFILL SHALL BE PLACED IN ACCORDANCE WITH CITY OF WENTZVILLE STANDARDS.
4. TYPE "C" BEDDING PER CITY OF WENTZVILLE STANDARDS REQUIRED FOR PIPES IN ROCK.
5. ALL TRENCH BACKFILLS UNDER PAVEMENT WITHIN PUBLIC RIGHT-OF-WAY SHALL BE GRANULAR BACKFILLED. TRENCH BACKFILLS UNDER PAVED AREAS, OUTSIDE OF PUBLIC RIGHT-OF-WAY SHALL BE GRANULAR BACKFILL IN LIEU OF THE EARTH BACKFILL COMPACTED TO 90 PERCENT OF THE STANDARD AASHTO T-180 COMPACTION TEST A.S.T.M. D-1557.

ABBREVIATIONS:

AI............ AREA INLET (OPEN 4 SIDES UNLESS NOTED OTHERWISE)
DAI.......... DOUBLE AREA INLET (OPEN 6 SIDES UNLESS NOTED OTHERWISE.)
MH.......... MANHOLE
CI.......... CURB INLET
DCI.......... COUBLE CURB INLET
GSI.......... GRATE INLET WITH SIDE INTAKE. (ELEVATION OF INLET TOP IS TO THE TOP OF GRATE, ADD 0.50' FOR TOP OF SIDE INTAKE.)
2GSI........ 2 GRATE INLET WITH SIDE INTAKE. (ELEVATION OF INLET TOP IS TO THE TOP OF GRATE, ADD 0.50' FOR TOP OF SIDE INTAKE.)
EP............ END OF PIPE
FE............ FLARED END SECTION
IMH......... INTERCEPTOR MANHOLE
TD........... TRENCH DRAIN
ATG......... ADJUST TO GRADE
*.............. DENOTES HYDRAULIC GRADE JUMP
TBR.......... TO BE REMOVED
TBR&R..... TO BE REMOVED & REPLACED

CITY OF WENTZVILLE GRADING NOTES

1. CONSTRUCTION ACCESS TO SITE SHALL CONSIST OF A MINIMUM 25' x 50' TEMPORARY GRAVEL WASH DOWN AREA, LOCATED ADJACENT TO PAVEMENT. ALL TRUCKS SHALL BE WASHED DOWN PRIOR TO LEAVING SITE.
2. ALL SOFT SOILS SHOULD BE REMOVED, DOWN TO FIRM MATERIAL, PRIOR TO THE PLACEMENT OF FILL MATERIAL. THE SOFT SOILS MAY BE UTILIZED AS FILL, PROVIDED THAT THE MATERIAL IS SPREAD OUT TO DRY SUFFICIENTLY AND CAN BE COMPACTED TO THE REQUIREMENTS OF THE PROJECT SPECIFICATIONS.
3. NO SLOPE SHALL BE STEEPER THAN 3(HORIZONTAL): 1(VERTICAL). ALL SLOPES SHALL BE SODDED OR SEEDED AND MULCHED.
4. CITY SHALL BE PROVIDED WITH A COPY OF GRADING COMPACTION TESTS RESULTS. IN AREAS OF PROPOSED PAVEMENT, A MINIMUM COMPACTION TO AT LEAST 90% OF MAXIMUM DRY DENSITY, AS DETERMINED BY THE MODIFIED PROCTOR TEST, OR 95% OF MAXIMUM DRY DENSITY, AS DETERMINED BY THE STANDARD PROCTOR TEST WILL BE REQUIRED, OR AS OTHERWISE RECOMMENDED BY THE GEOTECHNICAL SOILS REPORT.
5. ANY TRASH, DEBRIS, PAVEMENT OR FOUNDATION MATERIALS FROM ANY EXISTING OR PREVIOUS ON-SITE BUILDING, STRUCTURE, OR IMPROVEMENT MUST BE REMOVED FOR PROPER DISPOSAL OFF SITE, OR AS RECOMMENDED BY THE OWNERS LICENSED PROFESSIONAL ENGINEER.
6. ANY WELLS OR SPRINGS WHICH MAY EXIST ON THE PROPERTY SHOULD BE LOCATED. WELLS SHALL BE CAPPED AND SEALED IN ACCORDANCE WITH THE REQUIREMENTS OF THE MISSOURI DEPARTMENT OF NATURAL RESOURCES, AND IN A MANNER ACCEPTABLE TO THE CITY OF WENTZVILLE. SPRINGS SHALL BE HANDLED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE OWNERS LICENSED PROFESSIONAL ENGINEER.
7. ANY CONTAMINATED SOILS ENCOUNTERED DURING GRADING OPERATIONS SHALL BE HANDLED IN ACCORDANCE WITH THE OWNERS LICENSED PROFESSIONAL ENVIRONMENTAL ENGINEERING REPRESENTATIVE.

UTILITY NOTES:

1. ALL FILL MATERIAL IS TO BE IN PLACE AND COMPACTED BEFORE INSTALLATION OF PROPOSED UTILITIES.
2. CONTRACTOR SHALL NOTIFY THE UTILITY INSPECTORS 72 HOURS BEFORE CONNECTING TO ANY EXISTING LINE.
3. CONTRACTOR SHALL MAINTAIN A MINIMUM OF 3'-6' COVER ON ALL WATERLINES AND 3'-6' ON ALL SANITARY SEWER LINES.
4. THE CONTRACTOR IS SPECIFICALLY CAUTIONED THAT THE LOCATION AND/OR ELEVATION OF EXISTING UTILITIES AS SHOWN ON THESE PLANS IS BASED ON RECORDS OF THE VARIOUS UTILITY COMPANIES, AND WHERE POSSIBLE, MEASUREMENTS TAKEN IN THE FIELD. THE INFORMATION IS NOT TO BE RELIED ON AS BEING EXACT OR COMPLETE. THE CONTRACTOR MUST CALL THE APPROPRIATE UTILITY COMPANIES AT LEAST 72 HOURS BEFORE ANY EXCAVATION TO REQUEST EXACT FIELD LOCATION OF UTILITIES. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO LOCATE ALL EXISTING UTILITIES WHICH CONFLICT WITH THE PROPOSED IMPROVEMENTS SHOWN ON THE PLANS.
5. ALL FILLED PLACED UNDER BUILDINGS, PROPOSED SANITARY AND STORM SEWERS AND/OR PAVED AREAS, INCLUDING TRENCH BACKFILLS SHALL BE COMPACTED TO AT LEAST 90% OF MAXIMUM DRY DENSITY AS DETERMINED BY THE "MODIFIED A.A.S.H.T.O. T-180 COMPACTION TEST" (ASTM D-1557) UNLESS OTHERWISE SPECIFIED BY THE LOCAL GOVERNING AUTHORITY SPECIFICATIONS. ALL TESTS SHALL BE VERIFIED BY A SOILS ENGINEER.
6. GAS, WATER AND OTHER UNDERGROUND UTILITIES SHALL NOT CONFLICT WITH THE DEPTH OR HORIZONTAL LOCATIONS OF EXISTING AND PROPOSED SANITARY AND STORM SEWERS, INCLUDING HOUSE LATERALS.
7. ALL NECESSARY INSPECTIONS AND/OR CERTIFICATIONS REQUIRED BY CODES AND/OR UTILITY SERVICE COMPANIES SHALL BE PERFORMED PRIOR TO ANNOUNCED BUILDING POSSESSION AND THE FINAL CONNECTION OF SERVICE.
8. ALL UTILITY TRENCH BACKFILL SHALL HAVE GRANULAR BACKFILL AND BE MECHANICALLY COMPACTED.
9. THE CONTRACTOR SHALL VERIFY THE LOCATION, CONDITION AND ELEVATION OF ALL PROPOSED SEWER CONNECTION POINTS PRIOR TO THE START OF CONSTRUCTION. ANY DISCREPANCIES THAT WOULD INTERFERE WITH THE PROPOSED SEWER DESIGN SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE ENGINEER.
10. ALL PERMIT FEES AND COSTS ASSOCIATED WITH BRINGING UTILITY, SEWER AND WATER SERVICES TO THE SITE SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. ALL FEES AND COSTS SHALL BE INCLUDED IN THE CONTRACTORS BID.
11. GENERAL CONTRACTOR SHALL COORDINATE INSTALLATION OF GAS, ELECTRIC AND TELEPHONE SERVICES TO DEVELOPMENT WITH UTILITY COMPANIES. G.C. IS TO PROVIDE TRENCH, WIRE, AND CONDUIT FOR TELEPHONE AND ELECTRICAL SERVICES, BACKFILL AND GRADE SMOOTH FOR A COMPLETE TELEPHONE AND ELECTRIC INSTALLATION.
12. G.C. TO PROVIDE OPENING FOR CITY OF WENTZVILLE TO MAKE TAP. G.C. IS ALSO TO PROVIDE TRENCH, BACKFILL AND GRADE SMOOTH FOR A COMPLETE WATER LINE INSTALLATION.
13. EXISTING SANITARY SEWER SERVICE SHALL NOT BE INTERRUPTED.
14. THE CONTRACTOR SHALL INCLUDE THE COST ESTIMATE PROVIDED BY AMEREN UE - ELECTRIC FOR THE RELOCATION/REMOVAL OF ANY OVERHEAD ELECTRIC OR GUY WIRES IN HIS/HER BID.
15. THE CONTRACTOR SHALL INCLUDE FOR TELEPHONE INSTALLATION COSTS BY THE LOCAL PHONE COMPANY IN HIS/HER BID.
16. ALL MANHOLE AND CATCH BASIN TOPS BUILT WITHOUT ELEVATIONS FURNISHED BY THE ENGINEER WILL BE THE RESPONSIBILITY OF THE SEWER CONTRACTOR.
17. ALL WATER LINE CONSTRUCTION AND MATERIALS SHALL MEET THE SPECIFICATIONS AND INSTALLATION REQUIREMENTS OF CITY OF WENTZVILLE OF ST. CHARLES COUNTY.
18. ALL DUCTILE IRON PIPE FOR HYDRANTS AND VALVES SHALL CONFORM TO A.W.W.A. SPECIFICATION C-106 AND/OR C-108. THE DUCTILE IRON FITTINGS SHALL CONFORM TO A.W.W.A. SPECIFICATION C-110. ALL RUBBER GASKET JOINTS FOR WATER DUCTILE IRON PRESSURE PIPE AND FITTINGS SHALL CONFORM TO A.W.W.A. SPECIFICATION C-111.
19. THE EXTERIOR OF SANITARY SEWER MANHOLES SHALL BE WATERPROOFED IN ACCORDANCE WITH MISSOURI DEPARTMENT OF NATURAL RESOURCES SPECIFICATIONS, 10 CSR 8.120 (7)(E).
20. BRICK SHALL NOT BE USED ON MANHOLES.
21. THE CITY OF WENTZVILLE SHALL BE NOTIFIED A MINIMUM OF 72HOURS IN ADVANCE OF CONSTRUCTION FOR COORDINATION AND INSPECTIONS.
22. ANY EXISTING IMPROVEMENTS DISTURBED, DAMAGED OR DESTROYED DURING CONSTRUCTION SHALL BE REPAIRED OR REPLACED TO EQUAL OR BETTER CONDITION.
23. ALL STORM AND SANITARY TRENCH BACKFILLS SHALL BE WATER JETTED. GRANULAR BACKFILL SHALL BE USED UNDER PAVEMENT AREAS. WATER JETTING SHALL BE 100% COMPLETE AND APPROVED PRIOR TO PAVING.
24. ALL SANITARY LATERALS SHALL BE 6" MINIMUM PER CITY OF WENTZVILLE STANDARDS.
25. ALL SANITARY LATERALS SHALL BE PRIVATE.
26. FLUSHING HYDRANTS OR WATER METERS SHALL NOT BE LOCATED IN DRIVEWAYS OR WALKS.
27. CONCRETE PIPE USED FOR STORM SEWER CONSTRUCTION SHALL BE CLASS III, ASTM C-76 WITH A MINIMUM DIAMETER OF 12".
28. ALL STORM SEWER PIPE INSTALLED WITHIN THE PUBLIC RIGHT-OF-WAY SHALL BE CLASS III REINFORCED CONCRETE.
29. LOCATION OF PROPOSED STREET LIGHTS IS APPROXIMATE. SUBMIT PHOTOMETRICS PLAN TO THE CITY OF WENTZVILLE FOR APPROVAL PRIOR TO CONSTRUCTION. STREET LIGHTS SHALL BE INSTALLED IN ACCORDANCE WITH AMEREN UE - ELECTRIC SPECIFICATIONS.
30. SOD WILL BE REQUIRED FOR ANY OFFSITE RESTORATION THAT IS NECESSARY UNLESS SPECIFIED OTHERWISE BY THE PROPERTY OWNERS.

WENTZVILLE PROJECT #: ENG-2022-033A

hdesigngroup
architecture + design

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OWNER

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1001 SCHROEDER CREEK BLVD.
WENTZVILLE, MO 63385
636.327.5101

PROJECT TEAM

CIVIL ENGINEER
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LENEXA, KS 66214
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REVISIONS

NO.	DESCRIPTION	DATE
1	ADD 01	1/11/2023
2	ADD 02	1/25/2023

PROJECT NO.: 19-040 DRAWN BY: J.R. & A.J.
DATE: 12.15.22 REVIEWED BY: M.F.

PROFESSIONAL SEAL

ENGINEERS AUTHENTICATION
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STEVEN D. MARION P.E.
PROFESSIONAL ENGINEER
PE 2006007195

PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:

1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

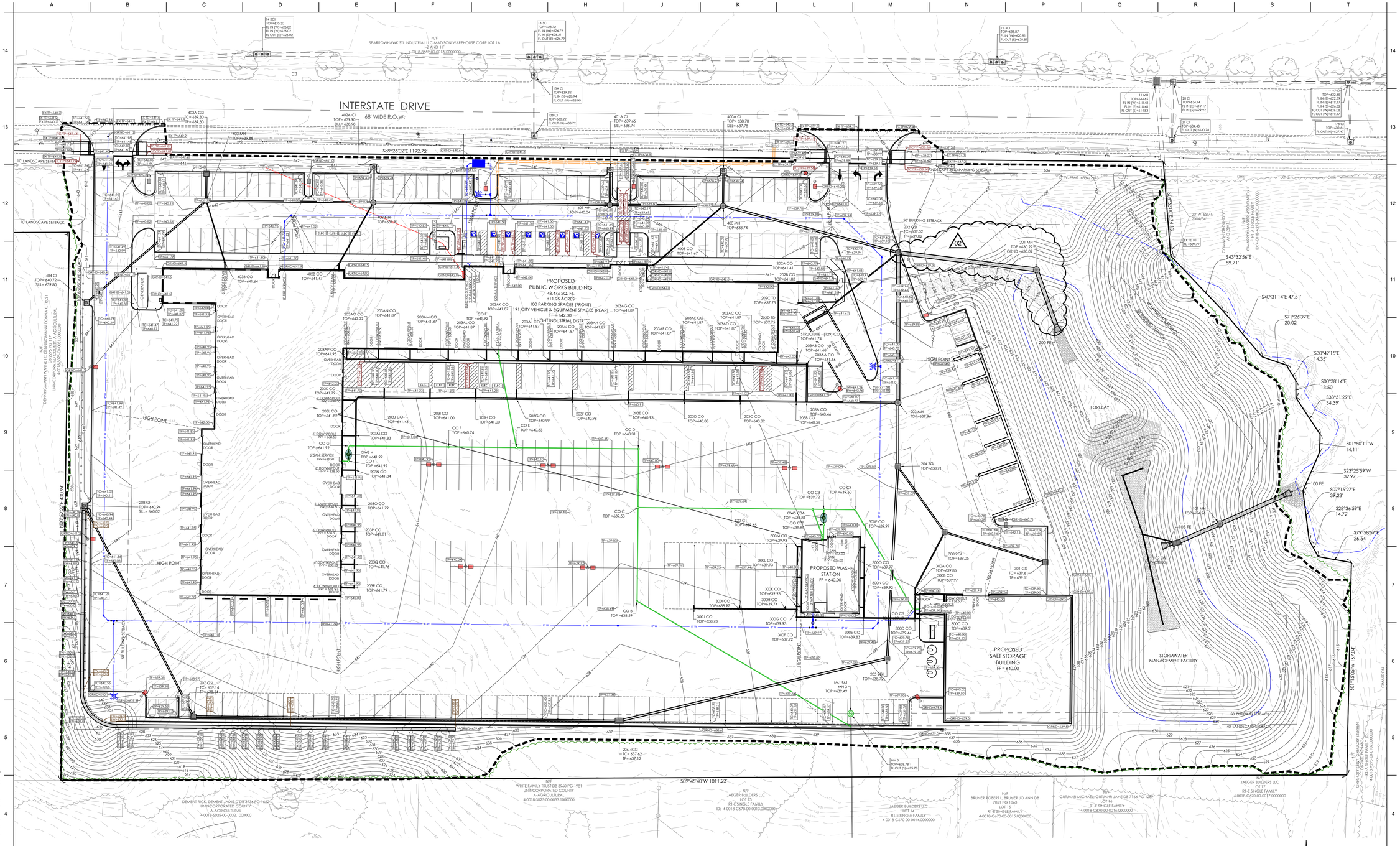
GENERAL NOTES

SHEET

C-001

NOT RELEASED FOR CONSTRUCTION

\\Vault-pc\vault\CIVIL 3D PROJECTS\2020\2000610_CITY OF WENTZVILLE PUBLIC WORKS_WENTZVILLE MO\ENGINEERING\CONSTRUCTION DRAWINGS\SHEETS\GENERAL NOTES.dwg



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UNDERGROUND UTILITIES AND OSHA SAFETY NOTE:

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WENTZVILLE PROJECT #: ENG-2022-033A

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STEVEN D. MARION
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PROFESSIONAL ENGINEER
PE 2006007195

PROJECT TITLE

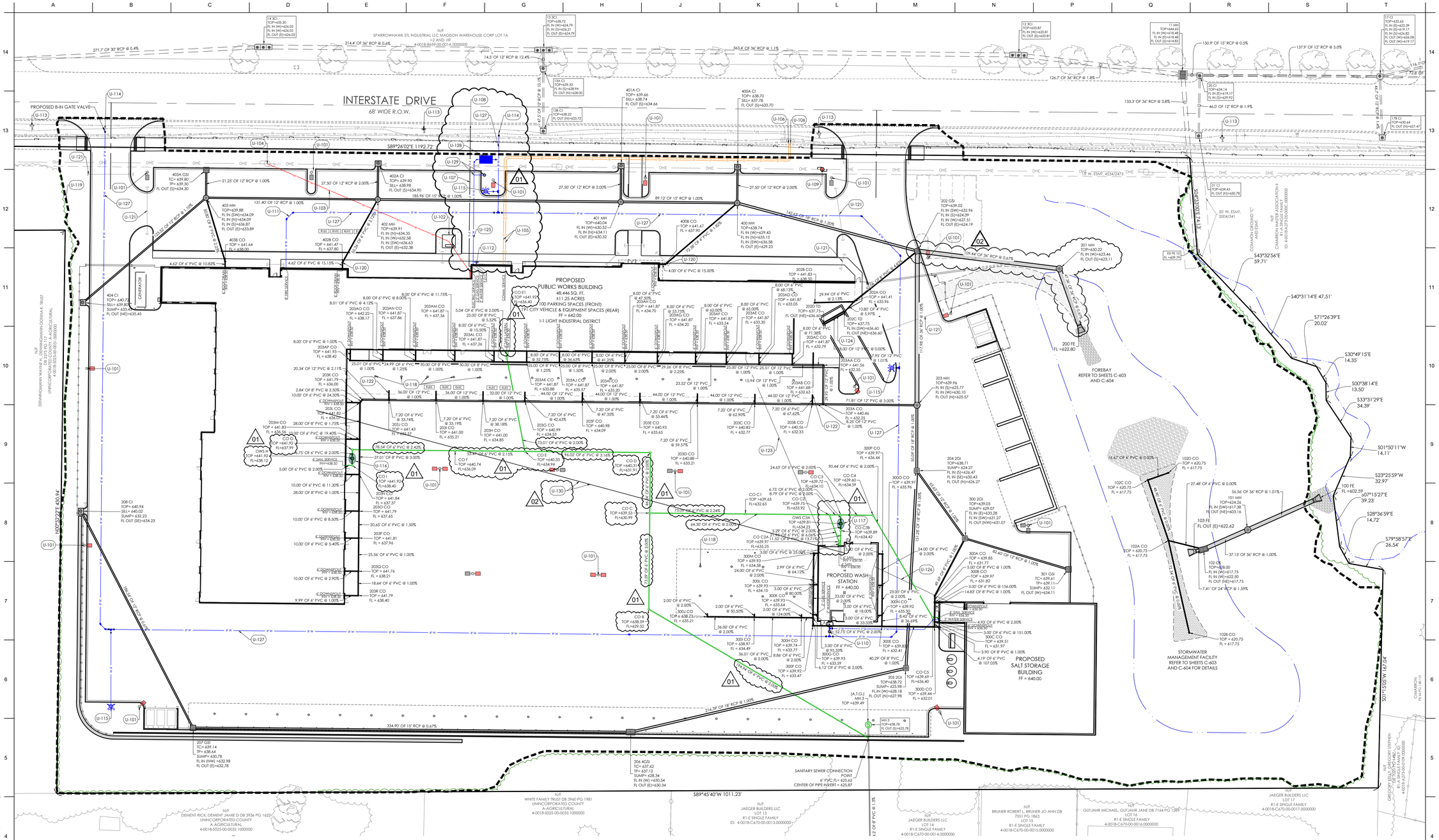
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

GRADING PLAN

SHEET
C-300

NOT RELEASED FOR CONSTRUCTION



REFERENCE NOTES SCHEDULE

UTILITY PLAN

CODE	DESCRIPTION	DETAIL
U-101	PROPOSED LIGHT STANDARD. REFER TO ELECTRICAL PLANS FOR LIGHTING SPECIFICATIONS AND STRUCTURAL PLANS FOR POLE BASE.	
U-102	PROPOSED TRANSFORMER PAD AND BOLLARDS SHALL BE INSTALLED PER AMEREN UE - ELECTRIC SPECIFICATIONS	
U-103	PROPOSED 4" CONDUIT(S) PER AMEREN UE - ELECTRIC SPECIFICATIONS. CONTRACTOR SHALL INCLUDE COST OF INSTALLATION PER AMEREN UE - ELECTRIC REQUIREMENTS. G.C. SHALL CONFIRM NUMBER OF CONDUITS PER TRENCH PRIOR TO BID AND CONSTRUCTION.	
U-104	PROPOSED POINT OF CONNECTION FOR UNDERGROUND ELECTRIC SERVICE. CONTRACTOR TO COORDINATE WITH AMEREN UE - ELECTRIC.	
U-105	PROPOSED CONDUITS. ONE 2" CONDUIT FOR TELEPHONE AND TWO 2" CONDUIT FOR CABLE TO BE PLACED IN SAME RUN. CONTRACTOR TO COORDINATE WITH BRIGHTSPEED ON REQUIREMENTS AND STANDARDS.	
U-106	PROPOSED POINT OF CONNECTION FOR UNDERGROUND TELEPHONE AND CABLE SERVICE.	
U-107	PROPOSED 2" GAS LINE. SHALL BE INSTALLED PER AMEREN UE- NATURAL GAS SPECIFICATIONS.	
U-108	PROPOSED POINT OF GAS SERVICE CONNECTION AT EXISTING GAS MAIN. TRENCH AND EXCAVATIONS TO BE INSTALLED BY GENERAL CONTRACTOR PER AMEREN UE - NATURAL GAS SPECIFICATIONS. LOCATION OF EX. GAS TO BE VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION. CONTRACTOR TO COORDINATE INSTALLATION WITH AMEREN UE- NATURAL GAS. RESTORE ALL AREAS DISTURBED BY CONNECTION TO PREVIOUS OR BETTER CONDITIONS.	

CODE	DESCRIPTION	DETAIL
U-109	CONSTRACTOR TO COORDINATE WITH AMEREN UE - ELECTRIC FOR RELOCATION OF EXISTING POLE.	
U-110	PROPOSED 2" COMMERCIAL WATER METER PER CITY OF WENTZVILLE SPECIFICATIONS	
U-111	PROPOSED 8" FIRE SERVICE LINE. REFER TO MEP PLANS	
U-112	FIRE DEPARTMENT CONNECTION. REFER TO MEP PLANS	
U-113	EXISTING FIRE HYDRANT	
U-114	PROPOSED WATER TAP INTO EXISTING MAIN PER CITY OF WENTZVILLE SPECIFICATIONS. G.C. TO VERIFY SIZE OF EXISTING MAIN AND TAP METHODS REQUIRED BY THE PUBLIC WORKS DEPARTMENT.	
U-115	PROPOSED FIRE HYDRANT ASSEMBLY WITH VALVE	
U-116	PROPOSED GREASE/OIL SEPARATOR CAPACITY 1000 GPM	
U-117	PROPOSED GREASE/OIL SEPARATOR CAPACITY 500 GPM	
U-118	PROPOSED UNDER CANOPY LIGHTING. REFER TO ELECTRICAL PLANS FOR FIXTURE TYPE AND SPECIFICATIONS.	
U-119	PROPOSED LAND DISTURBANCE LIMITS	
U-120	PROPOSED CLEANOUT	2/C-702
U-121	PROPOSED 2" UNDERGROUND IRRIGATION SLEEVES (FUTURE LAWN IRRIGATION. TAP. BACKFLOW PREVENTOR AND METER BY OTHERS)	
U-122	PROPOSED DOWNSPOUT REFER TO ARCHITECTURAL PLANS FOR CONNECTION DETAIL	

CODE	DESCRIPTION	DETAIL
U-123	PROPOSED 2" FIBER CONDUIT	
U-124	PROPOSED 12" PRO SERIES CHANNEL 20' SHALLOW PROFILE CHANNEL DRAIN. COORDINATE WALL SLEEVE WITH STRUCTURE.	1/C-702
U-125	PROPOSED 3" WATER LINE	
02 U-126	PROPOSED 2" CONDUIT FOR ELECTRIC ROUTING FROM WASH BUILDING	
U-127	PROPOSED 8" PE AWWA C906 DR13.5 WATER MAIN PER CITY OF WENTZVILLE STANDARDS	
U-128	PROPOSED 3" COMMERCIAL WATER METER PER CITY OF WENTZVILLE SPECIFICATIONS	3/C-702
01 U-129	FUTURE IRRIGATION METER AND TAP (BY OTHERS)	
02 U-130	PROPOSED (2) 3" CONDUIT FOR ELECTRIC ROUTING FROM MAIN BUILDING	

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UNDERGROUND UTILITIES AND OSHA SAFETY NOTE:

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REVISIONS

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PROJECT NO.: 19-040 DRAWN BY: J.R. & A.J.
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PROFESSIONAL SEAL

STATE OF MISSOURI
STEVEN D. MARION
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PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

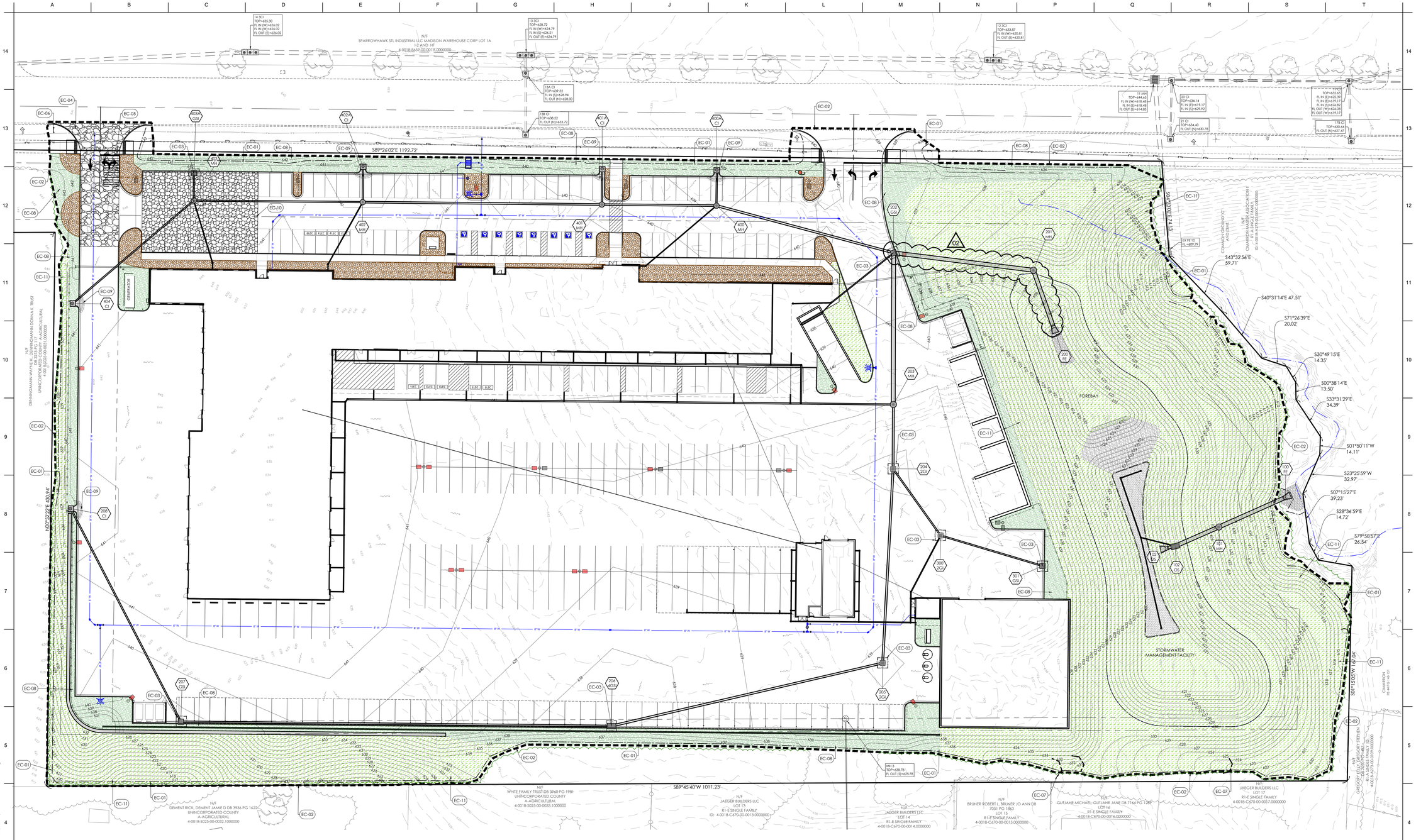
PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

UTILITY PLAN

1" = 30'
30 15 0 30 60
SCALE IN FEET

SHEET
C-400

NOT RELEASED FOR CONSTRUCTION



REFERENCE NOTES SCHEDULE

CODE	EROSION CONTROL DESCRIPTION	DETAIL
EC-01	PROPOSED SILT FENCE	1/C-501
EC-02	PROPOSED LAND DISTURBANCE LIMITS	
EC-03	PROPOSED INLET PROTECTION BARRIER	2/C-501
EC-04	PROPOSED CONSTRUCTION ENTRANCE	3/C-501
EC-05	WASHDOWN STATION, 25' X 50' TEMPORARY GRAVEL WASH DOWN AREA. ALL TRUCKS SHALL BE WASHED DOWN PRIOR TO LEAVING SITE.	3/C-501
EC-06	PERMIT AND NOTICE BOARD SIGN	4/C-501
EC-07	PROPOSED DITCH CHECK	5/C-501
EC-08	AREAS THAT SHALL BE SODDED AND IRRIGATED PER CITY OF WENTZVILLE REQUIREMENTS.	
EC-09	CURB INLET PROTECTION	6/C-501
EC-10	PROPOSED INTERIM PARKING/STAGING AREA. G.C. SHALL CONSTRUCT WITH A 2" TO 4" CLEAN GRAVEL FOR OFFSTREET PARKING AREA	
EC-11	AREAS THAT SHALL BE SEEDED AND MULCHED AND IRRIGATED PER CITY OF WENTZVILLE REQUIREMENTS. RECP's WILL BE REQUIRED PER DETAIL 7/C - 501	7/C-501

CONSTRUCTION SEQUENCING ACTIVITIES:

- INSTALL PROJECT SIGN & POST PERMITS
- INSTALL SILT & CONSTRUCTION FENCING
- INSTALL INLET PROTECTION
- INSTALL CONSTRUCTION ENTRANCE / EXIT
- INSTALL VEHICULAR WASH DOWN AREA
- BEGIN EXCAVATION & SITE DEMOLITION
- BEGIN BUILDING FOOTINGS & FOUNDATIONS
- BEGIN UTILITY TRENCHING & EXCAVATION
- PARKING & DRIVE AREA PAVING
- FINISHED GRADING & LANDSCAPING
- SEEDING & SOD WORK
- REMOVAL OF EROSION CONTROL AND OTHER BMP's

PROPOSED START DATE OF CONSTRUCTION: APRIL 1ST, 2023
PROPOSED FINISH DATE OF CONSTRUCTION: APRIL, 2024

NOTES:

1. REFER TO THE EROSION CONTROL DETAIL SHEET & STORMWATER POLLUTION PREVENTION NARRATIVE FOR ADDITIONAL NOTES AND REQUIREMENTS.
2. THE GENERAL CONTRACTOR SHALL OBTAIN A COPY OF THE NPDES PERMIT ISSUED FOR THE SITE AND POST IT AT THE PROJECT SITE PRIOR TO ANY LAND DISTURBING ACTIVITIES. REFER TO SITE SIGN DETAIL ON THE EROSION CONTROL DETAIL SHEET.
3. CONTRACTOR SHALL INSTALL BMP'S NOTED ON THIS PLAN PRIOR TO BEGINNING ANY LAND DISTURBING, DEMOLITION, OR TREE REMOVAL ACTIVITIES.
4. THE CONTRACTOR SHALL INSTALL CONSTRUCTION ENTRANCE/EXIT AND MAINTAIN THESE ENTRANCES DURING CONSTRUCTION.
5. G.C. TO BE AWARE A LAND DISTURBANCE PERMIT WILL BE REQUIRED. SITE PLAN/PLAT APPROVAL IS NOT TO BE CONSTRUCTED AS APROVAL OF A LAND DISTURBANCE PERMIT.
6. PRIOR TO ANY MAJOR LAND DISTURBANCE ACTIVITY, A MISSOURI STATE LAND OPERATING PERMIT IS REQUIRED.
7. THE JOB SITE TRAILER, DUMPSTER, FUELING AREA, STORAGE & LAY-DOWN AREA SHALL BE LOCATED BY THE GENERAL CONTRACTOR AT THE START OF CONSTRUCTION. THESE ITEMS MUST BE NOTED BY THE CONTRACTOR ON THE SWPPP DRAWINGS.
8. SOIL STOCKPILES AND DEMOLITION DEBRIS STOCKPILES SHALL HAVE SILT FENCES INSTALLED IF LEFT ON SITE & UNDISTURBED FOR MORE THAN 13 DAYS.

SITE DATA

LOT AREA	±11.25 ACRES
TOTAL ONSITE DISTURBED AREA	10.36 ACRES
TOTAL OFFSITE DISTURBED AREA	0.01 ACRES
TOTAL DISTURBED AREA	10.37 ACRES

ALL PROJECT SITES ARE REQUIRED TO COMPLY WITH REQUIREMENTS OF THE "CLEAN WATER ACT" ESTABLISHED BY THE US ENVIRONMENTAL PROTECTION AGENCY.

THE EPA'S NATIONAL POLLUTION DISCHARGE ELIMINATION SYSTEM (NPDES) PROGRAM REQUIRES PERMITS TO BE ISSUED BY REGULATORY AGENCIES WHEN PROJECT SITES DISTURB 1 ACRE OR MORE.

4" TO 6" IOWA RIVER GRAVEL OVER 5 OZ. WEED BARRIER

SOD

SEED AND MULCH

HYDROLOGIC SOIL GROUP:

- KESWICK SILT LOAM, 9 TO 14 PERCENT SLOPES, ERODED, SOIL RATING D
- MEXICO SILT LOAM, 1 TO 4 PERCENT SLOPES, ERODED, SOIL RATING D
- WELLER SILT LOAM, 5 TO 9 PERCENT SLOPES, SOIL RATING D
- URBAN LAND - ORTHENTS COMPLEX, 1 TO 9 PERCENT SLOPES

SITE BENCHMARK:

ELEVATION WAS ESTABLISHED USING THE MISSOURI DEPARTMENT OF TRANSPORTATION'S VRS, RTK SYSTEM, NAD 1983, EAST ZONE.

"O" IN CROSS LOCATED BETWEEN LOT 13 AND LOT 14 ON RAMBLEWOOD CIR AT SOUTH OF THE SITE. ELEVATION= 633.15'

1" = 30'

30 15 0 30 60

SCALE IN FEET

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EROSION CONTROL PLAN

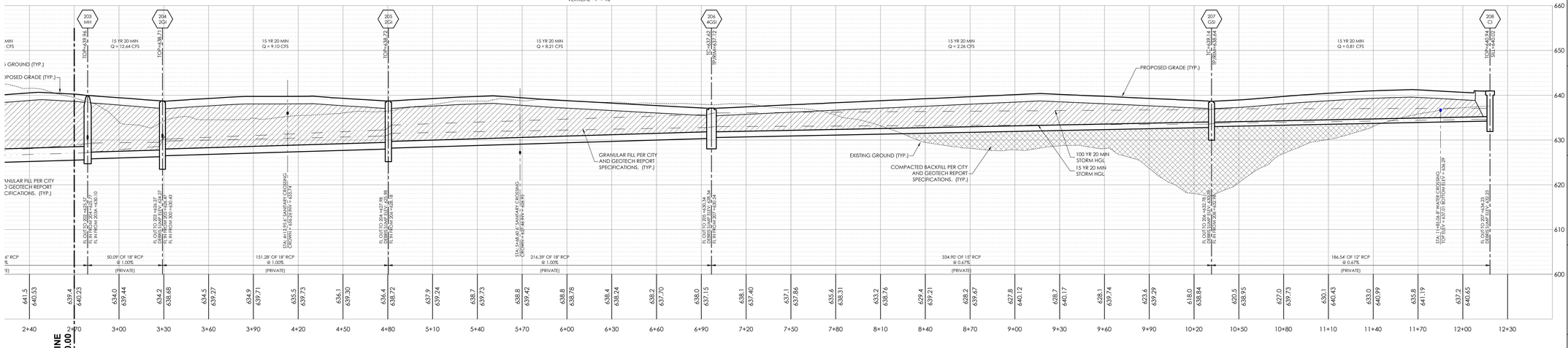
SHEET
C-500

NOT RELEASED FOR CONSTRUCTION

\\Vault-pc\vault\CIVIL 3D PROJECTS\2020\2020010_CITY OF WENTZVILLE PUBLIC WORKS_WENTZVILLE MO\ENGINEERING\CONSTRUCTION DRAWINGS\SHEETS\EROSION CONTROL PLAN.dwg

208 CI - 202 GSI STORM SEWER PROFILE

HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'

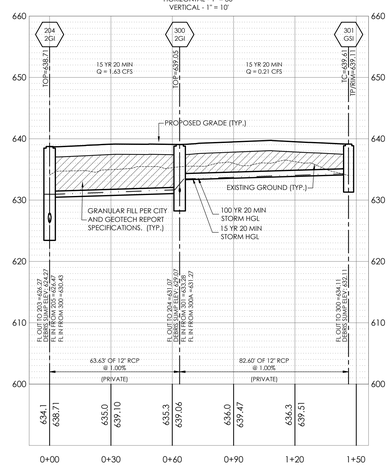


MATCH LINE STA. 2+70.00

02

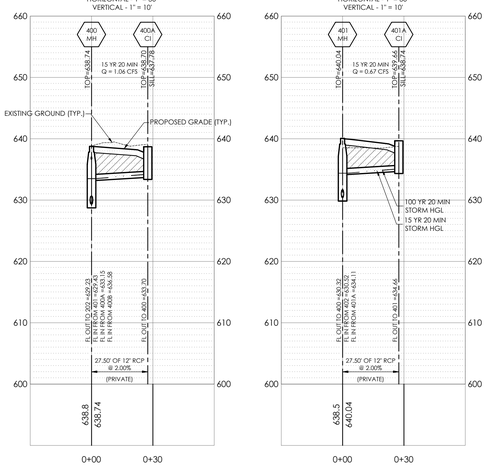
301 GSI - 204 2GI STORM SEWER PROFILE

HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'



400A CI - 400 MH STORM SEWER PROFILE

HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'

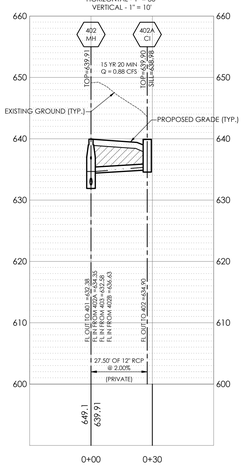


401A CI - 401 MH STORM SEWER PROFILE

HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'

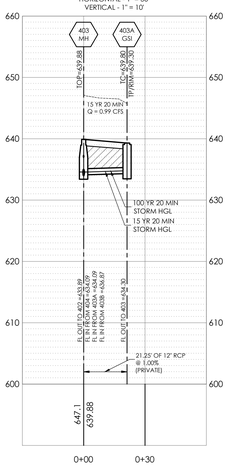
402A CI - 402 MH STORM SEWER PROFILE

HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'



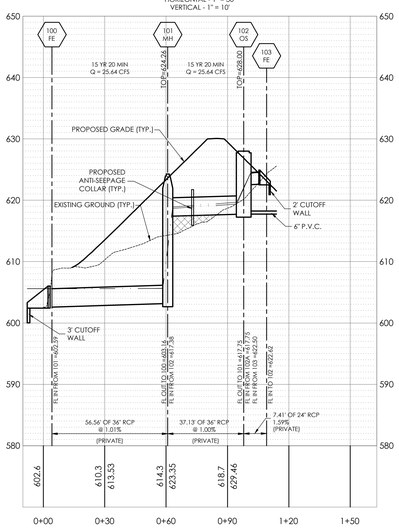
403A GSI - 403 MH STORM SEWER PROFILE

HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'



103 FE- 100 FE STORM SEWER PROFILE

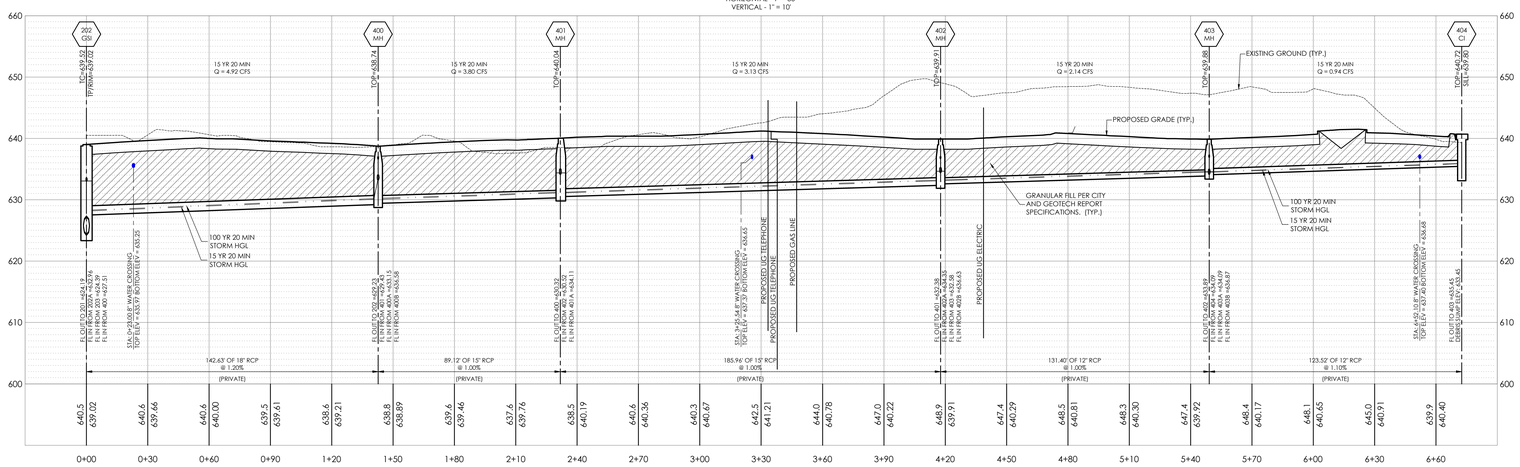
HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'



MATCH LINE STA. 2+70.00

404 CI - 202 GSI STORM SEWER PROFILE

HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'



STORM SEWER PIPES WITH A DESIGN GRADE LESS THAN 1.0% WILL REQUIRE VERIFICATION OF THE PIPE GRADE FOR EACH REACH PRIOR TO ANY SURFACE RESTORATION OR INSTALLATION OF ANY SURFACE IMPROVEMENTS

"Little MO" says CALL BEFORE YOU DIG! 1-800-DIG-RITE

UNDERGROUND UTILITIES AND OSHA SAFETY NOTE:

Underground utilities and structures have been plotted from available information and therefore, their location must be considered approximate only. It is the responsibility of the individual contractors to notify the utility companies before actual construction. All O.S.H.A rules and regulations established for the type of construction required by these plans shall be strictly followed (ie. trenching, blasting, etc.)

WENTZVILLE PROJECT #: ENG-2022-033A

hdesigngroup
architecture + design
5039 S National Avenue | Springfield, MO 65810 | 417.887.6595

OWNER
CITY OF WENTZVILLE
1001 SCHROEDER CREEK BLVD.
WENTZVILLE, MO 63385
636.327.5101

PROJECT TEAM

CIVIL ENGINEER
PREMIER DESIGN GROUP
100 MIDLAND PARK DRIVE
WENTZVILLE, MO 63385
314.925.7444

MAINTENANCE CONSULTANT
HDR ENGINEERING, INC.
17725 KATY FREEWAY SUITE 102
HOUSTON, TX 77094
816.360.2700

STRUCTURAL ENGINEER
METTEMEYER ENGINEERING
2225 W CHESTERFIELD BLVD., SUITE 300
SPRINGFIELD, MO 65807
417.890.8002

MEP ENGINEER
HENDERSON ENGINEERS, INC.
8345 LENEXA DR., #300
LENEXA, KS 66214
913.742.5000

REVISIONS

NO.	DESCRIPTION	DATE
1	ADD 01	1/11/2023
2	ADD 02	1/25/2023

PROJECT NO.: 19-040 DRAWN BY: J.R. & A.J.
DATE: 12.15.22 REVIEWED BY: M.F.

PROFESSIONAL SEAL

STATE OF MISSOURI
STEVEN D. MARION
NUMBER
PE2006007195
ENGINEER

ENGINEERS AUTHENTICATION
The responsibility for professional engineering liability on this project is hereby limited to the set of plans authenticated by the seal, signature, and date hereunder attached. Responsibility is disclaimed for all other engineering documents and for any other plans specifically excluded; revisions after this date are not authenticated.
STEVEN D. MARION P.E.
PROFESSIONAL ENGINEER
PE 2006007195

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

STORM SEWER PROFILES

SHEET
C-600

NOT RELEASED FOR CONSTRUCTION

15 YEAR 20 MINUTE STORM

LineNo.	LineID	InletID	LineLength	n-valuePipe	LineSize	InvertUp	InvertDn	LineSlope	Grnd/RimElev Up	Grnd/RimElev Dn	DepthUp	HGLUp	HGLDn	Rim-Hw	Defl.Angle	VelDn	VelHd Dn	J-LossCoeff	EnergyLoss	MinorLoss	CapacityFull	KnownQ	FlowRate	CrossSlope, Sx	InletEff	QCaptured	QBypass	QCarryover	BypassDepth	BypassSpread	n-valueGutter	GutterSpread
			(ft)		(in)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(Deg)	(ft/s)	(ft)		(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/ft)	(%)	(cfs)	(cfs)	(cfs)	(ft)	(ft)		(ft)
1	201-200	201	47.36	0.013	36	623.11	622.8	0.65	630.22	624.05	2.73	625.84	625.8	4.22	-109.45	3.26	0.16	0.91	0.053	0.16	53.96	0	23.02	....	....	....	....	....	....	....	....	....
2	202-201	202	109.44	0.013	36	624.19	623.46	0.67	639.02	630.22	1.54**	625.73	626	13.29	-63.43	3.6	0.61	2.56 z	0	1.57	54.47	0.69	23.02	0.02	100	0.69	0	0	n/a	n/a	....	1.07
3	203-202	203	117.978	0.013	18	625.57	624.39	1	640.01	639.02	1.5	629.09	625.89	10.7	-97	9.78	1.49	0.15	3.195	0.22	10.5	4.64	17.28	....	....	....	....	....	....	....	....	....
4	400-202	400	143	0.013	18	629.23	627.51	1.2	638.74	639.02	0.85**	630.08	628.2	8.66	7.4	6.26	0.35	0.97 z	0	n/a	11.52	0.06	4.92	....	....	....	....	....	....	....	....	....
5	401-400	401	89.122	0.013	15	630.32	629.43	1	640.04	638.74	0.79**	631.11	630.12	8.93	-14.345	5.47	0.34	1.00 z	0	0.34	6.45	0	3.8	....	....	....	....	....	....	....	....	....
6	402-401	402	185.962	0.013	15	632.38	630.52	1	639.91	640.04	0.71**	633.09	631.13	6.82	0	5.22	0.29	1.00 z	0	0.29	6.46	0.11	3.13	....	....	....	....	....	....	....	....	....
7	403-402	403	131.399	0.013	12	633.89	632.58	1	639.88	639.91	0.62**	634.51	633.14	5.37	0	4.73	0.27	1.00 z	0	0.27	3.56	0.21	2.14	....	....	....	....	....	....	....	....	....
8	204-203	204	50.092	0.013	24	626.27	625.77	1	638.71	640.01	2	629.47	629.31	8.97	0	4.02	0.25	1.1	0.156	0.28	22.6	1.91	12.64	0.02	100	1.91	0	0	n/a	n/a	....	1.89
9	300-204	300	63.627	0.013	12	631.07	630.43	1.01	639.05	638.71	0.54**	631.61	630.9	7.44	-35.629	4.44	0.22	1.00 z	0	0.22	3.57	1.42	1.63	0.02	100	1.42	0	0	n/a	n/a	....	1.32
10	402A-402	402A	27.503	0.013	12	634.9	634.35	2	639.9	639.91	0.39**	635.29	634.63	4.61	90.04	4.81	0.15	1.00 z	0	0.15	5.04	0.88	0.88	0.02	100	0.88	0	0	n/a	n/a	....	6.81
11	401A-401	401A	27.501	0.013	12	634.66	634.11	2	639.66	640.04	0.34**	635	634.36	4.66	90	4.45	0.12	1.00 z	0	0.12	5.04	0.67	0.67	0.02	100	0.67	0	0	n/a	n/a	....	5.68
12	404-403	404	123.52	0.013	12	635.45	634.09	1.1	640.72	639.88	0.41**	635.86 j	634.51	4.86	-40.99	2.96	0.15	1.00 z	0	n/a	3.74	0.94	0.94	0.02	100	0.94	0	0	n/a	n/a	....	7.12
13	403A-403	403A	21.255	0.013	12	634.3	634.09	0.99	639.3	639.88	0.42**	634.72 j	634.51	4.58	90	3.12	0.16	1.00 z	0	n/a	3.54	0.99	0.99	0.02	100	0.99	0	0	n/a	n/a	....	1.25
14	301-300	301	82.6	0.013	12	634.11	633.28	1	639.11	639.05	0.19**	634.3	633.44	4.81	-37.866	2.48	0.07	1.00 z	0	n/a	3.57	0.21	0.21	0.02	100	0.21	0	0	n/a	n/a	....	0.54
15	400A-400	400A	27.5	0.013	12	633.7	633.15	2	638.7	638.74	0.43**	634.13	633.46	4.57	75.656	5.07	0.16	1.00 z	0	0.16	5.04	1.06	1.06	0.02	100	1.06	0	0	n/a	n/a	....	7.71
16	205-204	205	151.279	0.013	18	627.98	626.47	1	638.72	638.71	1.5	630.88	629.74	7.24	2.954	5.15	0.41	1.45	1.136	0.6	10.49	0.89	9.1	0.02	100	0.89	0	0	n/a	n/a	....	1.42
17	206-205	206	216.392	0.013	18	630.34	628.18	1	637.12	638.72	1.5	632.8	631.48	4.15	73.806	4.65	0.34	0.5	1.323	0.17	10.49	5.95	8.21	0.02	100	5.95	0	0	n/a	n/a	....	6.08
18	207-206	207	334.903	0.013	15	632.78	630.54	0.67	638.64	637.12	0.76	633.54	632.97	4.92	13.651	1.84	0.05	1.36	0.65	0.18	5.28	1.45	2.26	0.02	100	1.45	0	0	n/a	n/a	....	1.4
19	208-207	208	186.539	0.013	12	634.23	632.98	0.67	640.94	638.64	0.38**	634.61 j	633.72	6.33	62.125	1.31	0.14	1.00 z	0	n/a	2.92	0.81	0.81	0.02	100	0.81	0	0	n/a	n/a	....	6.44
20	202A-202	202A	62.06	0.012	8	635.96	632.96	4.83	641.41	639.02	0.16**	636.12	633.06	5.29	-45.8	4.16	0.06	0.17 z	0	0.01	2.88	0.02	0.13	....	....	....	....	....	....	....	....	....
21	202C-202A	202C	10.789	0.012	4	636.6	635.96	5.93	637.75	641.41	0.19**	636.79	636.12	0.96	-8.218	2.56	0.08	0.35 z	0	0.03	0.5	0	0.11	....	....	....	....	....	....	....	....	....
22	202D-202C	202D	18.024	0.012	12	636.6	636.6	0	637.75	637.75	0.21	636.81	636.79	0.92	17.379	1.1	0.02	1	0.02	0.01	0	0.11	0.11	....	....	....	....	....	....	....	....	....
23	101-100	101	56.561	0.013	36	603.16	602.59	1.01	624.26	605	2.45	605.61	605.59	18.61	156.042	3.63	0.2	0.15	0.084	0.04	66.95	0	25.64	....	....	....	....	....	....	....	....	....
24	102-101	102	37.133	0.013	36	617.75	617.38	1	628	624.26	1.63**	619.38	618.67	8.62	0.251	8.8	0.66	0.23 z	0	n/a	66.57	0	25.64	....	....	....	....	....	....	....	....	....
25	103-102	103	11.8	0.013	24	622.5	622.38	1.02	624.83	628	2	624.5	624.38	-0.7	10.949	8.16	1.04	1	0.15	1.04	22.81	25.64	25.64	....	100	25.64	0	0	....	....	....	....
	Notes: j-Line contains hyd. jump; s-Supercritical depth; z-Zero Junction Loss																															

100 YEAR 20 MINUTE STORM

LineNo.	LineID	InletID	LineLength	n-valuePipe	LineSize	InvertUp	InvertDn	LineSlope	Grnd/RimElev Up	Grnd/RimElev Dn	DepthUp	HGLUp	HGLDn	Rim-Hw	Defl.Angle	VelDn	VelHd Dn	J-LossCoeff	EnergyLoss	MinorLoss	CapacityFull	KnownQ	FlowRate	CrossSlope, Sx	InletEff	QCaptured	QBypass	QCarryover	BypassDepth	BypassSpread	n-valueGutter	GutterSpread
			(ft)		(in)	(ft)	(ft)	(%)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(Deg)	(ft/s)	(ft)		(ft)	(ft)	(cfs)	(cfs)	(cfs)	(ft/ft)	(%)	(cfs)	(cfs)	(cfs)	(ft)	(ft)		(ft)
1	201-200	201	47.36	0.013	36	623.11	622.8	0.65	630.22	624.05	2.76	625.87	625.8	4.06	-109.45	4.39	0.3	0.91	0.096	0.29	53.96	0	31.01	....	....	....	....	....	....	....	....	....
2	202-201	202	109.44	0.013	36	624.19	623.46	0.67	639.02	630.22	1.80**	625.99	626.16	13.03	-63.43	4.62	0.76	2.56 z	0	1.94	54.47	0.93	31.01	0.02	100	0.93	0	0	n/a	n/a	....	1.25
3	203-202	203	117.978	0.013	36	625.57	624.39	1	640.01	639.02	1.55**	627.12 j	625.99	12.89	-97	6.06	0.62	0.15 z	0	n/a	66.7	6.25	23.29	....	....	....	....	....	....	....	....	....
4	400-202	400	143	0.013	18	629.23	627.51	1.2	638.74	639.02	0.99**	630.22	628.33	8.52	7.4	6.74	0.44	0.97 z	0	n/a	11.52	0.09	6.61	....	....	....	....	....	....	....	....	....
5	401-400	401	89.122	0.013	15	630.32	629.43	1	640.04	638.74	0.91**	631.23	630.27	8.81	-14.345	5.83	0.44	1.00 z	0	n/a	6.45	0	5.1	....	....	....	....	....	....	....	....	....
6	402-401	402	185.962	0.013	15	632.38	630.52	1	639.91	640.04	0.83**	633.21	631.25	6.7	0	5.6	0.37	1.00 z	0	0.37	6.46	0.14	4.2	....	....	....	....	....	....	....	....	....
7	403-402	403	131.399	0.013	12	633.89	632.58	1	639.88	639.91	0.73**	634.62	633.26	5.26	0	5.04	0.34	1.00 z	0	n/a	3.56	0.29	2.88	....	....	....	....	....	....	....	....	....
8	204-203	204	50.092	0.013	18	626.27	625.77	1	638.71	640.01	1.5	628.59	627.27	8.53	0	9.64	1.45	1.1	1.319	1.59	10.49	2.58	17.04	0.02	100	2.58	0	0	n/a	n/a	....	3.7
9	300-204	300	63.627	0.013	12	631.07	630.43	1.01	639.05	638.71	0.63**	631.7	631	7.35	-35.629	4.78	0.27	1.00 z	0	n/a	3.57	1.91	2.2	0.02	100	1.91	0	0	n/a	n/a	....	1.47
10	402A-402	402A	27.503	0.013	12	634.9	634.35	2	639.9	639.91	0.46**	635.36	634.68	4.54	90.04	5.23	0.18	1.00 z	0	0.18	5.04	1.18	1.18	0.02	100	1.18	0	0	n/a	n/a	....	8.28
11	401A-401	401A	27.501	0.013	12	634.66	634.11	2	639.66	640.04	0.40**	635.06	634.4	4.6	90	4.85	0.15	1.00 z	0	0.15	5.04	0.9	0.9	0.02	100	0.9	0	0	n/a	n/a	....	6.91
12	404-403	404	123.52	0.013	12	635.45	634.09	1.1	640.72	639.88	0.47**	635.92 j	634.62	4.8	-40.99	3	0.18	1.00 z	0	n/a	3.74	1.26	1.26	0.02	100	1.26	0	0	n/a	n/a	....	8.65
13	403A-403	403A	21.255	0.013	12	634.3	634.09	0.99	639.3	639.88	0.49**	634.79 j	634.62	4.51	90	3.17	0.19	1.00 z	0	n/a	3.54	1.33	1.33	0.02	100	1.33	0	0	n/a	n/a	....	1.33
14	301-300	301	82.6	0.013	12	634.11	633.28	1	639.11	639.05	0.22**	634.33	633.47	4.78	-37.866	2.73	0.08	1.00 z	0	0.08	3.57	0.29	0.29	0.02	100	0.29	0	0	n/a	n/a	....	0.65
15	400A-400	400A	27.5	0.013	12	633.7	633.15	2	638.7	638.74	0.50**	634.2	633.51	4.5	75.656	5.51	0.2	1.00 z	0	n/a	5.04	1.42	1.42	0.02	100	1.42	0	0	n/a	n/a	....	9.37
16	205-204	205	151.279	0.013	18	627.98	626.47	1	638.72	638.71	1.5	632.24	630.18	5.39	2.954	6.94	0.75	1.45	2.062	1.09	10.49	1.19	12.26	0.02	100	1.19	0	0	n/a	n/a	....	1.6
17	206-205	206	216.392	0.013	18	630.34	628.18	1	637.12	638.72	1.5	635.73	633.33	1.08	73.806	6.27	0.61	0.5	2.405	0.31	10.49	8.01	11.07	0.02	100	8.01	0	0	n/a	n/a	....	9.44
18	207-206	207	334.903	0.013	15	632.78	630.54	0.67	638.64	637.12	1.25	636.79	636.04	1.72	13.651	2.49	0.1	1.36	0.752	0.13	5.28	1.96	3.06	0.02	100	1.96	0	0	n/a	n/a	....	1.72
19	208-207	208	186.539	0.013	12	634.23	632.98	0.67	640.94	638.64	1	637.1	636.92	3.81	62.125	1.4	0.03	1	0.178	0.03	2.92	1.1	1.1	0.02	100	1.1	0	0	n/a	n/a	....	7.9
20	101-100	101	56.561	0.013	36	603.16	602.59	1.01	624.26	605	2.48	605.64	605.59	18.55	156.042	4.93	0.38	0.15	0.153	0.07	66.95	0	34.86	....	....	....	....	....	....	....	....	....
21	102-101	102	37.133	0.013	36	617.75	617.38	1	628	624.26	1.92**	619.67	618.92	8.33	0.251	9.52	0.83	0.23 z	0	0.19	66.57	0	34.86	....	....	....	....	....	....	....	....	....
22	103-102	103	11.8	0.013	24	622.5	622.38	1.02	624.83	628	2	624.66	624.38	-1.75	10.949	11.1	1.92	1	0.28	1.91	22.81	34.86	34.86	....	100	34.86	0	0	....	....	....	....
23	202A-202	202A	62.06	0.012	8	635.96	632.96	4.83	641.41	639.02	0.19**	636.15	633.07	5.26	-45.8	4.59	0.07	0.17 z	0	n/a	2.88	0.03	0.18	....	....	....	....	....	....	....	....	....
24	202C-202A	202C	10.789	0.012	4	636.6	635.96	5.93	637.75	641.41	0.22**	636.82	636.15	0.93	-8.218	2.84	0.1	0.35 z	0	0.03	0.5	0	0.15	....	....	....	....	....	....	....	....	....
25	202D-202C	202D	18.024	0.012	12	636.6	636.6	0	637.75	637.75	0.24	636.84	636.82	0.89	17.379	1.19	0.02	1	0.021	0.02	0	0.15	0.15	....	....	....	....	....	....	....	....	....
	Notes: j-Line contains hyd. jump; s-Supercritical depth; z-Zero Junction Loss																															

02

STORM SEWER PIPES WITH A DESIGN GRADE LESS THAN 1.0% WILL REQUIRE VERIFICATION OF THE PIPE GRADE FOR EACH REACH PRIOR TO ANY SURFACE RESTORATION OR INSTALLATION OF ANY SURFACE IMPROVEMENTS

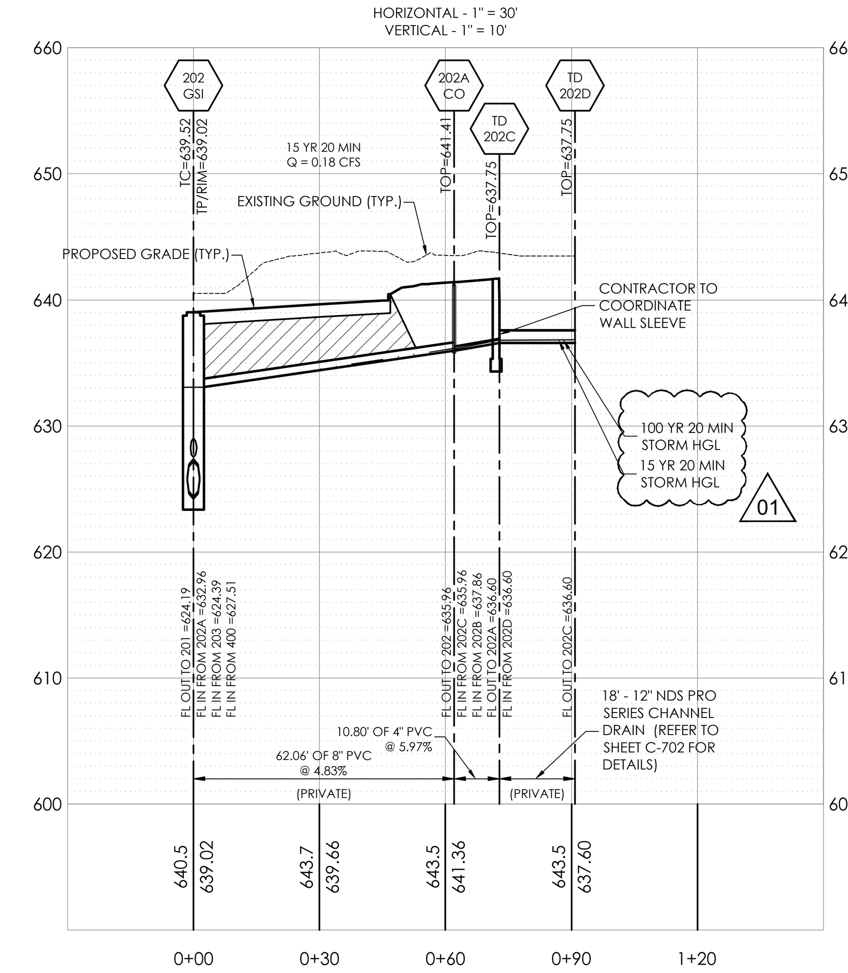
"Little MO" says CALL BEFORE YOU DIG! 1-800-DIG-RITE

UNDERGROUND UTILITIES AND OSHA SAFETY NOTE:

Underground utilities and structures have been plotted from available information and therefore, their location must be considered approximate only. It is the responsibility of the individual contractors to notify the utility companies before actual construction. All O.S.H.A rules and regulations established for the type of construction required by these plans shall be strictly followed (ie. trenching, blasting, etc.)

202D TD- 202 GSI STORM SEWER PROFILE

HORIZONTAL - 1" = 30'
VERTICAL - 1" = 10'



WENTZVILLE PROJECT #: ENG-2022-033A

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OWNER

CITY OF WENTZVILLE
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REVISIONS

NO.	DESCRIPTION	DATE
1	ADD 01	1/11/2023
2	ADD 02	1/25/2023

PROJECT NO.: 19-040 DRAWN BY: J.R. & A.J.
DATE: 12.15.22 REVIEWED BY: M.F.

PROFESSIONAL SEAL

ENGINEERS AUTHENTICATION
The responsibility for professional engineering liability on this project is hereby limited to the set of plans authenticated by the seal, signature, and date hereunder attached. Responsibility is disclaimed for all other engineering plans involved in this project and specifically excludes revisions after this date unless reauthenticated.
STEVEN D. MARION P.E.
PROFESSIONAL ENGINEER
PE 2006007195

PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:

1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

STORM SEWER HYDRAULICS

SHEET
C-601

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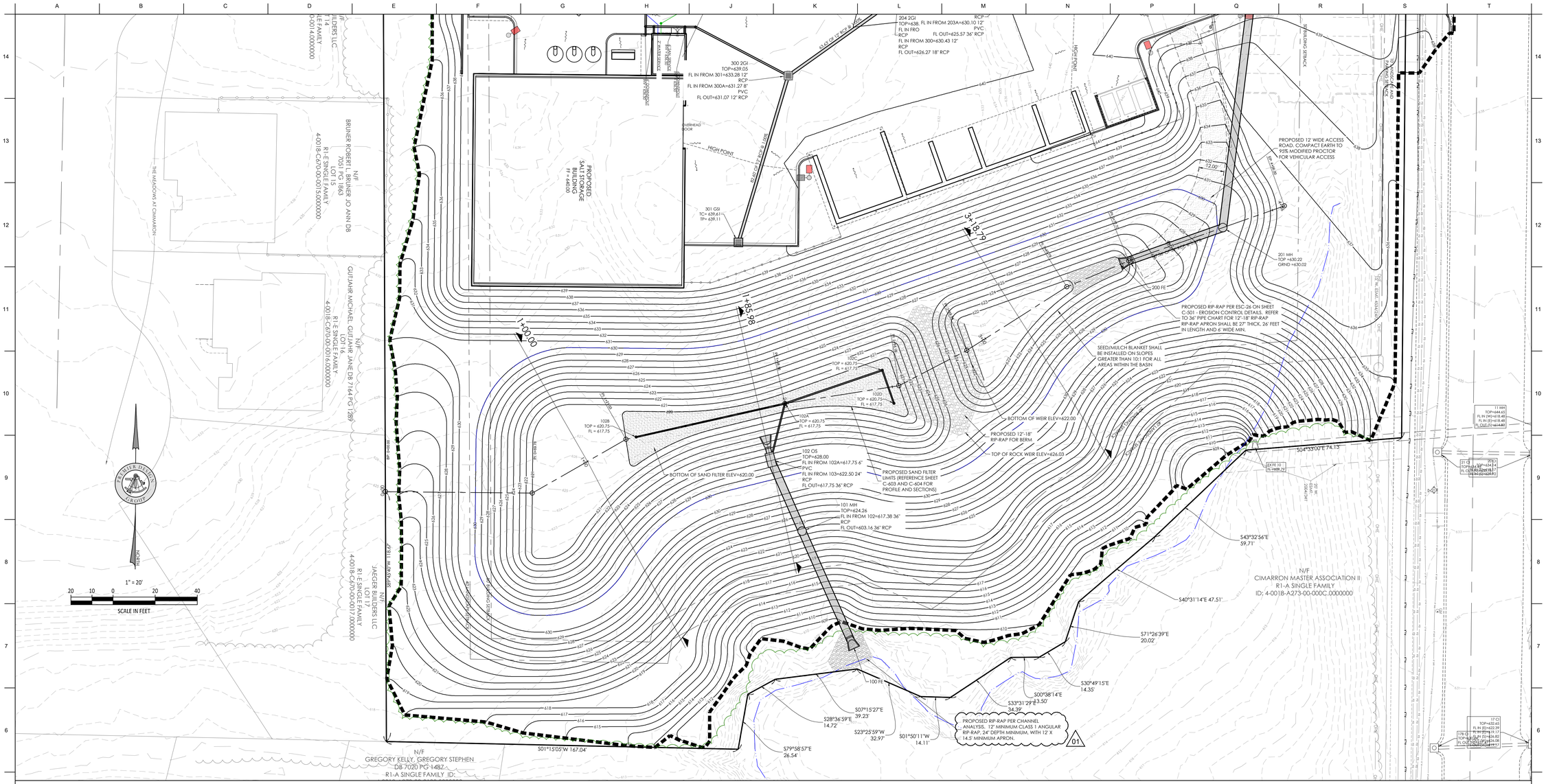
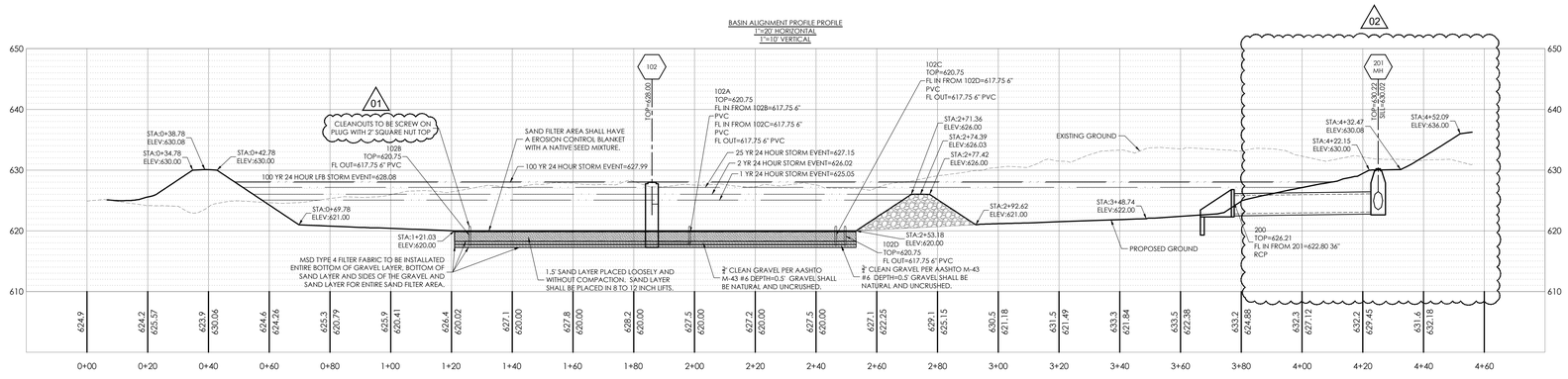
\\Vault-pc\vault\CIVIL 3D PROJECTS\2020\2000610_CITY OF WENTZVILLE PUBLIC WORKS_WENTZVILLE MO\ENGINEERING\CONSTRUCTION DRAWINGS\SHEETS\STORM SEWER PROFILES.dwg





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WENTZVILLE PROJECT #: ENG-2022-033A

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PROJECT NO.: 19-040 DRAWN BY: J.R. & A.J.
DATE: 12.15.22 REVIEWED BY: M.F.

PROFESSIONAL SEAL

STATE OF MISSOURI STEVEN D. MARION NUMBER PE2006007195 PROFESSIONAL ENGINEER

ENGINEERS AUTHENTICATION
The responsibility for professional engineering validity on this project is hereby limited to the set of plans authenticated by the seal, signature, and date hereunder attached. Responsibility is disclaimed for all other engineering plans involved in this project and specifically excludes revisions made to these plans after authenticated.
STEVEN D. MARION, P.E.
PROFESSIONAL ENGINEER
PE 2006007195

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CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

DETENTION BASIN DETAILS

SHEET
C-603

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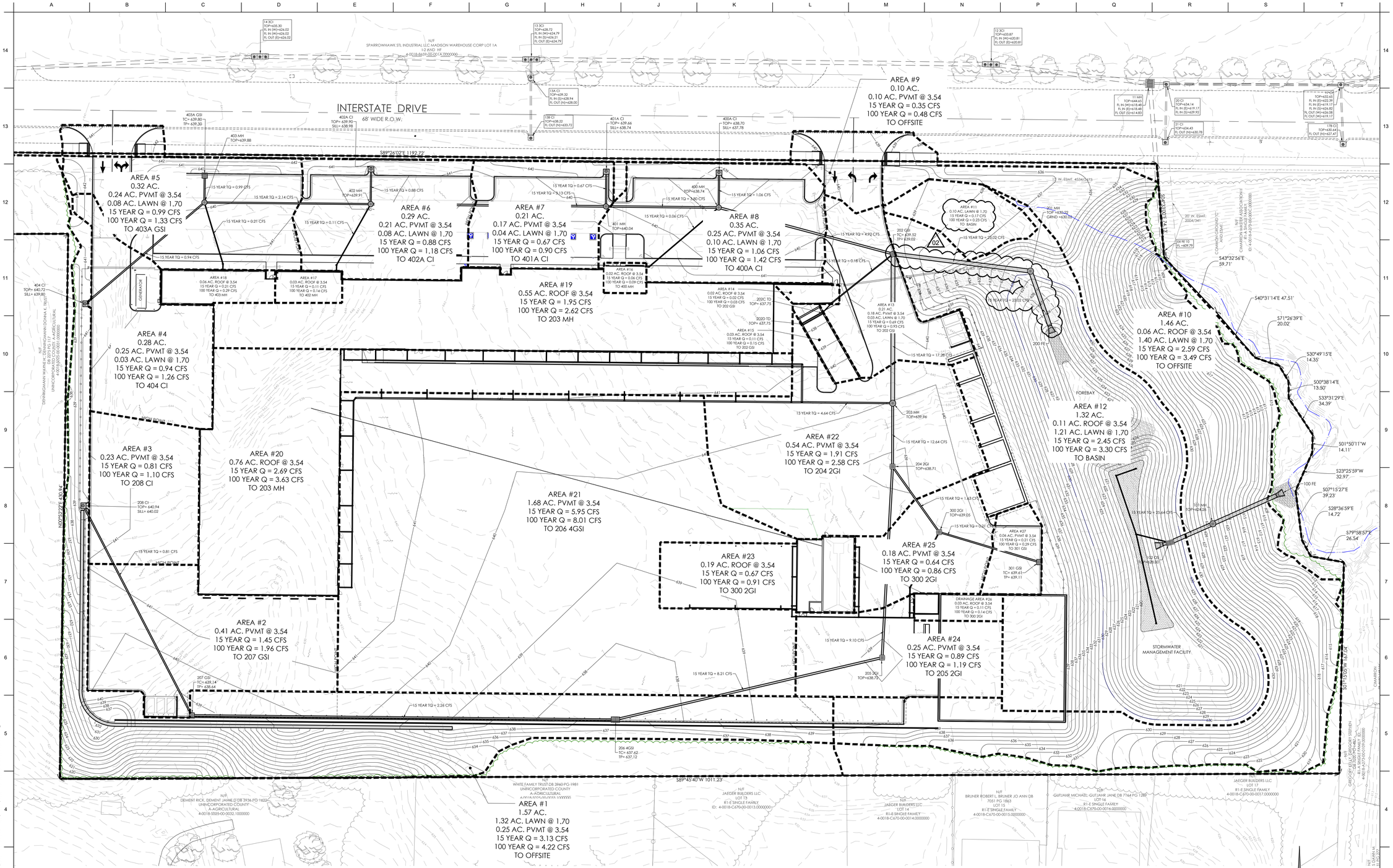

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WENTZVILLE PROJECT #: ENG-2022-033A

\\hdwfs-pc\work\CIVIL 3D PROJECTS\2020\2000610_CITY OF WENTZVILLE PUBLIC WORKS_WENTZVILLE MO\EXGINTERING\CONSTRUCTION DRAWINGS\SHEETS\C-900 PROPOSED DRAINAGE AREA MAP.dwg

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PROJECT NO.: 19-040 DRAWN BY: J.R. & A.J.
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PROFESSIONAL SEAL

STATE OF MISSOURI
STEVEN MARION INGMIRE
PE2006027195
PROFESSIONAL ENGINEER

ENGINEERS AUTHENTICATION

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STEVEN D. MARION P.E.
PROFESSIONAL ENGINEER
PE 2006027195

PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:

1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

PROPOSED DRAINAGE AREA MAP

SHEET

C-900

NOT RELEASED FOR CONSTRUCTION

SPECIAL CONDITIONS, REQUIREMENTS AND NOTES TO OWNER, DEVELOPER AND CONTRACTOR:

1. CONTRACTOR, BUILDER AND SUBCONTRACTORS INVOLVED IN ANY FORM OF CONSTRUCTION USING THESE CONTRACT DOCUMENTS SHALL BE INFORMED OF THE FOLLOWING RESPONSIBILITIES, PERFORMANCE CRITERIA, LIMITATIONS AND RISKS ASSOCIATED WITH CONSTRUCTION. IF THE OWNER, DEVELOPER OR CONTRACTOR IS NOT ABLE TO ACCEPT THE RESPONSIBILITIES OR PERFORMANCE CRITERIA AND LIMITATIONS, NOTIFY THE ENGINEER OF RECORD OR ARCHITECT PRIOR TO START OF CONSTRUCTION. IT SHALL BE EXPRESSLY UNDERSTOOD THAT THE ENGINEER IS NOT RESPONSIBLE OR LIABLE FOR THE LACK OF PERFORMANCE OF MATERIALS, SYSTEMS OR DESIGNS NOT BEING LIMITED TO ITEMS OUTLINED BELOW. CONTRACTORS AND SUBCONTRACTORS SHALL THOROUGHLY REVIEW ALL CONDITIONS AND RESPONSIBILITIES STATED IN THESE NOTES, PLANS, SECTIONS / DETAILS, AND SHALL NOTIFY THE ENGINEER AND OWNER IN WRITING PRIOR TO CONSTRUCTION OF ANY CONDITIONS OR RESPONSIBILITIES WHICH ARE NOT ACCEPTABLE OR NOT UNDERSTOOD.

2. THE CONTRACTOR SHALL USE ALL STANDARD MEANS TO ENSURE PROPER PROTECTION AND CURING OF ALL CEMENTITIOUS MATERIALS TO REDUCE CRACKING OR SURFACE SPALLING. PLAIN CONCRETE, REINFORCED CONCRETE, OR CONCRETE MASONRY DEVELOP CRACKS. THE CRACKS ARE DUE TO INHERENT SHRINKAGE, CREEP AND RESTRAINING EFFECTS. CRACKS ARE NORMALLY COSMETIC AND THE SYSTEM MAINTAINS SERVICEABILITY AND STRENGTH REQUIREMENTS. JOINTS MAY BE INDICATED TO CONTROL CRACKING, BUT ARE NOT MEANT TO ELIMINATE ALL CRACKING, AS THIS IS NOT PRACTICAL. EXTREME CRACKING MAY BE CAUSED BY POOR MATERIAL OR PLACEMENT. CONTACT THE ENGINEER OF RECORD FOR POSSIBLE REPAIR REQUIREMENTS.

3. FOUNDATION SETTLEMENT MAY CAUSE DISTORTION AND DISTRESS TO THE SUPPORTED STRUCTURE AS WELL AS ADJACENT UTILITIES, SLABS, FOUNDATIONS, ETC. THE GEOTECHNICAL REPORT MAY INDICATE A LEVEL OF DISPLACEMENT. ATTENTION TO PROPER SOIL PREPARATION AND GRADING, AS WELL AS PROPER DRAINAGE AWAY FROM STRUCTURE IS ESSENTIAL IN REDUCING EXPECTED SETTLEMENT. ALL REQUIREMENTS WITHIN THE GEOTECHNICAL REPORT ARE TO BE FOLLOWED. INFORM THE ENGINEER OF RECORD OF ANY CONFLICTS BETWEEN THE REPORT AND THE DRAWINGS.

4. VARIATION IN DIMENSIONS MAY OCCUR AS A RESULT OF THERMAL INFLUENCES, NATURAL DEFLECTIONS AND/OR CAMBERS OF MEMBERS. AS A RESULT, QUANTITIES MAY VARY AND ARCHITECTURAL FINISHES MAY BE AT RISK OF COSMETIC VARIATION OR DAMAGE.

5. THE ENGINEER OF RECORD SHALL NOT BE RESPONSIBLE FOR VARIATIONS TO PLANS BETWEEN BID PROCESS AND FINALIZED APPROVED DOCUMENTS RELEASED FOR CONSTRUCTION UNLESS SUCH VARIATIONS ARE ISSUED BY THE ENGINEER. ADDITIONS AND ALTERATIONS MAY BE MADE BY THE ENGINEER BETWEEN RELEASE OF BID DOCUMENTS AND FINALIZED CONSTRUCTION DOCUMENTS.

6. THESE DRAWINGS HAVE BEEN PREPARED USING STANDARDS OF PROFESSIONAL CARE AND COMPLETENESS NORMALLY EXERCISED UNDER SIMILAR CIRCUMSTANCES BY REPUTABLE STRUCTURAL ENGINEERS IN THIS OR SIMILAR LOCALITIES. THEY NECESSARILY ASSUME THAT THE WORK DEPICTED WILL BE PERFORMED BY AN EXPERIENCED CONTRACTOR, SUBCONTRACTOR AND/OR WORKPERSONS WHO HAVE A WORKING KNOWLEDGE OF THE APPLICABLE CODE STANDARDS AND REQUIREMENTS AND OF INDUSTRY ACCEPTED STANDARD GOOD PRACTICE. AS NOT EVERY CONDITION OR ELEMENT IS (OR CAN BE) EXPLICITLY SHOWN ON THESE DRAWINGS. IT IS UNDERSTOOD THAT THE CONTRACTOR WILL USE INDUSTRY ACCEPTED STANDARD GOOD PRACTICE FOR ALL WORK WHETHER EXPLICITLY SHOWN OR NOT.

7. CALCULATION AND DESIGN OF MISCELLANEOUS NON-STRUCTURAL ITEMS, SUCH AS RAILINGS, NON-STRUCTURAL WALLS AND PREFABRICATED STRUCTURAL ITEMS, SUCH AS CANOPIES, ARE NOT INCLUDED AND ARE TO BE PROVIDED BY OTHERS UNLESS SPECIFICALLY NOTED ON THESE DRAWINGS.

8. THESE DRAWINGS REPRESENT THE FINISHED STRUCTURE. THEY DO NOT INDICATE THE MEANS AND METHODS OF CONSTRUCTION. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO DESIGN AND PROVIDE ADEQUATE, SHORING, BRACING, FORMWORK, ETC. AS REQUIRED FOR THE PROTECTION OF LIFE AND PROPERTY DURING CONSTRUCTION.

9. CONSTRUCTION MATERIALS SHALL BE UNIFORMLY SPREAD OUT SUCH THAT DESIGN LIVE LOAD PER SQUARE FOOT AS STATED HEREIN IS NOT EXCEEDED. VISITS TO THE SITE BY THE STRUCTURAL ENGINEER SHALL NOT INCLUDE INSPECTION OF THE ABOVE ITEMS.

10. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATION PROCEDURES INCLUDING SHORING AND PROTECTION OF ADJACENT PROPERTY, STRUCTURES, STREETS AND UTILITIES IN ACCORDANCE WITH THE LOCAL BUILDING DEPARTMENT AND SHALL COMPLY WITH ALL APPLICABLE BUILDING CODES, REGULATIONS AND SAFETY REQUIREMENTS.

11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR VERIFICATION OF ALL DIMENSIONS, CONDITIONS AND ELEVATIONS WITH OTHER DISCIPLINES DRAWINGS PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR SHALL INFORM THE ARCHITECT AND ENGINEER OF RECORD IN WRITING OF ANY DISCREPANCIES OR OMISSIONS NOTED ON THE DRAWINGS. ANY SUCH DISCREPANCY, OMISSION OR VARIATION NOT REPORTED BEFORE THE START OF CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.

12. WHERE REFERENCE IS MADE TO VARIOUS TEST STANDARDS FOR MATERIALS, SUCH STANDARDS SHALL BE THE LATEST EDITION AND/OR ADDENDA.

13. OPTIONS ARE FOR CONTRACTOR'S CONVENIENCE. IF AN OPTION IS USED, THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL NECESSARY CHANGES AND SHALL COORDINATE ALL DETAILS.

14. TYPICAL GENERAL STRUCTURAL NOTES AND DETAILS SHALL APPLY, THOUGH NOT NECESSARILY AT A SPECIFIC LOCATION ON PLANS. WHERE NO DETAILS ARE SHOWN, CONSTRUCTION SHALL CONFORM TO SIMILAR WORK ON THE PROJECT. DETAILS MAY ONLY SHOW ONE SIDE OF CONNECTION OR MAY OMIT INFORMATION FOR CLARITY. WHERE DISCREPANCIES OCCUR IN THESE DRAWINGS, SPECIFIC NOTES AND DETAILS ON DRAWINGS SHALL TAKE PRECEDENCE OVER GENERAL STRUCTURAL NOTES AND TYPICAL DETAILS.

15. ALL OPENINGS ARE NOT SHOWN ON THESE DRAWINGS. ESTABLISH AND VERIFY ALL OPENINGS AND INSERTS FOR ARCHITECTURAL, MECHANICAL, PLUMBING AND ELECTRICAL WITH APPROPRIATE TRADES, DRAWINGS AND SUBCONTRACTORS PRIOR TO CONSTRUCTION. OPENINGS MAY REQUIRE ADDITIONAL REINFORCING OR SUPPORTS AS SHOWN ON TYPICAL DETAILS. IF TYPICAL DETAILS FOR ALL CONDITIONS ARE NOT INCLUDED HEREIN, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REQUEST IN WRITING ADDITIONAL INFORMATION.

16. ALL INSPECTIONS REQUIRED BY THE BUILDING CODES, LOCAL BUILDING OFFICIALS, OR BY THESE PLANS SHALL BE PROVIDED BY AN INDEPENDENT INSPECTION COMPANY OR THE BUILDING DEPARTMENT. SPECIAL INSPECTION REQUIREMENTS STATED HEREIN ARE PARTIAL. COMPLETE INSPECTION REQUIREMENTS SHALL BE AS DIRECTED BY THE LOCAL BUILDING DEPARTMENT. SITE VISITS BY THE ENGINEER DO NOT CONSTITUTE A SPECIAL INSPECTION, UNLESS SPECIFICALLY CONTRACTED FOR.

17. SHOP DRAWINGS SHALL BE SUBMITTED FOR ALL STRUCTURAL ITEMS. SHOP DRAWINGS ARE REVIEWED ONLY FOR GENERAL COMPLIANCE WITH THE STRUCTURAL DRAWINGS. REVIEW DOES NOT INDICATE THAT THE SHOP DRAWINGS ARE CORRECT OR COMPLETE. RESPONSIBILITY FOR CORRECTNESS SHALL REST WITH THE CONTRACTOR. ANY CHANGES, SUBSTITUTIONS, OR DEVIATIONS FROM CONTRACT DRAWINGS SHALL BE CLOUDED. ANY OF THE AFOREMENTIONED SHALL NOT BE CONSIDERED APPROVED AFTER ENGINEER'S REVIEW UNLESS SPECIFICALLY NOTED ACCORDINGLY. THE SHOP DRAWINGS DO NOT SUPERSEDE OR REPLACE THE ORIGINAL CONTRACT DRAWINGS. ANY ENGINEERING PROVIDED BY OTHERS AND SUBMITTED FOR REVIEW SHALL BEAR THE SEAL OF AN APPROPRIATELY REGISTERED ENGINEER. THE ENGINEER OF RECORD SHALL NOT BE RESPONSIBLE FOR THE ADEQUACY OF ENGINEERING DESIGNS PERFORMED BY OTHERS. ALLOW A MINIMUM OF 10 WORKING DAYS FOR THE ENGINEER'S REVIEW. ONE COPY OF EACH SUBMITTAL WILL BE RETAINED FOR THE ENGINEER'S RECORDS.

DEFERRED SUBMITTALS:

1. IN ACCORDANCE WITH THE IBC SECTION 106.3.4.2, SPECIALTY ITEMS, PRE-ENGINEERED COMPONENTS, AND DESIGN/ BUILD ELEMENTS MAY BE SUBMITTED FOR APPROVAL BY THE ENGINEER OF RECORD AND THE BUILDING OFFICIAL BY DEFERRED SUBMITTAL. SUCH ITEMS ARE DEFINED AS THOSE SPECIFIED IN CONSTRUCTION DOCUMENTS BUT WHICH REQUIRE DESIGN BY THE MANUFACTURER, SUPPLIER, OR INSTALLER.

2. SUBMITTALS ARE REQUIRED FOR THE FOLLOWING:

   A. POST TENSIONED SLAB DETAILS AND CALCULATIONS
   B. WOOD FLOOR AND ROOF TRUSSES
   C. WALL PANELS BUILT W/ WOOD STUDS (ONLY IF WALLS ARE BUILT OFF SITE)
   D. SIMPSON STRONG-TIE, OR EQUAL, HARDWARE **(INCLUDING ALL TRUSS HANGERS)**
   E. SIMPSON ATS (ANCHOR TIEDOWN SYSTEM) OR APPROVED EQUAL
   F. COVERED PARKING
   G. CONCRETE MIX DESIGNS AND REBAR SHOP DRAWINGS
   H. STEEL SHOP DRAWINGS
   J. CANOPIES
   K. HAND/GUARD RAILS
   L. SIGNS

3. SUBMITTALS SHALL INCLUDE:

   A. CALCULATIONS PREPARED AND SEALED BY AN APPROPRIATELY REGISTERED ENGINEER (THE "SPECIALTY ENGINEER").

   B. DIAGRAM PREPARED AND SEALED BY THE SPECIALTY ENGINEER, SHOWING LOAD MAGNITUDES AND LOCATIONS - SEPARATED INTO DEAD, LIVE, WIND AND/OR SEISMIC COMPONENTS - THAT ARE APPLIED TO THE PRIMARY STRUCTURE.

   C. ERECTION OR DESIGN DRAWINGS BEARING THE SPECIALTY ENGINEER'S SEAL AND THE ARCHITECT'S STAMP INDICATING HIS REVIEW.

4. SUBMIT (1) REPRODUCIBLE COPY, ONE (1) WET SEALED COPY FOR THE STRUCTURAL ENGINEER OF RECORD'S FILE, AND ADDITIONAL COPIES AS ARE NECESSARY FOR THE BUILDING DEPARTMENT. SUBMITTALS CONTAINING EXCEPTIONS, CORRECTIONS, OR OTHER REVIEW COMMENTS ARE NOT ACCEPTABLE FOR SUBMITTAL TO THE BUILDING DEPARTMENT.

5. THE STRUCTURAL ENGINEER OF RECORD'S REVIEW IS STRICTLY LIMITED TO THE FOLLOWING:

   A. THE DRAWINGS AND CALCULATIONS ARE PROPERLY SEALED.

   B. THE LOAD CRITERIA IS CONSISTENT WITH THE CONTRACT DOCUMENTS AND INTERNATIONAL BUILDING CODE REQUIREMENTS.

   C. THE CONNECTIONS TO THE PRIMARY STRUCTURE ARE CONSISTENT WITH THE PRIMARY DESIGN.

   D. THE BASE STRUCTURE IS CAPABLE OF SUPPORTING THE IMPOSED LOADS.

6. IF THE LOADS IMPOSED ON THE STRUCTURE EXCEED THE LOAD ALLOWANCE PROVIDED THE STRUCTURAL ENGINEER OF RECORD WILL REJECT THE SUBMITTAL. ONLY AT THE OWNER'S WRITTEN DIRECTION WILL MODIFICATIONS TO THE BASE STRUCTURE TO ACCOMMODATE THE SPECIALTY ITEM(S) BE MADE BY THE ENGINEER OF RECORD. DEFERRED SUBMITTAL ITEMS SHALL NOT BE INSTALLED UNTIL THEIR DESIGN AND THE ENGINEER OF RECORD AND THE BUILDING OFFICIAL HAVE APPROVED SUBMITTAL DOCUMENTS.

CONCRETE:

1. MINIMUM 28 DAY STRENGTH (f'c) SHALL BE AS FOLLOWS:

USE TYPE	STRENGTH	ACI EXPOSURE CLASSIFICATIONS			
FOOTINGS AND PIERS	4000 PSI	F0	S0	W0	C0
EXTERIOR WALLS	4500 PSI	F3	S2	W1	C3
INTERIOR WALLS	4500 PSI	F0	S0	W0	C0
INTERIOR SLAB ON GROUND	4000 PSI	F0	S0	W0	C0
EXTERIOR SLAB ON GROUND	5000 PSI	F3	S2	W1	C3
ELEVATED SLABS	4000 PSI	F0	S0	W0	C0
SALT STORAGE SLAB & WALLS	5000 PSI	F3	S3	W1	C2

2. A MIX DESIGN SHALL BE SUBMITTED FOR REVIEW FOR EACH MIX TYPE AND SHALL INCLUDE RESULTS OF STENGTH TEST, ALL MATERIALS TO BE USED, SIEVE ANALYSIS OF AGGREGATE, AND DATA FOR ALL PRODUCTS.

3. AIR ENTRAINMENT AS FOLLOWS:
   A. EXTERIOR CONCRETE SHALL BE PER ASTM C260, 3% +- 1%
   B. INTERIOR CONCRETE SHALL BE LIMITED TO 3% IN ACCORDANCE WITH ACI 302.1R

4. FLY ASH MAY BE USED AT CONTRACTOR'S OPTION. IF USED IT SHALL BE LIMITED TO 20% AND MEET ASTM 6618, CLASS "F".

5. CONCRETE MIXES SHALL BE DESIGNED BY A CERTIFIED LABORATORY AND APPROVED BY THE ENGINEER ACCORDING TO ACI 301.

6. CONCRETE SHALL BE NORMAL WEIGHT CONCRETE OF 145 POUND PER CUBIC FOOT USING HARDROCK AGGREGATES U.N.O. AGGREGATES USED IN CONCRETE SHALL CONFORM TO ASTM C33, CONCRETE AGGREGATES.

7. THE CONCRETE SUPPLIER SHALL STATE THE SLUMP AND ADDITIVES USED IN THE MIX DESIGN.
   A. MAXIMUM SLUMP FOR EXTERIOR SLABS SHALL BE 4" +/- 1".
   B. MAXIMUM SLUMP FOR ALL OTHER CONCRETE SHALL BE 3" +/- 1".
   C. WATER SHALL BE CLEAN AND POTABLE. IF ADDITIONAL FLOWABILITY IS REQUIRED FOR PLACEMENT OF ANY CONCRETE MIX, A WATER-REDUCING ADDITIVE CONFORMING TO ASTM C494, TYPE A OR F, SHALL BE USED. NO ADDITIONAL WATER MAY BE ADDED TO THE MIX. THE ONLY WATER WHICH MAY BE ADDED ONSITE IS MIXWATER THAT HAS BEEN LEFT OUT AT THE BATCH PLANT.
   D. CONCRETE DELIVERY TICKET SHALL CLEARLY INDICATE THE AMOUNT OF MIX WATER WHICH HAS BEEN LEFT OUT. MAXIMUM SLUMP SHALL BE 8" FOR CONCRETE WITH VERIFIED SLUMP OF 2" TO 4" BEFORE ADDING HIGH-RANGE WATER-REDUCING ADMIXTURE OR PLASTICIZING ADMIXTURE. SEE DIVISION 3 SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

8. PORTLAND CEMENT SHALL CONFORM TO ASTM C 150 **TYPE II** CEMENT. CALCIUM CHLORIDE IS NOT ALLOWED.

9. NO MORE THAN 90 MINUTES SHALL ELAPSE BETWEEN CONCRETE BATCHING AND CONCRETE PLACEMENT, UNLESS APPROVED BY THE ENGINEER OR AUTHORIZED TESTING AGENCY.

10. CONCRETE MIXING, PLACEMENT AND QUALITY SHALL BE PER IBC SECTION 1904, ASTM C 94, ASTM C 685, AND ACI 302. MECHANICALLY VIBRATE ALL CONCRETE WHEN PLACED, EXCEPT SLABS ON GROUND NEED ONLY BE VIBRATED OR THOROUGHLY RODDED AROUND EMBEDDED STRAPS OR HARDWARE, BOLTS FOR UPLIFT ANCHORS, CURBS AND EDGES OF SLAB STEPS AND UNDER FLOOR DUCTS OR SIMILAR ELEMENTS. REMOVE ALL DEBRIS FROM FORMS BEFORE PLACING CONCRETE.

11. CONCRETE SHALL NOT BE DROPPED THROUGH REINFORCING STEEL (AS IN WALLS AND COLUMNS) SO AS TO CAUSE SEGREGATION OF AGGREGATES. UNCONFINDED FALL SHALL NO EXCEED 5 FEET. CARE SHALL BE TAKE IN PLACING SLABS ON GROUND SO AS TO CONCRETE DOES NOT DISTURB FILL MATERIAL.

12. ALL ITEMS THAT ARE CAST INTO CONCRETE SUCH AS REINFORCING, DOWELS, BOLTS, ANCHORS, SLEEVES, EMBEDS, INSERTS, ETC. SHALL BE SECURELY POSITIONED IN THE FORMS BEFORE PLACING THE CONCRETE. SUPPORT ALL REINFORCING WITH CHAIRS AS REQUIRED. FLOATING IN OF THESE ITEMS IS NOT PERMITTED. REINFORCING, DOWELS, EMBEDS, AND INSERTS SHALL BE CLEAN OF RUST, OILS, AND DIRT PRIOR TO CASTING.

13. CONCRETE SLAB ON GROUND CONTROL JOINTS SHALL BE AS SHOWN ON THE FOUNDATION PLAN OR TYPICAL DETAILS. WHERE CONTROL JOINTS ARE NOT SHOWN ON PLANS, ALL CONCRETE SLABS ON GROUND SHALL BE BOUND BY KEYED, DOWELED OR SAWCUT CONTROL JOINTS SUCH THAT THE ENCLOSED AREA DOES NOT EXCEED 144 SQUARE FEET. RATIO OF BOUNDARY DIMENSIONS SHALL NOT EXCEED 1.5:1. LOCATE CONTROL JOINTS OFF OF CORNERS OF DIAMOND ISOLATION LEAVE OUTS AND RE-ENTRANT CORNERS. KEYED OR DOWELED CONSTRUCTION JOINTS NEED ONLY OCCUR AT EXPOSED EDGES DURING POURING. ALL OTHER JOINTS MAY BE SAWCUT. SAWCUT JOINTS SHALL BE CUT IN SLABS ON GROUND AS SOON AS POSSIBLE WITHIN 24 HOURS AFTER SLAB FINISHING AS MAY BE SAFELY DONE WITHOUT DISLODGING AGGREGATE.

14. PIPES OTHER THAN ELECTRICAL CONDUITS SHALL NOT BE EMBEDDED IN STRUCTURAL CONCRETE EXCEPT WHERE SPECIFICALLY APPROVED BY THE ENGINEER. MAXIMUM PIPE SIZE SHALL BE 1/3 OF THE SLAB THICKNESS AND LOCATED AT MID-DEPTH. MINIMUM SPACING SHALL BE 3 TIMES THE OUTSIDE PIPE DIAMETER. PIPES SHALL NOT IMPAIR THE STRENGTH OF THE MEMBER.

15. PROTECT CONCRETE FROM DAMAGE OR REDUCED STRENGTH DUE TO HOT OR COLD WEATHER IN ACCORDANCE WITH ACI 305 AND 306 AND IBC SECTION 1905.
WHERE DOWELS, BOLTS OR INSERTS ARE CALLED TO BE ANCHORED TO CAST IN PLACE CONCRETE ELEMENTS USING EPOXY ADHESIVES, FOLLOW ALL MANUFACTURERS RECOMMENDATIONS. ALTERNATE ANCHORAGE SYSTEMS MAY BE USED WITH ENGINEERS PRIOR APPROVAL.

FOUNDATIONS:

1. GEOTECHNICAL REPORT: PROFESSIONAL SERVICE INDUSTRIES, INC., 11826 BORMAN DR. ST LOUIS, MO 63146

   PROJECT NO.: 0040404-1 DATED: 11/08/2021

2. THE OWNER SHALL EMPLOY A GEOTECHNICAL ENGINEER TO PROVIDE SOIL TESTING AND REVIEW DURING CONSTRUCTION. THE GEOTECHNICAL ENGINEER SHALL REVIEW AND APPROVE THE FOUNDATION REQUIREMENTS OF THE CONTRACT DOCUMENTS. IF CONDITIONS VARY FROM THAT INDICATED HEREIN, THEN THE GEOTECHNICAL ENGINEER SHALL NOTIFY THE ARCHITECT AND ENGINEER PRIOR TO FOUNDATION CONSTRUCTION.

3. THE BACKFILL SHALL BE PLACED AND COMPACTED ON EACH SIDE OF FOUNDATION WALLS SUCH THAT NO UNBALANCED LATERAL LOADS ARE INDUCED ON THE WALL.

4. BACKFILL SHALL BE PLACED EVENLY AGAINST EACH SIDE OF SUBGRADE STRUCTURAL ELEMENTS TO PRODUCE APPROXIMATELY EQUAL AND OPPOSITE LATERAL PRESSURES.

5. UNDERCUT THE BUILDING AREA AND INSTALL A MINIMUM OF 24" OF SELECT, LOW VOLUME ENGINEERED FILL BELOW ALL FLOOR SLAB SUB-BASE PER THE GEOTECHNICAL REPORT.

WALLS:
1. RETAINING WALLS ARE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 40 PSF PER FOOT. THIS IS BASED UPON A LEAN CLAY BACKFILL. BACKFILL WALLS PRIOR TO PLACING THE ELEVATED FLOOR ABOVE.

2. BASEMENT WALLS ARE DESIGNED FOR AN EQUIVALENT FLUID PRESSURE OF 55 PSF PER FOOT. THIS IS BASED UPON A LEAN CLAY BACKFILL. BACKFILL WALLS PRIOR TO PLACING THE ELEVATED FLOOR ABOVE.

SLAB ON GRADE:
1. TYPICAL CONCRETE SLAB ON GROUND SHALL BE 4" THICK WITH 6x6-W2.1Xw2.1 WELDED WIRE FABRIC OVER A 15 MIL VAPOR RETARDER, UNLESS WHERE NOTED OTHERWISE ON PLANS. PROVIDE (1) #4 CONTINUOUS AT PERIMETER OF SLAB AND (2) #4x4'-0" BARS AT RE-ENTRANT CORNERS.

2. SLAB ON GROUND SUPPORT: MINIMUM 6" LAYER OF GRANULAR BASE CONSISTING OF AN OPEN GRADED CRUSHED STONE (ASTM C33, #57 STONE OR SIMILAR), PER GEOTECHNICAL REPORT.

3. UNLESS NOTED OTHERWISE IN THE GEOTECHNICAL REPORT, CONCRETE SLABS ON GROUND SHALL BE SUPPORTED ON SELECT FILL MATERIAL AS NOTED ABOVE. FILL MATERIAL SHOULD BE MOISTENED, BUT NOT SATURATED JUST PRIOR TO PLACING CONCRETE. CARE SHALL BE TAKEN IN PLACING SLABS ON GRADE SO AS NOT TO DISTURB FILL MATERIAL OR REINFORCING. THE FILL MATERIAL SHALL BE COMPACTED TO NO LESS THAN 95% COMPACTION AT MOISTURE CONTENT RANGE OF 3% BELOW TO 3% ABOVE OPTIMUM MOISTURE CONTENT BEFORE PLACEMENT OF SLABS. REFER TO GEOTECHNICAL REPORT FOR ANY ADDITIONAL REQUIREMENTS.

SHALLOW SPREAD FOOTINGS:
1. FROST DEPTH IS 30" BELOW GRADE.

2. ALLOWABLE FOOTING BEARING CAPACITY IS AS FOLLOWS PER GEOTECH REPORT:
   2a. PUBLIC WORKS BUILDING
      ON "COMPETENT NATURALLY DEPOSITED SOILS OR COMPACTED-ENGINEERED FILL": 3820 PSF
   2b. WASH STATION BUILDING
      ON "COMPETENT NATURALLY DEPOSITED SOILS OR COMPACTED-ENGINEERED FILL": 4000 PSF
   2c. SALT STORAGE BUILDING
      ON "COMPETENT NATURALLY DEPOSITED SOILS OR COMPACTED-ENGINEERED FILL": 4370 PSF

**NO FOUNDATIONS MAY BE BEARED ON SITE FILL. ALL MUST BEAR ON "COMPETENT NATURALLY DEPOSITED SOILS OR COMPACTED-ENGINEERED FILL" PER THE GEOTECHNICAL REPORT. **

3. ALL FOOTINGS SHALL EXTEND TO DEPTH NOTED ABOVE UNLESS NOTED OTHERWISE ON PLANS OR DETAIL. GRADE IS DEFINED AS TOP OF SLAB FOR INTERIOR FOOTINGS, AND LOWEST ADJACENT COMPACTED SUBGRADE (PAD GRADE BEFORE LANDSCAPING) OR NATURAL GRADE WITHIN 5 FEET OF BUILDING FOR PERIMETER FOOTINGS. GRADE IS DEFINED AS TOP OF EXTERIOR PAVING OR CONCRETE WHERE EXTERIOR PAVING OR CONCRETE IS PERMANENTLY LOCATED DIRECTLY ADJACENT TO BUILDING AND EXTENDS AT LEAST 5 FEET FROM BUILDING.

4. FOOTING EXCAVATIONS SHALL BE CLEAN AND FREE FROM LOOSE DEBRIS, STANDING WATER, OR UNCOMPACTED MATERIAL AT TIME OF CONCRETE PLACEMENT.

5. EXCAVATION FOR FOOTINGS SHALL BE CUT TO ACCURATE SIZE AND DIMENSIONS AS SHOWN ON PLANS. ALL SOIL BELOW SLABS AND FOOTINGS SHALL BE PROPERLY COMPACTED AND SUBGRADE BROUGHT TO A REASONABLE TRUE AND LEVEL PLANE BEFORE PLACING CONCRETE.

6. SITE PREPARATION AND GRADING REQUIREMENTS OF THE GEOTECHNICAL REPORT AND ANY ADDENDA SHALL BE COMPLETED PRIOR TO CONSTRUCTION OF FOUNDATIONS. ANY TESTS, INSPECTIONS, FIELD OBSERVATIONS, OR APPROVAL FROM THE GEOTECHNICAL ENGINEER SHALL BE PERFORMED PRIOR TO PLACEMENT OF FOUNDATION REINFORCING STEEL OR CONCRETE. ALTERATIONS TO SITE PREPARATION OR GRADING SHALL BE REPORTED TO THE ENGINEER PRIOR TO FOUNDATION CONSTRUCTION.

HAND/GUARD RAILS:

1. HANDRAIL ASSEMBLIES AND GUARDS SHALL BE DESIGNED TO RESIST A LOAD OF 50 PLF APPLIED IN ANY DIRECTION AT THE TOP AND TO TRANSFER THIS LOAD THROUGH THE SUPPORTS TO THE STRUCTURE.

2. HANDRAIL ASSEMBLIES AND GUARDS SHALL BE ABLE TO RESIST A SINGLE CONCENTRATED LOAD OF 200 POUNDS APPLIED IN ANY DIRECTION AT ANY POINT ALONG THE TOP, AND HAVE ATTACHMENT DEVICES AND SUPPORTING STRUCTURE TO TRANSFER THIS LOADING TO APPROPRIATE STRUCTURAL ELEMENTS OF THE BUILDING. THIS LOAD NEED NOT BE ASSUMED TO ACT CONCURRENTLY WITH THE LOADS SPECIFIED IN THE PRECEDING PARAGRAPH.

3. INTERMEDIATE RAILS (ALL THOSE EXCEPT THE HANDRAIL), BALUSTERS AND PANEL FILLERS SHALL BE DESIGNED TO WITHSTAND A HORIZONTALLY APPLIED NORMAL LOAD OF 50 POUNDS ON AN AREA EQUAL TO 1 SQUARE FOOT, INCLUDING OPENINGS AND SPACE BETWEEN RAILS. REACTIONS DUE TO THIS LOADING ARE NOT REQUIRED TO BE SUPERIMPOSED WITH THOSE ABOVE.

4. WHERE HANDRAILS AND GUARDS ARE DESIGNED IN ACCORDANCE WITH THE PROVISIONS FOR ALLOWABLE STRESS DESIGN (WORKING STRESS DESIGN) EXCLUSIVELY FOR THE LOADS SPECIFIED ABOVE, THE ALLOWABLE STRESS FOR THE MEMBERS AND THEIR ATTACHMENTS ARE PERMITTED TO BE INCREASED BY ONE-THIRD.

5. PROVIDE BLOCKING IN WALLS AT ALL HANDRAIL LOCATIONS.

MASONRY (CONCRETE BLOCK):

1. COMPRESSIVE STRENGTH OF CONCRETE MASONRY CONSTRUCTION, (CMU) SHALL BE AS FOLLOWS (PSI).
MASONRY STRENGTH NOT SPECIFICALLY NOTED ON PLAN SHALL SHALL BE (F'm) 2000 PSI.

MASONRY STRENGTH (F'm DESIGN)	= 2,000 PSI
BLOCK STRENGTH	= 2,000 PSI
TYPE M MORTAR STRENGTH	= 2,500 PSI (02)
TYPE S MORTAR STRENGTH	= 2,000 PSI
GROUT STRENGTH	= 3,000 PSI

2. CONCRETE BLOCK SHALL BE HOLLOW LOAD-BEARING CONCRETE MASONRY UNITS CONFORMING TO ASTM C90, GRADE N-II. ALL BLOCKS SHALL BE PLACED IN RUNNING BOND CONSTRUCTION (UNLESS OTHERWISE NOTED) WITH ALL VERTICALS CELLS IN ALIGNMENT.

3. MORTAR MIX SHALL CONFORM TO REQUIREMENTS OF IBC SECTION 2103.8, TYPE M OR S, TYPE M MORTAR SHALL BE USED WHERE MASONRY IS IN CONTACT WITH SOIL.

4. GROUT: USE SUFFICIENT WATER FOR GROUT TO FLOW INTO ALL JOINTS OF THE MASONRY WITHOUT SEGREGATION.
ALL CELLS IN CONCRETE BLOCKS CONTAINING REINFORCING SHALL BE FILLED SOLID WITH GROUT. ALL MASONRY BELOW FINISHED FLOOR OR GRADE SHALL BE GROUTED.

5. MINIMUM WALL VERTICAL REINFORCING, UNLESS NOTED OTHERWISE ON PLANS OR DETAILS, SHALL BE #5 BAR VERTICAL FULL HEIGHT IN CENTER OF GROUTED CELL AT ALL WALL INTERSECTIONS, CORNERS, WALL ENDS, JAMBS AT WALL OPENINGS, EACH SIDE OF CONTROL JOINTS, AND AT INTERVALS NOT TO EXCEED 32 INCHES ON CENTER. TIE AT 8'-0" VERTICALLY, WITH SINGLE WIRE LOOP TIE OR EQUIVALENT. DOWEL ALL VERTICAL REINFORCING TO FOUNDATION WITH DOWELS TO MATCH AND LAP VERTICAL REINFORCING.

6. MINIMUM WALL HORIZONTAL REINFORCING, UNLESS NOTED OTHERWISE ON PLANS OR DETAILS, SHALL BE A SINGLE #5 BAR IN CENTER OF 8 INCH DEEP CONTINUOUS GROUTED BOND BEAM AT TOP OF PARAPET OR FREE STANDING WALL AND AT 8'-0" INTERVALS THROUGH CONTROL JOINTS. PROVIDE BENT BARS PER TYPICAL DETAILS TO MATCH AND LAP HORIZONTAL BOND BEAM REINFORCING AT CORNERS AND WALL INTERSECTIONS TO MAINTAIN BOND BEAM CONTINUIITY. USE BOND BEAM UNITS AT HORIZONTAL REINFORCING. PROVIDE BOND BEAMS AT FLOOR LEVELS AND AT THE MIDSPAN OF EACH FLOOR. REFER TO DETAILS FOR ADDITIONAL INFORMATION.

7. MINIMUM LINTEL, WHERE NOT NOTED ON PLANS, SHALL HAVE A MINIMUM OF (2) #5 CONTINUOUS HORIZONTAL BARS IN BOTTOM OF BOND BEAM OR LINTEL BLOCK AND SHALL BE GROUTED SOLID TO A MINIMUM DEPTH OF 24 INCHES. ALL LINTEL REINFORCING AND GROUT SHALL EXTEND 2 FEET MINIMUM PAST JAMBS UNLESS NOTED OTHERWISE ON PLAN DETAILS.

8. LAP REINFORCING 60 BAR DIAMETERS FOR GRADE 60. STAGGER LAP SPLICES A MINIMUM OF ONE LAP LENGTH.

9. RETAINING WALLS, BASEMENT WALLS, ETC,. SHALL BE ADEQUATELY WATERPROOFED AND DRAINED AS SPECIFIED BY OTHERS. IF NOT SPECIFIED BY OTHERS UNLESS NOTED OTHERWISE, DRAINAGE THROUGH RETAINING WALLS SHALL BE PROVIDED BY MEANS OF 1-1/2" DIA. HOLE AT 4 FEET O.C. AT LOW GRADE LEVEL. PROVIDE 2" GRAVEL COVER WITH FABRIC COVER AT DRAIN HOLES.

10. MASONRY VENEER SHALL BE ATTACHED TO SUPPORTING WALL FRAMING WITH 3/16" DIA. WALLS TIES OR DOVETAIL-TYPE METAL TIES OF EQUIVALENT STIFFNESS EMBEDDED INTO HORIZONTAL MORTAR JOINTS. MAX. VERTICAL SPACING OF TIES SHALL BE 16". MAX. HORIZONTAL SPACING SHALL BE 24". TIES IN ALTERNATE COURSES SHALL BE STAGGERED. PROVIDE 9 GA. WIRE REINFORCING IN HORIZONTAL MORTAR JOINTS AT 16" O.C. ENGAGE 9 GA. WIRE WITH WALL ANCOR TIES . CONSTRUCTION JOINTS IN MASONRY VENEER WALLS SHALL BE LOCATED PER THE ARCHITECTURAL DRAWINGS.

11. HORIZONTAL JOINTS SHALL BE REINFORCED WITH 9-GAUGE TRUSS-TYPE JOINT REINFORCEMENT EQUAL TO "DUROWALL" @ 16" O.C.

12. UNLESS OTHERWISE NOTED ON ARCHITECTURAL ELEVATIONS PROVIDE CONTROL/EXPANSION JOINTS @ 25'-0" ON CENTER OR 1.5x HEIGHT, WHICHEVER IS LESS.

REINFORCING STEEL (FOR CONCRETE AND MASONRY):

1. REINFORCED CONCRETE DESIGNED IN ACCORDANCE WITH THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318-02) BY THE AMERICAN CONCRETE INSTITUTE.

2. REINFORCING BAR DETAILING, FABRICATING, AND PLACING SHALL CONFORM TO THE "ACI STANDARD: DETAILS AND DETAILING OF CONCRETE REINFORCEMENT" (ACI 315) AND THE "MANUAL OF ENGINEERING AND PLACING DRAWINGS FOR REINFORCED CONCRETE STRUCTURES" (ACI 315R) BY THE AMERICAN CONCRETE INSTITUTE. THE MOST CURRENT EDITIONS OF CONCRETE REINFORCING STEEL INSTITUTE'S "REINFORCING BAR DETAILING" AND "PLACING REINFORCING BARS" MAY ALSO BE USED.

3. REINFORCING STEEL SHALL CONFORM TO THE REQUIREMENTS OF ASTM A615. REINFORCING SHALL BE GRADE 60 (FY=60 KSI) DEFORMED BARS FOR ALL BARS UNLESS NOTED OTHERWISE ON PLANS OR DETAILS. ALL REINFORCING TO BE WELDED SHALL BE ASTM A706. GRADE 60 LOW ALLOY WELDABLE STEEL.

4. WELDED WIRE FABRIC SHALL CONFORM TO THE REQUIREMENTS OF ASTM A185. LAPS IN WELDED WIRE FABRIC SHALL BE MADE SUCH THAT THE OVERLAP, MEASURED BETWEEN OUTERMOST CROSS WIRE OF EACH FABRIC SHEET, IS NOT LESS THAN THE SPACING OF CROSS WIRES PLUS 2 INCHES.

5. ALL DIMENSIONS SHOWING THE LOCATION OF REINFORCING STEEL NOT NOTED AS "CLEAR" OR "CLR" ARE TO CENTER OF STEEL. MINIMUM COVER FOR NON-PRESTRESSED CONCRETE REINFORCING SHALL BE AS FOLLOWS, UNLESS NOTED OTHERWISE ON PLANS OR DETAILS:

EXPOSURE CONDITION:	MINIMUM COVER:	TOLERANCES (+/-):
CAST AGAINST AND PERMANENTLY EXPOSED TO EARTH:	3"	3/8"
EXPOSED TO EARTH OR WEATHER:		
#5 AND SMALLER:	11/2"	3/8"
#6 AND LARGER:	2"	3/8"
NOT EXPOSED TO WEATHER OR IN CONTACT WITH THE GROUND:		
ROOF SLAB:	1"	1/8"
STRUCTURAL SLABS & WALLS:	3/4"	1/8"
BEAMS AND COLUMNS (PRIMARY REINFORCEMENT, TIES, STIRRUPS AND SPIRALS):	11/2"	3/8 "
SLABS ON GRADE:	11/2"	1/4"

6. LAP SPLICES OF REINFORCING STEEL IN ALL CONCRETE SHALL BE ACCORDING TO ACI 318 (CLASS B SPLICE), UNLESS NOTED OTHERWISE. STAGGER SPLICES A MINIMUM OF ONE LAP IN LENGTH. NO TACK WELDING OF REINFORCING BARS ALLOWED. LATEST ACI CODE AND DETAIL MANUAL APPLY. PROVIDE BENT CORNER BARS TO MATCH AND LAP WITH HORIZONTAL BARS AT ALL CORNERS AND INTERSECTIONS PER TYPICAL DETAILS. VERTICAL WALL BARS SHALL BE SPLICED AT OR NEAR FLOOR LINES. SPLICE BARS TOP BARS AT CENTER LINE OF SPAN AND BOTTOM BARS AT THE SUPPORT IN SPANDRELS, BEAMS, GRADE BEAMS, ETC. UNLESS NOTED OTHERWISE.

7. ALL CONSTRUCTION JOINTS SHOWN ON THE DRAWINGS SHALL BE INCORPORATED IN THE STRUCTURE UNLESS THEIR ELIMINATION IS APPROVED BY THE ENGINEER. ADDITIONAL CONSTRUCTION JOINTS REQUIRED TO FACILITATE CONSTRUCTION SHALL BE LOCATED AND DETAILED ON SHOP DRAWINGS. WHEN CONSTRUCTION JOINTS OTHER THAN THOSE SHOWN ON THE DRAWINGS ARE REQUIRED, THE REINFORCEMENT SHALL PASS CONTINUOUSLY THROUGH THE JOINT AND A KEY SHALL BE PROVIDED FOR ADEQUATE SHEAR TRANSFER.

8. ALL REINFORCING SHALL BE BENT COLD. BARS SHALL NOT BE STRAIGHTENED AND RE-BENT. FIELD BENDING OF REBAR SHALL NOT BE ALLOWED UNLESS SPECIFICALLY NOTED OTHERWISE.

9. WELDING OF REINFORCING BARS, METAL INSERTS, AND CONNECTIONS SHALL CONFORM WITH UBC STANDARD 19-2, AND SHALL BE MADE ONLY AT LOCATIONS SHOWN ON PLANS OR DETAILS.

10. REINFORCING BAR SPACING SHOWN ON PLANS ARE AT MAXIMUM ON CENTERS. ALL BARS SHALL BE DETAILED AND PLACED PER CONCRETE REINFORCING STEEL INSTITUTE (CRSI) SPECIFICATIONS & HANDBOOK. DOWEL ALL VERTICAL REINFORCING TO FOUNDATION. SECURELY TIE ALL BARS IN LOCATION BEFORE PLACING CONCRETE.

EXTERIOR SHEATHING REQUIREMENTS AT LIGHT GAGE STUD WALLS:

1. EXTERIOR WALL SHEATHING SHALL BE 1/2" THICK GLASS MAT SHEATHING AND BE ATTACHED TO METAL STUDS @ 8" O.C. AT EDGES AND FIELD LOCATIONS. SPACING SHALL BE REDUCED TO 6" O.C. AT EDGES, INTERMEDIATE SUPPORTS, AND FOR WALL CORNER LOCATIONS. FASTENERS SHALL BE NO. 8 X 1 1/4" FLAT HEAD SCREWS W/ 0.292"Ø MIN. HEAD.

2. MINIMUM SHEATHING SHEET SIZE SHALL BE 2'-0"x4'-0" AND TWO-SPAN MINIMUM. SHEATHING MAY BE LAID HORIZONTALLY OR VERTICALLY.

3. WALL SHEATHING IS ONLY REQUIRED AT EXTERIOR LIGHT GAGE STUD WALLS. NO STRUCTURAL WALL SHEATHING IS REQUIRED AT EXTERIOR LIGHT GAGE GIRTS.

STRUCTURAL STEEL:

1. STRUCTURAL STEEL MEMBERS SHALL CONFORM WITH THE FOLLOWING STANDARDS AND MATERIAL PROPERTIES UNLESS NOTED OTHERWISE:

SHAPE	STANDARD	Fy
ROLLED WIDE FLANGE SECTIONS	ASTM A992	50 KSI
CHANNELS AND ANGLES	ASTM A36	36 KSI
BARS AND PLATES	ASTM A36	36 KSI
TUBES	ASTM A500	46 KSI
PIPES (OPTION 1)	ASTM A53 GRADE B	36 KSI
PIPES (OPTION 2)	A500 GRADE B	42 KSI
BOLTS AT STEEL CONNECTIONS	ASTM A325 OR A490	----
ANCHOR RODS	ASTM F1554	36 KSI

2. ALL BOLTS SHALL BE INSTALLED AS BEARING-TYPE CONNECTIONS WITH THREADS EXCLUDED FROM SHEAR PLANE (TYPE "X" CONNECTION), UNLESS NOTED OTHERWISE. HIGH-STRENGTH BOLTS SHALL BE TIGHTENED USING ANY AISC APPROVED METHOD. ALL NON-SLIP CRITICAL BOLTS SHALL BE INSTALLED IN SNUG TIGHT CONDITION.

3. BOLTS FOR SLIP-CRITICAL CONNECTIONS SHALL BE LOAD INDICATOR BOLTS (LIB) OR SHALL BE EQUIPPED WITH LOAD INDICATOR WASHERS WHICH PROVIDE AN EASY MEANS OF VISUALLY VERIFYING PROPER BOLT TENSION. WHERE LOAD INDICATOR BOLTS CANNOT BE USED DUE TO SPACE RESTRICTIONS OR FOR OTHER REASONS, BOLTS MAY BE TIGHTENED USING THE TURN OF THE NUT METHOD AS OUTLINED IN THE AISC "STEEL CONSTRUCTION MANUAL". NO PAINT SHALL BE APPLIED IN THE REGION OF THE SLIP CRITICAL CONNECTIONS.

4. ALL THREADED ROD, THREADED STUDS, FOUNDATION ANCHOR BOLTS, AND ALL BOLTED CONNECTIONS INVOLVING WOOD MEMBERS SHALL BE ASTM A-307 UNLESS NOTED OTHERWISE.

5. ALL BOLTS AND WASHERS IN CONTACT WITH TREATED WOOD SHALL BE HOT DIPPED GALVANIZED OR STAINLESS STEEL.

6. HEADED ANCHOR STUDS SHALL CONFORM TO ALL REQUIREMENTS OF THE LATEST EDITION OF THE "RECOMMENDED PRACTICES FOR STUD WELDING" AND THE "STRUCTURAL WELDING CODE" PUBLISHED BY AMERICAN WELDING SOCIETY (AWS). ALL BOLTS, ANCHOR BOLTS, EXPANSION BOLTS, ETC. SHALL BE INSTALLED WITH STEEL WASHERS AT FACE OF WOOD.

7. ALL STRUCTURAL AND MISCELLANEOUS STEEL SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH AISC SPECIFICATIONS FOR THE DESIGN, FABRICATION AND ERECTION OF STRUCTURAL STEEL FOR BUILDINGS, CODE REFERENCED EDITION.

8. WELDING SHALL BE PERFORMED BY WELDERS HOLDING VALID CERTIFICATES AND HAVING CURRENT EXPERIENCE IN THE TYPE OF WELD SHOWN ON THE DRAWINGS. ALL WELDING SHALL USE E70 SERIES LOW HYDROGEN ELECTRODES UNLESS NOTED OTHERWISE. ALL WELDS INVOLVING REINFORCING BARS SHALL USE E90 SERIES ELECTRODES. ALL WELDING SHALL CONFORM TO THE LATEST AMERICAN WELDING SOCIETY (AWS) STANDARDS. WELDS ON DRAWINGS ARE SHOWN AS SHOP WELDS. CONTRACTOR MAY SHOP WELD OR FIELD WELD AT HIS DISCRETION. ALL FULL PENETRATION WELDS SHALL BE TESTED AND CERTIFIED BY AN INDEPENDENT TESTING LABORATORY.

9. GROUT BENEATH COLUMN BASES OR BEARING PLATES SHALL BE 5,000 PSI (MINIMUM) NON-SHRINK FLOWABLE GROUT OR DRYPACK. INSTALL GROUT UNDER BEARING PLATES BEFORE FRAMING MEMBER IS INSTALLED. AT COLUMNS, INSTALL GROUT UNDER BASE PLATES AFTER COLUMN HAS BEEN PLUMBED BUT PRIOR TO FLOOR OR ROOF INSTALLATION. GROUT DEPTH SHALL BE SUFFICIENT TO ALLOW GROUT OR DRYPACK TO BE PLACED BENEATH PLATE WITHOUT VOIDS.

10. DETAILS OUTLINE BASIC CONNECTION TYPES. BEAM TO BEAM AND BEAM TO COLUMN CONNECTIONS NOT DETAILED IN DRAWINGS SHALL BE SIZED BY STEEL DETAILER AS STANDARD AISC, TYPE 2, BEARING CONNECTIONS CAPABLE OF SUPPORTING REACTIONS DEVELOPED BY MAXIMUM UNIFORM LOAD CAPACITY ON A SIMPLE SPAN FOR BEAM AND BEAM SPAN GIVEN.

11. STEEL SHALL BE DESIGNED, DETAILED, FABRICATED AND ERECTED ACCORDING TO ALL APPLICABLE SECTIONS OF THE CODE REFERENCED EDITION OF THE AISC MANUAL OF STEEL CONSTRUCTION. SHOP DRAWINGS SHALL BE SUBMITTED INDICATING COMPLETE INFORMATION REQUIRED FOR CONSTRUCTION OF STRUCTURAL STEEL AND SHALL INCLUDE LAYOUT AND DIMENSIONS OF FRAMING PLANS, CONNECTION DETAILS, AND SEQUENCE, ETC. SHOP DRAWINGS AND CALCULATIONS SHALL BE SEALED BY A STRUCTURAL ENGINEER REGISTERED IN THE STATE OF THE PROJECT SITE.

12. HEAVY LOADS THAT EXCEED 75% OF ALLOWABLE LIVE LOADS SHOWN ON THE PLANS, FOR TEMPORARY EQUIPMENT, CONSTRUCTION MATERIALS, OR OTHER LOADS NOT SHOWN IN THE CONTRACT DOCUMENTS, SHALL NOT BE PLACED OR SUPPORTED FROM ELEVATED STRUCTURE WITHOUT PRIOR WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER.

13. FOUNDATION ANCHOR RODS SHALL BE AS CALLED OUT IN THE COLUMN TABLE AND IN BASE PLATE DETAILS, WITH LEVELING NUTS. IF ANCHOR RODS ARE NOT CALLED OUT, USE 3/4" DIAMETER WITH 10" EMBEDMENT AND EMBEDDED HEAVY HEX HEAD. HEAVY HEX HEAD SHALL BE TACK WELDED TO ANCHOR ROD.

14. FINISHES ON STRUCTURAL STEEL USED IN AREAS TO RECEIVE SPRAYED ON FIRE PROOFING SHALL BE COMPATIBLE WITH FIREPROOFING MATERIAL. STEEL SHALL BE DELIVERED TO THE SITE CLEAN AND FREE OF LOOSE RUST, SCALE, SLAG AND OIL. PREPARE AND CLEAN SURFACES, AS REQUIRED, BEFORE APPLICATION OF FIREPROOFING MATERIAL. COMPLY WITH FIREPROOFING ASSEMBLY REQUIREMENTS RE: PLANS AND DIVISIONS 05120 AND 07270 OF THE SPECIFICATIONS.

15. ALL HANGERS, CLIPS, INSERTS, ETC. SUSPENDED FROM THE FLOOR AND ROOF STRUCTURE (BEAMS AND JOISTS) SHALL BE INSTALLED PRIOR TO THE APPLICATION OF THE SPRAYED-ON FIREPROOFING. PATCH ANY FIREPROOFING DAMAGED AFTER THE INITIAL APPLICATION.

16. INSPECTION OF STRUCTURAL STEEL CONNECTIONS SHALL BE PERFORMED BY A QUALIFIED INSPECTOR RETAINED BY THE CONTRACTOR, APPROVED BY THE ENGINEER AND OWNER. INSPECTOR QUALIFICATION SHALL BE BASED ON COMPLIANCE WITH APPROPRIATE PROVISIONS OF THE AWS CODE- D1.1. INSPECTION SHALL INCLUDE VISUAL INSPECTION OF ALL COMPLETED STRUCTURAL WELDED CONNECTIONS. THE INSPECTING AGENCY SHALL BE NOTIFIED BEFORE ANY WELDING WORK BEGINS AND SHALL BE RESPONSIBLE FOR VERIFICATION OF WELDERS CERTIFICATIONS, INSPECTION OF CONNECTIONS BEFORE WELDING BEGINS, AND INSPECTION DURING WELDING UNTIL THE INSPECTOR IS SATISFIED THAT THE WELDING PROCESS IS BEING PERFORMED PER AWS REQUIREMENTS.

17. ALL EXPOSED STEEL SHALL BE GALVANIZED UNLESS NOTED OTHERWISE, INCLUDING MASONRY SUPPORT LINTELS. RE: DIVISION 5 OF THE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

18. FIELD CUTTING, DRILLING OR OTHER MODIFICATION OF STRUCTURAL STEEL COMPONENTS IS NOT PERMITTED WITHOUT WRITTEN APPROVAL OF THE STRUCTURAL ENGINEER. WHERE BEAM PENETRATIONS CANNOT BE AVOIDED OR WHERE CUTTING IS REQUIRED, CONTRACTOR SHALL SUBMIT TO THE ENGINEER, ALL PERTINENT INFORMATION INCLUDING PENETRATION SHAPE, SIZE LOCATION AND METHOD OF CUTTING THE OPENING.

19. ALL OPEN ENDS OF HSS MEMBERS SHALL HAVE A 1/4" THICK (MINIMUM) END PLATE, SECURED WITH 3/16" FILLET WELD ALL AROUND, UNLESS NOTED OTHERWISE.

20. MECHANICAL CONTRACTOR SHALL DESIGN AND SUPPLY ALL FRAMING AS REQUIRED TO SUPPORT OR SUSPEND EQUIPMENT, DUCTS, AND PIPING BETWEEN FRAMING OUTLINED IN HE CONTRACT DOCUMENTS. REFER TO MEP / HVAC DRAWINGS FOR EXACT LOCATIONS AND WEIGHTS OF ITEMS TO BE SUPPORTED OR SUSPENDED AND VERIFY CONFORMANCE WITH STRUCTURAL FRAMING PLANS.

21. STAIRS, LANDINGS, RAILINGS, AND SUPPORTS TO BE DESIGNED BY STAIR MANUFACTURER UNLESS NOTED OTHERWISE ON THE DRAWINGS. THE DESIGN LOADING SHALL BE AS STATED IN THE IBC TABLE 1607.1 FOR STAIRS AND 1607.8 FOR RAILINGS. MANUFACTURER SHALL SUBMIT SEALED CALCULATIONS AND DRAWINGS BY A PROFESSIONAL ENGINEER IN THE STATE WHERE THE PROJECT IS LOCATED. CALCULATIONS AND DRAWINGS SHALL INCLUDE ALL POSTS, BRACKETS, HANGERS, STRINGERS, ETC. THAT SUPPORT STAIRS. ALL OTHER STAIRS SHALL BE CONSTRUCTED AS SHOWN ON THE ARCHITECTURAL DRAWINGS.

22. HOLES IN TUBE STEEL MEMBERS INTENDED FOR USE WITH SPRAY FOAM INSULATION MUST BE PUNCHED IN FABRICATION SHOP PRIOR TO DELIVERY TO SITE.

MISCELLANEOUS STEEL:

1. PROVIDE L6x6x5/16 ANGLE AT ALL FLOOR DECK AND L4x4x1/4 ANGLE AT ALL ROOF DECK EDGES AND PENETRATIONS U.N.O. OR IF THE DISTANCE FROM EDGE OF FLOOR OR ROOF DECK TO BEAM OR JOIST REQUIRES A LONGER HORIZONTAL LEG. PROVIDE BENT PLATE EDGE ANGLE (MINIMUM THICKNESS = 1/4" AT FLOORS & 3/16" AT ROOF) WHERE LONGER LEGS ARE REQUIRED OR HORIZONTAL AND VERTICAL LEGS OF ANGLE ARE NOT AT 90 DEGREES.

2. PROVIDE AN L3-1/2x3-1/2x1/4" "H" FRAME BELOW ALL ROOF MOUNTED MECHANICAL EQUIPMENT INCLUDING ROOF DRAINS, UNLESS NOTED OTHERWISE FOR JOIST/BEAM SPACINGS LESS THAN 3'-0". PROVIDE AN L5x3-1/2x5/16" "H" FRAME BELOW ALL ROOF MOUNTED MECHANICAL EQUIPMENT INCLUDING ROOF DRAINS, UNLESS NOTED OTHERWISE FOR JOIST/BEAM SPACINGS OVER 3'-0" UP TO 6'-0".

3. REFER TO MEP/HVAC DRAWINGS FOR LOCATIONS OF ROOF OR FLOOR MOUNTED MECHANICAL EQUIPMENT. CONTRACTOR SHALL COORDINATE MEP/HVAC UNIT LOCATIONS AND VERIFY CONFORMANCE WITH STRUCTURAL FRAMING PLANS.

4. PROVIDE ALL EMBED PLATES, LEDGERS, LINTELS AND BRACKETS AS REQUIRED FOR A COMPLETE SYSTEM AS OUTLINED IN THE CONTRACT DOCUMENTS.

5. REFER TO STRUCTURAL STEEL NOTES FOR REQUIRED ASTM DESIGNATIONS FOR VARIOUS STEEL SHAPES AND PLATES AS WELL AS FINISHES, CONNECTION INFORMATION AND QUALITY CONTROL.

6. MECHANICAL CONTRACTOR SHALL DESIGN AND SUPPLY ALL FRAMING AS REQUIRED TO SUPPORT OR SUSPENDED EQUIPMENT, DUCTS AND PIPING BETWEEN FRAMING OUTLINED IN THE CONTRACT DOCUMENTS. REFER TO MEP/HVAC DRAWINGS FOR LOCATIONS AND WEIGHTS OF ITEMS TO BE SUPPORTED OR SUSPENDED.

STEEL LINTELS:

1. LINTELS SUPPORTING BRICK SHALL BE A GALVANIZED L6x6x5/16 FOR OPENINGS LESS THAN 6'-0" W/ 8" OF BEARING ON EACH SIDE OF THE OPENING. FOR SPANS LARGER THAN 6'-0", IF NOT OTHERWISE NOTED OR DETAILED, NOTIFY ENGINEER.

2. PROVIDE 8" OF END BEARING ON EACH SIDE OF THE OPENING FOR ALL LINTELS.

STEEL DECK:

1. DECK SECTION PROPERTIES ARE BASED UPON VULCRAFT'S DECK CATALOG "DESIGNING WITH VULCRAFT STEEL JOISTS AND JOIST GIRDERS STEEL DECK" 3RD EDITION DATED 2019.

2. DECK SHALL BE 3 SPAN MINIMUM AND CAPABLE OF SAFELY SUPPORTING THE LOADING AS INDICATED ON THE DRAWINGS FOR THE SPANS AND SPACING SHOWN. WHERE DECK IS CUT FOR PENETRATIONS PROVIDE SUPPORT ANGLES.

3. DECK SHALL BE INSTALLED IN FULL WIDTH SHEETS, STARTING AT BUILDING PERIMETER. FILLER PIECES SHALL BE INSTALLED ONLY AT LOCATIONS OF MINIMUM SHEAR. ALL SIDE LAP FASTENERS FOR FILLER PIECES SHALL BE SPACED AT 12" O.C. MAXIMUM TO ADJACENT SHEETS.

4. ROOF DECK

   A. STEEL DECK SHALL BE TYPE B, 1 1/2" DEEP, AND 22 GAUGE. DECK SHALL BE PAINTED UNLESS OTHERWISE NOTED.

   B. STEEL DECK AT WASH BUILDING SHALL BE TYPE N, 3" DEEP, AND 22 GAUGE. DECK SHALL BE GALVANIZED.

   C. ATTACH DECK TO SUPPORTS WITH 3/4" DIAMETER PUDDLE WELDS ON A 36/7 PATTERN WITH ONE SIDE LAP FASTENER PER SPAN. PROVIDE A 12" O.C. ATTACHMENT SPACING AT THE PERIMETER. CONTRACTOR MAY USE HILTI DECK PINS IN LIEU OF PUDDLE WELDS AT HIS OPTION.

   D. ALL OPENINGS IN DECK SHALL BE SUPPORTED WITH A L3x3x1/4 (MINIMUM) FRAME SET BETWEEN BEAMS. SUPPORT EDGES OF MECHANICAL EQUIPMENT WITH L4x4x5/16 SET BETWEEN JOISTS OR BEAMS. WHERE MECHANICAL EQUIPMENT EDGES ARE PARALLEL TO BEAMS ANGLE SPACING SHALL NOT EXCEED 6'-0" OR AS REQUIRED BY EQUIPMENT MANUFACTURER, WHICHEVER IS LESS.

   E. ALL OPENINGS THROUGH DECKING NOT SHOWN ON STRUCTURAL DRAWINGS, SUCH AS THOSE REQUIRED FOR STACKS, CONDUITS, PLUMBING, VENTS, ETC., SHALL BE CUT & REINFORCED AS REQ'D BY THE TRADES REQUIRING THE OPENINGS, PER THE SDI SPECIFICATION. MAX. TOLERABLE PENETRATION OR DECK DAMAGE THAT CAN BE SUSTAINED W/OUT REINFORCEMENT SHALL BE 6" DIA., OR ONE RIB PER SINGLE SHEET. FOR ALL PENETRATIONS BETWEEN 6" DIA.- 13" DIA., INSTALLER SHALL PROVIDE A 16 GAGE COVER PLATE WHICH EXTENDS A MIN. OF 6" PAST HOLE IN EA. DIRECTION, & IS ATTACHED TO ADJACENT DECKING USING THE TYP. FASTENING REQUIREMENTS AROUND OPENINGS THAT HAVE BEEN SPECIFIED.

   F. ANGLES SUPPORTING MECHANICAL EQUIPMENT SHALL BE WELDED TO JOIST TOP CHORDS OR BEAM FLANGES. ADDITIONAL ANGLE STRUTS ARE REQUIRED TO DISTRIBUTE LOADS TO JOIST PANEL POINTS.

5. FLOOR DECK
   A. MEZZANINE FRAMING @ FLEET BUILDING:
   STEEL DECK AND CONCRETE SLAB SHALL BE 3-1/2" (TOTAL THICKNESS) NORMAL WEIGHT CONCRETE OVER 1-1/2" 1.5 FD 22GA GALVANIZED DECK. REINFORCEMENT: 6x6-W2.1xW2.1 WWF, U.N.O. MAINTAIN 2" COVER FROM TOP OF SLAB AT ALL LOCATIONS.

   B. STORM SHELTER LID @ PUBLIC WORKS AREA:
   COMPOSITE STEEL DECK AND CONCRETE SLAB SHALL BE 3-1/2" (TOTAL THICKNESS) NORMAL WEIGHT CONCRETE OVER 1.5 CD 22GA GALVANIZED COMPOSITE DECK. REINFORCEMENT: 6x6-W2.1xW2.1 WWF, U.N.O. MAINTAIN 2" COVER FROM TOP OF SLAB AT ALL LOCATIONS.

COLD FORMED STEEL FRAMING

1. ALL COLD-FORMED STEEL FRAMING SHALL BE FABRICATED AND ERECTED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND IN ACCORDANCE WITH THE LATEST EDITION OF "SPECIFICATIONS FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS" BY THE AMERICAN IRON AND STEEL INSTITUTE.

2. STRUCTURAL DRAWINGS TYPICALLY SHOW ONLY THE PRIMARY STRUCTURAL FRAMING ELEMENTS OF THE SYSTEM. CONTRACTOR SHALL PROVIDE ALL ACCESSORIES INCLUDING TRACKS, WEB STIFFENERS, BLOCKING, LINTELS, CLIP ANGLES, REINFORCEMENTS, FASTENING DEVICES, BRACING, AND OTHER ACCESSORIES AS RECOMMENDED BY THE MANUFACTURER TO PROVIDE A COMPLETE FRAMING SYSTEM.

3. SHOP DRAWINGS AND DESIGN CRITERIA SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL PRIOR TO FABRICATION. ALL REQUIRED ATTACHMENTS, BRACING, BLOCKING, BRIDGING, ETC. FOR SHALL BE INCLUDED IN THE SHOP DRAWINGS AND SHALL BE IN PLACE BEFORE THE SHEATHING IS INSTALLED.

4. SHOP DRAWING SUBMITTALS SHALL BE SEALED BY A PROFESSIONAL ENGINEER IN THE STATE WHERE THE PROJECT IS LOCATED.

5. STEEL FOR 12-, 14-, AND 16-GAUGE STUDS AND JOISTS SHALL HAVE MINIMUM YIELD STRENGTH OF 50 KSI. STEEL FOR 18-, 20-, AND 25-GAUGE STUDS AND JOISTS, ALL GAUGES OF TRACK, ALL DIAGONAL TENSION STRAPS OR BRACES, AND BRIDGING SHALL HAVE MINIMUM YIELD STRENGTH OF 33 KSI.

6. ALL COMPONENTS SHALL HAVE A MINIMUM G60 GALVANIZED COATING.

7. FASTENING OF COMPONENTS SHALL BE WITH SELF-TAPPING SCREWS OR WELDS. ALL WELDS OF GALVANIZED COMPONENTS SHALL BE TOUCHED UP WITH ZINC-RICH PAINT.

8. ALL STUDS SHALL BE SECURELY SEATED FOR FULL END BEARING AT TOP AND BOTTOM TRACKS. PROVIDE A MINIMUM OF (1) #10 SCREW IN EACH TRACK FLANGE. UNLESS NOTED OTHERWISE, PROVIDE DOUBLE A STUD AT ALL JAMBS, CORNERS, INTERSECTIONS, AND BEAM BEARING LOCATIONS.

9. WALL STUD BRIDGING, AS RECOMMENDED BY THE STUD MANUFACTURER, SHALL BE INSTALLED TO PREVENT BOTH WEAK AXIS BENDING AND STUD ROTATION AT 4'-0" MAXIMUM INTERVALS. WALLS 8'-0" AND SHORTER SHALL HAVE A SINGLE ROW OF BRIDGING AT MID-HEIGHT. IN ADDITION, BRIDGING SHALL BE PROVIDED AT ROOF LINES AND ELSEWHERE AS NOTED ON THE DRAWINGS. SOLID BLOCKING SHALL BE INSTALLED IN LIEU OF BRIDGING WHERE NOTED ON THE DRAWINGS.

10. ALL SCREWS SHALL BE SELF-TAPPING PAN HEAD, HEX HEAD, OR WAFER HEAD SHEET METAL SCREWS AND SHALL EXTEND NOT LESS THAN 3 EXPOSED THREADS PAST THE LAST MEMBER BEING ATTACHED.
   A. SCREWS SHALL BE SPACED NO CLOSER THAN 5/8 INCH ON CENTER AND WITH A MINIMUM FREE EDGE DISTANCE OF 1/2 INCH.
   B. SCREWS OF A LARGER DIAMETER SHALL REPLACE SCREWS, WHICH ARE REMOVED, WHERE THE REPLACEMENT IS MADE INTO AN EXISTING HOLE.
   C. REPLACE ALL SCREWS WHICH STRIP OUT THE MATERIAL.
   D. SCREWS #8 AND LARGER SHALL HAVE A MINIMUM HEAD SIZE OF 5/16 INCH.

11. CLIP ANGLES OR FLAT CLIPS USED FOR ATTACHMENTS SHALL BE 20 GAUGE MINIMUM, UNLESS NOTED OTHERWISE. SIZE CLIP ANGLES AND FLAT CLIPS TO MAINTAIN MINIMUM SCREW SPACING AND EDGE DISTANCES NOTED ABOVE.

12. ALL WELDING SHALL CONFORM TO AWS1.3 AND SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS AND BE PERFORMED BY PERSONS EXPERIENCED IN LIGHT GAUGE, STRUCTURAL STEEL FRAMING WORK.

13. KNOCKOUTS IN WEBS SHALL BE A MINIMUM OF 10" AWAY FROM FACE OF SUPPORT.

14. HOLES IN BUILT-UP LIGHT GAUGE MEMBERS INTENDED FOR USE WITH SPRAY FOAM INSULATION MUST BE PUNCHED IN FABRICATION SHOP PRIOR TO DELIVERY TO SITE.

CONFLICTING REQUIREMENTS:

1. ANY AND ALL CONFLICTS WITHIN THE CONTRACT DOCUMENTS (PLANS, SPECIFICATIONS AND OTHER DOCUMENTS); OR BETWEEN THE DOCUMENTS AND EXISTING PROJECT CONDITIONS SHALL BE QUANTIFIED BY THE CONTRACTOR(S); AND ALL ASSOCIATED COSTS MUST BE INCLUDED IN THE CONTRACTOR(S) BASE BID; OR ANY AND/OR ALL COSTS SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR(S). IT SHALL BE THE SOLE RESPONSIBILITY OF THE CONTRACTOR(S) TO BRING EACH CONFLICT TO THE ATTENTION OF THE ENGINEER OF RECORD. ALL CONFLICTS SHALL BE IDENTIFIED IN WRITTEN FORM AND SUBMITTED THROUGH THE "REQUEST FOR INFORMATION" (RFI) PROCESS DURING BIDDING. THE ENGINEER OF RECORD SHALL REVIEW ALL IDENTIFIED CONFLICTS AND RENDER TO THE CONTRACTOR(S) THEIR DECISION.

2. IF THE CONTRACTOR(S) DO NOT SUBMIT AN RFI AND/OR DO NOT RECEIVE A DIRECTIVE OR CLARIFICATION IN WRITING FROM THE ENGINEER OF RECORD THROUGH NO FAULT OF THEIR OWN, CONTRACTOR SHALL BE REQUIRED TO COMPLY WITH THE MORE STRINGENT STANDARD, OR HIGHER LEVEL OF QUALITY AT NO ADDITIONAL COSTS TO THE OWNER.

3. IF COMPLIANCE WITH TWO OR MORE STANDARDS IS SPECIFIED AND THE STANDARDS ESTABLISHES A DIFFERENT OR CONFLICTING REQUIREMENTS FOR MINIMUM QUANTITIES OR QUALITY LEVELS, COMPLY WITH THE MOST STRINGENT REQUIREMENT.

ELECTRONIC FILES:

ELECTRONIC FILES CREATED BY METTEMEYER ENGINEERING, LLC. ARE AVAILABLE FOR USE BY THE GENERAL CONTRACTOR, SUBCONTRACTORS, OR BUILDERS INVOLVED IN ANY FORM OF CONSTRUCTION AND BIDS ON THE PROJECT BASED ON THE FOLLOWING TERMS AND CONDITIONS:

BY USING THIS COMPUTER-GENERATED DRAWING, YOU WILL INDICATE YOUR ACCEPTANCE OF THE FOLLOWING TERMS AND CONDITIONS. THE PURPOSE OF THIS AGREEMENT IS TO SET FORTH THE CONDITIONS FOR THE USE BY A SECOND PARTY (USER) OF COMPUTER-GENERATED DRAWINGS PREPARED BY METTEMEYER ENGINEERING, LLC. METTEMEYER ENGINEERING, LLC RETAINS OWNERSHIP OF THE INFORMATION CONTAINED ON THE DRAWINGS; PERMISSION TO USE THESE MATERIALS IS GIVEN ONLY SUBJECT TO THE TERMS OF THIS AGREEMENT.

ARTICLE 1. THE INFORMATION RECORDED ON COMPUTER-GENERATED DRAWINGS REPRESENTS A PORTION OF STRUCTURAL ENGINEERING SERVICES PERFORMED BY METTEMEYER ENGINEERING, LLC. NO REPRESENTATION IS MADE BY METTEMEYER ENGINEERING, LLC THAT THE DATA IS WITHOUT INACCURACY. METTEMEYER ENGINEERING, LLC GRANTS PERMISSION TO USE ITS COMPUTER-GENERATED DRAWINGS WITH THIS UNDERSTANDING AND WITH NO LIABILITIES EITHER EXPRESSED OR IMPLIED FOR ACCURACY OR COMPLETENESS. THE USER AGREES TO HOLD HARMLESS AND DEFEND METTEMEYER ENGINEERING, LLC IN THE EVENT OF ANY ACTION AGAINST OR BY THE USER FOR THE PREPARATION OF INFORMATION GENERATED THROUGH THE USE OF COMPUTER-GENERATED DRAWINGS PREPARED BY METTEMEYER ENGINEERING, LLC. FURTHER, IN THE EVENT OF SUCH LEGAL ACTION, THE USER AGREES TO PAY REASONABLE ATTORNEY'S FEES AND EXPENSES INCURRED BY METTEMEYER ENGINEERING, LLC IN RESOLVING THE MATTER.

ARTICLE 2. COMPUTER-GENERATED DRAWINGS ARE MADE AVAILABLE SOLELY FOR THE FACILITATION OF THE USER'S WORK ON THE SPECIFIC PROJECT IDENTIFIED BELOW AND NO PERMISSION IS GRANTED HEREIN FOR COPYING OR REUSE. THE USER'S ACCEPTANCE OF THESE TERMS, WHICH IS COMMUNICATED BY OPENING OR USING THIS DRAWING, CONSTITUTES A WAIVER OF LIABILITY AND THE ACCEPTANCE OF RESPONSIBILITIES FOR THE COORDINATION OF ANY REVISIONS AND COMPUTER-GENERATED INTERLINEATIONS MADE TO THE INFORMATION TRANSMITTED.

ARTICLE 3. UTILIZATION OF COMPUTER-GENERATED DRAWINGS NOT IN ACCORDANCE WITH THE TERMS OF THIS AGREEMENT SHALL CONSTITUTE A BREACH OF THIS AGREEMENT; METTEMEYER ENGINEERING, LLC WILL AT SUCH TIME DEMAND RETURN OF ITS PROPERTY AND MAY SEEK LEGAL RECOURSE AND THE COST OF REASONABLE FEES.

STEEL JOISTS

1. ALL JOISTS SHALL BE DESIGNED, FABRICATED, WELDED AND ERECTED IN ACCORDANCE WITH THE LATEST EDITION OF THE "STANDARD SPECIFICATIONS" OF THE STEEL JOIST INSTITUTE.

2. JOIST MANUFACTURER SHALL DESIGN AND SUBMIT CALCULATIONS BY AN APPROPRIATELY REGISTERED ENGINEER FOR ALL JOISTS AND JOISTS GIRDERS, EXCEPT PARALLEL CHORD JOIST WITH UNIFORM LOADS AND CONTINUOUSLY SUPPORTED COMPRESSION CHORDS PER SJI STANDARD LOAD TABLES. CALCULATIONS SHALL INCLUDE DEFLECTION AND CAMBER REQUIREMENTS. LIVE LOAD DEFLECTIONS SHALL BE LIMITED TO SPAN/360. ALL JOISTS AND JOIST GIRDERS SHALL BE CAMBERED FOR THE DESIGN DEAD LOAD. MANUFACTURER SHALL ADD ADDITIONAL WEB MEMBERS AS REQUIRED AND ADJUST CHORD AND WEB SIZES ACCORDINGLY, BUT SHALL NOT ALTER DEPTH OF JOISTS WITHOUT APPROVAL OF THE ARCHITECT. DESIGN CALCULATIONS SHALL INCLUDE SUPERIMPOSED LOADS FROM MECHANICAL, ELECTRICAL, PLUMBING, AND OTHER ROOF-SUPPORTED EQUIPMENT. VERIFY SIZE, WEIGHT AND LOCATION OF EQUIPMENT WITH ARCHITECTURAL, MECHANICAL, PLUMBING AND ELECTRICAL DRAWINGS.

3. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS ALONG WITH DESIGN CALCULATIONS SEALED BY A REGISTERED ENGINEER FOR REVIEW PRIOR TO MANUFACTURE. SHOP DRAWINGS AND CALCULATIONS SHALL INCLUDE DETAILS OF ANY OPTIONAL FIELD SPLICES.

4. ALL STEEL JOISTS, GIRDERS OR BEAMS SHALL BEAR AT A PANEL POINT. JOISTS OR BEAMS SHALL BE EQUALLY SPACED BETWEEN COLUMN LINES UNLESS NOTED OTHERWISE ON PLANS. MANUFACTURER SHALL DESIGN JOIST SHOES WHERE BEARING LENGTH IS LESS THAN 4" AT LH SERIES JOIST AND LESS THAN 3" AT K SERIES JOIST.

5. MANUFACTURER SHALL PROVIDE BRIDGING AS REQUIRED PER SJI SPECIFICATIONS. WHERE BOTTOM CHORD WELD IS INDICATED ON DRAWINGS, DO NOT WELD BOTTOM CHORDS TO JOIST SUPPORT UNTIL FULL DEAD LOAD IS IN PLACE. WHERE CROSS BRIDGING INTERFERES WITH MECHANICAL INSTALLATIONS, REMOVE THE INTERFERING CROSS BRIDGING ELEMENTS AFTER TOTAL DEAD LOAD IS APPLIED AND REPLACE WITH EQUIVALENT HORIZONTAL ANGLES (L2"x2"x3/16" MINIMUM) AT TOP AND BOTTOM CHORDS.

6. HORIZONTAL BRIDGING SHOWN ON THE PLANS IS FOR REFERENCE ONLY. JOIST MANUFACTURER SHALL DESIGN AND SUPPLY ALL BRIDGING REQUIRED. THE GROSS WIND UPLIFT IS AS FOLLOWS (THE WEIGHT OF THE BAR JOISTS AND DECK MAY BE SUBTRACTED TO ARRIVE AT THE NETUPLIFT):

   BUILDING INTERIOR..16 psf (0.6 FACTOR APPLIED)
   BUILDING PERIMETER(20' FROM EDGE)........................19 psf (0.6 FACTOR APPLIED)

7. MANUFACTURER SHALL DESIGN JOIST AND JOIST GIRDERS IN ACCORDANCE WITH THE UNDERWRITER LABORATORY (U.L.) DESIGN REQUIREMENTS IN ORDER TO ACHIEVE THE FIRE RATING SPECIFIED IN ARCHITECTURAL DRAWINGS.

8. THE GENERAL CONTRACTOR SHALL COORDINATE JOIST SPACINGS WITH FLOOR PENETRATIONS FOR MECHANICAL, ELECTRICAL, PLUMBING OR OTHER ITEMS IN THIS CONTRACT WHICH MAY CONFLICT WITH JOIST SPACINGS SHOWN. JOIST MAY BE SHIFTED TO MISS REQUIRED REQUIRED PENETRATIONS - ISOLATED SPACINGS (NO MORE THAN 2 ADJACENT SPACES) MAY BE INCREASED OR DECREASED BY A MAXIMUM OF 6". ANY ADJUSTMENTS MUST BE SHOWN ON BAR JOIST AND METAL DECK SHOP DRAWINGS.

9. WHERE JOIST OCCUR AT COLUMN LINES, EXTEND BOTTOM CHORD TO COLUMN AND PROVIDE A STABILIZER PLATE. DO NOT ATTACH BOTTOM CHORD TO COLUMN.

10. PROVIDE AN L4x4x3/8 "H" FRAME BELOW ALL ROOF MOUNTED MECHANICAL EQUIPMENT INCLUDING ROOF DRAINS, UNLESS NOTED OTHERWISE.

11. PROVIDE 1/4" BEARING PLATES WITH 2-1/2" DIA. x 4" HEADED STUDS AT EACH JOIST BEARING ON CMU WALLS. SIZE PLATES PER JOIST MANUFACTURER RECOMMENDATIONS (4"x6" MINIMUM FOR 1 JOIST, 6"x6" MINIMUM FOR TWO JOISTS) UNLESS NOTED OTHERWISE. SEE SJI STANDARD SPECIFICATION FOR OPEN WEB STEEL JOIST FOR ADDITIONAL RECOMMENDATIONS. CONTINUOUS 1/4"x4" AND 1/4" x 6" PLATES WITH 1/2" DIA.x4" HEADED STUDS AT 16" O.C. MAY BE USED AT SINGLE AND DOUBLE JOISTS RESPECTIVELY AT CONTRACTOR'S OPTION.

12. ALL JOIST SEATS AT THE POTENTIAL DIAPHRAGM BOUNDARIES SHALL HAVE THE CAPACITY TO RESIST A LATERAL LOAD APPLIED AT THE TOP OF THE TOP CHORD, PERPENDICULAR TO THE SPAN, (ROLLOVER) AS FOLLOWS:
   a. FOR JOIST SEATS UP TO 3 1/2" DEEP, THE SEAT SHALL BE CAPABLE OF RESISTING A 2,000 LB FORCE. NOTE THAT FOR K-SERIES JOISTS A MINIMUM ANCHORAGE WELD LENGTH OF 1 1/2" SHALL BE USED.
   b. FOR JOIST SEATS GREATER THAN 3 1/2" DEEP, THE SEAT SHALL BE CAPABLE OF RESISTING A 1,200 LB FORCE.

STONE AND BRICK VENEER WITH STEEL STUD OR MASONRY BACKING :

1. VENEER TIES SHALL BE 3/16"Ø WHERE LOOP TIES AND SHOULD EMBED IN VENEER JOINT A MINIMUM OF 1/2 THE WIDTH OF THE VENEER. WIRE SHOULD BE COLD DRAWN STEEL CONFORMING TO ASTM A82. WIRELOOP TIRES SHALL BE ATTACHED TO STEEL STUD BACKING AT EACH STUD AND AT 16" O.C. MAX. VERTICAL SPACING. WIRE LOOP TIES SHALL BE ATTACHED TO STEEL STUDS USING 12 GA.x3/4" WIRE ANCHOR STRAP. ATTACH ANCHOR STRAP TO STUD USING 3/4"x#10 ZINC COATED SCREWS.

2. WIRE LOOP AND ANCHOR STRAPS SHALL BE HOT DIPPED GALVANIZED AND SHALL CONFORM TO ASTM A153. WIRE LOOP TIES SHALL BE ATTACHED TO MASONRY BACKING AT 16" O.C. MAX. VERTICAL AND HORIZONTAL SPACING. WIRE LOOP TIES SHALL BE EMBEDDED IN MASONRY USING 12GA.x3/4" WIRE ANCHOR STRAP WITH A HOOKED OR OTHER APPROVED END. WIRE LOOP AND ANCHOR STRAPS SHALL BE HOT DIPPED GALVANIZED AND SHALL CONFIRM TO ASTM A153.

POST-INSTALLED ANCHORS:

1. POST-INSTALLED ANCHORS SHALL ONLY BE USED WHERE SPECIFIED ON THE CONSTRUCTION DOCUMENTS. SPECIAL INSPECTIONS ARE REQUIRED PER THE PROVISIONS SET FORTH IN BELOW REFERENCED IBC CODE REPORTS. ANCHORS ARE TO BE INSTALLED BY EXPERIENCED INSTALLERS OR CONTRACTOR TO CONTACT MANUFACTURER'S REPRESENTATIVE FOR PROPER PRODUCT INSTALLATION TRAINING ON INITIAL ANCHORS. SUBSTITUTION REQUESTS, FOR PRODUCTS OTHER THAN THOSE SPECIFIED BELOW, SHALL BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER OF RECORD ALONG WITH CALCULATIONS THAT ARE PREPARED AND SEALED BY A REGISTERED PROFESSIONAL ENGINEER. THE CALCULATIONS SHALL DEMONSTRATE THAT THE SUBSTITUTED PRODUCT IS CAPABLE OF ACHIEVING THE PERTINENT EQUIVALENT PERFORMANCE VALUES (MINIMUM) OF THE SPECIFIED PRODUCT USING THE APPROPRIATE DESIGN PROCEDURE AND/OR STANDARD(S) AS REQUIRED BY THE BUILDING CODE.

2. CONCRETE ANCHORS
   A. MECHANICAL ANCHORS FOR USE IN CRACKED AND UNCRACKED CONCRETE SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ACI 355.2 AND ICC-ES AC193. PRE-APPROVED MECHANICAL ANCHORS INCLUDE:
      - SIMPSON STRONG-TIE "TITEN-HD"
      - HILTI KWIK HUS (ICC-ES ESR-3027)
   B. ADHESIVE ANCHORS FOR USE IN CRACKED AND UNCRACKED CONCRETE SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ICC-ES AC308. PRE-APPROVED ADHESIVE ANCHORS INCLUDE:
      - SIMPSON STRONG-TIE "SET-GT" (ICC-ES ESR-2508)
      - HILTI HIT-HY 200-A (ICC-ES ESR 3187)
   C. GAS AND POWDER-ACTUATED FASTENERS FOR USE IN CONCRETE SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ICC-ES AC70. PRE-APPROVED ADHESIVE ANCHORS INCLUDE:
      - SIMPSON STRONG-TIE "GDP PINS" (ICC-ES ESR-2811)
      - SIMPSON STRONG-TIE "PDPA" (ICC-ES ESR-2138)

3. MASONRY ANCHORS
   A. ANCHORAGE TO SOLID-GROUTED CONCRETE MASONRY
      - MECHANICAL AND CONCRETE SCREW ANCHORS FOR USE IN SOLID-GROUTED CONCRETE MASONRY SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ICC-ES AC01 OR AC106, RESPECTIVELY. PRE-APPROVED MECHANICAL AND CONCRETE SCREW ANCHORS INCLUDE:
         - SIMPSON STRONG-TIE "TITEN-HD" (ICC-ES ESR-1056)
         - HILTI "KWIK HUS" (ICC-ES-ESR-3785)
      - ADHESIVE ANCHORS FOR USE IN SOLID-GROUTED CONCRETE MASONRY SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ICC-ES AC58. PRE-APPROVED ADHESIVE ANCHORS INCLUDE:
         - SIMPSON STRONG-TIE "SET GT" (ICC-ES ESR-2508)
         - HILTI "HIT-HY 200-A (ICC-ES ESR-3963)
      - GAS AND POWDER-ACTUATED FASTENERS FOR USE IN CONCRETE MASONRY SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ICC-ES AC70. PRE-APPROVED ADHESIVE ANCHORS INCLUDE:
         - SIMPSON STRONG-TIE "GDP PINS" (ICC-ES ESR-2811)

   B. STEEL FASTENERS
      - GAS AND POWDER-ACTUATED FASTENERS FOR USE IN STEEL SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ICC-ES AC70. PRE-APPROVED ADHESIVE ANCHORS INCLUDE:
         - SIMPSON STRONG-TIE "GDP PINS" (ICC-ES ESR-2811)
         - SIMPSON STRONG-TIE "PDPA" (ICC-ES ESR-2138)

ABBREVIATIONS:

1. B/ = BOTTOM OF
2. BRG = BEARING
3. DBE = DECK BEARING ELEVATION
4. EL = ELEVATION
5. EOR = ENGINEER OF RECORD
6. f'c = CONCRETE COMPRESSIVE STRENGTH
7. FTG = FOOTING
8. FV = FIELD VERIFY
9. G.C. = GENERAL CONTRACTOR
10. H.A.S. = HEADED ANCHOR STUD
11. JBE = JOIST BEARING ELEVATION
12. MEP = MECHANICAL, ELECTRICAL, PLUMBING
13. MFR = MANUFACTURER
14. RTU = ROOF TOP UNIT
15. T/ = TOP OF
16. U.N.O. = UNLESS NOTED OTHERWISE

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HENDERSON ENGINEERING, INC.
8345 LENEXA DR., #300
LENEXA, KS 66214
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REVISIONS

NO.	DESCRIPTION	DATE
01	ADD 01	01/11/23
02	ADD 02	01/25/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER E-2000162147
1-25-23
REGISTERED PROFESSIONAL ENGINEER

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PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY
PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

GENERAL NOTES

SHEET
S000

BASIS FOR DESIGN:

1. BUILDING CODE: IBC 2015
   RISK CATEGORY = III
   REFER TO CHAPTER 35 FOR REFERENCED STANDARDS

2. DEAD LOADS
   - A. ROOF, PRE-ENG. METAL BUILDING — PER MFR. + 5 PSF COLLATERAL
   - B. ROOF, MAIN OFFICE BUILDING — 18 PSF
   - C. ROOF, WASH BUILDING — 16 PSF
   - D. ROOF, SALT STORAGE BUILDING — PER MFR. + 5 PSF COLLATERAL
   - E. MEZZANINE STORAGE — 36 PSF

3. LIVE LOADS
   - A. ROOFS, ALL (NO REDUCTION) — 20 PSF
   - B. MEZZANINE STORAGE — 250 PSF
   - C. WASH BLDG. PLATFORM — 60 PSF

4. SNOW LOAD
   - A. GROUND SNOW — P_g = 20 PSF
   - B. MINIMUM FLAT ROOF SNOW LOAD — P_m = 22 PSF
   - C. SLOPED ROOF SNOW LOAD — P_s = 16 PSF
   - D. EXPOSURE FACTOR — C_e = 1.0
   - E. IMPORTANCE FACTOR — I_s = 1.1
   - F. THERMAL FACTOR — C_t = 1.2
   - G. RAIN ON SNOW = 5 PSF (FLAT ROOF)

5. SEISMIC LOAD
   - A. IMPORTANCE FACTOR, Ie = 1.25
   - B. S_S = 0.293
   - C. S_1 = 0.132
   - D. SITE CLASS = C
   - E. SD_S = 0.234
   - F. SD_1 = 0.147
   - G. SEISMIC DESIGN CATEGORY = C
   - H. BASIC SEISMIC FORCE RESISTING SYSTEM
     - a. STEEL ORDINARY CONCENTRICALLY BRACED FRAMES
     - b. STEEL INTERMEDIATE MOMENT FRAMES
     - c. INTERMEDIATE REINFORCED MASONRY SHEAR WALLS
   - I. DESIGN BASE SHEAR
     - a. FLEET PEMB = BY OTHERS
     - b. PUBLIC WORKS BUILDING = 166.3 KIPS
     - c. WASH BUILDING = 43.6 KIPS
     - d. SALT STORAGE = BY OTHERS
   - J. RESPONSE MODIFICATION COEFFICIENT(S), R
     - a. STEEL ORDINARY CONCENTRICALLY BRACED FRAMES = 3.25
     - b. STEEL INTERMEDIATE MOMENT FRAMES = 4.5
     - c. INTERMEDIATE REINFORCED MASONRY SHEAR WALLS = 3.5
   - K. SEISMIC RESPONSE COEFFICIENT(S), Cs
     - a. STEEL ORDINARY CONCENTRICALLY BRACED FRAMES = 0.090
     - b. STEEL INTERMEDIATE MOMENT FRAMES = 0.065
     - c. INTERMEDIATE REINFORCED MASONRY SHEAR WALLS = 0.084
   - L. ANALYSIS PROCEDURE = EQUIVALENT LATERAL FORCE PROCEDURE

.02

6. WIND LOAD
   - A. BASIC WIND SPEED (3-SECOND GUST)
     - a. ULTIMATE DESIGN WIND SPEED — 120 MPH
     - b. SERVICE DESIGN WIND SPEED — 93 MPH
   - B. RISK CATERGORY, I_w = 1.0
   - C. EXPOSURE = "C"
   - D. INTERNAL PRESSURE COEFFICIENT = ±0.18
   - E. WIND DESIGN PRESSURES (COMPONENTS & CLADDING) - REFER TO TABLES BELOW.
   - F. MEAN ROOF HEIGHTS:
     - a. 30'-6" @ FLEET PEMB
     - b. 15'-0" @ MAIN OFFICE BUILDING
     - c. 21'-6" @ WASH BUILDING

.02

7. PRE-ENGINEERED METAL BUILDING STANDARD DEFLECTION CRITERIA

VERTICAL
- A. ROOF PANEL, L = DISTANCE BETWEEN PURLINS:
  - a. L/180 (L, S, OR W)
  - b. L/150 (D+L)
- B. PURLINS, L = BAY LENGTH
  - a. L/150 (L, S, OR W)
  - b. L/120 (D+L)
- C. EW RAFTERS, L = DISTANCE BETWEEN COLUMNS
  - a. L/180 (L, S, OR W)
  - b. L/120 (D+L)
- D. MAIN FRAMES, L = FRAME WIDTH
  - a. L/180 (L, S, OR W)
  - b. L/120 (D+L)

HORIZONTAL
- A. WALL PANEL, L = DISTANCE BETWEEN GIRTS — L/60
- B. GIRTS, L = BAY LENGTH — L/90
- C. EW COLUMNS, H = COLUMN HEIGHT — H/90
- D. MAIN FRAMES, H = EAVE HEIGHT — H/60 (H/100 @ CRANE BAYS)

.02

ROOF GROSS UPLIFT AT OFFICES (PSF)

AREA SUPPORT FT²	ZONE 1'	ZONE 1	ZONE 2	ZONE 3
10	16.0 / -26.4	16.0 / -45.9	16.0 / -60.5	16.0 / -82.4
20	16.0 / -26.4	16.0 / -42.8	16.0 / -56.6	16.0 / -74.7
50	16.0 / -26.4	16.0 / -37.5	16.0 / -51.4	16.0 / -64.4
100	16.0 / -26.4	16.0 / -35.8	16.0 / -47.6	16.0 / -56.6

WALL AND PARAPET PRESSURES AT OFFICES (PSF)

AREA SUPPORT FT²	WALLS		PARAPETS	
	ZONE 4	ZONE 5	ZONE 4	ZONE 5
10	28.8 / -31.2	28.8 / -38.6	66.0 / -38.3	87.9 / -46.1
20	27.5 / -29.9	27.5 / -35.9	62.1 / -36.9	80.1 / -43.3
50	25.8 / -28.2	25.8 / -32.6	78.0 / -55.6	90.9 / -59.6
100	24.4 / -26.9	24.4 / -29.9	73.3 / -54.0	82.4 / -57.2

ROOF GROSS UPLIFT AT FLEET BUILDING (PSF)

AREA SUPPORT FT²	ZONE 1'	ZONE 1	ZONE 2	ZONE 3
10	16.0 / -30.6	16.0 / -53.3	16.0 / -70.3	16.0 / -95.7
20	16.0 / -30.6	16.0 / -49.7	16.0 / -65.8	16.0 / -86.7
50	16.0 / -30.6	16.0 / -43.6	16.0 / -59.7	16.0 / -74.8
100	16.0 / -30.6	16.0 / -41.6	16.0 / -55.2	16.0 / -65.8

WALL AND PARAPET PRESSURES AT FLEET BUILDING (PSF)

AREA SUPPORT FT²	WALLS		PARAPETS	
	ZONE 4	ZONE 5	ZONE 4	ZONE 5
10	33.4 / -36.3	33.4 / -44.8	N/A	N/A
20	31.9 / -34.7	31.9 / -41.7	N/A	N/A
50	29.9 / -32.7	29.9 / -37.8	N/A	N/A
100	28.4 / -31.2	28.4 / -34.7	N/A	N/A

ROOF GROSS UPLIFT AT WASH BUILDING (PSF)

AREA SUPPORT FT²	ZONE 1'	ZONE 1	ZONE 2	ZONE 3
10	16.0 / -28.5	16.0 / -49.6	16.0 / -65.4	16.0 / -89.1
20	16.0 / -28.5	16.0 / -46.3	16.0 / -61.2	16.0 / -80.7
50	16.0 / -28.5	16.0 / -40.6	16.0 / -55.6	16.0 / -69.6
100	16.0 / -28.5	16.0 / -38.7	16.0 / -51.4	16.0 / -61.2

WALL AND PARAPET PRESSURES WASH BUILDING (PSF)

AREA SUPPORT FT²	WALLS		PARAPETS	
	ZONE 4	ZONE 5	ZONE 4	ZONE 5
10	31.1 / -33.8	31.1 / -41.7	N/A	N/A
20	29.7 / -32.3	29.7 / -38.9	N/A	N/A
50	27.9 / -30.5	27.9 / -35.2	N/A	N/A
100	26.4 / -29.0	26.4 / -32.3	N/A	N/A

ROOF GROSS UPLIFT AT SALT STORAGE BUILDING (PSF)

AREA SUPPORT FT²	ZONE 1'	ZONE 1	ZONE 2	ZONE 3
10	16.0 / -32.0	16.0 / -55.6	16.0 / -73.3	16.0 / -99.8
20	16.0 / -32.0	16.0 / -51.9	16.0 / -68.6	16.0 / -90.5
50	16.0 / -32.0	16.0 / -45.5	16.0 / -62.3	16.0 / -78.0
100	16.0 / -32.0	16.0 / -43.4	16.0 / -57.6	16.0 / -68.6

WALL AND PARAPET PRESSURES SALT STORAGE BUILDING (PSF)

AREA SUPPORT FT²	WALLS		PARAPETS	
	ZONE 4	ZONE 5	ZONE 4	ZONE 5
10	34.9 / -37.8	34.9 / -46.8	N/A	N/A
20	33.3 / -36.2	33.3 / -43.5	N/A	N/A
50	31.2 / -34.2	31.2 / -39.4	N/A	N/A
100	29.6 / -32.6	29.6 / -36.2	N/A	N/A

TYPICAL GROSS UPLIFT NOTES

1. ALL UPLIFT VALUES ARE EXPRESSED IN PSF.
2. NEGATIVE VALUE DENOTES PRESSURE AWAY FROM SURFACE.
3. POSITIVE VALUE DENOTES PRESSURE AWAY FROM SURFACE.
4. EFFECTIVE DEAD LOAD TO RESIST UPLIFT = 18 PSF U.N.O. FOR WOOD FRAMING.
5. EFFECTIVE DEAD LOAD TO RESIST UPLIFT = 24 PSF U.N.O. FOR STEEL FRAMING.

MASONRY CONSTRUCTION

TMS 402 AND TMS 602 LEVEL "B" QUALITY ASSURANCE

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. MATERIAL TESTING:		
A. VERIFICATION OF SLUMP FLOW AND VISUAL STABILITY INDEX (VSI) AS DELIVERED TO THE PROJECT SITE IN ACCORDANCE WITH ARTICLE 1.5 B.1.b.3 FOR SELF-CONSOLIDATING GROUT.	-	X
B. VERIFICATION OF fm IN ACCORDANCE WITH ARTICLE 1.4 B PRIOR TO CONSTRUCTION, EXCEPT WHERE SPECIFICALLY EXEMPTED BY THE CODE.	-	X
2. VERIFY COMPLIANCE WITH THE APPROVED SUBMITTALS.	-	X
3. AS MASONRY CONSTRUCTION BEGINS, VERIFY THAT THE FOLLOWING ARE IN COMPLIANCE:		
A. PROPORTIONS OF SITE-PREPARED MORTAR.	-	X
B. CONSTRUCTION OF MORTAR JOINTS.	-	X
C. LOCATION OF REINFORCEMENT AND CONNECTORS.	-	X
4. PRIOR TO GROUTING, VERIFY THAT THE FOLLOWING ARE IN COMPLIANCE:		
A. GROUT SPACING.	-	X
B. GRADE, TYPE, AND SIZE OF REINFORCEMENT AND ANCHOR BOLTS, AND PRESTRESSING TENDONS AND ANCHORAGE.	-	X
C. PLACEMENT OF REINFORCEMENT AND CONNECTORS.	-	X
D. PROPORTIONS OF SITE-PREPARED GROUT.	-	X
E. CONSTRUCTION OF MORTAR JOINTS.	-	X
5. VERIFY DURING CONSTRUCTION:		
A. SIZE AND LOCATION OF STRUCTURAL ELEMENTS.	-	X
B. TYPE, SIZE, AND LOCATION OF ANCHORS, INCLUDING OTHER DETAILS OF ANCHORAGE OF MASONRY TO STRUCTURAL MEMBERS, FRAMES, OR OTHER CONSTRUCTION.	-	X
C. WELDING OF REINFORCEMENT.	X	-
D. PREPARATION, CONSTRUCTION, AND PROTECTION OF MASONRY DURING COLD WEATHER OR HOT WEATHER.	-	X
E. PLACEMENT OF GROUT.	X	-
6. OBSERVATION PREPARATION OF GROUT SPECIMENS, MORTAR SPECIMENS, AND/OR PRISMS.	-	X

STRUCTURAL STEEL

AISC 360

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. MATERIAL VERIFICATION OF HIGH-STRENGTH BOLTS, NUTS, AND WASHERS:		
A. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	-	X
B. MANUFACTURER'S CERTIFICATE OF COMPLIANCE REQUIRED.	-	X
2. INSPECT OF HIGH-STRENGTH BOLTING:		
A. BEARING-TYPE CONNECTIONS.	-	X
B. SLIP-CRITICAL CONNECTIONS.	X	-
3. MATERIAL VERIFICATION OF STRUCTURAL STEEL:		
A. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	-	X
B. MANUFACTURER'S CERTIFIED MILL TEST REPORTS.	-	X
4. MATERIAL VERIFICATION OF WELD FILLER MATERIALS:		
A. IDENTIFICATION MARKINGS TO CONFORM TO AWS SPECIFICATION IN THE APPROVED CONSTRUCTION DOCUMENTS.	-	X
B. MANUFACTURER'S CERTIFIED OF COMPLIANCE REQUIRED.	-	X
5. INSPECTION OF STRUCTURAL STEEL WELDING:		
A. COMPLETE AND PARTIAL PENETRATION GROOVE WELDS.	X	-
B. MULTI-PASS FILLET WELDS.	X	-
C. SINGLE-PASS FILLET WELDS > 5/16".	X	-
D. SINGLE-PASS FILLET WELDS < 5/16".	-	X
6. INSPECTION OF STEEL FRAME JOINT DETAILS FOR COMPLIANCE WITH APPROVED CONSTRUCTION DOCUMENTS:		
A. DETAILS SUCH AS BRACING AND STIFFENING.	-	X
B. MEMBER LOCATIONS.	-	X
C. APPLICATION OF JOINT DETAILS AT EACH CONNECTION.	-	X

STATEMENT OF SPECIAL INSPECTIONS

1. SPECIAL INSPECTIONS ARE REQUIRED FOR THIS PRIMARY BUILDING FRAME / MAIN FORCE RESISTING SYSTEM PER THE LATEST EDITION OF THE IBC.
2. REFER TO THE IBC FOR ADDITIONAL INFORMATION RELATED TO THESE TABLES.
3. INSPECTIONS AND TESTING SHALL BE PROVIDED BY A QUALIFIED TESTING LABORATORY, RETAINED BY THE OWNER AND APPROVED BY THE ENGINEER OF RECORD.
4. REPORTS SHALL INDICATE THAT WORK INSPECTED OR TESTED WAS OR WAS NOT COMPLETED IN CONFORMANCE TO APPROVED CONSTRUCTION DOCUMENTS. DISCREPANCIES SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE CONTRACTOR FOR CORRECTION. IF THEY ARE NOT CORRECT, THE DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE BUILDING OFFICIAL AND THE ENGINEER OF RECORD PRIOR TO THE COMPLETION OF THAT PHASE OF THE WORK.
5. A LETTER OF SUBSTANTIAL COMPLETION SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT BY THE SPECIAL INSPECTOR PRIOR TO THE FINAL INSPECTION.

SOILS

IBC TABLE 1705.6

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	-	X
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	-	X
3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.	-	X
4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESS DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	-
5. PRIOR TO PLACEMENT OF COMPACTED FILL, INSPECT SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	-	X

CONCRETE CONSTRUCTION

IBC TABLE 1705.3

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. INSPECT REINFORCEMENT AND VERIFY PLACEMENT.	-	X
2. REINFORCING BAR WELDING:		
B. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706.	-	X
B. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16".	-	X
C. INSPECT ALL OTHER WELDS.	X	-
3. INSPECT ANCHORS CAST IN CONCRETE.	-	X
4. INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS:		
A. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED	X	-
B. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 4.A.	-	X
5. VERIFY USE OF REQUIRED DESIGN MIX.	-	X
6. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	-
7. INSPECT CONCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	-
8. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	-	X
9. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	-	X

CAST-IN-PLACE DEEP FOUNDATION ELEMENTS

IBC TABLE 1705.8

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. INSPECT DRILLING OPERATIONS AND MAINTAIN COMPLETE AND ACCURATE RECORDS FOR EACH ELEMENT.	X	-
2. VERIFY PLACEMENT LOCATIONS AND PLUMBNESS, CONFIRM ELEMENT DIAMETERS, LENGTHS, EMBEDMENT INTO BEDROCK AND ADEQUATE END-BEARING STRATA CAPACITY. RECORD CONCRETE OR GROUT VOLUMES.	X	-
3. FOR CONCRETE ELEMENTS, PERFORM TESTS AND ADDITIONAL SPECIAL INSPECTIONS IN ACCORDANCE WITH SECTION 1705.3.	-	X

STEEL CONSTRUCTION

IBC TABLE 1705.2

TYPE	CONTINUOUS SPECIAL INSPECTION	PERIODIC SPECIAL INSPECTION
1. MATERIAL VERIFICATION OF COLD-FORMED STEEL DECK:		
A. IDENTIFICATION MARKINGS TO CONFORM TO ASTM STANDARDS SPECIFIED IN THE APPROVED CONSTRUCTION DOCUMENTS.	-	X
B. MANUFACTURER'S CERTIFICATE TEST REPORTS.	-	X
2. INSPECT OF COLD-FORMED STEEL DECK WELDING:		
A. FLOOR DECK WELDS.	-	X
B. ROOF DECK WELDS.	-	X
3. INSPECTION OF REINFORCING STEEL WELDING:		
A. VERIFICATION OF WELD ABILITY OF REINFORCING STEEL OTHER THAN A706.	-	X
B. REINFORCING STEEL RESISTING FLEXURAL AND AXIAL FORCES IN REINFORCING STEEL RESISTING FLEXURAL AND AXIAL FORCES IN OF SPECIAL REINFORCED CONCRETE SHEAR WALLS AND SHEAR REINFORCEMENT.	X	-
C. SHEAR REINFORCEMENT.	X	-
D. OTHER REINFORCING STEEL.	-	X

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REVISIONS

NO.	DESCRIPTION	DATE
01	ADD 01	01/11/23
02	ADD 02	01/25/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL

ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER E-2000162147
1-25-23
PROFESSIONAL ENGINEER

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PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

SPECIAL INSPECTIONS & B.F.D.

SHEET
S001

STRAIGHT DOWEL DEVELOPMENT LENGTHS (INCHES)
Fy = 60,000 PSI

BAR SIZE	TENSION												COMPRESSION		
	OTHER BARS						TOP BARS								
	3000 PSI CONCRETE	4000 PSI CONCRETE	5000 PSI CONCRETE	6000 PSI CONCRETE	7000 PSI CONCRETE	8000 PSI CONCRETE	3000 PSI CONCRETE	4000 PSI CONCRETE	5000 PSI CONCRETE	6000 PSI CONCRETE	7000 PSI CONCRETE	8000 PSI CONCRETE	3000 PSI CONCRETE	4000 PSI CONCRETE	5000 PSI-10,000 PSI CONCRETE
#3	17	15	13	12	12	12	22	19	17	16	14	14	9	8	8
#4	22	19	17	16	15	14	29	25	23	21	19	18	11	10	9
#5	28	24	22	20	18	17	36	31	28	26	24	22	14	12	12
#6	33	29	26	24	22	21	43	37	34	31	28	27	17	15	14
#7	48	42	38	34	32	30	63	54	49	45	41	39	20	17	16
#8	55	48	43	39	36	34	72	62	56	51	47	44	22	19	18
#9	62	54	48	44	41	38	81	70	63	57	53	50	25	22	21
#10	70	61	54	50	46	43	91	79	71	64	60	56	28	25	23
#11	78	67	60	55	51	48	101	87	78	71	66	62	31	27	26
#14	93	81	72	66	61	57	121	105	94	86	79	74	38	33	31
#18	124	108	96	88	81	76	161	140	125	114	106	99	50	43	41

NOTES:
1. TOP BARS ARE HORIZONTAL REINFORCEMENT PLACED SO THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE REINFORCEMENT.

2. DEVELOPMENT LENGTHS IN TENSION ARE BASED ON THE FOLLOWING. NOTIFY ENGINEER IF ONE OF THE FOLLOWING CRITERIA IS NOT MET:
A. CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED IS NOT LESS THAN THE BAR DIAMETER, CLEAR COVER NOT LESS THAN THE BAR DIAMETER, AND STIRRUPS OR TIES THROUGHOUT THE DEVELOPMENT LENGTH NOT LESS THAN THE CODE MINIMUM, OR

B. CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN 2 TIMES THE BAR DIAMETER AND CLEAR COVER NOT LESS THAN THE BAR DIAMETER.

LAP SPLICE LENGTHS (INCHES)
Fy = 60,000 PSI

BAR SIZE	TENSION (CLASS B SPLICE)												COMPRESSION
	OTHER BARS						TOP BARS						
	3000 PSI CONCRETE	4000 PSI CONCRETE	5000 PSI CONCRETE	6000 PSI CONCRETE	7000 PSI CONCRETE	8000 PSI CONCRETE	3000 PSI CONCRETE	4000 PSI CONCRETE	5000 PSI CONCRETE	6000 PSI CONCRETE	7000 PSI CONCRETE	8000 PSI CONCRETE	3000 PSI-10,000 PSI CONCRETE
#3	23	20	17	16	15	15	29	25	23	21	19	19	12
#4	29	25	23	21	20	19	38	33	30	28	25	24	15
#5	37	32	29	26	24	23	47	41	37	34	32	29	19
#6	43	38	34	32	29	28	56	49	45	41	37	36	23
#7	63	55	50	45	42	39	82	71	64	59	54	51	27
#8	72	63	56	51	47	45	94	81	73	67	62	58	30
#9	81	71	63	58	54	50	106	91	82	75	69	65	34
#10	91	80	71	65	60	56	119	103	93	84	78	73	39
#11	102	88	78	72	67	63	132	114	102	93	86	81	43
#14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	51
#18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	68

NOTES:
1. TOP BARS ARE HORIZONTAL REINFORCEMENT PLACED SO THAT MORE THAN 12" OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE REINFORCEMENT.

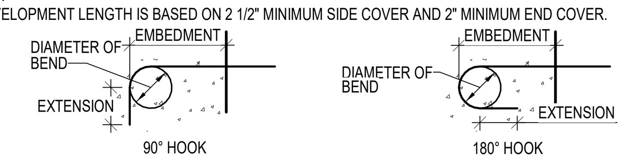
2. DEVELOPMENT LENGTHS IN TENSION ARE BASED ON THE FOLLOWING.
NOTIFY ENGINEER IF ONE OF THE FOLLOWING CRITERIA IS NOT MET:
A. CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED IS NOT LESS THAN THE BAR DIAMETER, CLEAR COVER NOT LESS THAN THE BAR DIAMETER, AND STIRRUPS OR TIES THROUGHOUT THE DEVELOPMENT LENGTH NOT LESS THAN THE CODE MINIMUM, OR

B. CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN 2 TIMES THE BAR DIAMETER AND CLEAR COVER NOT LESS THAN THE BAR DIAMETER.

HOOKED DOWEL DEVELOPMENT LENGTHS IN TENSION (INCHES)
Fy = 60,000 PSI

BAR SIZE	EMBEDMENT						EXTENSION		MINIMUM BEND DIAMETER (IN.)
	3000 PSI CONCRETE	4000 PSI CONCRETE	5000 PSI CONCRETE	6000 PSI CONCRETE	7000 PSI CONCRETE	8000 PSI CONCRETE	90° HOOK	180° HOOK	
#3	6	6	6	6	6	6	5	3	3
#4	8	7	6	6	6	6	6	3	4
#5	10	8	7	7	6	6	8	3	5
#6	12	10	9	8	8	7	9	3	6
#7	13	12	10	9	9	8	11	4	7
#8	15	13	12	11	10	9	12	4	8
#9	17	15	13	12	11	11	14	5	12
#10	19	17	15	14	13	12	16	6	13
#11	22	19	17	15	14	13	17	6	15

NOTES:
1. DEVELOPMENT LENGTH IS BASED ON 2 1/2" MINIMUM SIDE COVER AND 2" MINIMUM END COVER.



INTERIOR LIGHT GAGE WALL STUD SIZES

MAX WALL HEIGHT	STUD SIZE	SPACING	REQUIRED BLOCKING/BRIDGING
14'-8"	362S137-33	16"	MANUFACTURER'S STANDARD @ 4'-0" O.C.
15'-4"	362S162-33	16"	MANUFACTURER'S STANDARD @ 4'-0" O.C.
21'-8"	600S137-33	16"	MANUFACTURER'S STANDARD @ 4'-0" O.C.
22'-9"	600S162-33	16"	MANUFACTURER'S STANDARD @ 4'-0" O.C.

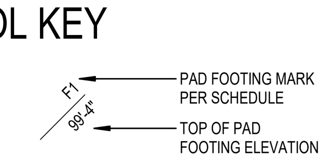
EXTERIOR LIGHT GAGE HEADER SCHEDULE

SPAN	REDHEADER TYPE	HEADER CLIP	JAMB STUD
6'-0" - 9'-0"	587HS300-54	14GA W/ 4/6 SCREW PATTERN	600S300-54
9'-0" - 15'-6"	587HS350-97	14GA W/ 4/6 SCREW PATTERN	600S300-97

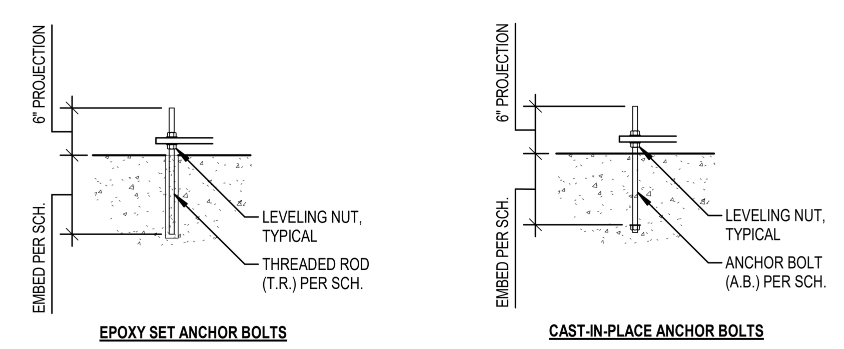
PAD FOOTING SCHEDULE

PAD FOOTING MARK	WIDTH	LENGTH	THICKNESS	REINFORCEMENT	REMARKS
F3	3'-0"	3'-0"	1'-4"	(4) #4 BARS EA. WAY, BOTTOM	
F3.5	3'-6"	3'-6"	1'-4"	(4) #5 BARS EA. WAY, BOTTOM	
F4.5a	4'-6"	4'-6"	1'-4"	(6) #5 BARS EA. WAY, TOP & BTM	
F4a	4'-0"	4'-0"	1'-4"	(5) #5 BARS EA. WAY, TOP & BTM	
F5	5'-0"	5'-0"	1'-4"	(6) #5 BARS EA. WAY, TOP & BTM	
F5.5	5'-6"	5'-6"	1'-4"	(5) #6 BARS EA. WAY, BOTTOM	
F5.5a	5'-6"	5'-6"	1'-4"	(7) #5 BARS EA. WAY, TOP & BTM	
F6	6'-0"	6'-0"	1'-4"	(7) #5 BARS EA. WAY, TOP & BTM	
F7	7'-0"	7'-0"	1'-4"	(7) #6 BARS EA. WAY, TOP & BTM	
F7.5	7'-6"	7'-6"	1'-4"	(7) #6 BARS EA. WAY, TOP & BTM	
F8	8'-0"	8'-0"	1'-4"	(9) #5 BARS EA. WAY, TOP & BTM	
F8.5	8'-6"	8'-6"	2'-0"	(9) #5 BARS EA. WAY, TOP & BTM	
F14x4	14'-0"	4'-0"	1'-4"	(5) #5 BARS LONG WAY, TOP & BTM (16) #5 BARS SHORT WAY, TOP & BTM	
F18x4	4'-0"	18'-0"	1'-4"	(6) #5 BARS LONG WAY, TOP & BTM (20) #5 BARS SHORT WAY, TOP & BTM	
F20x5	5'-0"	20'-0"	1'-4"	(6) #5 BARS LONG. WAY, TOP & BTM (24) #5 BARS, LONG WAY, TOP & BTM	
F20x6	6'-0"	20'-0"	2'-0"	(8) #6 BARS LONG WAY, TOP & BTM (24) #6 BARS SHORT WAY, TOP & BTM	

SYMBOL KEY



NOTE:
SEE PAD FOOTING SCHEDULE FOR SIZES AND REINFORCEMENT.



CONCRETE PEDESTAL SCHEDULE

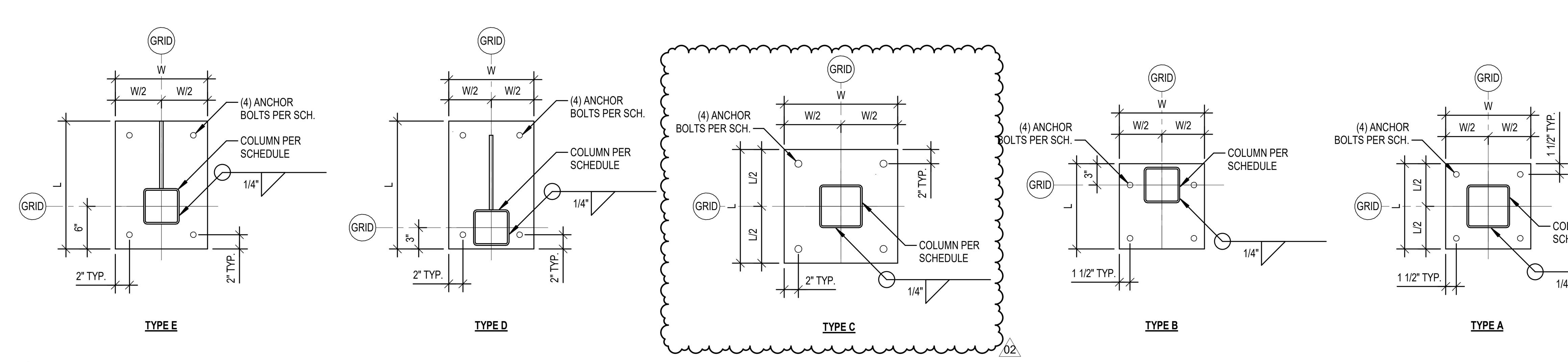
PEDESTAL LOCATION	PEDESTAL SIZE (INCHES)	B/PEDESTAL	T/PEDESTAL	REBAR DOWELS	REBAR TIES
D-23	24" x 24"	EL=98'-0"	EL=99'-4"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
D-23.5	24" x 24"	EL=98'-0"	EL=99'-4"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
D-24	36" x 36"	EL=98'-0"	EL=99'-4"	(12) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
E.1-23.5	24" x 24"	EL=94'-0"	EL=98'-0"	(8) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.
E.1-24	36" x 36"	EL=94'-0"	EL=98'-0"	(12) #6	#3 @ 9" O.C., TOP (3) IN TOP 5" OF PED.

02

STEEL COLUMN SCHEDULE

COLUMN LOCATION	COLUMN SHAPE	BASE PLATE TYPE	PLATE THICKNESS	PLATE LENGTH	PLATE WIDTH	BOLT DIAM.	ANCHOR BOLT EMBED.	ANCHOR BOLT TYPE	SHEAR LUG DEPTH	SHEAR LUG WIDTH	SHEAR LUG THICKNESS	SHEAR LUG WELD	B/STEEL COLUMN ±	T/STEEL COLUMN ±
A(6")-17.7	HSS5-1/2X5-1/2X3/8	B	1"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=113'-9"
A-17	HSS5-1/2X5-1/2X3/8	B	1"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=124'-4"
A-18	HSS5-1/2X5-1/2X3/8	B	1"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 120'-0"
B-13	HSS5-1/2X5-1/2X3/8	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=117-4"
B-14	HSS5-1/2X5-1/2X3/8	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=117-7"
B-14.3	HSS5-1/2X5-1/2X3/8	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 120'-0"
B-15	HSS5-1/2X5-1/2X3/8	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 120'-0"
B-16	HSS5-1/2X5-1/2X3/8	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 120'-0"
C-1	HSS5X5X1/4	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
C-2	HSS5X5X1/4	B	1"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
C-3.1	HSS5X5X3/8	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
C-4	HSS4X4X1/4	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
C-4.6	HSS4X4X1/4	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
C-5.3	HSS4X4X1/4	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-2 1/2"
C-6	HSS5-1/2X5-1/2X3/8	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 121'-0"
C-7.2	HSS8X6X1/2	B	3/4"	14"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 121'-0"
C-7.4	HSS8X6X1/2	B	3/4"	14"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 121'-0"
C-7.6	HSS8X6X1/2	B	3/4"	14"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 121'-0"
C-8	HSS5-1/2X5-1/2X3/8	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 121'-0"
D-9	HSS5X5X1/4	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116' -6 3/4"
D-9.7	HSS5X5X1/4	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116' -6 3/4"
D-10	HSS5X5X1/4	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116' -6 3/4"
D-11	HSS4X4X1/4	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116' -6 3/4"
D-12	HSS4X4X1/4	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116' -6 3/4"
D-13	HSS5X5X3/8	D	1"	16"	12"	1-1/4"	12"	F1554-GR55 A.B.					EL=98'-8"	T/STL=116' -6 3/4"
D-17	HSS5-1/2X5-1/2X3/8	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=124'-4"
D-18	HSS5-1/2X5-1/2X3/8	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=119'-8 3/4"
D-19	HSS4X4X1/4	B	3/4"	11"	11"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116'-8 3/4"
D-20	HSS4X4X1/4	B	3/4"	11"	11"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116'-8 3/4"
D-21	HSS5-1/2X5-1/2X1/4	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=116'-8 3/4"
D-22	HSS5-1/2X5-1/2X1/4	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 120'-0"
D-23	HSS6X6X3/8	A	1"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=99'-4"	T/PARAPET = 120'-0"
D-23.5	HSS6X6X1/2	A	1"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=99'-4"	T/PARAPET = 120'-0"
D-24	HSS6X6X1/2	C	1-1/2"	16"	16"	1-1/4"	12"	F1554-GR55 A.B.					EL=99'-4"	T/PARAPET = 120'-0"
D.6-5.3	HSS4X4X1/4	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
E-9	HSS5X5X1/4	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=115'-5"
E-13	HSS5X5X3/8	E	1"	16"	12"	1-1/4"	12"	F1554-GR55 A.B.					EL=98'-8"	T/STL=115'-5"
E-14	HSS5X5X3/8	A	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=115'-5"
E-15	HSS5X5X3/8	A	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=115'-5"
E-16	HSS5X5X1/4	A	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=115'-5"
E-17	HSS5-1/2X5-1/2X3/8	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=124'-4"
E-18	HSS5-1/2X5-1/2X3/8	E	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=119'-8 3/4"
E-19	HSS5X5X1/4	A	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 115'-0"
E-20	HSS5X5X1/4	A	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 115'-0"
E.1-23	HSS10X10X3/8	C	1"	18"	16"	1"	12"	F1554-GR36 A.B.					EL=98'-0"	T/STL=111'-6"
E.1-23.5	HSS10X10X3/8	C	1-1/2"	18"	16"	1-1/4"	12"	F1554-GR55 A.B.					EL=98'-0"	T/STL=111'-6"
E.1-24	HSS10X10X3/8	C	1-1/2"	18"	16"	1-1/4"	12"	F1554-GR55 A.B.					EL=98'-0"	T/STL=111'-6"
F-1	HSS5X5X1/4	D	1"	16"	12"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
F-2	HSS4X4X1/4	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
F-4	HSS4X4X1/4	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-0"
F-6	HSS5X5X1/4	B	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-2 1/2"
F-7.4	HSS4X4X1/4	B	3/4"	12"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	EL=112'-2 1/2"
H-10	HSS6X3X1/2	A	3/4"	12"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL = 114'-6"
H-11	HSS3-1/2X3-1/2X3/8	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL = 114'-6"
H-12	HSS3-1/2X3-1/2X3/8	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL = 114'-6"
H-13	HSS4X4X1/4	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	FLEET T/STL=114'-8"
J-17	HSS5-1/2X5-1/2X3/8	A	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/STL=124'-4"
J-18	HSS5-1/2X5-1/2X3/8	A	3/4"	12"	12"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/PARAPET = 120'-0"
K.2-9	HSS3-1/2X3-1/2X1/4	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	FLEET T/STL=114'-8"
L-23	HSS10X10X3/8	C	1"	18"	18"	1"	12"	F1554-GR36 A.B.					EL=98'-8"	T/STL=111'-6"
Q.1-7.3	HSS4X4X1/2	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/CMU = 110'-8"
Q.1-7.9	HSS4X4X1/2	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/CMU = 110'-8"
R.9-7.3	HSS4X4X1/2	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/CMU = 110'-8"
R.9-7.9	HSS4X4X1/2	A	3/4"	10"	10"	3/4"	8"	F1554-GR36 A.B.					EL=98'-8"	T/CMU = 110'-8"

NOTES:
1. ANCHOR BOLT TYPE - A.B. = CAST-IN-PLACE ANCHOR BOLT AND T.R. = EPOXY SET THREADED ROD.
2. EPOXY SET THREADED RODS SHALL BE SET IN HILTI HIT-HY 200 EPOXY, UNLESS NOTED OTHERWISE.



B
S002
BASE PLATE TYPES
Scale: 1" = 1'-0"

hdesigngroup
architecture + design

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8345 LENEXA DR., #300
LENEXA, KS 66214
417.555.5555

REVISIONS

NO.	DESCRIPTION	DATE
01	ADD 01	01/11/23
02	ADD 02	01/25/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER E-2000162147
1-25-23
REGISTERED PROFESSIONAL ENGINEER

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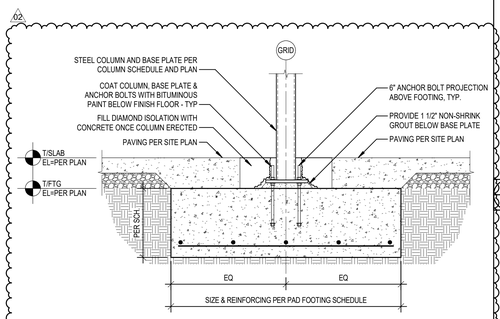
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

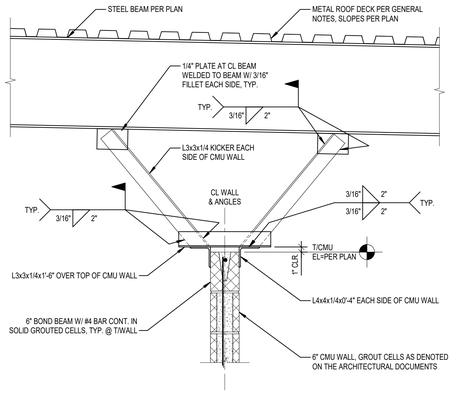
PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

SCHEDULES

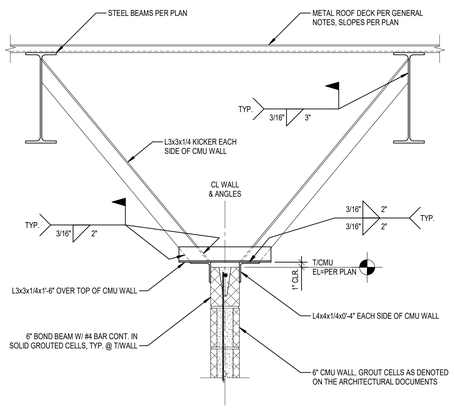
SHEET
S002



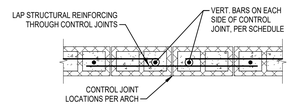
V S003 EXTERIOR STEEL COLUMN FOUNDATION, TYP.
Scale: 3/4" = 1'-0"



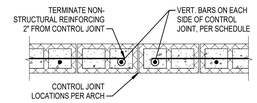
U S003 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"



T S003 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"

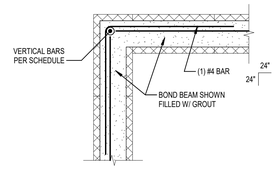


@ STRUCTURAL WALL

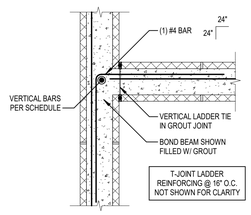


@ NON-STRUCTURAL WALL

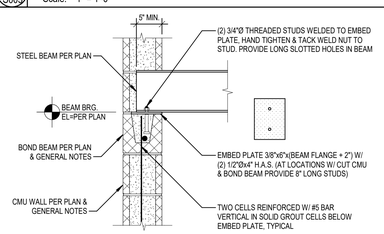
R S003 CMU WALL CONTROL JOINT, TYP. (PLAN VIEW)
Scale: 3/4" = 1'-0"



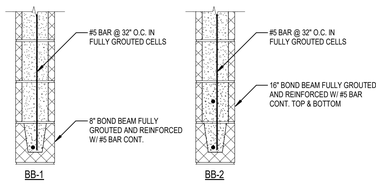
Q S003 CMU BOND BEAM CORNERS, TYP. (PLAN VIEW)
Scale: 1" = 1'-0"



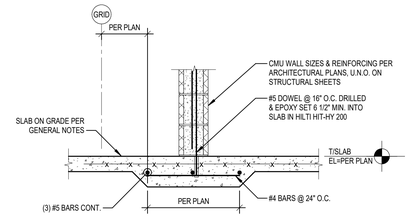
P S003 CMU WALL @ INTERSECTION, TYP. (PLAN VIEW)
Scale: 1" = 1'-0"



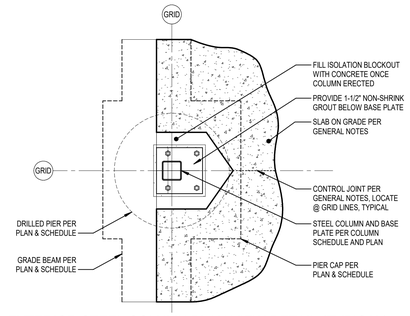
N S003 HOIST BEAM BEARING @ CMU WALL (TYPICAL)
Scale: 1" = 1'-0"



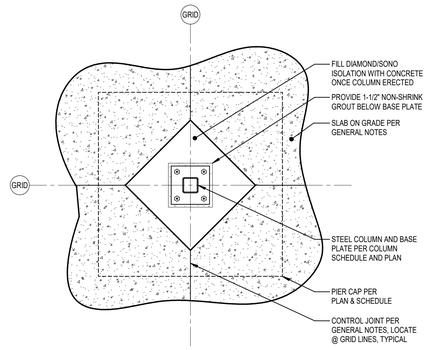
M S003 CMU WALL BOND BEAM TYPES (TYPICAL)
Scale: 1" = 1'-0"



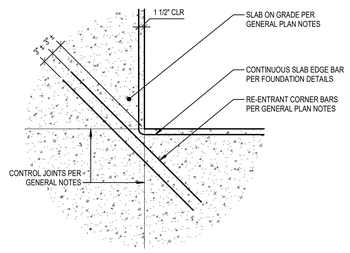
L S003 THICKENED SLAB @ INTERIOR CMU WALL, TYPICAL
Scale: 3/4" = 1'-0"



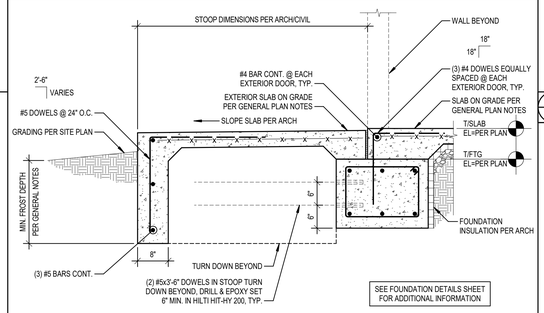
K S003 EXTERIOR STEEL COLUMN PLAN VIEW DETAIL (TYPICAL)
Scale: 3/4" = 1'-0"



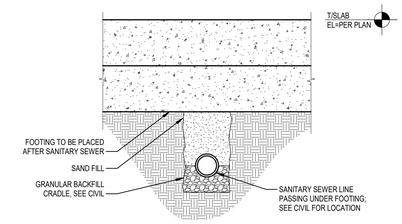
J S003 INTERIOR STEEL COLUMN PLAN VIEW DETAIL (TYPICAL)
Scale: 3/4" = 1'-0"



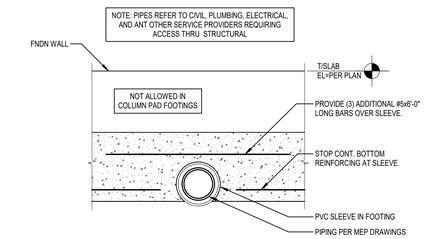
H S003 TYPICAL RE-ENTRANT CORNER BARS
Scale: 3/4" = 1'-0"



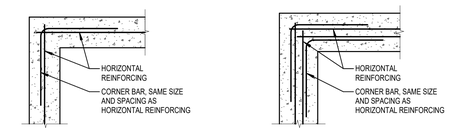
G S003 TYPICAL FROST STOOP @ EXTERIOR DOORS
Scale: 3/4" = 1'-0"



F S003 TYPICAL PIPE BELOW FOUNDATION
Scale: 3/4" = 1'-0"



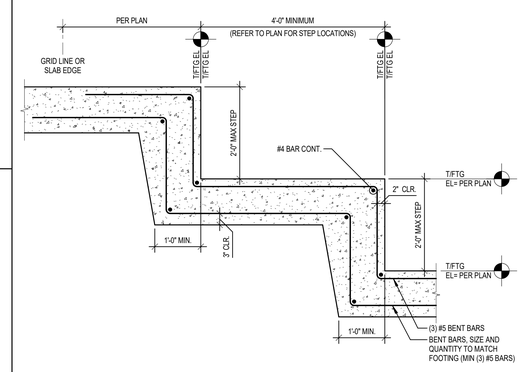
E S003 TYPICAL PIPE PENETRATION @ FOUNDATION
Scale: 3/4" = 1'-0"



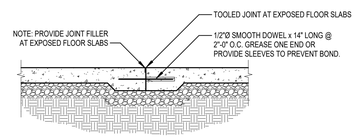
@ SINGLE LAYER REINFORCEMENT

@ DOUBLE LAYER REINFORCEMENT

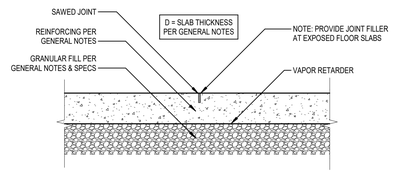
D S003 CORNER BARS (TYPICAL)
Scale: 3/4" = 1'-0"



C S003 TYPICAL STEPPED FOOTING
Scale: 3/4" = 1'-0"



B S003 CONSTRUCTION JOINT (TYPICAL)
Scale: 3/4" = 1'-0"



A S003 CONTROL JOINT (TYPICAL)
Scale: 1 1/2" = 1'-0"

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REVISIONS

NO.	DESCRIPTION	DATE
01	ADD 01	01/11/23
02	ADD 02	01/25/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

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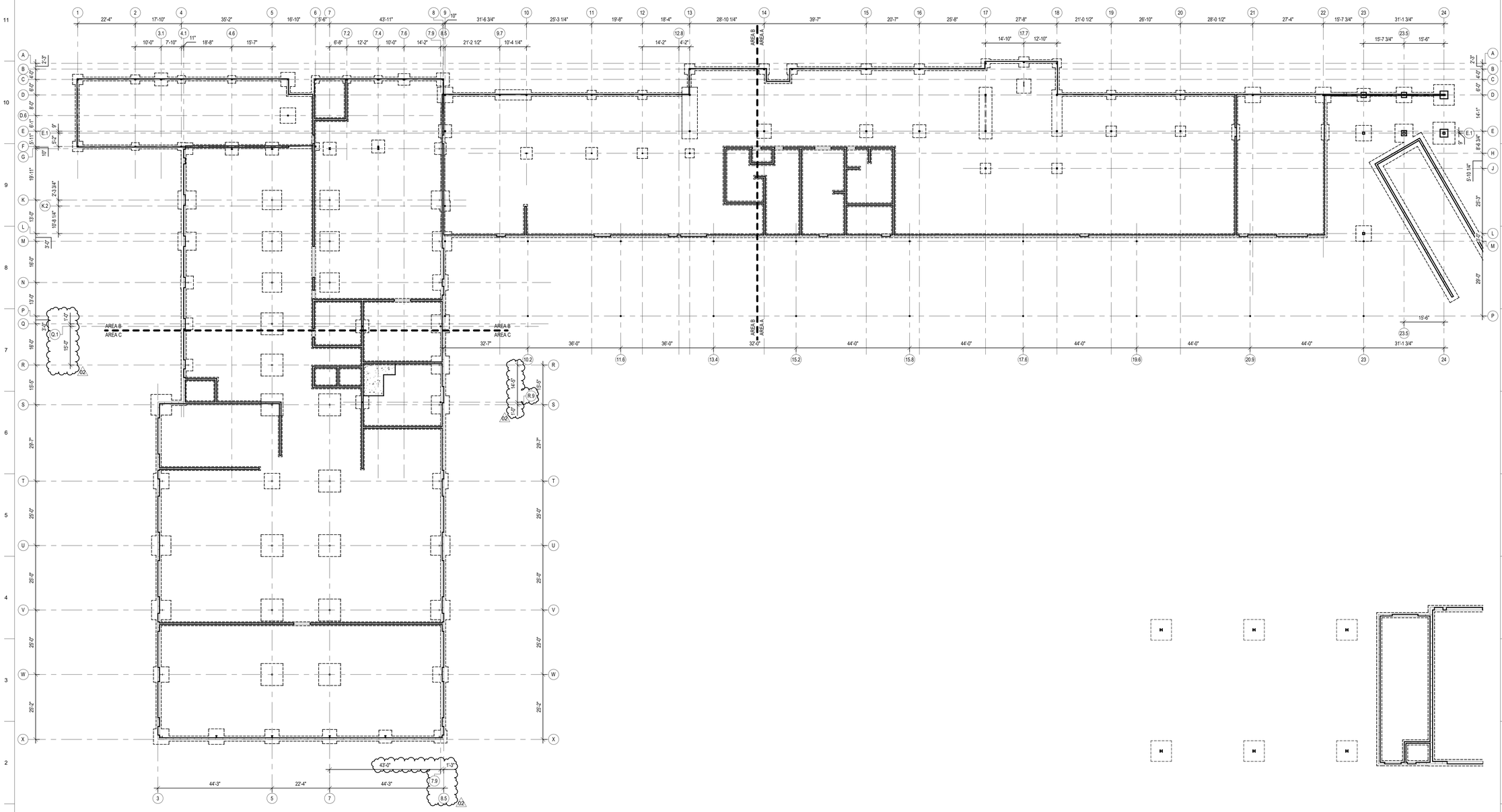
TYPICAL DETAILS

SHEET
S003

GENERAL PLAN NOTES

1. SEE SHEET S101A FOR GENERAL FOUNDATION NOTES.
2. SEE SHEET S002 FOR SCHEDULES.



A FOUNDATION PLAN - OVERALL
S101
Scale: 1/16" = 1'-0"

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ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER
E-2000162147
1-25-23
PROFESSIONAL ENGINEER

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FOUNDATION PLAN - OVERALL

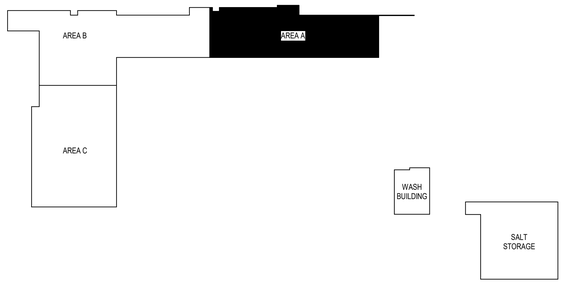
SHEET
S101

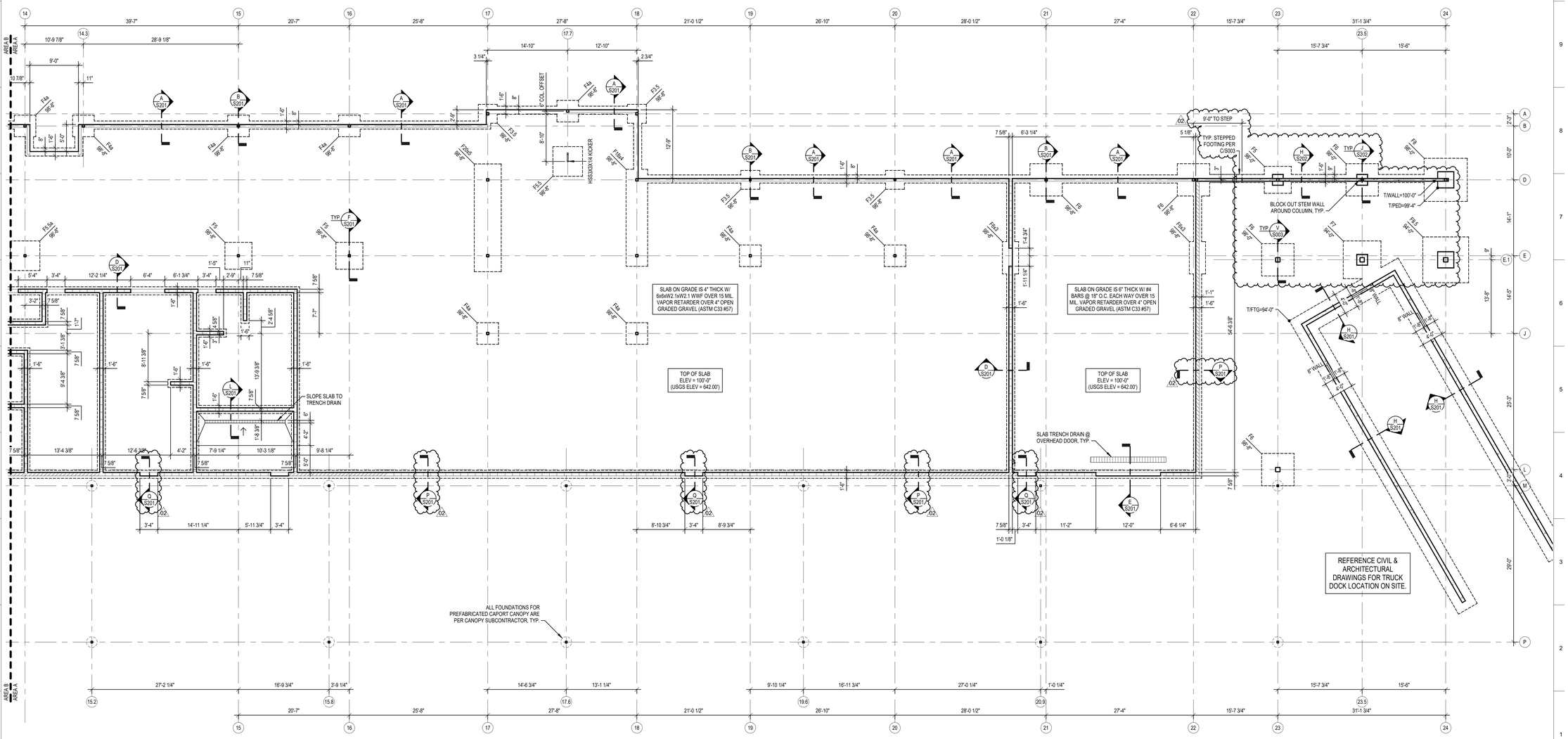
PAD FOOTING SCHEDULE

PAD FOOTING MARK	WIDTH	LENGTH	THICKNESS	REINFORCEMENT	REMARKS
F3	3'-0"	3'-0"	1'-4"	(4) #4 BARS EA. WAY, BOTTOM	
F3.5	3'-6"	3'-6"	1'-4"	(4) #5 BARS EA. WAY, BOTTOM	
F4.5a	4'-6"	4'-6"	1'-4"	(6) #5 BARS EA. WAY, TOP & BTM	
F4a	4'-0"	4'-0"	1'-4"	(5) #5 BARS EA. WAY, TOP & BTM	
F5	5'-0"	5'-0"	1'-4"	(6) #5 BARS EA. WAY, TOP & BTM	
F5.5	5'-6"	5'-6"	1'-4"	(5) #6 BARS EA. WAY, BOTTOM	
F5.5a	5'-6"	5'-6"	1'-4"	(7) #5 BARS EA. WAY, TOP & BTM	
F6	6'-0"	6'-0"	1'-4"	(7) #5 BARS EA. WAY, TOP & BTM	
F7	7'-0"	7'-0"	1'-4"	(7) #6 BARS EA. WAY, TOP & BTM	
F7.5	7'-6"	7'-6"	1'-4"	(7) #6 BARS EA. WAY, TOP & BTM	
F8	8'-0"	8'-0"	1'-4"	(9) #5 BARS EA. WAY, TOP & BTM	
F8.5	8'-6"	8'-6"	2'-0"	(9) #5 BARS EA. WAY, TOP & BTM	
F14x4	14'-0"	4'-0"	1'-4"	(5) #5 BARS LONG WAY, TOP & BTM (16) #5 BARS SHORT WAY, TOP & BTM	
F18x4	4'-0"	18'-0"	1'-4"	(6) #5 BARS LONG WAY, TOP & BTM (20) #5 BARS SHORT WAY, TOP & BTM	
F20x5	5'-0"	20'-0"	1'-4"	(6) #5 BARS LONG WAY, TOP & BTM (24) #5 BARS, LONG WAY, TOP & BTM	
F20x6	6'-0"	20'-0"	2'-0"	(8) #6 BARS LONG WAY, TOP & BTM (24) #6 BARS SHORT WAY, TOP & BTM	

GENERAL PLAN NOTES

1. TYPICAL CONCRETE SLAB ON GRADE, U.N.O., AT HEATED AREAS SHALL BE 4" THICK WITH 6x6 W2.1xW2.1 REINFORCEMENT OVER 10-MIL VISQUEEN VAPOR BARRIER. IF THE CONCRETE SLAB ON GRADE IS TO BE LEFT EXPOSED, PROVIDE CHAIRS TO SUPPORT THE WWF (NO VAPOR BARRIER).
2. SEE SHEET S000 FOR GENERAL NOTES. SEE SHEET S001 FOR SPECIAL INSPECTIONS AND BASIS FOR DESIGN CRITERIA. SEE SHEET S002 FOR SCHEDULES.
3. CJ - CONTROL OR CONSTRUCTION JOINT IN FLOOR SLAB, SEE A/S003 & B/S003 RESPECTIVELY.
4. SEE ARCHITECTURAL AND PLUMBING SHEETS FOR WATER-PROOFING AND STORM WATER DRAINAGE REQUIREMENTS.
5. SLOPE SLAB TO FLOOR DRAINS. REFER TO ARCH FOR LOCATIONS.
6. CENTER ALL PIER CAPS UNDER COLUMNS OR CENTERLINES OF MASONRY WALLS. REFER TO PLAN, SCHEDULE, AND PIER CAP DETAILS.
7. PRIOR TO CASTING INTERIOR THICKENED SLAB SOIL COMPACTION REPORT MUST BE APPROVED BY THE ENGINEER OF RECORD.
8. NOT ALL MECHANICAL OPENINGS AND/OR PENETRATIONS MAY BE INDICATED. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
9. THE BUILDING SHALL NOT BE LOCATED ON SITE OFF OF THE STRUCTURAL DOCUMENTS. REFER TO THE CIVIL SITE PLAN AND ARCHITECTURAL PLANS FOR BUILDING LOCATION INFORMATION.
10. PROVIDE (2) #4x4'-0" RE-ENTRANT CORNER BARS, TYPICAL.
11. PLAN REFERENCE ELEVATION OF 100'-0" = USGS ELEVATION OF 1310.5'.
12. AT ALL OVERHEAD DOORS, STEEL FRAMES, AND MAN DOORS, PROVIDE HORIZONTAL DOWELS BETWEEN INTERIOR AND EXTERIOR SLAB. DOWELS ARE TO BE #4 BARS @ 12" O.C. AT MID DEPTH OF SLAB.
13. CONCRETE COLUMN PEDESTALS ARE PER PLAN AND CONCRETE PEDESTAL SCHEDULE. CONCRETE PEDESTALS ARE CENTERED ON GRIDS OR ALIGNED WITH STEM WALL EDGES, U.N.O.





A S101A FOUNDATION PLAN - AREA A
Scale: 1/8" = 1'-0"

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DATE: 12.15.22 REVIEWED BY: BSW

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ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER E-2000162147
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REGISTERED PROFESSIONAL ENGINEER

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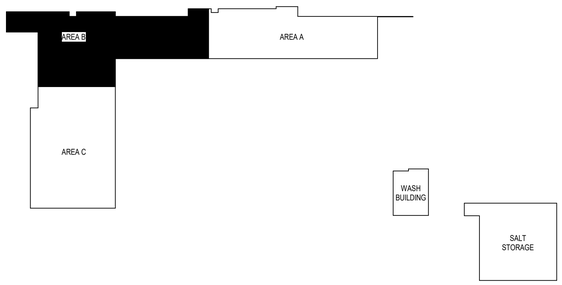
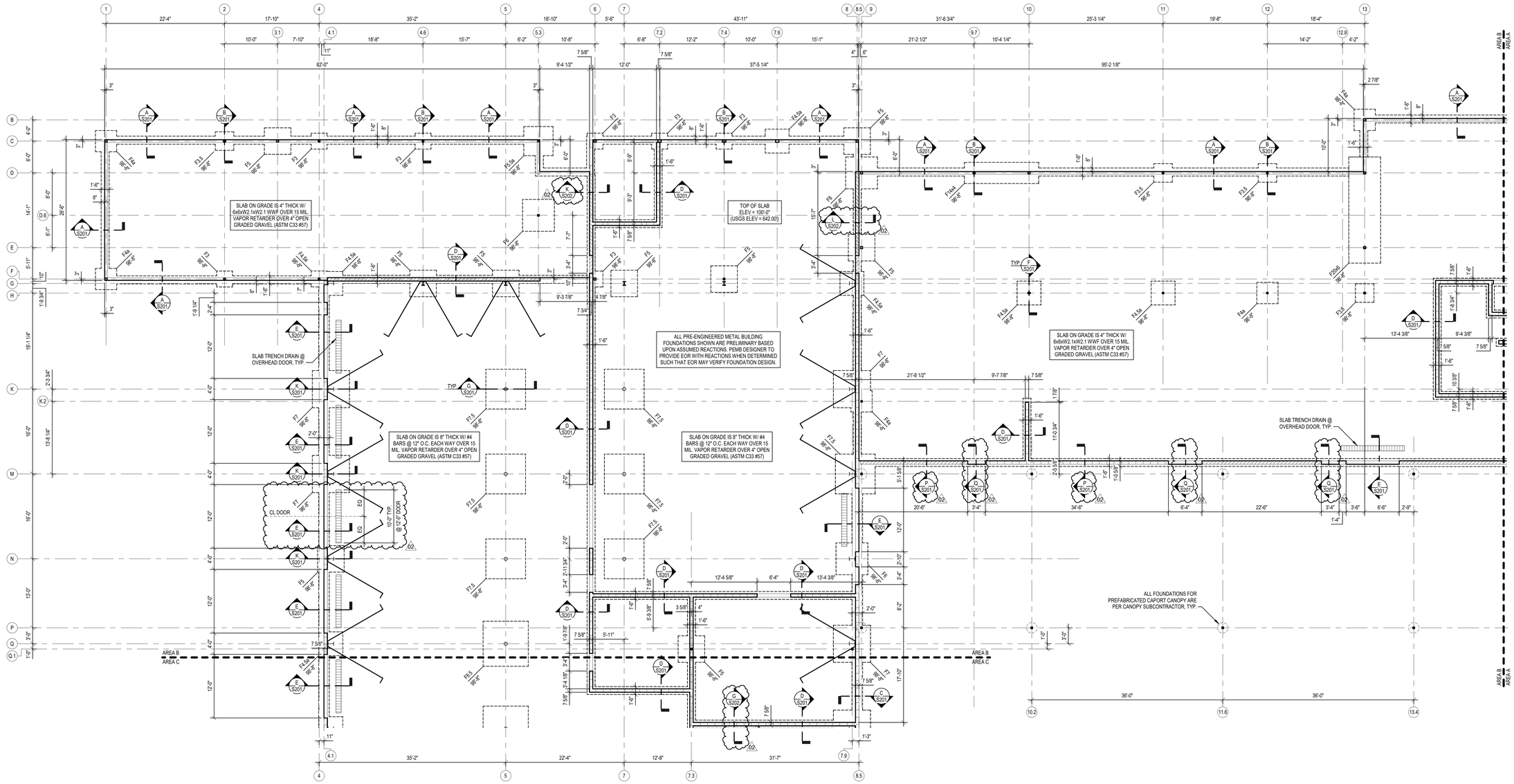
FOUNDATION PLAN - AREA A

SHEET
S101A

GENERAL PLAN NOTES

1. SEE SHEET S101A FOR GENERAL FOUNDATION NOTES.
2. SEE SHEET S002 FOR SCHEDULES.





A S101B FOUNDATION PLAN - AREA B
Scale: 1/8" = 1'-0"

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ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER E-2000162147
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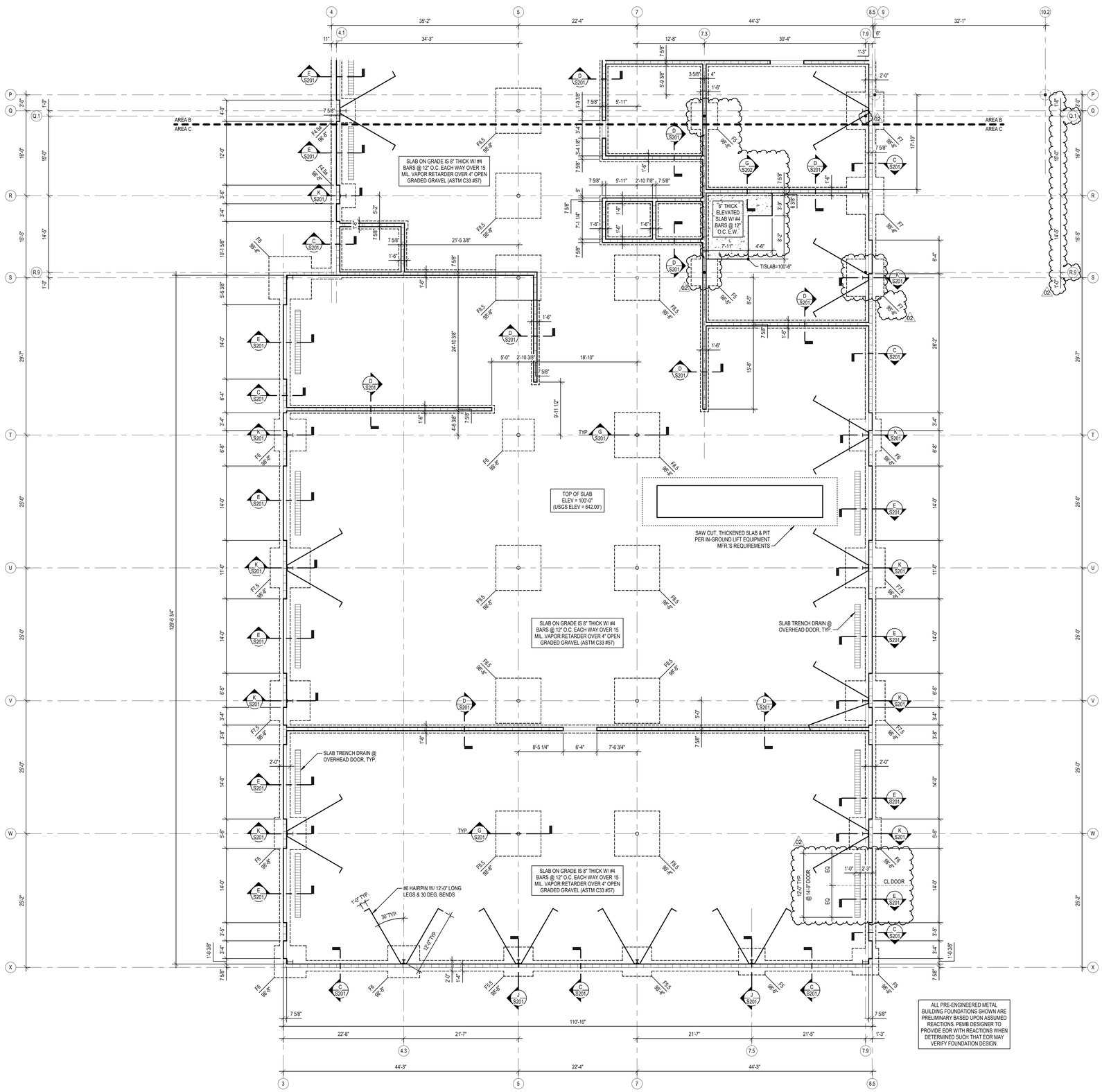
FOUNDATION PLAN - AREA B

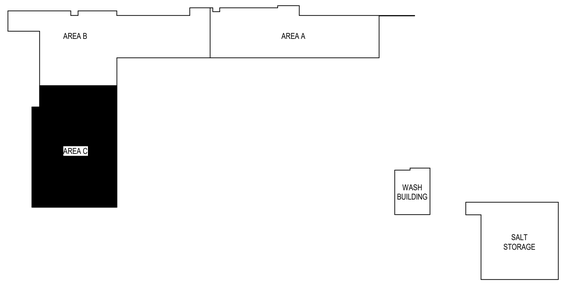
SHEET
S101B



A S101C FOUNDATION PLAN - AREA C
Scale: 1/8" = 1'-0"

GENERAL PLAN NOTES

1. SEE SHEET S101A FOR GENERAL FOUNDATION NOTES.
2. SEE SHEET S002 FOR SCHEDULES.



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417.890.8002

MEP ENGINEER
HENDERSON ENGINEERING, INC.
8345 LENEXA DR., #300
LENEXA, KS 66214
417.555.5555

REVISIONS

NO.	DESCRIPTION	DATE
02	ADD 02	01/25/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

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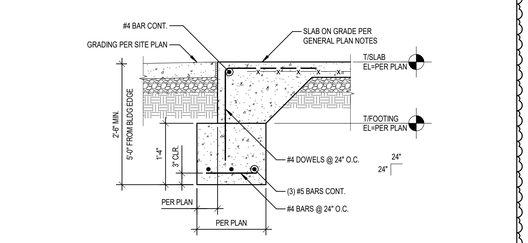
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

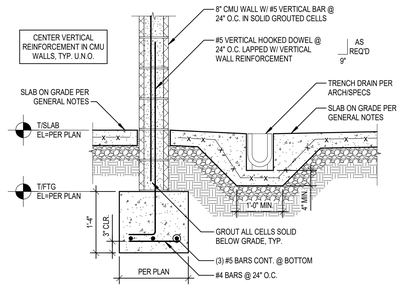
PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

FOUNDATION PLAN - AREA C

SHEET
S101C



Q S201 FOUNDATION DETAIL
Scale: 3/4" = 1'-0"



L S201 TRENCH DRAIN FOUNDATION DETAIL
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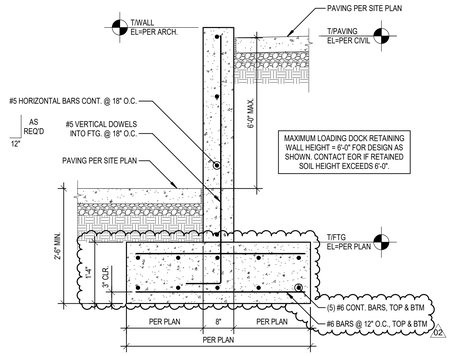

H S201 FOUNDATION DETAIL @ TRUCK DOCK
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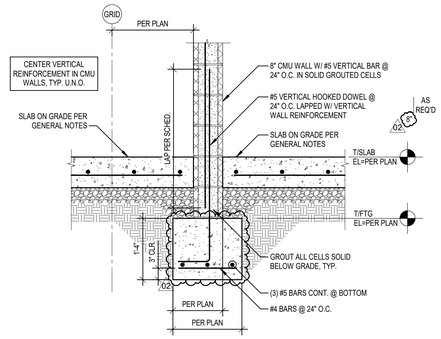
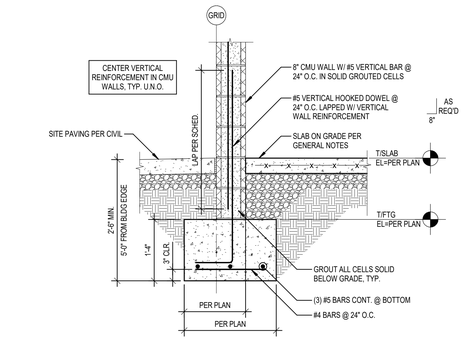


D S201 INTERIOR CMU WALL DETAIL, TYP.
Scale: 3/4" = 1'-0"



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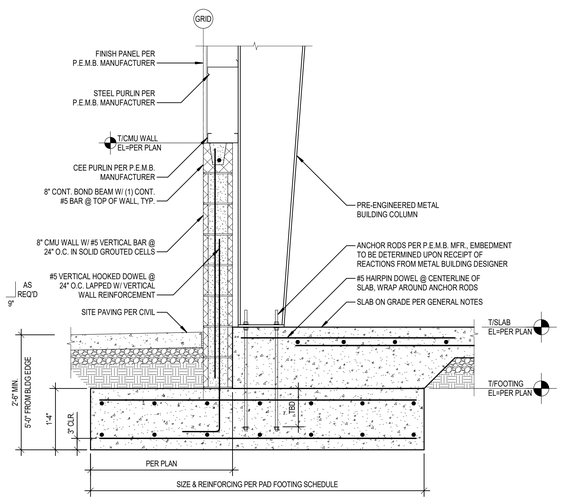

K S201 EXTERIOR PEMB COLUMN FOUNDATION DETAIL
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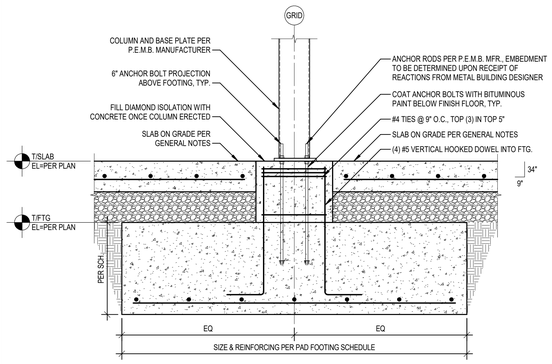
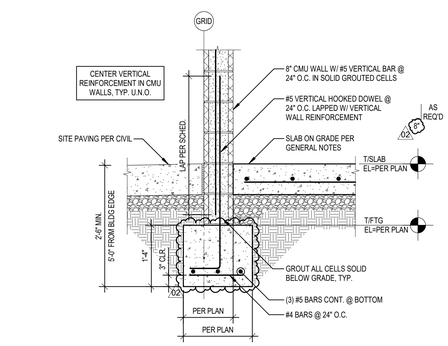
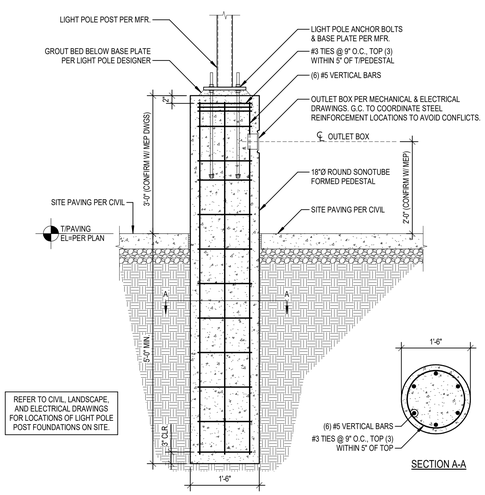


G S201 INTERIOR PEMB COLUMN FOUNDATION, TYP.
Scale: 3/4" = 1'-0"



C S201 EXERIOR CMU WALL DETAIL, TYP.
Scale: 3/4" = 1'-0"



N S201 SITE LIGHT POLE FNDN.
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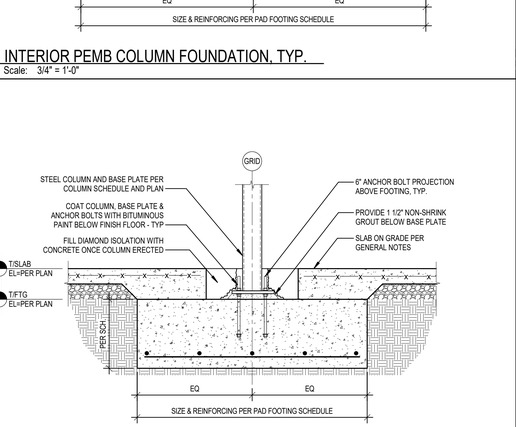
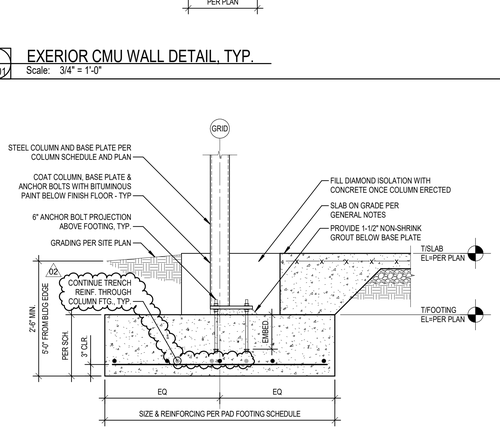


F S201 INTERIOR STEEL COLUMN FOUNDATION, TYP.
Scale: 3/4" = 1'-0"



B S201 EXT/INT STEEL COLUMN FOUNDATION, TYP.
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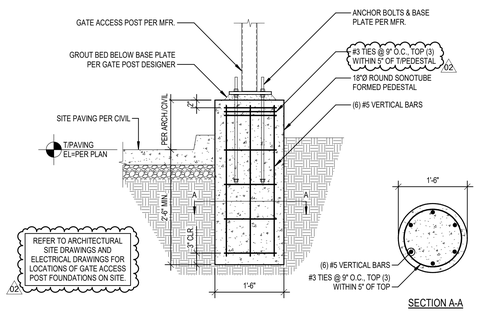

M S201 SITE GATE ACCESS POST FNDN.
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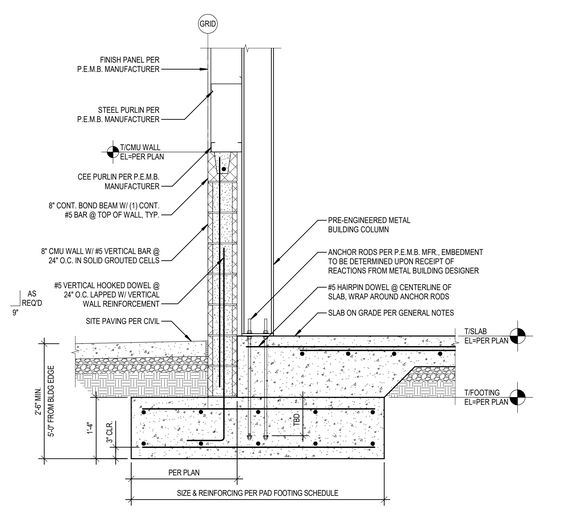
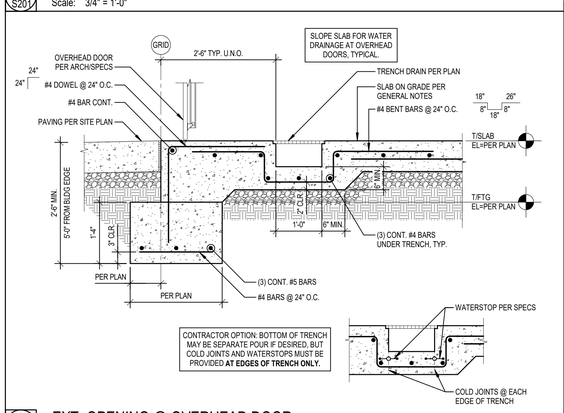
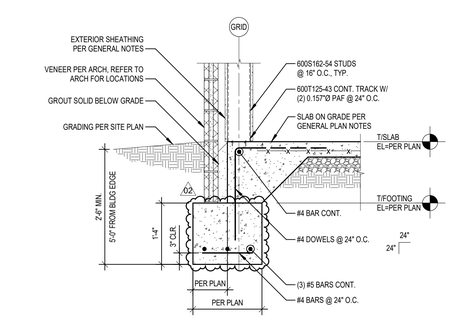


J S201 EXTERIOR PEMB COLUMN FOUNDATION DETAIL
Scale: 3/4" = 1'-0"



E S201 EXT. OPENING @ OVERHEAD DOOR
Scale: 3/4" = 1'-0"



A S201 FOUNDATION DETAIL
Scale: 3/4" = 1'-0"

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01	ADD 01	01/11/23
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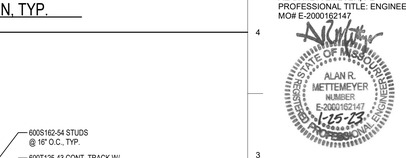
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147



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PROJECT ADDRESS:
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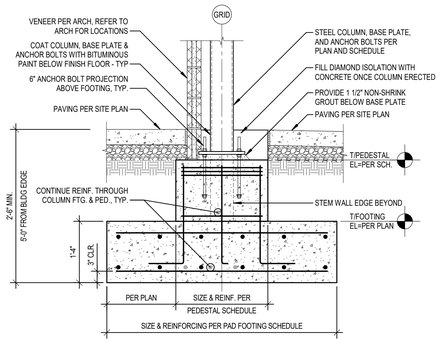
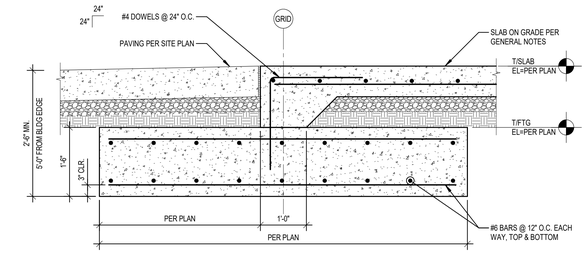
WENTZVILLE, MO 63385

FOUNDATION DETAILS

SHEET
S201

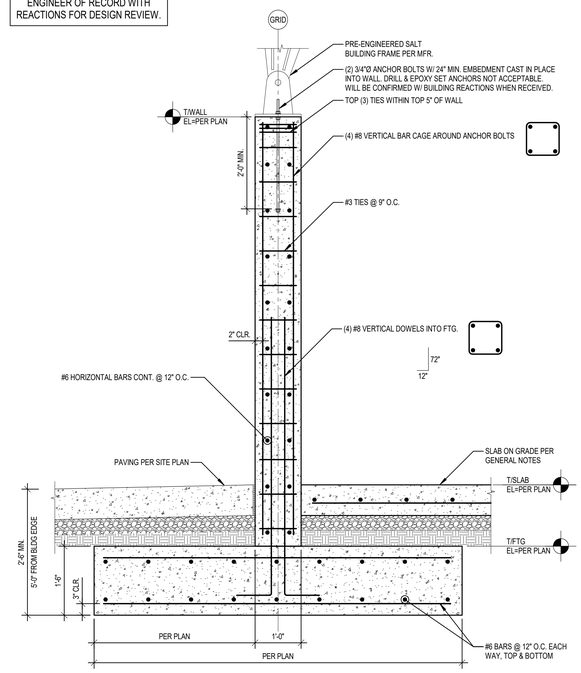


J S202 FOUNDATION DETAIL
Scale: 3/4" = 1'-0"

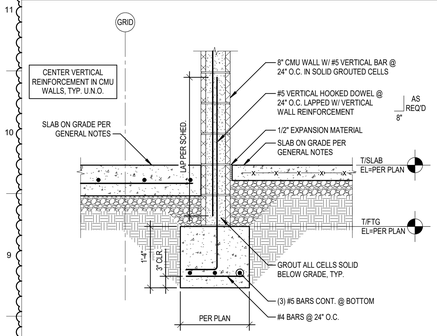


E S202 FOUNDATION DETAIL @ SALT STORAGE
Scale: 3/4" = 1'-0"

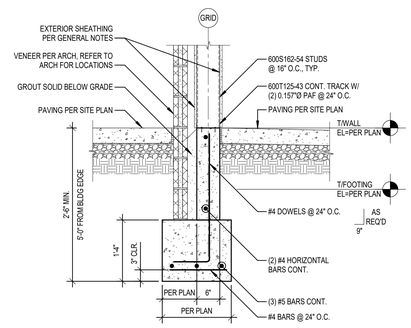
SALT STORAGE STRUCTURE MANUFACTURER TO PROVIDE ENGINEER OF RECORD WITH REACTIONS FOR DESIGN REVIEW.



B S202 FOUNDATION DETAIL @ SALT STORAGE
Scale: 3/4" = 1'-0"



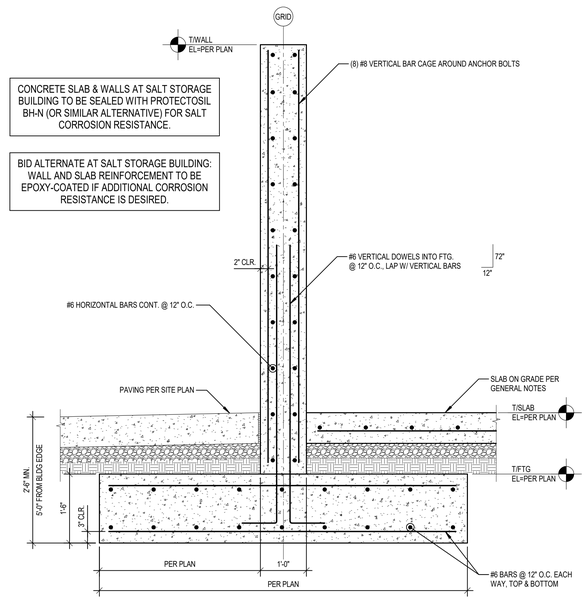
L S202 INTERIOR CMU WALL DETAIL
Scale: 3/4" = 1'-0"



H S202 FOUNDATION DETAIL
Scale: 3/4" = 1'-0"

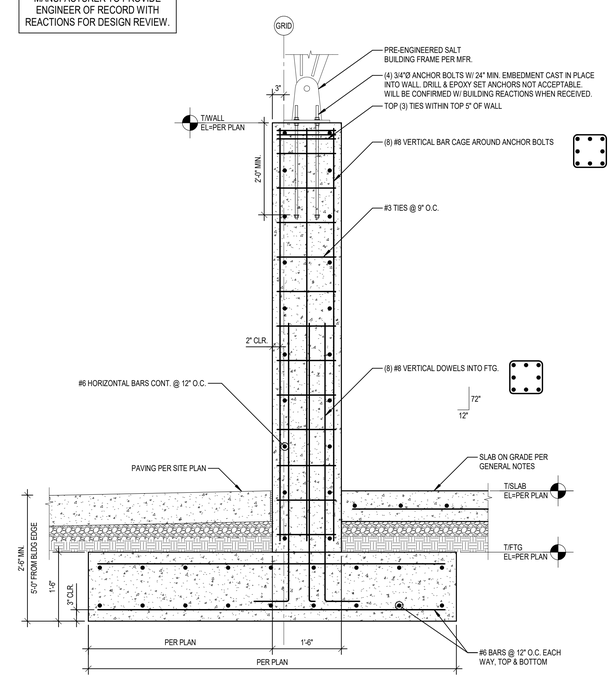
CONCRETE SLAB & WALLS AT SALT STORAGE BUILDING TO BE SEALED WITH PROTECTOSIL BH-N (OR SIMILAR ALTERNATIVE) FOR SALT CORROSION RESISTANCE.

BID ALTERNATE AT SALT STORAGE BUILDING: WALL AND SLAB REINFORCEMENT TO BE EPOXY-COATED IF ADDITIONAL CORROSION RESISTANCE IS DESIRED.

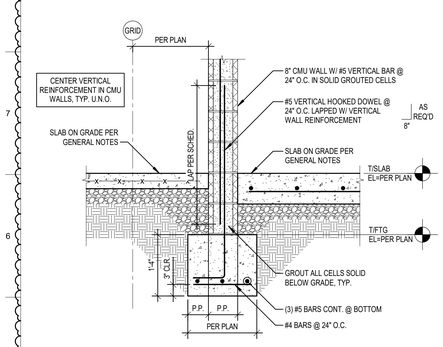


D S202 FOUNDATION DETAIL @ SALT STORAGE
Scale: 3/4" = 1'-0"

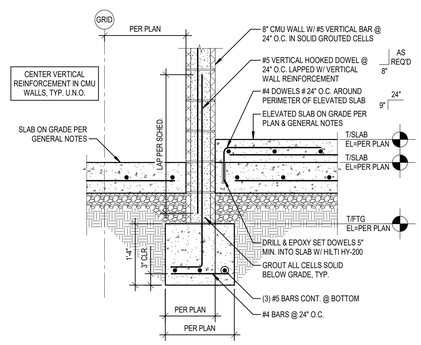
SALT STORAGE STRUCTURE MANUFACTURER TO PROVIDE ENGINEER OF RECORD WITH REACTIONS FOR DESIGN REVIEW.



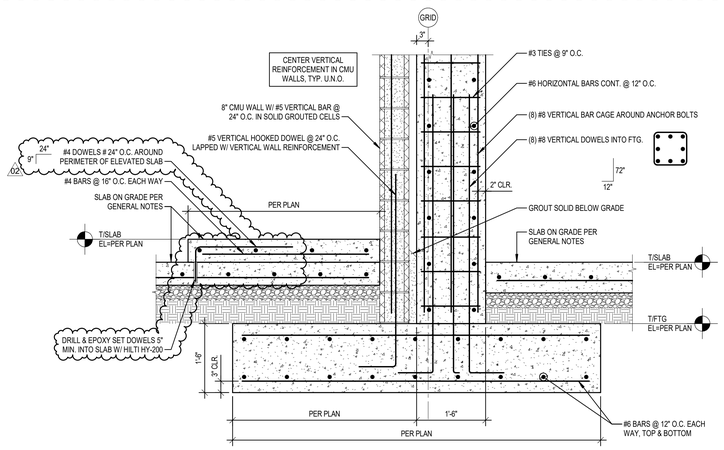
A S202 FOUNDATION DETAIL @ SALT STORAGE
Scale: 3/4" = 1'-0"



K S202 INTERIOR CMU WALL DETAIL
Scale: 3/4" = 1'-0"



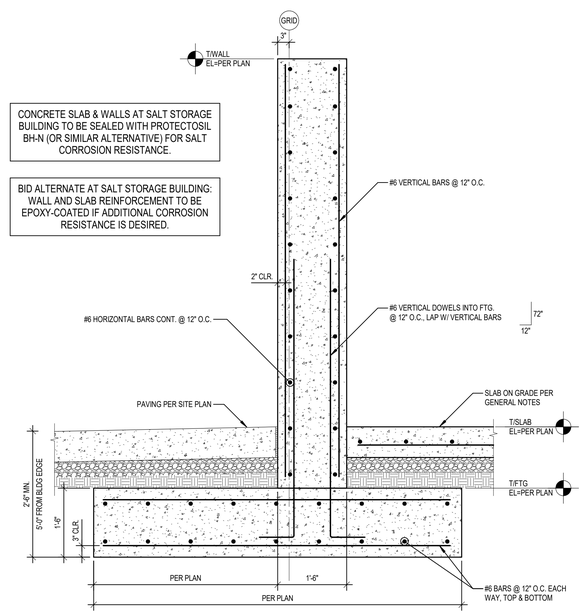
G S202 INTERIOR CMU WALL DETAIL @ ELEVATED SLAB
Scale: 3/4" = 1'-0"



F S202 FOUNDATION DETAIL @ SALT STORAGE
Scale: 3/4" = 1'-0"

CONCRETE SLAB & WALLS AT SALT STORAGE BUILDING TO BE SEALED WITH PROTECTOSIL BH-N (OR SIMILAR ALTERNATIVE) FOR SALT CORROSION RESISTANCE.

BID ALTERNATE AT SALT STORAGE BUILDING: WALL AND SLAB REINFORCEMENT TO BE EPOXY-COATED IF ADDITIONAL CORROSION RESISTANCE IS DESIRED.



C S202 FOUNDATION DETAIL @ SALT STORAGE
Scale: 3/4" = 1'-0"

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PROJECT TEAM

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100 MIDLAND PARK DRIVE
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314.925.7444

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PROFESSIONAL TITLE: ENGINEER
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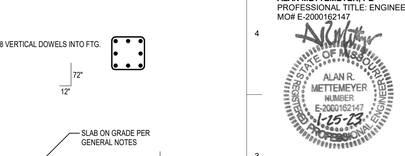

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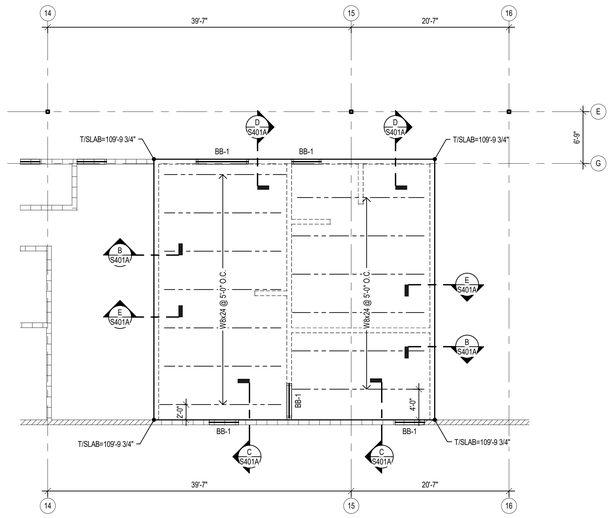
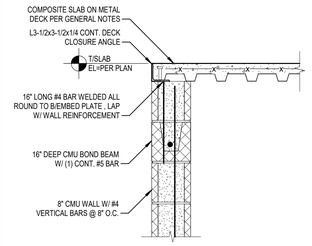
PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

FOUNDATION DETAILS

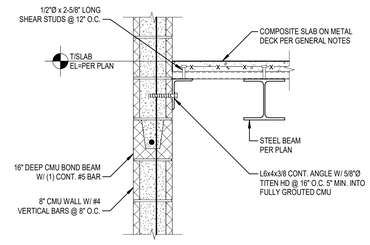
SHEET
S202



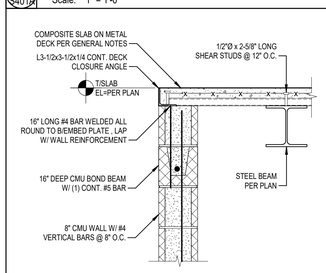
F S401A STORM SHELTER LID FRAMING PLAN
Scale: 1/8" = 1'-0"



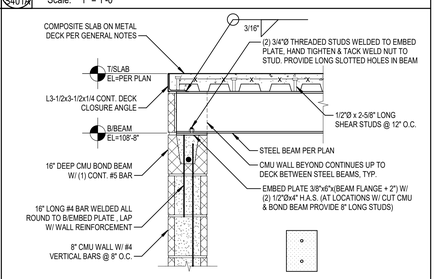
E S401A STORM LID FRAMING DETAIL
Scale: 1" = 1'-0"



C S401A STORM LID FRAMING DETAIL
Scale: 1" = 1'-0"



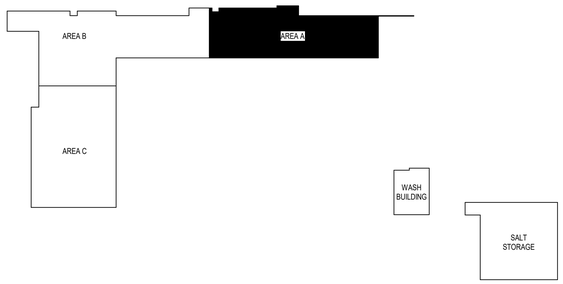
D S401A STORM LID FRAMING DETAIL
Scale: 1" = 1'-0"

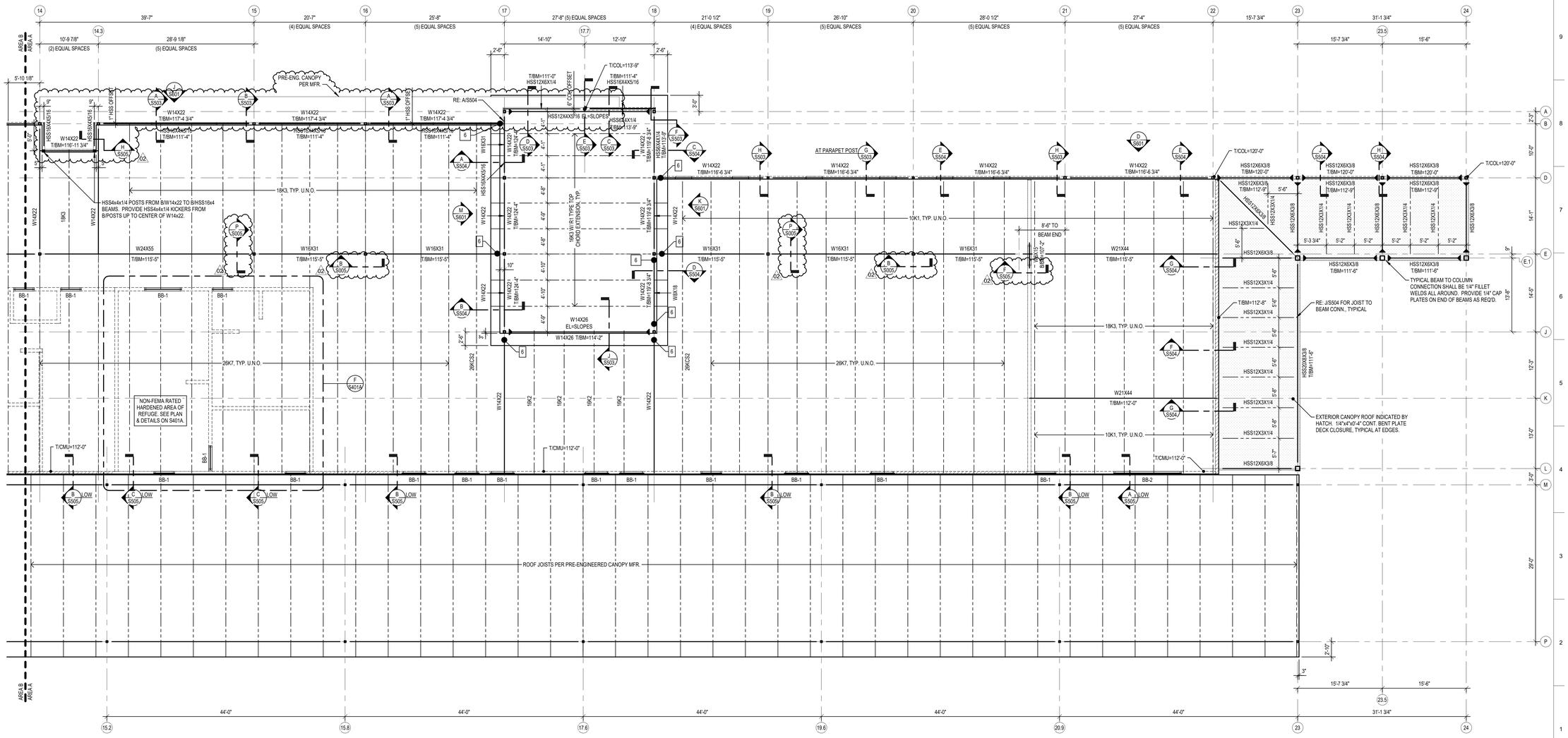


B S401A STORM LID FRAMING DETAIL
Scale: 1" = 1'-0"

GENERAL PLAN NOTES

1. SEE SHEET S000 FOR GENERAL STRUCTURAL NOTES.
2. SEE SHEET S001 FOR SPECIAL INSPECTIONS & BASIS FOR DESIGN.
3. SEE SHEET S002 FOR SCHEDULES.
4. SEE SHEETS S003, S004, & S005 FOR TYPICAL DETAILS.
5. ▶ = MOMENT CONNECTIONS PER PLAN, REFER TO DETAIL S/S003.
6. ● = SLIP CRITICAL STEEL CONNECTION FOR DRAG STRUT LOCATIONS PER PLAN.
7. NOT ALL MECHANICAL OPENINGS AND/OR PENETRATIONS MAY BE INDICATED. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
8. STEEL COLUMN ELEVATIONS PER STEEL COLUMN SCHEDULE.
9. STEEL POST ELEVATIONS PER STEEL POST SCHEDULE.





A S401A ROOF FRAMING PLAN - AREA A
Scale: 1/8" = 1'-0"

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02	ADD 02	01/25/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER E-2000162147
1-25-23
REGISTERED PROFESSIONAL ENGINEER

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PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
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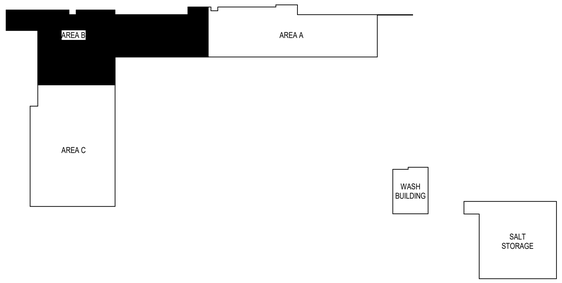
WENTZVILLE, MO 63385

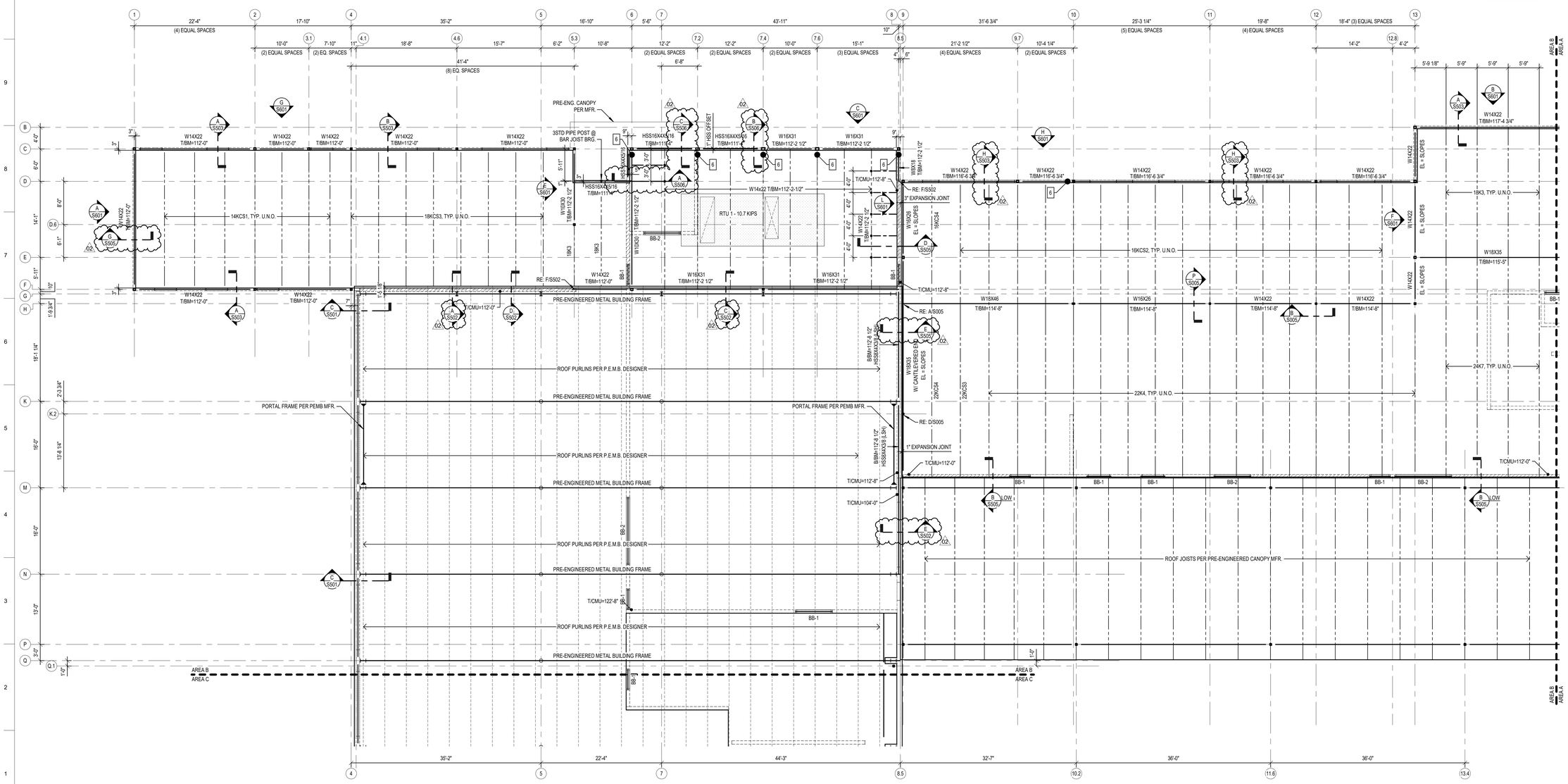
ROOF FRAMING PLAN - AREA A

SHEET
S401A

GENERAL PLAN NOTES

1. SEE SHEET S000 FOR GENERAL STRUCTURAL NOTES.
2. SEE SHEET S001 FOR SPECIAL INSPECTIONS & BASIS FOR DESIGN.
3. SEE SHEET S002 FOR SCHEDULES.
4. SEE SHEETS S003, S004, & S005 FOR TYPICAL DETAILS.
5. ▶ = MOMENT CONNECTIONS PER PLAN, REFER TO DETAIL S/S003.
6. ● = SLIP CRITICAL STEEL CONNECTION FOR DRAG STRUT LOCATIONS PER PLAN.
7. NOT ALL MECHANICAL OPENINGS AND/OR PENETRATIONS MAY BE INDICATED. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
8. STEEL COLUMN ELEVATIONS PER STEEL COLUMN SCHEDULE.
9. STEEL POST ELEVATIONS PER STEEL POST SCHEDULE.





A S401B ROOF FRAMING PLAN - AREA B
Scale: 1/8" = 1'-0"

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REVISIONS

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PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER E-2000162147
01-25-23
PROFESSIONAL ENGINEER

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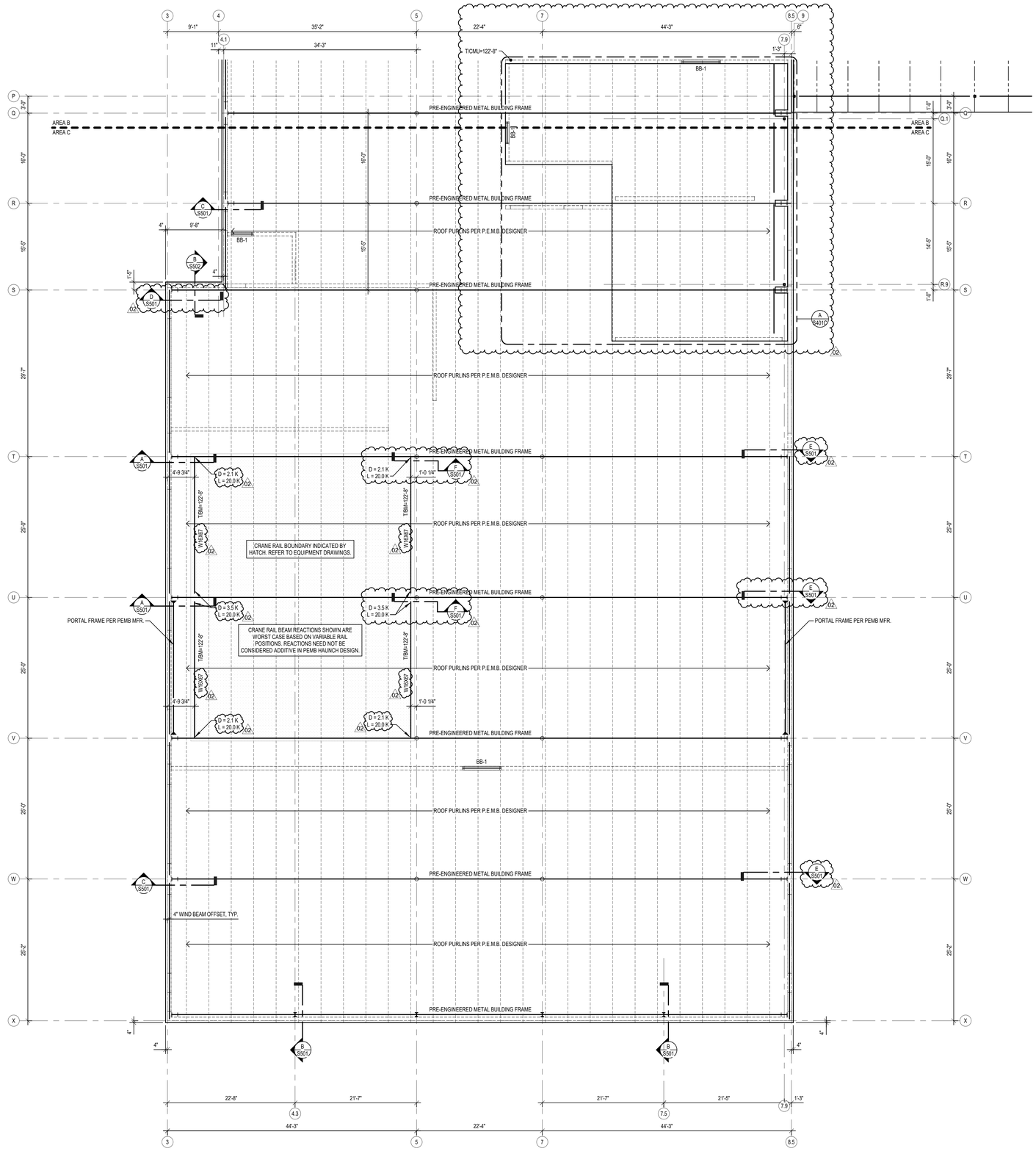
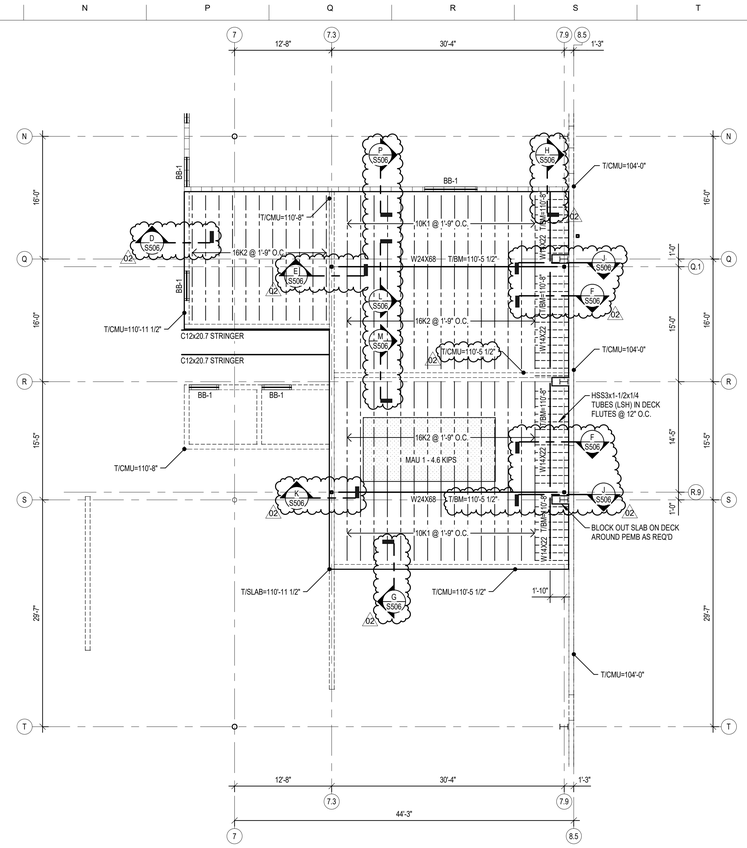
ROOF FRAMING PLAN - AREA B

SHEET
S401B



B S401C ROOF FRAMING PLAN - AREA C
Scale: 1/8" = 1'-0"



A S401C MEZZANINE FLOOR FRAMING PLAN
Scale: 1/8" = 1'-0"

GENERAL PLAN NOTES

1. SEE SHEET S000 FOR GENERAL STRUCTURAL NOTES.
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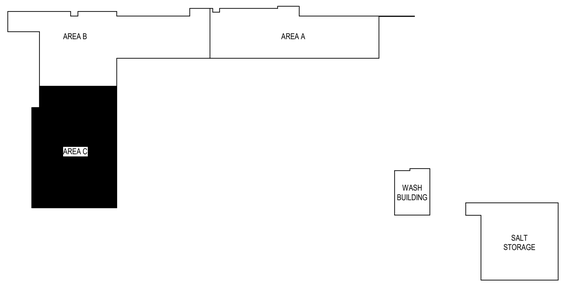

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REVISIONS

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PROFESSIONAL SEAL
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PROFESSIONAL TITLE: ENGINEER
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PROJECT ADDRESS:
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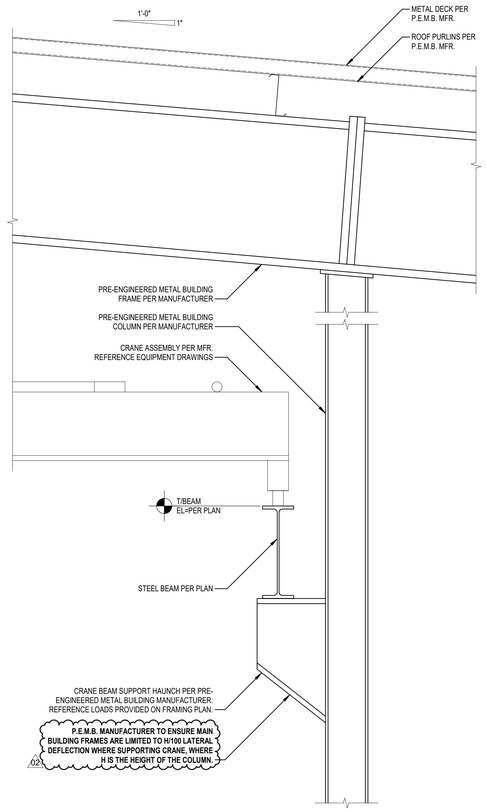
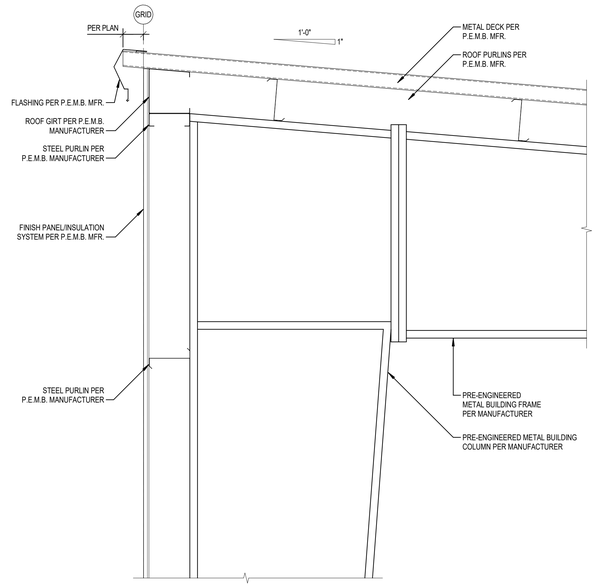
ROOF FRAMING PLAN - AREA C

SHEET
S401C



F S501 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"



D S501 PEMB FRAMING DETAIL
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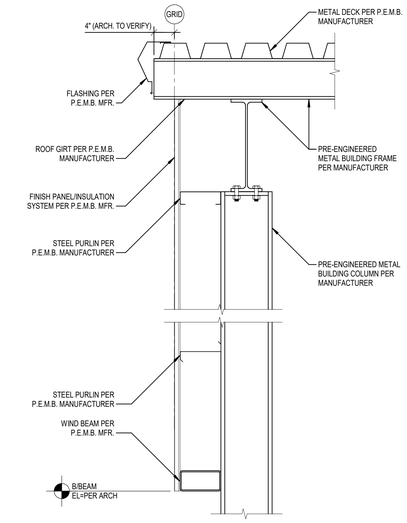

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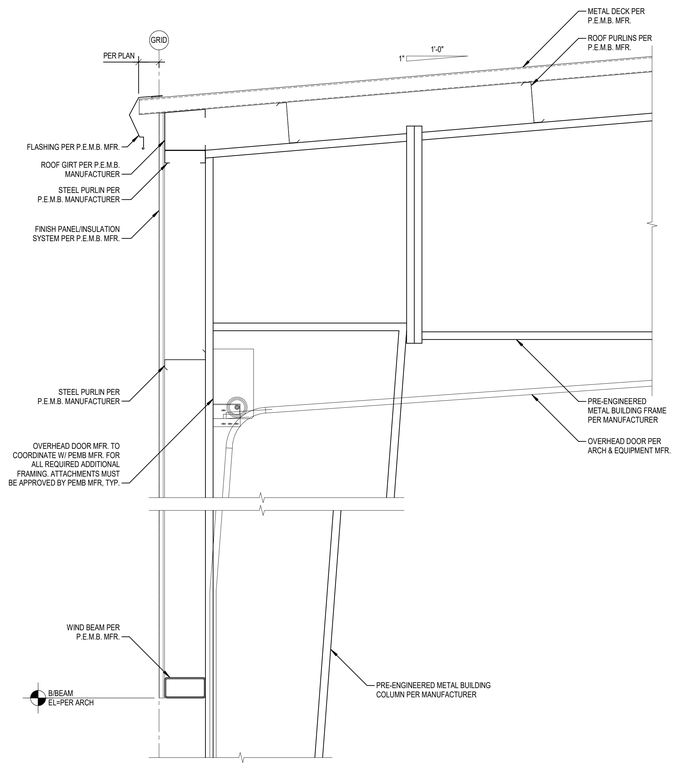

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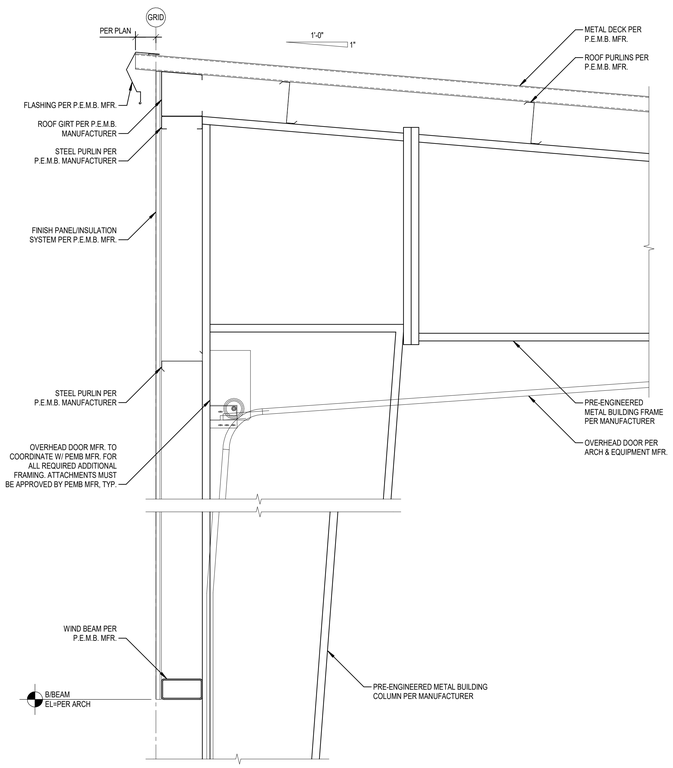

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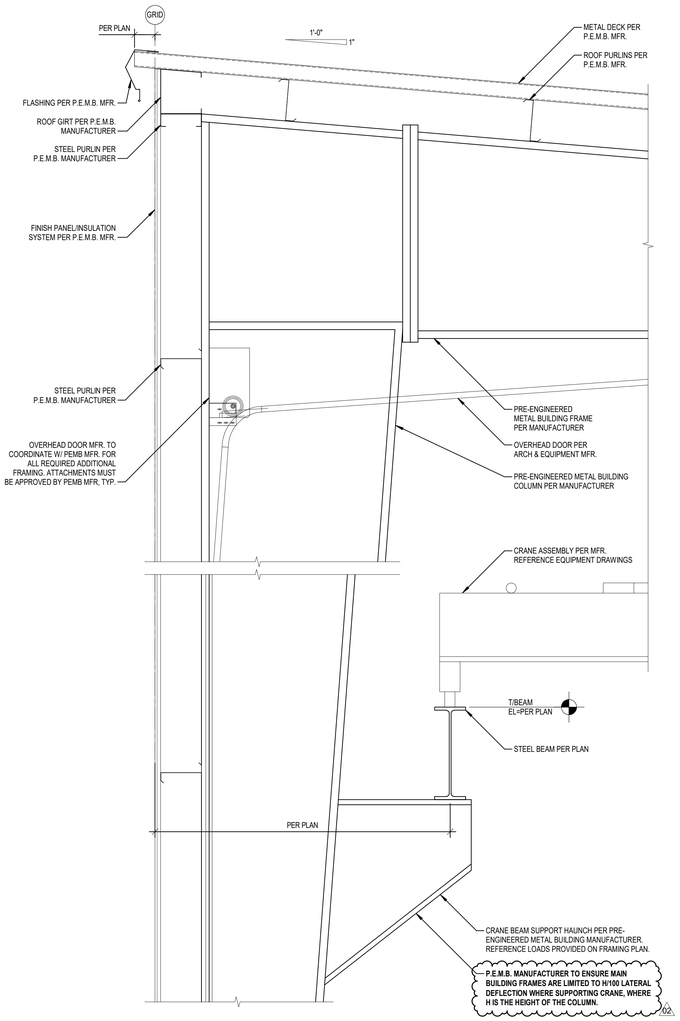

A S501 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"

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REVISIONS

NO.	DESCRIPTION	DATE
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PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER E-2000162147
1-15-23
SHEET 1 OF 1 SHEETS
REGISTERED PROFESSIONAL ENGINEER

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PROJECT ADDRESS:
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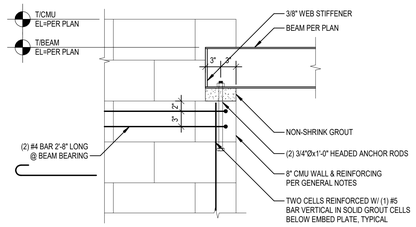
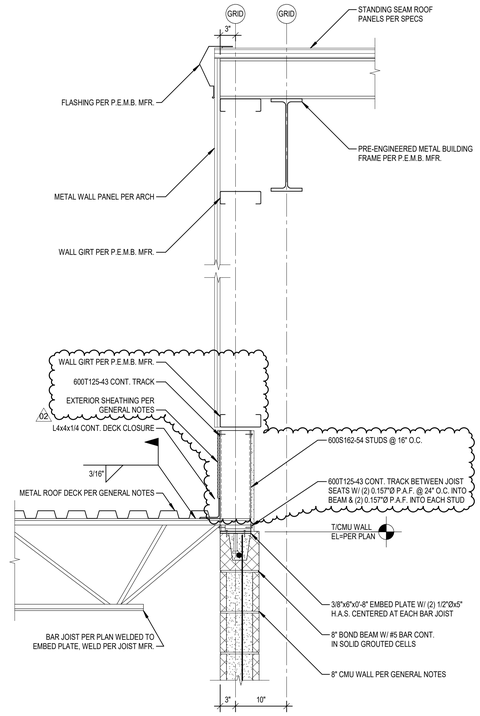
FRAMING DETAILS

SHEET
S501



F S502 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"



D S502 ROOF FRAMING DETAIL
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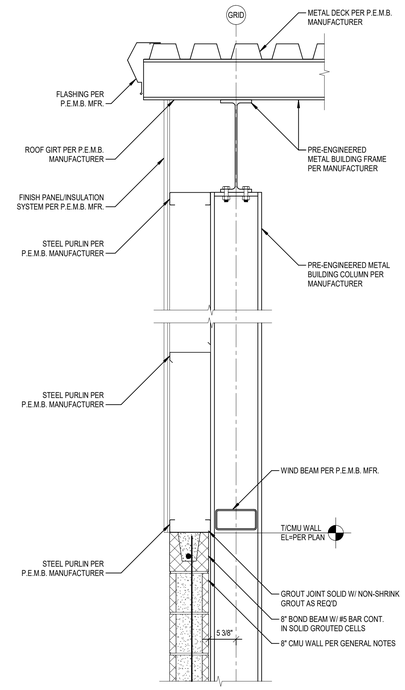

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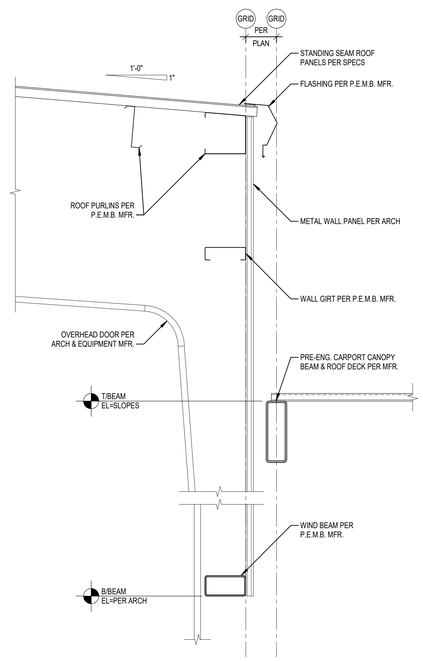

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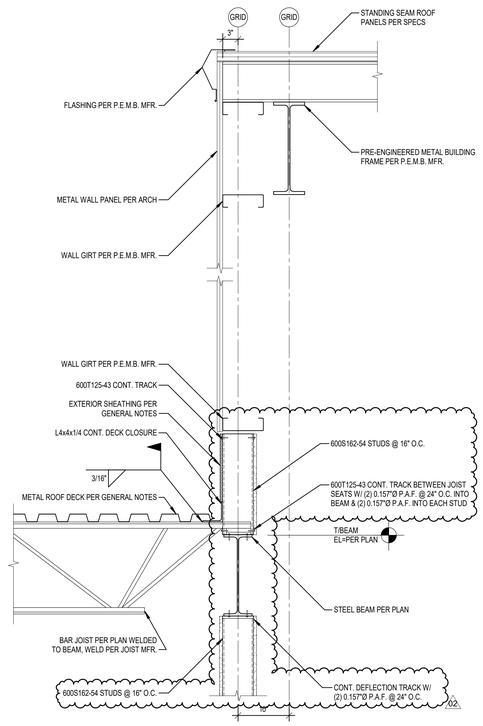
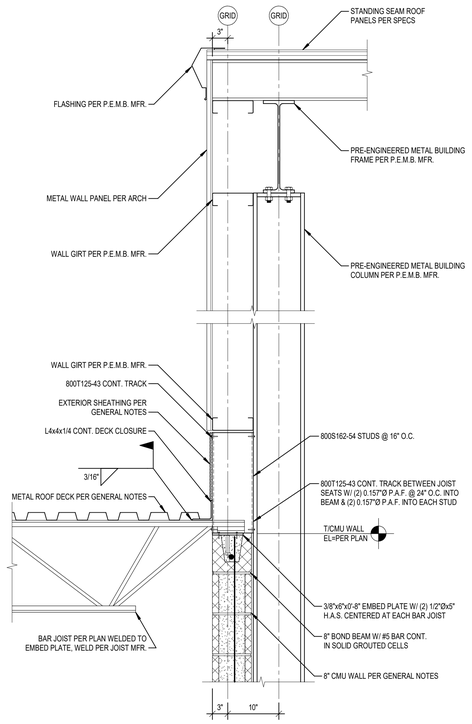


C S502 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"



A S502 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"

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REVISIONS

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PROFESSIONAL SEAL

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PROFESSIONAL TITLE: ENGINEER
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PROJECT TITLE

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PROJECT ADDRESS:
1295 INTERSTATE DRIVE
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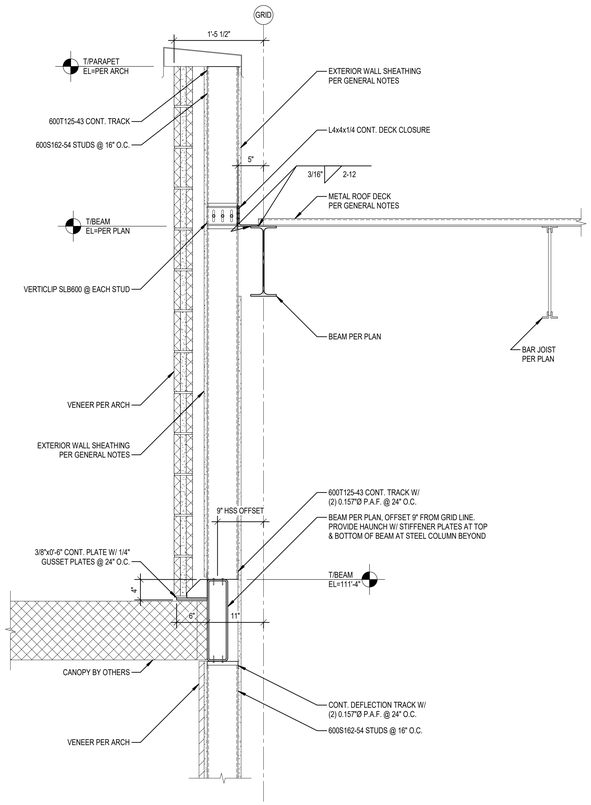
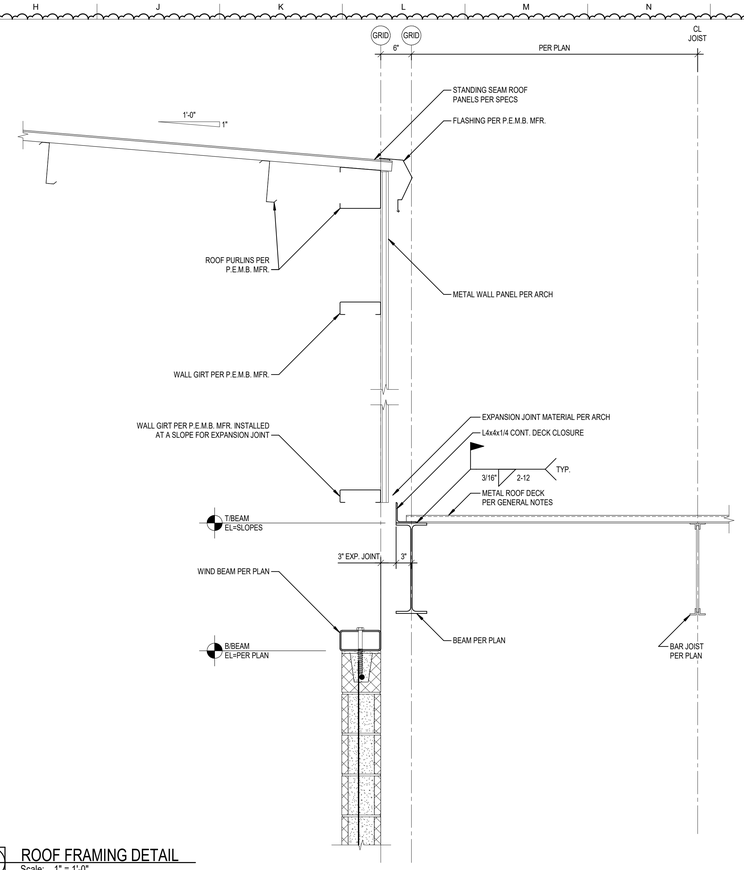
FRAMING DETAILS

SHEET
S502



H S505 ROOF FRAMING DETAIL
Scale: 1" = 1'-0"



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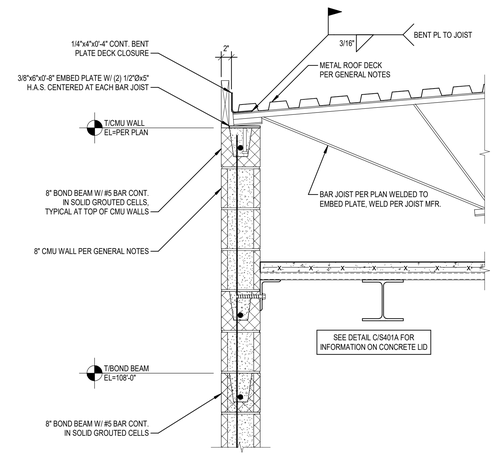

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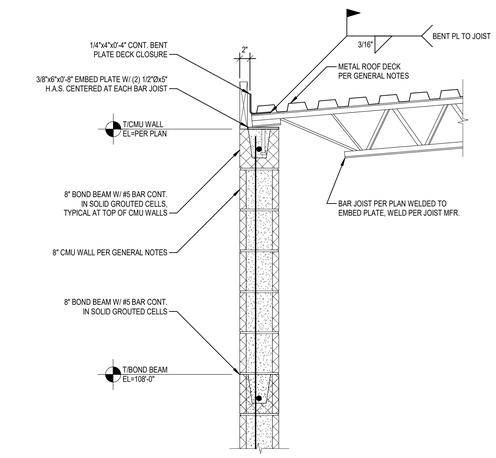

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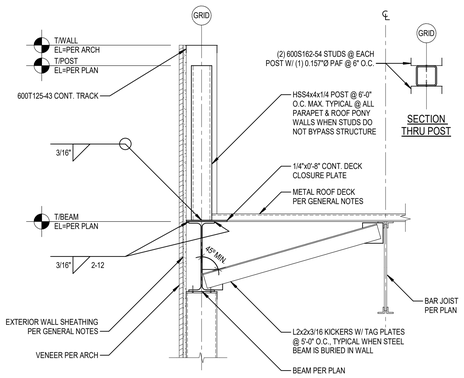

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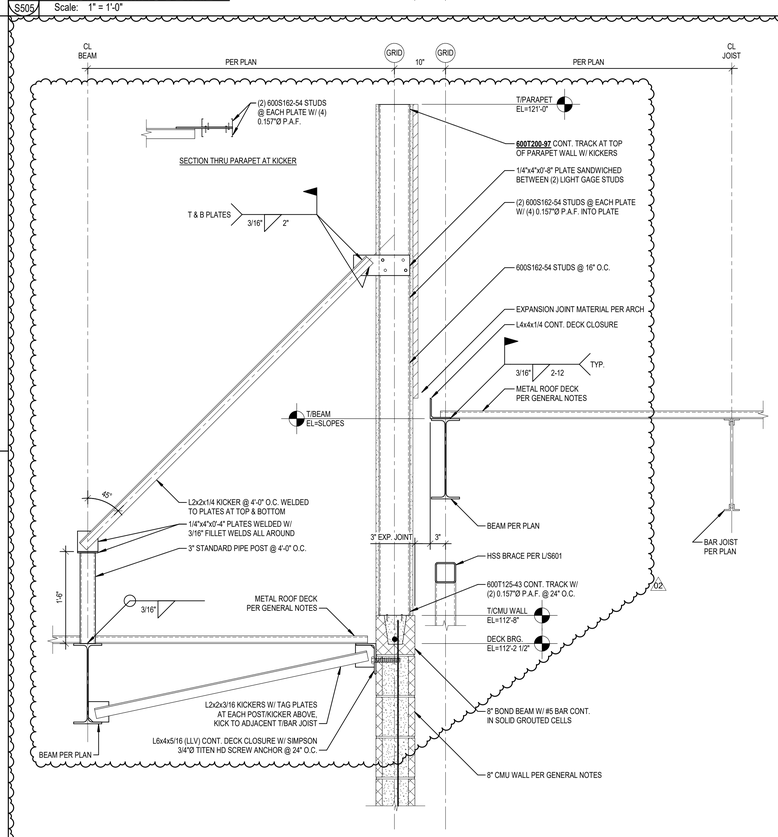
Scale: 1" = 1'-0"



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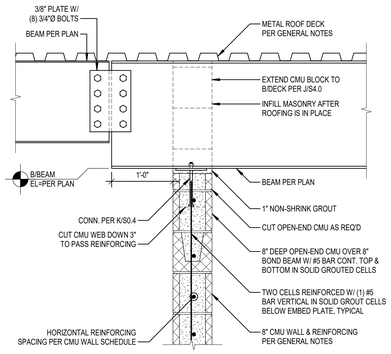

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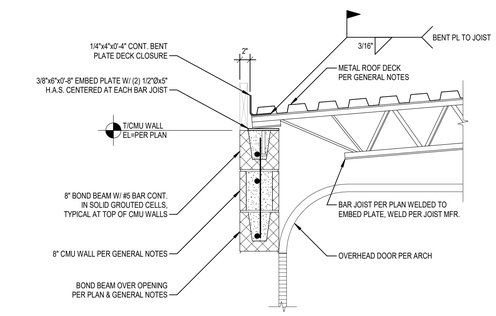

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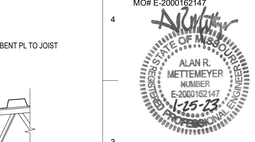

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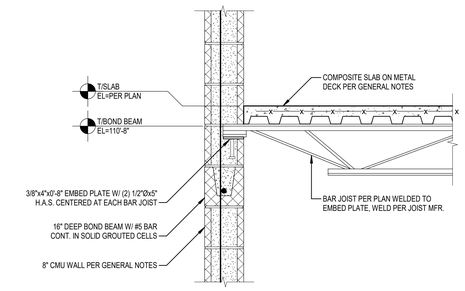
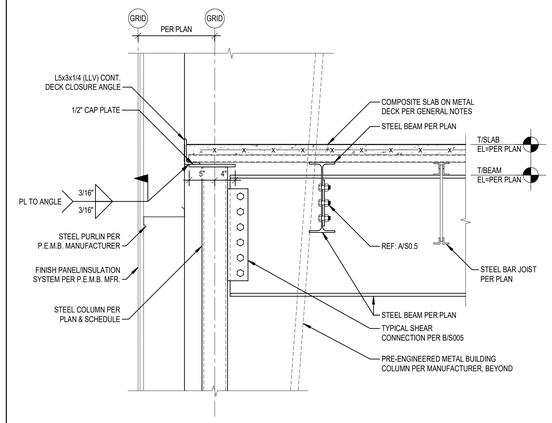
FRAMING DETAILS

SHEET
S505



P S506 MEZZANINE FRAMING DETAIL
Scale: 1" = 1'-0"



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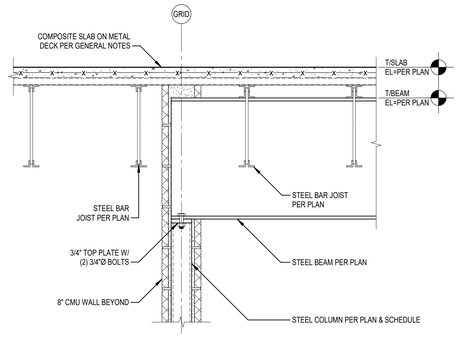

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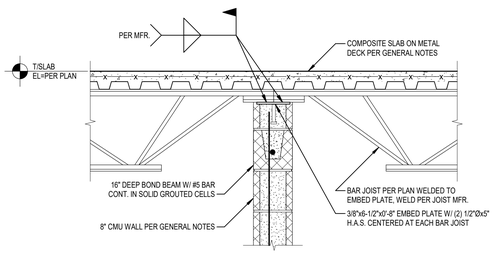

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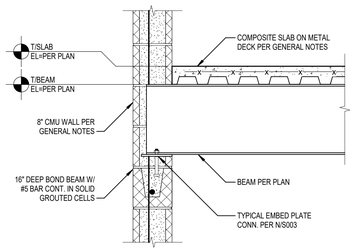

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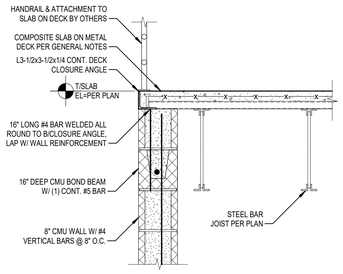

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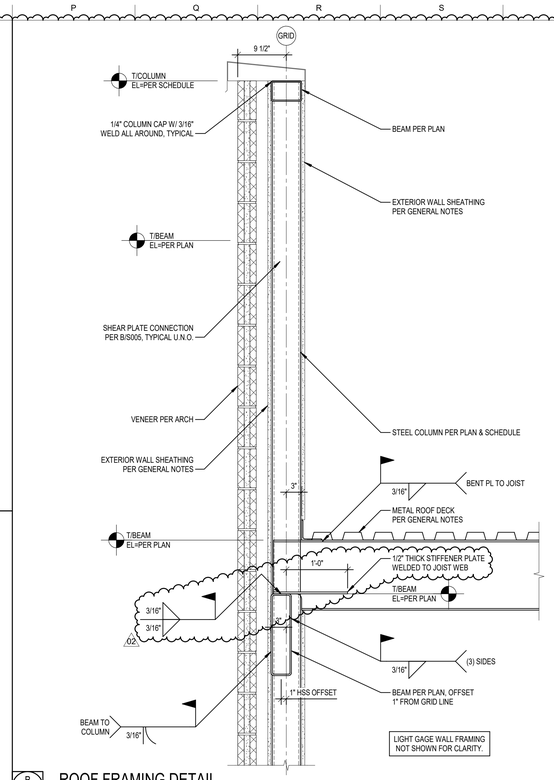

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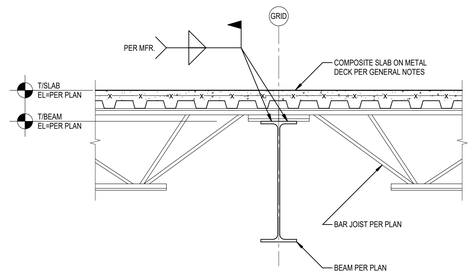

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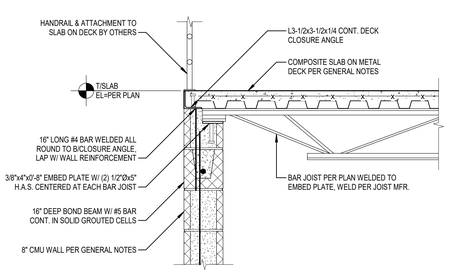

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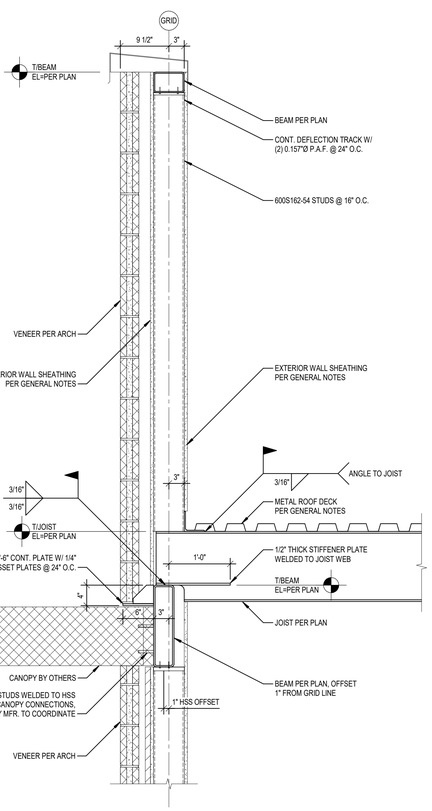
Scale: 1" = 1'-0"



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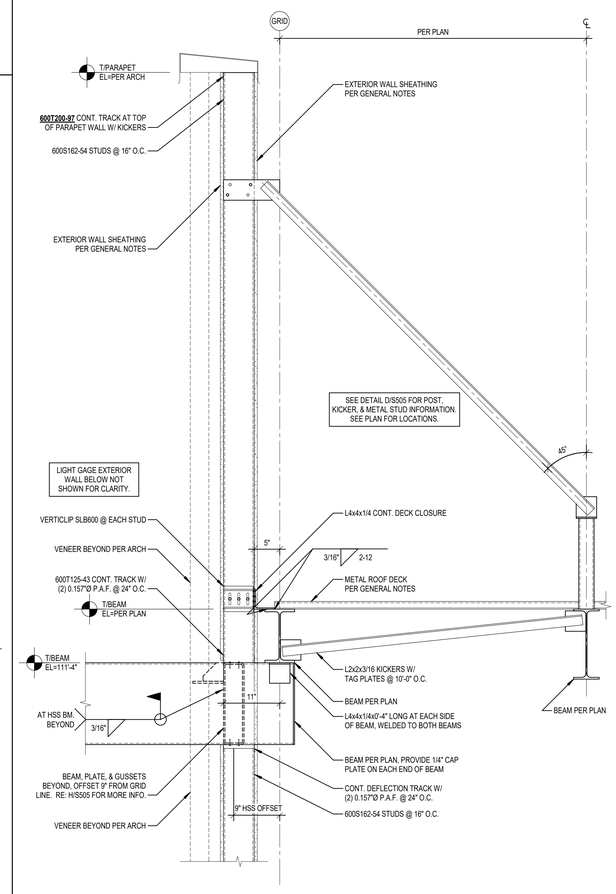

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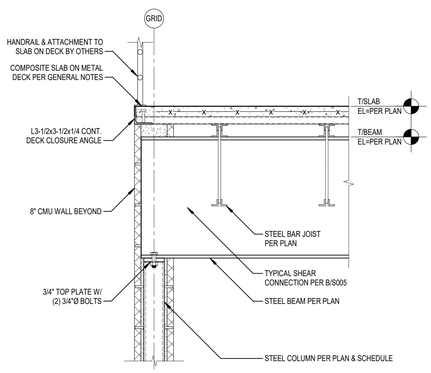

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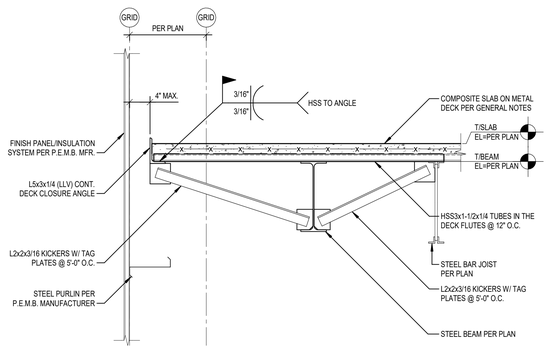

F S506 MEZZANINE FRAMING DETAIL
Scale: 1" = 1'-0"

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CITY OF WENTZVILLE, MISSOURI
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REVISIONS

NO.	DESCRIPTION	DATE
01	ADD 01	01/11/23
02	ADD 02	01/25/23

PROJECT NO.: 20-0067 DRAWN BY: MRH, TNB
DATE: 12.15.22 REVIEWED BY: BSW

PROFESSIONAL SEAL
ALAN METTEMEYER, PE
PROFESSIONAL TITLE: ENGINEER
MO# E-2000162147

STATE OF MISSOURI
ALAN R. METTEMEYER
NUMBER E-2000162147
1-25-23
REGISTERED PROFESSIONAL ENGINEER

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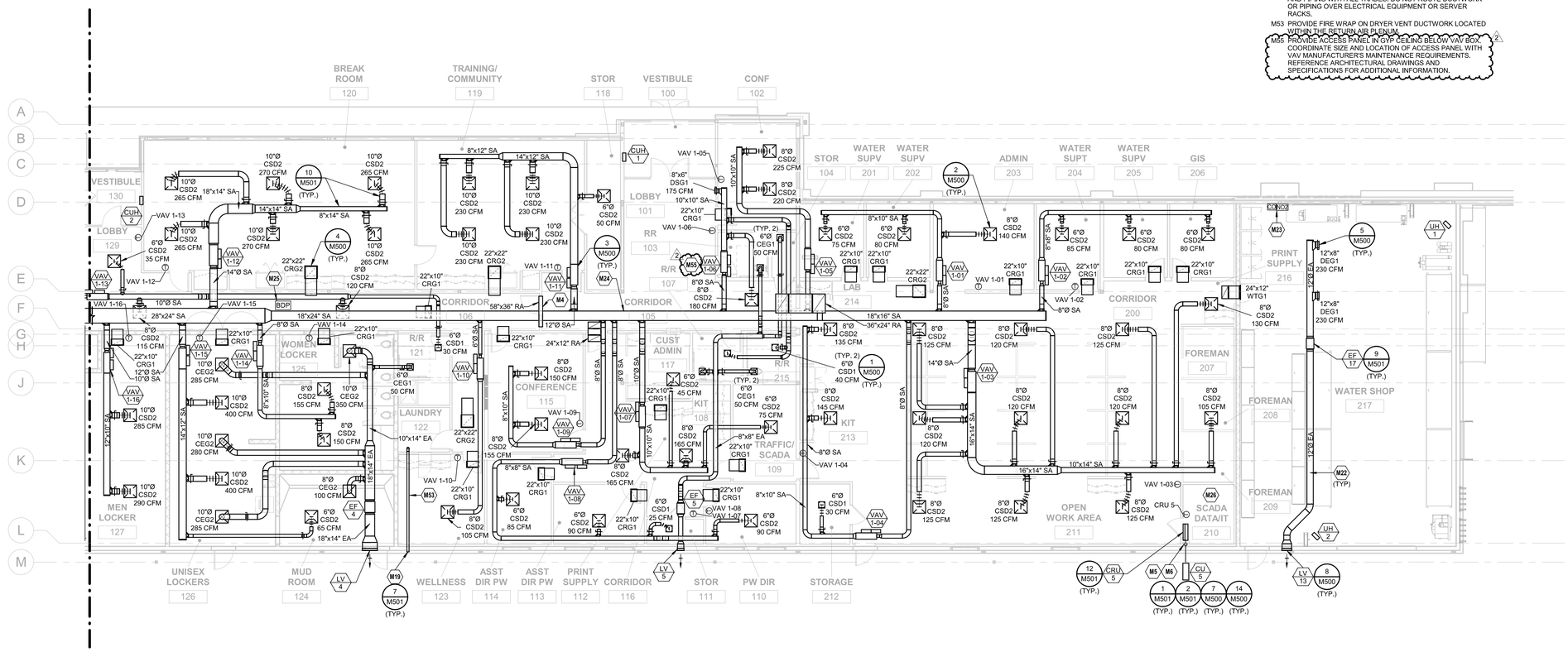
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

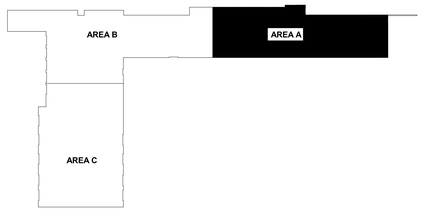
PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

FRAMING DETAILS

SHEET
S506



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



KEY PLAN

MECHANICAL PLAN NOTES:

M4 PROVIDE FRAMED OPENING IN WALL ABOVE CEILING.

M5 REFRIGERANT PIPE ROUTING SHOWN IS DIAGRAMMATIC. FINAL SIZING AND ROUTING OF REFRIGERANT LINES SHALL BE DETERMINED PER THE MANUFACTURER'S INSTRUCTIONS.

M6 ROUTE REFRIGERANT PIPING DOWN WITHIN STUD WALL AND PENETRATE THE EXTERIOR WALL 1'-0" AFF.

M19 TERMINATE 6 INCH DRYER VENT WITH THRU WALL VENT CAP.

M22 ALL EXPOSED DUCTWORK SHALL BE PROVIDED WITH PAINT GRIP FINISH FOR FIELD PAINTING. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

M23 MOUNT CO SENSOR AND NO2 SENSOR AT 4 FEET AFF. SENSORS SHALL PROVIDE AN AUDIBLE ALARM TO THE OCCUPANTS IF THEIR SETPOINT IS EXCEEDED. REFER TO CONTROLS SHEET M702 FOR SETPOINTS.

M24 LOCATION OF SUPPLY AIR DUCT STATIC PRESSURE SENSOR. REFER TO CONTROLS SHEET M701 FOR MORE INFORMATION.

M25 LOCATION OF BUILDING DIFFERENTIAL PRESSURE SENSOR. REFER TO CONTROLS SHEETS FOR MORE INFORMATION.

M26 COORDINATE INSTALLATION OF EQUIPMENT, DUCTWORK, AND PIPING WITH ALL TRADES. DO NOT ROUTE DUCTWORK OR PIPING OVER ELECTRICAL EQUIPMENT OR SERVER RACKS.

M53 PROVIDE FIRE WRAP ON DRYER VENT DUCTWORK LOCATED WITHIN THE RETURN AIR PLENUM.

M55 PROVIDE ACCESS PANEL IN GYP CEILING BELOW VAV BOX. COORDINATE SIZE AND LOCATION OF ACCESS PANEL WITH VAV MANUFACTURER'S MAINTENANCE REQUIREMENTS, REFERENCE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

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1950004840
EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: MJS
DATE: 12.15.22 REVIEWED BY: CJH

STATE OF MISSOURI
CARL J. HOLDEN
NUMBER PE-2020016283
PROFESSIONAL ENGINEER

01/24/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

HVAC LEVEL 1 PLAN - AREA A

SHEET
M101A

CARL J. HOLDEN

RADIANT HEATER COORDINATION:
ALL CONTRACTORS SHALL COORDINATE ROUTING OF DUCTWORK, PIPING, CONDUIT, WIRING AND OTHER ELEMENTS WITH OVERHEAD RADIANT HEATER REQUIRED CLEARANCES. COORDINATE WITH DIVISION 23 CONTRACTOR TO MAINTAIN HEATER MANUFACTURER'S REQUIRED CLEARANCES TO COMBUSTIBLES. CONTRACTORS ARE RESPONSIBLE FOR RESOLVING CONFLICTS AS THEY ARISE.

MECHANICAL PLAN NOTES:

M2 DIVISION 23 CONTRACTOR SHALL PROVIDE LINE VOLTAGE THERMOSTAT FOR RADIANT HEATERS. DIVISION 26 CONTRACTOR SHALL PROVIDE WALL SWITCH AND CONTACTOR SYSTEM FOR CONTROL OF HEATERS. REFER TO ELECTRICAL PLANS AND MECHANICAL CONTROLS FOR MORE INFORMATION.

M3 COORDINATE EXACT MOUNTING LOCATION AND HEIGHT WITH OTHER TRADES PRIOR TO INSTALLATION. REFER TO ARCHITECTURAL, EQUIPMENT, LIGHTING, AND ELECTRICAL PLANS FOR DOOR OPERATORS, EQUIPMENT, SWITCHES AND OTHER DEVICES.

M4 PROVIDE FRAMED OPENING IN WALL ABOVE CEILING.

M5 REFRIGERANT PIPE ROUTING SHOWN IS DIAGRAMMATIC. FINAL SIZING AND ROUTING OF REFRIGERANT LINES SHALL BE DETERMINED PER THE MANUFACTURER'S INSTRUCTIONS.

M7 ROUTE REFRIGERANT PIPING WITHIN CHASE. PENETRATE EXTERIOR WALL AT 1'-0" AFF.

M10 (1) CO SENSOR AND (2) NO2 SENSORS. MOUNT CO SENSOR AT 5 FEET AFF. MOUNT (1) NO2 SENSOR AT 5 FEET AFF AND (1) NO2 SENSOR AT 28 FEET AFF. SENSORS SHALL BE MOUNTED ON THE COLUMN. COORDINATE MOUNTING WITH COMPONENTS OF OTHER TRADES.

M11 PROVIDE 4"Ø DIAMETER GAS WATER HEATER CONCENTRIC VENT AND INTAKE THROUGH ROOF. TERMINATE MINIMUM 24 INCH ABOVE ROOF SURFACE PER MANUFACTURER'S RECOMMENDATION. REFER TO SPECIFICATION FOR MORE INFORMATION.

M13 6"Ø EXHAUST DUCT FROM VEHICLE EXHAUST HOSE REEL THROUGH SIDEWALL TERMINATING WITH SIDEWALL CAP.

M14 PROVIDE BUILDING BAS PANEL. QUANTITY OF PANELS TO BE DETERMINED BY CONTROLS CONTRACTOR. COORDINATE POWER AND DATA REQUIREMENTS WITH OTHER TRADES. CONTROLS CONTRACTOR IS RESPONSIBLE FOR ADDITIONAL POWER AND DATA PROVISIONS.

M17 PROVIDE DUCT ACCESS DOOR WITH LIMIT SWITCH FOR ACCESS TO UVC LIGHT. UVC LIGHT SHALL BE OFF WHILE ACCESS DOOR IS OPEN. DIVISION 26 SHALL PROVIDE DISCONNECT FOR LIGHT ON SIDE OF DUCTWORK.

M18 PROVIDE WARNING SIGN ON DUCT NEXT TO ACCESS DOOR INDICATING "CAUTION: UV LIGHT. DO NOT LOOK AT OR OPEN ACCESS DOOR WITHOUT FIRST TURNING OFF LIGHT."

M21 FAN CONTROLLER PROVIDED WITH FAN. REFER TO ELECTRICAL PLANS FOR LOCATION OF CONTROLLER AND CONTROL OF FANS.

M22 ALL EXPOSED DUCTWORK SHALL BE PROVIDED WITH PAINT GRIP FINISH FOR FIELD PAINTING. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

M23 MOUNT CO SENSOR AND NO2 SENSOR AT 4 FEET AFF. SENSORS SHALL PROVIDE AN AUDIBLE ALARM TO THE OCCUPANTS IF THEIR SETPOINT IS EXCEEDED. REFER TO CONTROLS SHEET M702 FOR SETPOINTS.

M26 COORDINATE INSTALLATION OF EQUIPMENT, DUCTWORK, AND PIPING WITH ALL TRADES. DO NOT ROUTE DUCTWORK OR PIPING OVER ELECTRICAL EQUIPMENT OR SERVER RACKS.

M27 ROUTE 60"X24" SA DUCT UP TO RTU-1 ON ROOF. TRANSITION TO UNIT CONNECTION SIZE IN ROOF CURB. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M28 ROUTE 76"X24" RA DUCT UP TO RTU-1 ON ROOF. TRANSITION TO UNIT CONNECTION SIZE IN ROOF CURB. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M29 ROUTE 28"Ø EA DUCT UP TO EF-7 ON ROOF. TRANSITION TO UNIT CONNECTION SIZE IN ROOF CURB. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M40 ROUTE EXHAUST DUCT DOWN TO 12" AFF AND TERMINATE WITH 1/2" GALVANIZED STEEL MESH SCREEN SECURED OVER DUCT OPENING. BALANCE BRANCH TO AIRFLOW INDICATED.

M41 ROUTE ALL EXPOSED DUCTWORK TIGHT TO STRUCTURE.

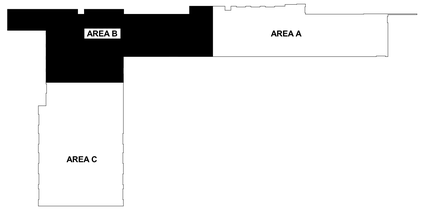
M45 ROUTE 12"X36" RETURN AIR DUCT UP AND TERMINATE OPEN ENDED WITHIN PLENUM.

M46 DUCT UP TO CEILING PLENUM. ROUTE DUCT TIGHT TO WALL. LEAVE END OF RETURN DUCT OPEN TO PLENUM. COVER WITH BIRDSCREEN.

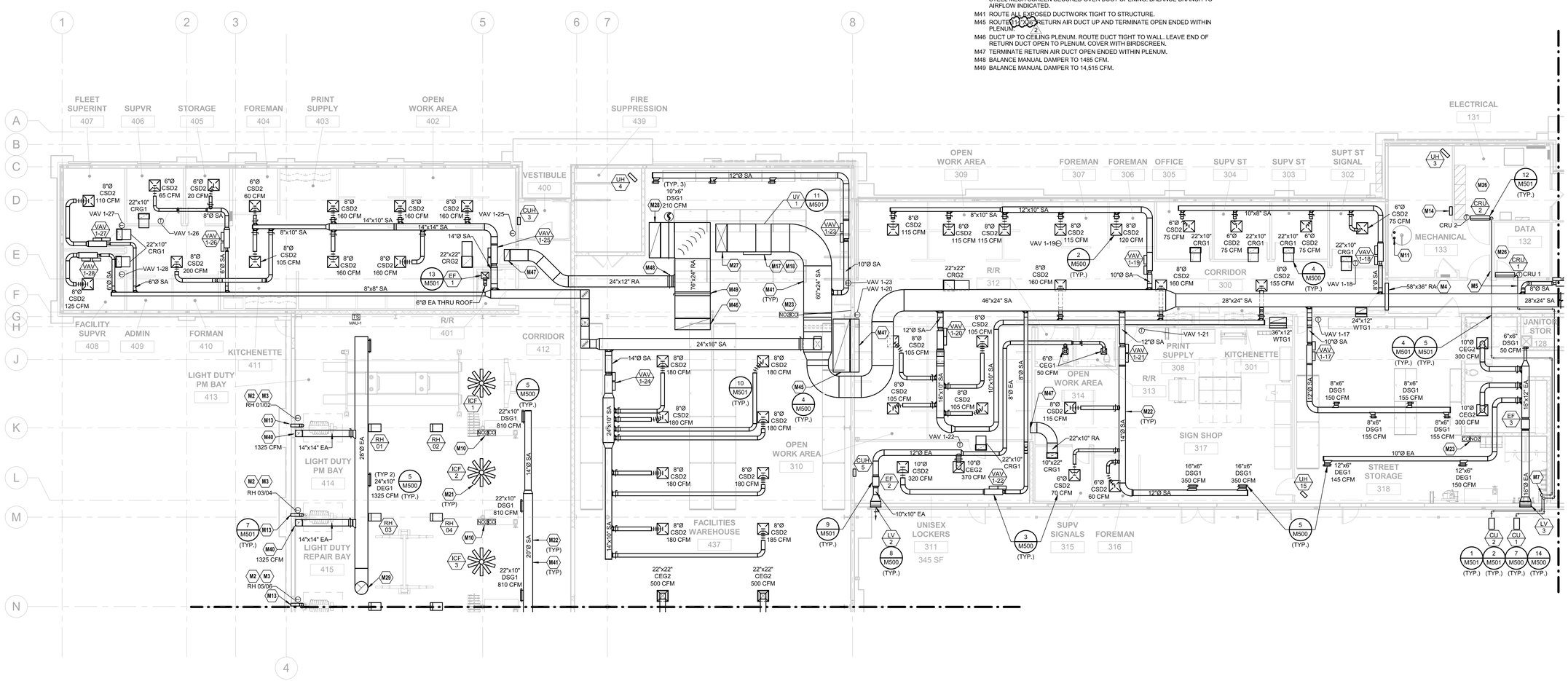
M47 TERMINATE RETURN AIR DUCT OPEN ENDED WITHIN PLENUM.

M48 BALANCE MANUAL DAMPER TO 1485 CFM.

M49 BALANCE MANUAL DAMPER TO 14,515 CFM.



KEY PLAN



1 HVAC LEVEL 1 PLAN - AREA B
1/8" = 1'-0"

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1950004840
EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: MJS
DATE: 12.15.22 REVIEWED BY: CJH

STATE OF MISSOURI
CARL J. HOLDEN
NUMBER PE-2020016283
PROFESSIONAL ENGINEER

01/24/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

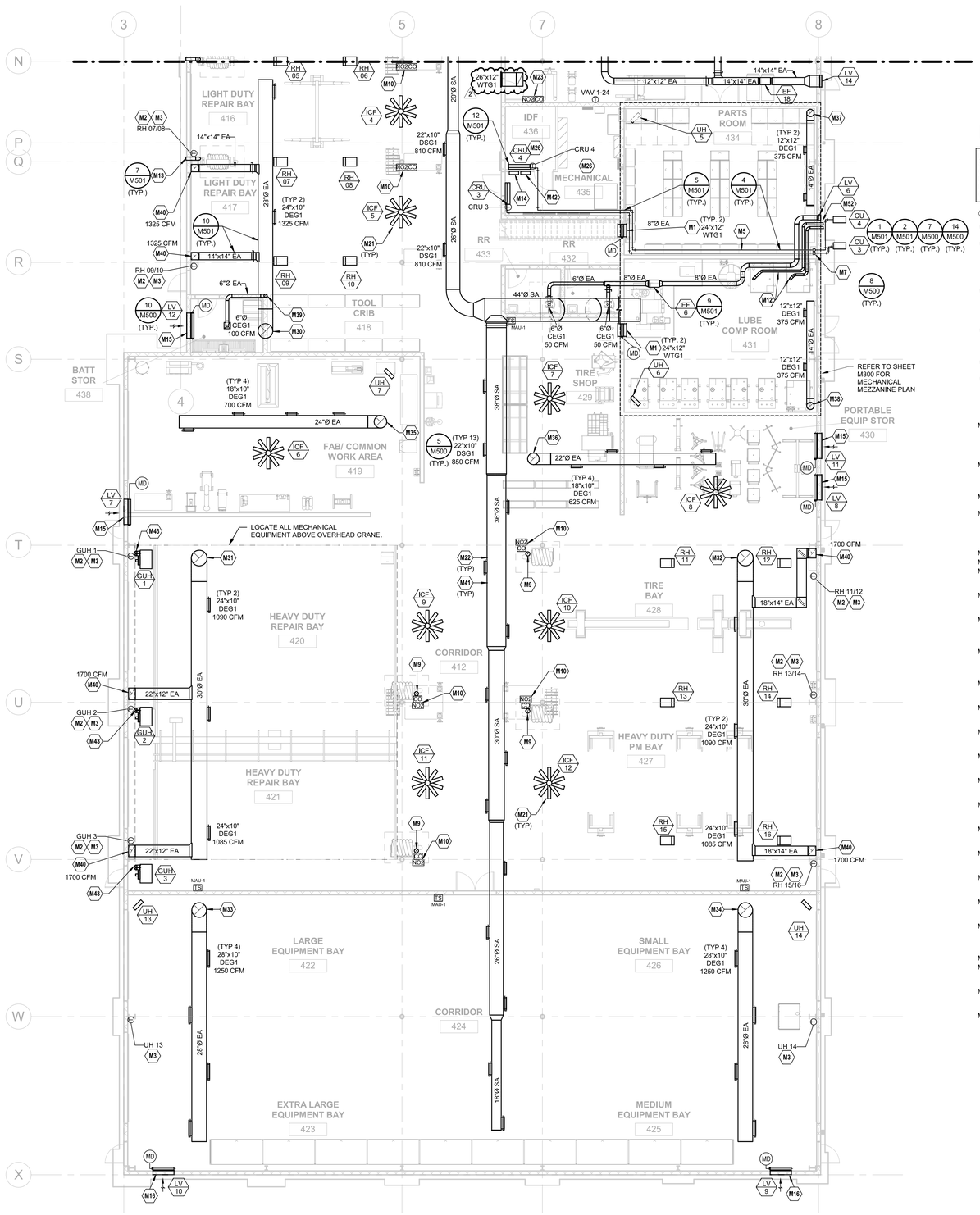
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

HVAC LEVEL 1 PLAN - AREA B

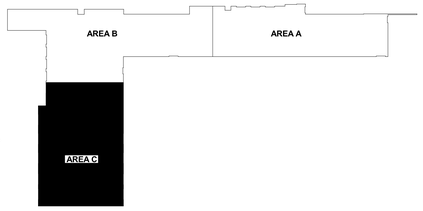
SHEET
M101B

CARL J. HOLDEN



1 HVAC LEVEL 1 PLAN - AREA C
1/8" = 1'-0"

KEY PLAN



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ALL CONTRACTORS SHALL COORDINATE ROUTING OF DUCTWORK, PIPING, CONDUIT, WIRING AND OTHER ELEMENTS WITH OVERHEAD RADIANT HEATER REQUIRED CLEARANCES. COORDINATE WITH DIVISION 23 CONTRACTOR TO MAINTAIN HEATER MANUFACTURER'S REQUIRED CLEARANCES TO COMBUSTIBLES. CONTRACTORS ARE RESPONSIBLE FOR RESOLVING CONFLICTS AS THEY ARISE.

MECHANICAL PLAN NOTES:

M1 INSTALL TRANSFER GRILLES BETWEEN DOOR AND BOTTOM OF STAIRS.

M2 DIVISION 23 CONTRACTOR SHALL PROVIDE LINE VOLTAGE THERMOSTAT FOR RADIANT HEATERS. DIVISION 26 CONTRACTOR SHALL PROVIDE WALL SWITCH AND CONTACTOR SYSTEM FOR CONTROL OF HEATERS. REFER TO ELECTRICAL PLANS AND MECHANICAL CONTROLS FOR MORE INFORMATION.

M3 COORDINATE EXACT MOUNTING LOCATION AND HEIGHT WITH OTHER TRADES PRIOR TO INSTALLATION. REFER TO ARCHITECTURAL, EQUIPMENT, LIGHTING, AND ELECTRICAL PLANS FOR DOOR OPERATORS, EQUIPMENT, SWITCHES AND OTHER DEVICES.

M5 REFRIGERANT PIPE ROUTING SHOWN IS DIAGRAMMATIC. FINAL SIZING AND ROUTING OF REFRIGERANT LINES SHALL BE DETERMINED PER THE MANUFACTURER'S INSTRUCTIONS.

M7 ROUTE REFRIGERANT PIPING WITHIN CHASE. PENETRATE EXTERIOR WALL AT 1'-0" AFF.

M9 8"Ø VEHICLE EXHAUST THROUGH ROOF FROM VEHICLE EXHAUST HOSE REEL. TERMINATE 8"Ø EXHAUST DUCT ABOVE ROOF PER VEHICLE EXHAUST SYSTEM MANUFACTURER RECOMMENDATIONS. AT A MINIMUM, TERMINATE WITH SCREENED GOOSENECK 1'-0" ABOVE ROOF SURFACE.

M10 (1) CO SENSOR AND (2) NO2 SENSORS. MOUNT CO SENSOR AT 5 FEET AFF. MOUNT (1) NO2 SENSOR AT 5 FEET AFF AND (1) NO2 SENSOR AT 28 FEET AFF. SENSORS SHALL BE MOUNTED ON THE COLUMN. COORDINATE MOUNTING WITH COMPONENTS OF OTHER TRADES.

M12 PROVIDE 4"Ø PRIMARY PVC VENT DISCHARGE FROM TANK TO SIDEWALL. VENT SIZE AND HEIGHT IN ACCORDANCE WITH NFPA 30, SECTION 27.8 AND PER MANUFACTURER'S RECOMMENDATIONS.

M13 6"Ø EXHAUST DUCT FROM VEHICLE EXHAUST HOSE REEL THROUGH SIDEWALL TERMINATING WITH SIDEWALL CAP.

M14 PROVIDE BUILDING BAS PANEL. QUANTITY OF PANELS TO BE DETERMINED BY CONTROLS CONTRACTOR. COORDINATE POWER AND DATA REQUIREMENTS WITH OTHER TRADES. CONTROLS CONTRACTOR IS RESPONSIBLE FOR ADDITIONAL POWER AND DATA PROVISIONS.

M15 MOUNT BOTTOM OF LOUVER 10'-0" AFF.

M16 MOUNT BOTTOM OF LOUVER 6'-0" AFF.

M21 FAN CONTROLLER PROVIDED WITH FAN. REFER TO ELECTRICAL PLANS FOR LOCATION OF CONTROLLER AND CONTROL OF FANS.

M22 ALL EXPOSED DUCTWORK SHALL BE PROVIDED WITH PAINT GRIP FINISH FOR FIELD PAINTING. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

M23 MOUNT CO SENSOR AND NO2 SENSOR AT 4 FEET AFF. SENSORS SHALL PROVIDE AN AUDIBLE ALARM TO THE OCCUPANTS IF THEIR SETPOINT IS EXCEEDED. REFER TO CONTROLS SHEET M702 FOR SETPOINTS.

M26 COORDINATE INSTALLATION OF EQUIPMENT, DUCTWORK, AND PIPING WITH ALL TRADES. DO NOT ROUTE DUCTWORK OR PIPING OVER ELECTRICAL EQUIPMENT OR SERVER RACKS.

M30 ROUTE 28"Ø EA DUCT UP TO EF-8 ON ROOF. TRANSITION TO UNIT CONNECTION SIZE IN ROOF CURB. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M31 ROUTE 30"Ø EA DUCT UP TO EF-9 ON ROOF. TRANSITION TO UNIT CONNECTION SIZE IN ROOF CURB. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M32 ROUTE 30"Ø EA DUCT UP TO EF-10 ON ROOF. TRANSITION TO UNIT CONNECTION SIZE IN ROOF CURB. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M33 ROUTE 28"Ø EA DUCT UP TO EF-11 ON ROOF. TRANSITION TO UNIT CONNECTION SIZE IN ROOF CURB. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M34 ROUTE 28"Ø EA DUCT UP TO EF-12 ON ROOF. TRANSITION TO UNIT CONNECTION SIZE IN ROOF CURB. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M35 ROUTE 24"Ø EA DUCT UP TO EF-13 ON ROOF. TRANSITION TO UNIT CONNECTION SIZE IN ROOF CURB. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M36 ROUTE 22"Ø EA DUCT UP TO EF-14 ON ROOF. TRANSITION TO UNIT CONNECTION SIZE IN ROOF CURB. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M37 ROUTE 14"Ø EA DUCT UP TO EF-15 ON ROOF. TRANSITION TO UNIT CONNECTION SIZE IN ROOF CURB. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M38 ROUTE 14"Ø EA DUCT UP TO EF-16 ON ROOF. TRANSITION TO UNIT CONNECTION SIZE IN ROOF CURB. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M39 ROUTE 6"Ø EA DUCT UP TO EF-19 ON ROOF. TRANSITION TO UNIT CONNECTION SIZE IN ROOF CURB. SEAL ROOF PENETRATION AIR AND WATER TIGHT.

M40 ROUTE EXHAUST DUCT DOWN TO 12" AFF AND TERMINATE WITH 1/2" GALVANIZED STEEL MESH SCREEN SECURED OVER DUCT OPENING. BALANCE BRANCH TO AIRFLOW INDICATED.

M41 ROUTE ALL EXPOSED DUCTWORK TIGHT TO STRUCTURE.

M42 VEHICLE EMISSION MONITORING SYSTEM CONTROL PANEL. COORDINATE POWER AND DATA REQUIREMENTS WITH OTHER TRADES.

M43 ROUTE 4"Ø UNIT HEATER FLUE AND 4"Ø COMBUSTION AIR DUCT UP THROUGH ROOF. FLUE SHALL BE CATEGORY III VENT. REFER TO SPECIFICATIONS FOR MORE INFORMATION.

M52 TANK VENT AND EXHAUST DISCHARGE SHALL BE LOCATED 10'-0" AWAY FROM MAU INTAKE LOUVER LOCATED ON MEZZANINE ABOVE.

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REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: MJS
DATE: 12.15.22 REVIEWED BY: CJH

STATE OF MISSOURI
CARL J. HOLDEN
NUMBER PE-2020016283
PROFESSIONAL ENGINEER
01/24/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY
PROJECT ADDRESS:
1296 INTERSTATE DRIVE
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HVAC LEVEL 1 PLAN - AREA C

SHEET
M101C

CARL J. HOLDEN

ROOFTOP UNIT SCHEDULE (DX COOLING, NATURAL GAS HEAT)

				SUPPLY FAN								RELIEF FAN						COOLING									GAS HEAT EXCHANGER								ELECTRICAL					
																				EAT	LAT		MIN EFF																	
MARK	MANUFACTURER	MODEL	UNIT TYPE	QUANTITY	FAN TYPE	TOTAL CFM	ESP (IN)	TSP (IN)	TOTAL BHP	TOTAL NOM HP	VFD (Y/N)	QUANTITY	TOTAL CFM	ESP (IN)	TOTAL BHP	TOTAL NOM HP	VFD (Y/N)	TH (MBH)	SH (MBH)	(°F DB)	(°F WB)	(°F DB)	(°F WB)	REFR TYPE	(EER)	IEER	MIN NO COMPRESSORS	MAX VEL (FPM)	MIN OUT (MBH)	NOM INPUT (MBH)	MIN EFF (%)	EAT (°F DB)	LAT (°F DB)	MIN NO STAGES	MAX VEL (FPM)	MIN O/A CFM	V/PH	MCA	MOCP	DISC TYPE	WEIGHT (LBS)	NOTES
RTU 1	TRANE	RF0603443	MZ VAV	2	AF	15900	2.40	4.75	18.83	20.00	Yes	2	7000	0.50	1.495	16.00	Yes	735.6	526.8	83.4	68.2	53.5	53.4	R410A	10.7	16.3	3	350	405	500.0	80	50.0	76.6	16:1 MODULATING	600	5520	460/3	161.4	175	NF	10700	ALL

MODEL NUMBERS AND NOMINAL TONS LISTED SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER, MODEL NUMBERS, OR NOMINAL TONS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. REFER TO SHEET M701 FOR PACKAGED MULTI-ZONE VAV ROOFTOP UNIT CONTROL DRAWING, POINTS LIST, AND SEQUENCE.
B. EQUIPMENT SIZED FOR 100 °F AMBIENT TEMPERATURE.
C. PROVIDE 2" MERV 8 PLEATED THROWAWAY PRE-FILTERS AND 4" MERV 13 PLEATED THROWAWAY AIR FILTERS.
D. DISCONNECT SWITCH PROVIDED BY DIVISION 26 CONTRACTOR.
E. STARTERS FOR ALL MOTORS SHALL BE FURNISHED INTEGRAL WITH UNIT.
F. PROVIDE FACTORY MOUNTED VARIABLE FREQUENCY DRIVE TO FACILITATE MODULATING FAN SPEED CONTROL.
G. PROVIDE SHAFT GROUNDING SYSTEM ON MOTOR. REFER TO MOTOR SPECIFICATION FOR ADDITIONAL INFORMATION.
H. PROVIDE SINGLE POINT POWER CONNECTION.
J. COORDINATE SIZE OF CONDUCTOR TERMINATION LUGS WITH CONDUCTOR SIZES SHOWN ON ELECTRICAL DRAWINGS.
K. PROVIDE 125 VAC, 20 AMP DUPLEX CONVENIENCE RECEPTACLE MOUNTED TO UNIT READY FOR FIELD WIRING WITH A COVER UL LISTED FOR WET AND DAMPER LOCATIONS WHEN IN USE.
L. SPECIFIED FAN ESP ACCOUNTS FOR DUCT LOSSES EXTERNAL TO UNIT.
M. SPECIFIED FAN TSP INCLUDES EXTERNAL DUCT AND INTERNAL FILTER, COIL, AND CASING LOSSES. FILTER LOSS IS AT A MAXIMUM OF 400 FPM FACE VELOCITY.
N. PROVIDE MOTOR HORSEPOWER TO OVERCOME INTERNAL UNIT STATIC PRESSURE DROP PLUS SPECIFIED EXTERNAL STATIC PRESSURE DROP. NOMINAL MOTOR HP SHALL BE NO LARGER THAN THE FIRST AVAILABLE NOMINAL MOTOR SIZE GREATER THAN THE REQUIRED BHP.
P. PROVIDE INSULATED ROOF CURB WITH MINIMUM HEIGHT REQUIRED TO MAINTAIN BOTTOM OF EQUIPMENT A MINIMUM OF 8 INCHES ABOVE FINISHED ROOF SURFACE. COORDINATE WITH ROOF INSULATION THICKNESS AND ROOF TAPER AT INSTALLED LOCATION. COORDINATE CURB TYPE WITH DRAWINGS.
Q. SCHEDULED WEIGHT IS THE MAXIMUM ALLOWABLE OPERATING WEIGHT OF THE EQUIPMENT. CURB IS NOT INCLUDED.
R. COOLING COIL LAT IS LEAVING AIR TEMPERATURE OF COIL.
S. PROVIDE GUARDS TO PROTECT CONDENSER COIL FROM HAIL OR OTHER DAMAGE.
T. PROVIDE HEATER TO MEET OR EXCEED SCHEDULED MINIMUM MBH OUTPUT. NOMINAL INPUT IS BASED ON LISTED MANUFACTURER'S STANDARD PRODUCT. COORDINATE EQUIPMENT GAS LOAD WITH PLUMBING CONTRACTOR IF DIFFERENT FROM THAT SCHEDULED. MEET MINIMUM EFFICIENCY SCHEDULED.
U. PROVIDE DIFFERENTIAL ENTHALPY ECONOMIZER.
V. PROVIDE WITH VARIABLE SPEED LEAD COMPRESSOR.
W. PROVIDE WITH STAINLESS STEEL HEAT EXCHANGER.
2 X. DIVISION 26 CONTRACTOR SHALL PROVIDE SMOKE DETECTORS IN RETURN AIR DUCT.

MAKEUP AIR UNIT SCHEDULE (NATURAL GAS HEAT)

				SUPPLY FAN								GAS HEAT EXCHANGER									ELECTRICAL			
MARK	MANUFACTURER	MODEL	AREA SERVED	CFM	ESP (IN)	NO OF FANS	BHP PER FAN	NOM HP PER FAN	VFD (Y/N)	V/PH	MCA	MOCP	MIN OUT (MBH)	NOM INPUT (MBH)	MIN EFF (%)	EAT (°F)	LAT (°F DB)	MIN NO STAGES	V/PH	MCA	MOCP	DISC TYPE	STARTER TYPE	WEIGHT (LBS)	NOTES
MAU 1	TRANE	CSAA035	FLEET MAINTENANCE	15100	1.2	2	5.17	7.50	Yes	460/3	26.25	45	1500.0	1875.0	80	0	90.0	10:1 MODULATING	120/1	5.26	15	NF	VFD	5900	ALL

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NOTES:

A. EQUIPMENT PROVIDED BY DIVISION 23.
2 B. PROVIDE 2" MERV 8 EFFICIENT PLEATED THROWAWAY AIR FILTERS.
C. DISCONNECT SWITCH PROVIDED BY DIVISION 26 CONTRACTOR.
D. STARTERS FOR ALL MOTORS SHALL BE FURNISHED INTEGRAL WITH UNIT.
E. SPECIFIED FAN ESP ACCOUNTS FOR DUCT LOSSES EXTERNAL TO UNIT. FILTER LOSS IS AT A MAXIMUM OF 400 FPM FACE VELOCITY.
F. PROVIDE MOTOR HORSEPOWER TO OVERCOME INTERNAL UNIT STATIC PRESSURE DROP PLUS SPECIFIED EXTERNAL STATIC PRESSURE DROP. NOMINAL MOTOR HP SHALL BE NO LARGER THAN THE FIRST AVAILABLE NOMINAL MOTOR SIZE GREATER THAN THE REQUIRED BHP.
G. DIVISION 28 CONTRACTOR SHALL PROVIDE SMOKE DETECTORS IN SUPPLY AIR DUCT(S).
H. SCHEDULED WEIGHT IS THE MAXIMUM ALLOWABLE OPERATING WEIGHT OF THE EQUIPMENT.
J. PROVIDE WITH STAINLESS STEEL HEAT EXCHANGER.
K. MAKE UP AIR UNIT DESIGNED FOR NATURAL GAS AT 972 BTU PER CUBIC FOOT AT A GAS SUPPLY PRESSURE OF 7-10" W.C. PROVIDE HIGH ALTITUDE GAS CONVERSION KIT AS REQUIRED.
L. PROVIDE HEATER TO MEET OR EXCEED SCHEDULED MINIMUM MBH OUTPUT. NOMINAL INPUT IS BASED ON LISTED MANUFACTURER'S STANDARD PRODUCT. COORDINATE EQUIPMENT GAS LOAD WITH PLUMBING CONTRACTOR IF DIFFERENT FROM THAT SCHEDULED. MEET MINIMUM EFFICIENCY SCHEDULED.
M. PROVIDE UNIT WITH END SUPPLY AIR DUCT DISCHARGE.
N. PROVIDE UNIT WITH MOTORIZED OUTSIDE AIR DAMPER.
P. CONTROLS CONTRACTOR SHALL PROVIDE MULTIPLE SPACE TEMPERATURE SENSORS AS SHOWN ON THE PLANS FOR AVERAGING CONTROL. REFER TO CONTROLS SHEET M701 FOR MORE INFORMATION.
Q. DIVISION 26 SHALL PROVIDE TWO POWER CONNECTIONS, ONE FOR THE SUPPLY FAN AND ONE FOR THE GAS HEAT CONTROL.

GRILLE, REGISTER AND DIFFUSER SCHEDULE

MARK	MANUFACTURER	SERVICE	MODEL	FACE TYPE	MOUNTING LOCATION	FACE SIZE (IN)	MAX NC	MAX PRESS DROP (IN W.C.)	NOTES
CEG1	PRICE	EXHAUST	80	EGGCRATE	CEILING	12"x12"	25	0.05	B, C, F, H, J, K
CEG2	PRICE	EXHAUST	80	EGGCRATE	CEILING	24"x24"	25	0.05	B, C, F, H, J, K
CRG1	PRICE	RETURN	80	EGGCRATE	CEILING	24"x12"	25	0.05	B, C, F, H, J
CRG2	PRICE	RETURN	80	EGGCRATE	CEILING	24"x24"	25	0.05	B, C, F, H, J
CSD1	PRICE	SUPPLY	SPD	PLAQUE	CEILING	12"x12"	25	0.08	A, B, C, F, H, K
CSD2	PRICE	SUPPLY	SPD	PLAQUE	CEILING	24"x24"	25	0.08	A, B, C, F, H, K
DEG1	PRICE	EXHAUST	630	LOUVERED	DUCT	REFER TO PLANS	25	0.05	B, D, E, G, H
DSG1	PRICE	SUPPLY	620	LOUVERED	DUCT	REFER TO PLANS	25	0.08	B, D, E, G, H
WTG1	PRICE	TRANSFER	630	LOUVERED	WALL	REFER TO PLANS	25	0.05	B, D, E, H

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NOTES:

A. 4-WAY THROW PATTERN UNLESS OTHERWISE INDICATED BY FLOW ARROWS ON DRAWINGS.
B. NECK SIZE SHOWN ON DRAWINGS. PROVIDE BRANCH DUCT TO MATCH NECK SIZE UNLESS OTHERWISE SHOWN ON DRAWINGS.
C. BAKED ENAMEL FINISH, WHITE TO MATCH CEILING COLOR.
D. FRONT BLADES PARALLEL TO LONG DIMENSION.
E. DOUBLE DEFLECTION BARS SHALL BE ADJUSTABLE.
F. FRAME TYPE TO MATCH CEILING/WALL CONSTRUCTION, COORDINATE WITH ARCHITECTURAL REFLECTED CEILING/WALL PLAN.
G. PROVIDE OPPOSED BLADE DAMPER ADJUSTABLE FROM FACE OF DEVICE.
H. PROVIDE DIFFUSERS, LINEAR SLOTS, AND GRILLES WITH NO EXPOSED MOUNTING SCREWS.
J. PAINT ALL INTERIOR SURFACES SLOTS, GRILLES AND PLENUMS FLAT BLACK.
K. WHEN LOCATED IN INACCESSIBLE CEILING AND THE BRANCH DUCT TO THE DEVICE SHOWS A DAMPER ON THE PLANS, CONTRACTOR SHALL PROVIDE REMOTE CABLE-OPERATED VOLUME DAMPER BY METROPOLITAN AIR TECHNOLOGIES MODEL RT-250 WITH EXTERNAL WORM GEAR OPERATOR OR EQUIVALENT YOUNG REGULATOR BUTTERFLY DAMPER WITH 270-275 CONTROLLER. OPERATOR SHALL HAVE A SQUARE DRIVE FOR 1/4" NUT DRIVER, DAMPER ASSEMBLY SHALL INCLUDE GALVANIZED STEEL DUCT WITH ROLLED BEAD STIFFENERS. REINFORCED BLADE, SELF LUBRICATING BEARING AND WORM GEAR MOUNTING PLATE. DAMPER SHALL BE INSTALLED IN BRANCH DUCT NOT INLET OF DIFFUSER.

LOUVER SCHEDULE

MARK	SERVICE	MANUFACTURER	MODEL	CFM	WIDTH (IN)	LENGTH (IN)	MIN FREE AREA (SF)	MAX VELOCITY	MAX APD (IN W.C.)	NOTES
LV 1	MAU-1 INTAKE	GREENHECK	ESD-435	15100	96	78	30.70	500	0.04	A - C, E
LV 2	EF-2 EXHAUST	GREENHECK	ESD-435	470	22	14	0.70	700	0.06	A - D
LV 3	EF-3 EXHAUST	GREENHECK	ESD-435	945	24	20	1.40	700	0.06	A - D
LV 4	EF-4 EXHAUST	GREENHECK	ESD-435	1350	28	22	1.90	700	0.07	A - D
LV 5	EF-5 EXHAUST	GREENHECK	ESD-435	200	12	12	0.30	700	0.06	A - D
LV 6	EF-6 EXHAUST	GREENHECK	ESD-202	100	10	10	0.10	700	0.07	A - D
LV 7	MAKE UP AIR	GREENHECK	ESD-435	4860	48	48	8.92	540	0.05	A - C, E
LV 8	MAKE UP AIR	GREENHECK	ESD-435	4860	48	48	8.92	540	0.05	A - C, E
LV 9	MAKE UP AIR	GREENHECK	ESD-435	3100	40	40	5.95	530	0.05	A - C, E
LV 10	MAKE UP AIR	GREENHECK	ESD-435	3100	40	40	5.95	530	0.05	A - C, E
LV 11	MAKE UP AIR	GREENHECK	ESD-435	4860	48	48	8.92	540	0.05	A - C, E
LV 12	MAKE UP AIR	GREENHECK	ESD-435	4860	48	48	8.92	540	0.05	A - C, E
LV 13	EF-17 EXHAUST	GREENHECK	ESD-435	460	18	16	1.50	700	0.07	A - D
LV 14	EF-18 EXHAUST	GREENHECK	ESD-435	1000	22	22	1.50	700	0.07	A - D

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NOTES:

A. PROVIDE 1/4" MESH ALUMINUM BIRD SCREEN.
B. PROVIDE ANODIZED FINISH. COLOR AS SELECTED BY ARCHITECT.
C. FRAME TYPE SHALL MATCH WALL CONSTRUCTION, COORDINATE WITH ARCHITECT.
D. PROVIDE WITH INTEGRAL LOW-LEAKAGE BACKDRAFT DAMPER.
E. PROVIDE WITH MOTORIZED CLASS I LOW-LEAKAGE DAMPER.

UVC ULTRAVIOLET EMITTER

MARK	MANUFACTURER	MOUNTING	AIRFLOW (CFM)	DESIGNED AVERAGE INTENSITY IN KILL BOX (µWsec/cm^2)	ELECTRICAL V/PH	ELECTRICAL AMPS	NOTES
UV 1	UVDI	RTU-1 SA DUCT	16000	1940	120/1	17.3	A-D

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NOTES:

A. PROVIDE UVC CONTROLLER WITH BACNET CAPABILITY FOR MONITORING OF EMITTER INTENSITY, ON/OFF, DOOR SWITCH, ETC.
B. PROVIDE ADJUSTABLE LEVEL INTERLOCK SWITCH FOR DOOR SAFETY ON EACH DOOR TO THE COOLING COIL SECTION.
C. PROVIDE RIGID MOUNTING RACK WITH POWER CONNECTIONS FOR MOUNTING OF UV-C EMITTERS.
D. PROVIDE INSTALLATION CLEANING KIT AND WIPES FOR EMITTER INSTALLATION.

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MECHANICAL SCHEDULES

SHEET
M600

CARL J. HOLDEN

VARIABLE AIR VOLUME TERMINAL SCHEDULE (ELECTRIC HEAT)

MARK	SERVED FROM	MANUFACTURER	MODEL	INLET SIZE (IN)	PRIMARY CFM	MIN PRIM CFM	MIN HEAT CFM	MAX HEAT CFM	HEATING COIL EAT	LAT	MBH	KW	STEPS	V/PH	CP TRANS V/PH	NOTES
VAV 1-01	RTU-1	PRICE	SDV	5"	295	90	90	195	55.0	90.0	7.2	2.5	SCR	277/1	INTEGRAL	ALL
VAV 1-02	RTU-1	PRICE	SDV	5"	245	65	65	185	55.0	90.0	6.9	2.5	SCR	277/1	INTEGRAL	ALL
VAV 1-03	RTU-1	PRICE	SDV	12"	1340	540	540	605	55.0	85.0	19.5	6.0	SCR	480/1	INTEGRAL	ALL
VAV 1-04	RTU-1	PRICE	SDV	5"	310	140	140	140	55.0	85.0	4.5	1.5	SCR	277/1	INTEGRAL	ALL
VAV 1-05	RTU-1	PRICE	SDV	7"	445	115	115	225	55.0	90.0	8.4	2.5	SCR	277/1	INTEGRAL	ALL
VAV 1-06	RTU-1	PRICE	SDV	6"	435	90	90	200	55.0	85.0	6.3	2.0	SCR	277/1	INTEGRAL	ALL
VAV 1-07	RTU-1	PRICE	SDV	7"	450	160	160	160	55.0	85.0	5.1	1.5	SCR	277/1	INTEGRAL	ALL
VAV 1-08	RTU-1	PRICE	SDV	5"	290	75	75	205	55.0	90.0	7.7	2.5	SCR	277/1	INTEGRAL	ALL
VAV 1-09	RTU-1	PRICE	SDV	5"	305	155	155	155	55.0	85.0	4.9	1.5	SCR	277/1	INTEGRAL	ALL
VAV 1-10	RTU-1	PRICE	SDV	4"	105	30	30	45	55.0	90.0	1.6	0.5	SCR	277/1	INTEGRAL	ALL
VAV 1-11	RTU-1	PRICE	SDV	9"	920	460	460	460	55.0	85.0	14.9	4.5	SCR	480/1	INTEGRAL	ALL
VAV 1-12	RTU-1	PRICE	SDV	12"	1600	800	800	800	55.0	85.0	25.9	8.0	SCR	480/3	INTEGRAL	ALL
VAV 1-13	RTU-1	PRICE	SDV	5"	300	90	90	900	55.0	85.0	2.9	1.0	SCR	277/1	INTEGRAL	ALL
VAV 1-14	RTU-1	PRICE	SDV	5"	305	65	65	125	55.0	90.0	4.6	1.5	SCR	277/1	INTEGRAL	ALL
VAV 1-15	RTU-1	PRICE	SDV	9"	865	175	175	390	55.0	85.0	12.6	4.0	SCR	277/1	INTEGRAL	ALL
VAV 1-16	RTU-1	PRICE	SDV	7"	575	115	115	205	55.0	85.0	6.5	2.0	SCR	277/1	INTEGRAL	ALL
VAV 1-17	RTU-1	PRICE	SDV	8"	615	125	125	310	55.0	90.0	11.6	3.5	SCR	277/1	INTEGRAL	ALL
VAV 1-18	RTU-1	PRICE	SDV	5"	300	75	75	240	55.0	90.0	9.1	3.0	SCR	277/1	INTEGRAL	ALL
VAV 1-19	RTU-1	PRICE	SDV	7"	580	205	205	320	55.0	90.0	12.1	4.0	SCR	277/1	INTEGRAL	ALL
VAV 1-20	RTU-1	PRICE	SDV	9"	895	405	405	405	55.0	85.0	13.0	4.0	SCR	277/1	INTEGRAL	ALL
VAV 1-21	RTU-1	PRICE	SDV	9"	945	475	475	475	55.0	90.0	17.9	5.5	SCR	480/1	INTEGRAL	ALL
VAV 1-22	RTU-1	PRICE	SDV	6"	320	65	65	160	55.0	90.0	6.0	2.0	SCR	277/1	INTEGRAL	ALL
VAV 1-23	RTU-1	PRICE	SDV	8"	630	130	130	315	55.0	90.0	11.9	3.5	SCR	277/1	INTEGRAL	ALL
VAV 1-24	RTU-1	PRICE	SDV	12"	1445	290	290	795	55.0	90.0	30.0	9.0	SCR	480/3	INTEGRAL	ALL
VAV 1-25	RTU-1	PRICE	SDV	10"	1165	410	410	585	55.0	90.0	22.0	6.5	SCR	480/1	INTEGRAL	ALL
VAV 1-26	RTU-1	PRICE	SDV	4"	85	30	30	80	55.0	90.0	2.9	1.0	SCR	277/1	INTEGRAL	ALL
VAV 1-27	RTU-1	PRICE	SDV	4"	110	30	30	80	55.0	90.0	2.9	1.0	SCR	277/1	INTEGRAL	ALL
VAV 1-28	RTU-1	PRICE	SDV	4"	125	25	25	75	55.0	90.0	2.8	1.0	SCR	277/1	INTEGRAL	ALL

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NOTES:

A. HEATING COIL BASED ON 45 °F MAX. AIR TEMPERATURE RISE, AND 450 FPM MINIMUM COIL FACE VELOCITY.
B. INSTALL FLEXIBLE DUCT CONNECTOR AT INLET CONNECTION.
C. PROVIDE INTEGRAL DISCONNECT SWITCH.
D. PROVIDE FACTORY INSTALLED CONTROL TRANSFORMER, COORDINATE PRIMARY POWER WITH ELECTRICAL DRAWINGS.
E. PROVIDE FACTORY-INSTALLED, PRESSURE INDEPENDENT, DDC CONTROL PACKAGE.
F. PROVIDE BOX WITH EITHER RIGHT HAND OR LEFT HAND CONFIGURATION AS SHOWN ON DRAWINGS.
G. PROVIDE BOX WITH MAGNETIC CONTACTORS FOR NON-HORIZONTAL MOUNTING.
H. FURNISH WITH VAV BOX CONTROLLER AND HIGH SPEED ELECTRONIC ACTUATOR.
J. INLET SIZE SHOWN IS THE MINIMUM ALLOWABLE INLET SIZE. NO SMALLER SIZES SHALL BE ACCEPTED.

FAN SCHEDULE

MARK	LOCATION	MANUFACTURER	MOUNTING	MODEL	CFM	MAX CFM	ESP (IN)	NOM HP	FAN RPM	DRIVE (BELT/DIRECT)	ECM (Y/N)	ELECTRICAL V/PH	DISC TYPE	STARTER TYPE	WEIGHT (LBS)	NOTES
EF 1	401 - RESTROOM	GREENHECK	CEILING	SP-A90	70	-	0.28	0.01	900	DIRECT	No	120/1	NF	MAG	15	C, D, E, H, J, K
EF 2	RESTROOMS/LOCKERS	GREENHECK	INLINE	SQ-90-VG	470	-	0.44	0.10	1609	DIRECT	Yes	120/1	NF	ECM	70	C, D, E, F, H, J
EF 3	RESTROOMS/LOCKERS	GREENHECK	INLINE	SQ-100-VG	945	-	0.50	0.25	1472	DIRECT	Yes	120/1	NF	ECM	65	C, D, E, F, H, J
EF 4	RESTROOMS/LOCKERS	GREENHECK	INLINE	SQ-120-VG	1350	-	0.48	0.50	1420	DIRECT	Yes	120/1	NF	ECM	75	C, D, E, F, H, J
EF 5	RESTROOMS/LOCKERS	GREENHECK	INLINE	SQ-80-VG	200	-	0.41	0.10	1442	DIRECT	Yes	120/1	NF	ECM	70	C, D, E, F, H, J
EF 6	RESTROOMS	GREENHECK	INLINE	SQ-70-VG	100	-	0.26	0.07	1364	DIRECT	Yes	120/1	NF	ECM	45	C, D, E, F, H, J
EF 7	FLEET MAINTENANCE BAY	GREENHECK	ROOF	G-200-VG	1900	5300	1.11	3.00	1233	DIRECT	Yes	208/3	NF	ECM	210	A, B, D, E, F, G, J
EF 8	FLEET MAINTENANCE BAY	GREENHECK	ROOF	G-200-VG	1900	5300	1.11	3.00	1233	DIRECT	Yes	208/3	NF	ECM	210	A, B, D, E, F, G, J
EF 9	FLEET MAINTENANCE BAY	GREENHECK	ROOF	G-240-C-VGD	2500	6665	0.45	2.00	824	DIRECT	Yes	208/3	NF	ECM	260	A, B, D, E, F, G, J
EF 10	FLEET MAINTENANCE BAY	GREENHECK	ROOF	G-240-C-VGD	2500	6665	0.45	2.00	824	DIRECT	Yes	208/3	NF	ECM	260	A, B, D, E, F, G, J
EF 11	FLEET MAINTENANCE BAY	GREENHECK	ROOF	G-200HP-VG	1800	5000	1.01	3.00	1486	DIRECT	Yes	208/3	NF	ECM	215	A, B, D, E, F, G, J
EF 12	FLEET MAINTENANCE BAY	GREENHECK	ROOF	G-200HP-VG	1800	5000	1.01	3.00	1486	DIRECT	Yes	208/3	NF	ECM	215	A, B, D, E, F, G, J
EF 13	COMMON WORK AREA	GREENHECK	ROOF	G-180-VG	1000	2800	0.68	1.00	954	DIRECT	Yes	120/1	NF	ECM	130	A, B, D, E, F, G, J
EF 14	TIRE SHOP	GREENHECK	ROOF	G-140-VG	1000	2500	0.37	1.00	1477	DIRECT	Yes	120/1	NF	ECM	80	A, B, D, E, F, G, J
EF 15	PARTS ROOM	GREENHECK	ROOF	G-095-VG	750	-	0.58	0.17	1725	DIRECT	Yes	120/1	NF	ECM	50	A, B, D, E, F, H, J
EF 16	LUBE/COMPRESSOR	GREENHECK	ROOF	G-095-VG	750	-	0.58	0.17	1725	DIRECT	Yes	120/1	NF	ECM	50	A, B, D, E, F, H, J
EF 17	WATER SHOP	GREENHECK	INLINE	SQ-90-VG	460	-	0.44	0.10	1398	DIRECT	Yes	120/1	NF	ECM	60	C, D, E, F, H, J
EF 18	FACILITIES WAREHOUSE	GREENHECK	INLINE	SQ-120-VG	1000	-	0.48	0.50	1072	DIRECT	Yes	120/1	NF	ECM	75	C, D, E, F, H, J
EF 19	BATTERY STORAGE	GREENHECK	ROOF	G-060-VG	100	-	0.25	0.07	1486	DIRECT	Yes	120/1	NF	ECM	20	A, B, D, E, F, H, J
EF 20	401 - RESTROOM	GREENHECK	CEILING	SP-A90	70	-	0.28	0.01	900	DIRECT	No	120/1	NF	MAG	15	C, D, E, H, J, K

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. PROVIDE INSULATED ROOF CURB WITH MINIMUM HEIGHT REQUIRED TO MAINTAIN BOTTOM OF EQUIPMENT A MINIMUM OF 8 INCHES ABOVE FINISHED ROOF SURFACE. PROVIDE SLOPED CURB IF NEEDED TO MATCH ROOF SLOPE. COORDINATE WITH ROOF INSULATION THICKNESS AND ROOF TAPER AT INSTALLED LOCATION. COORDINATE CURB TYPE WITH DRAWINGS.
B. PROVIDE BIRDSCREEN AND GRAVITY BACKDRAFT DAMPER.
C. PROVIDE WITH SPRING VIBRATION ISOLATION AND ALL-THREAD HANGING RODS.
D. DIVISION 26 CONTRACTOR SHALL PROVIDE DISCONNECT SWITCH.
E. STARTER FURNISHED INTEGRAL WITH UNIT.
F. PROVIDE WITH MANUFACTURER'S ELECTRONICALLY COMMUTATED (EC) MOTOR.
G. SCHEDULED MAX CFM IS THE EXHAUST FAN CFM DURING EMERGENCY MODE. REFER TO CONTROLS FOR MORE INFORMATION.
H. EXHAUST FAN IS CONSTANT VOLUME.
J. REFER TO CONTROLS SHEET M702 FOR FAN OPERATION CONTROLS.
K. INTERLOCK FAN WITH LOCAL LIGHT SWITCH.

INDUSTRIAL CEILING FAN SCHEDULE

MARK	LOCATION	MANUFACTURER	MODEL	MOUNTING	DIAMETER (FT)	BLADES	DRIVE (BELT/DIRECT)	MIN WATTS	FAN RPM	VFD (Y/N)	ELECTRICAL VOLTS	PH	NOTES
ICF 1	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 2	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 3	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 4	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 5	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 6	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 7	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 8	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 9	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 10	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 11	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D
ICF 12	MAINTENANCE BAY	MARLEY	60001HP	SUSPENDED	5	3	DIRECT	70	315	No	120	1	A-D

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. PROVIDE WITH MANUFACTURER'S WALL SPEED CONTROLLER WITH ON/OFF CONTROL AND REVERSIBLE FUNCTION.
B. MOUNT FAN TO STRUCTURE, COORDINATE ATTACHMENTS TO STRUCTURE WITH STRUCTURAL ENGINEER.
C. COORDINATE FAN INSTALLATION WITH GC AND ALL OTHER TRADES. MAINTAIN MANUFACTURER RECOMMENDED CLEARANCES FOR PROPER OPERATION AND MAINTENANCE.
D. PROVIDE WITH 24 INCH DOWNROD.

COMPUTER ROOM UNIT SCHEDULE

MARK	MANUFACTURER	MODEL	REFR TYPE	EVAPORATOR SECTION CFM	TC (MBH)	V/PH	MCA	CU MARK	CONDENSING SECTION AMB (°F)	V/PH	MCA	MOCP	NOTES
CRU 1	MITSUBISHI	PKA-A24/PUY-A24	R410A	700	24.0	208/1	1.0	CU 1	105	208/1	19.0	26	ALL
CRU 2	MITSUBISHI	PKA-A24/PUY-A24	R410A	700	24.0	208/1	1.0	CU 2	105	208/1	19.0	26	ALL
CRU 3	MITSUBISHI	PKA-A24/PUY-A24	R410A	700	24.0	208/1	1.0	CU 3	105	208/1	19.0	26	ALL
CRU 4	MITSUBISHI	PKA-A24/PUY-A24	R410A	700	24.0	208/1	1.0	CU 4	105	208/1	19.0	26	ALL
CRU 5	MITSUBISHI	PKA-A12/PUY-A12	R410A	425	12.0	208/1	1.0	CU 5	105	208/1	11.0	28	ALL

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NOTES:

A. CONTRACTOR SHALL VERIFY WITH EQUIPMENT SUPPLIER EXACT ROUTING AND SIZE OF INSULATED REFRIGERANT PIPING. INSTALL PER MANUFACTURERS RECOMMENDATIONS.
B. DIVISION 26 CONTRACTOR TO PROVIDE DISCONNECT SWITCH FOR EVAPORATOR SECTION AND CONDENSING SECTION.
C. PROVIDE WITH WALL MOUNTED THERMOSTAT BY UNIT MANUFACTURER.
D. PROVIDE WITH INTEGRAL CONDENSATE PUMP.
E. PROVIDE CONDENSER COIL HAIL GUARDS.
F. PROVIDE WITH EQUIPMENT SUPPORT RAILS. INSTALL OUTDOOR UNIT ON RAILS AND ANCHOR TO EXTERIOR CONCRETE PAD.
G. INDOOR UNIT POWERED THROUGH OUTDOOR UNIT. WIRING BETWEEN INDOOR AND OUTDOOR UNITS PROVIDED BY DIVISION 26 CONTRACTOR. COORDINATE CONDUCTOR QUANTITY WITH MANUFACTURER'S REQUIREMENTS.
H. PROVIDE WITH WIND BAFFLE AND LOW AMBIENT OPERATION DOWN TO 0°F.

NATURAL GAS-FIRED INFRARED HEATERS SCHEDULE

MARK	LOCATION	MANUFACTURER	MODEL	NOM INPUT (MBH)	MIN NO STAGES	MOUNTING MIN HEIGHT A.F.F. (FT)	ANGLE	ELECTRICAL VOLTS	PH	WEIGHT (LBS)	NOTES
RH 01	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 02	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 03	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 04	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 05	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 06	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 07	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 08	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 09	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 10	MAINTENANCE BAY	MODINE	IHR60	60	1	20	20°	120	1	60	ALL
RH 11	MAINTENANCE BAY	MODINE	IHR60	60	1	18	20°	120	1	60	ALL
RH 12	MAINTENANCE BAY	MODINE	IHR60	60	1	18	20°	120	1	60	ALL
RH 13	MAINTENANCE BAY	MODINE	IHR60	60	1	18	20°	120	1	60	ALL
RH 14	MAINTENANCE BAY	MODINE	IHR60	60	1	18	20°	120	1	60	ALL
RH 15	MAINTENANCE BAY	MODINE	IHR60	60	1	18	20°	120	1	60	ALL
RH 16	MAINTENANCE BAY	MODINE	IHR60	60	1	18	20°	120	1	60	ALL

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. PROVIDE WITH PARABOLIC REFLECTOR.
B. PROVIDE WITH HEAT DEFLECTOR.
C. PROVIDE WITH WIRE GRID.
D. PROVIDE WITH NECESSARY MOUNTING BRACKET AND ACCESSORIES TO RIGIDLY MOUNT FROM STRUCTURE.
E. DIVISION 26 CONTRACTOR SHALL PROVIDE DISCONNECT INSTALLED ON SERVICE SIDE OF UNIT.
F. PROVIDE GAS FLEXIBLE CONNECTOR AND SHUTOFF VALVE.
G. CONTRACTOR SHALL COORDINATE FINAL INSTALLATION LOCATION WITH OTHER DISCIPLINES. MAINTAIN RECOMMENDED CLEARANCES AS REQUIRED BY THE MANUFACTURER.

UNIT HEATER SCHEDULE (ELECTRIC)

MARK	MANUFACTURER	MODEL	MIN OUT (MBH)	NOM (KW)	CFM	MOTOR HP	V/PH	DISC TYPE	NOTES
UH 1	QMARK	MUH03-81	10.2	3.0	350	0.01	208/1	NF	B, D-G
UH 2	QMARK	MUH03-81	10.2	3.0	350	0.01	208/1	NF	B, D-G
UH 3	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	B, D-G
UH 4	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	A, D-G
UH 5	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	A, D-G
UH 6	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	A, D-G
UH 7	QMARK	MUH07-8	25.6	7.5	650	0.03	208/1	NF	B, D-G
UH 8	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	B, D-G
UH 9	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	B, D-G
UH 10	QMARK	MUH15-1	51.2	15.0	910	0.05	480/3	NF	C-G
UH 11	QMARK	MUH15-2	51.2	15.0	910	0.05	480/3	NF	C-G
UH 12	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	B, D-G
UH 13	QMARK	MUH15-8	51.2	15.0	910	0.05	208/3	NF	C-G
UH 14	QMARK	MUH15-8	51.2	15.0	910	0.05	208/3	NF	C-G
UH 15	QMARK	MUH05-81	17.0	5.0	350	0.01	208/1	NF	B, D-G

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. MOUNT 8.5 FEET ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
B. MOUNT 10 FEET ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
C. MOUNT 14 FEET ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
D. PROVIDE WITH UNIT MOUNTED THERMOSTAT.
E. PROVIDE NECESSARY MOUNTING BRACKET AND ACCESSORIES FOR HORIZONTAL MOUNTING.
F. DISCONNECT SWITCH PROVIDED BY DIVISION 26 CONTRACTOR.
G. MAINTAIN MANUFACTURER'S MINIMUM REQUIRED CLEARANCES ON ALL SIDES.

CABINET UNIT HEATER SCHEDULE (ELECTRIC)

MARK	MANUFACTURER	MODEL	MIN OUT (MBH)	NOM (KW)	MOUNTING TYPE	V/PH	MCA	DISC TYPE	NOTES
CUH 1	QMARK	MCSSAR4808	13.6	4.0	RECESSED WALL	208/1	19.2	NF	A-D
CUH 2	QMARK	MCSSAR4808	13.6	4.0	RECESSED WALL	208/1	19.2	NF	A-D
CUH 3	QMARK	MCSSAR4808	13.6	4.0	RECESSED WALL	208/1	19.2	NF	A-D
CUH 4	QMARK	MCSSAR4808	13.6	4.0	RECESSED WALL	208/1	19.2	NF	A-D
CUH 5	QMARK	MCSSAR1802	6.1	1.8	RECESSED WALL	120/1	15.0	NF	A-D

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. MOUNT 1 FOOT ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
B. PROVIDE WITH UNIT MOUNTED THERMOSTAT.
C. PROVIDE NECESSARY MOUNTING BRACKET AND ACCESSORIES FOR MOUNTING SPECIFIED.
D. PROVIDE FACTORY MOUNTED DISCONNECT.

UNIT HEATER SCHEDULE (NATURAL GAS)

MARK	MANUFACTURER	MODEL	NOM INPUT (MBH)	MIN OUT (MBH)	MIN EFF (%)	CFM	MOTOR HP	THROW (FT)	V/PH	DISC TYPE	NOTES
GUH 1	MODINE	HDS125	125	102.5	80	1980	0.13	56	120/1	NF	ALL
GUH 2	MODINE	HDS125	125	102.5	80	1980	0.13	56	120/1	NF	ALL
GUH 3	MODINE	HDS125	125	102.5	80	1980	0.13	56	120/1	NF	ALL

MODEL NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY MANUFACTURER AND MODEL NUMBERS ONLY. REVIEW THE COMPLETE DESCRIPTION, NOTES AND SPECIFICATIONS TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.

NOTES:

A. MOUNT 14 FEET ABOVE FINISHED FLOOR WITHOUT OBSTRUCTING AIRFLOW.
B. PROVIDE WITH WALL MOUNTED THERMOSTAT.
C. PROVIDE NECESSARY MOUNTING BRACKET AND ACCESSORIES FOR HORIZONTAL WALL MOUNTING. INSTALL SUCH THAT ALL REQUIRED CLEARANCES ARE MAINTAINED.
D. PROVIDE FACTORY MOUNTED DISCONNECT SWITCH INSTALLED ON SERVICE SIDE OF UNIT.
E. PROVIDE WITH STAINLESS STEEL HEAT EXCHANGER.
F. PROVIDE WITH TWO-STAGE ELECTRONIC OPERATED GAS CONTROL VALVE.

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REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: MJS
DATE: 12.15.22 REVIEWED BY: CJH

STATE OF MISSOURI
CARL J. HOLDEN
NUMBER PE-2020016283
PROFESSIONAL ENGINEER

01/24/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

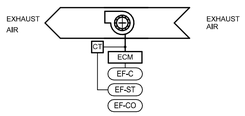
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

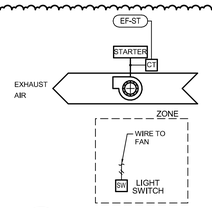
MECHANICAL SCHEDULES

SHEET
M601

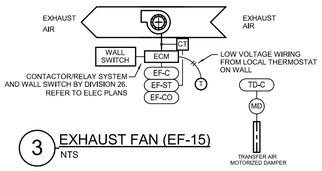
CARL J. HOLDEN



1 EXHAUST FAN (EF's 2-6,16-19)
NTS



2 EXHAUST FAN (EF's 1, 20)
NTS



3 EXHAUST FAN (EF-15)
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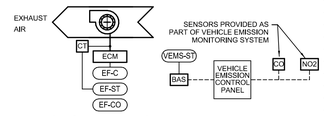


4 SHOP EXHAUST FAN WITH EMERGENCY MODE (EF's 7-14)
NTS

SEQUENCE OF OPERATIONS
EXHAUST FANS (EF's)

OPERATING MODES
OCCUPIED MODE:
The fan shall be in occupied mode per the project design conditions schedule shown on the control drawings.
UNOCCUPIED MODE:
The fan shall be in unoccupied mode for all periods not included in the occupied hours of operation.
EMERGENCY MODE (EF's 7-14):
The fan shall be in emergency mode upon receiving a signal from the vehicle emission monitoring system control panel that concentrations of CO and/or NO2 have been detected above their setpoints (35 PPM CO & 1 PPM NO2) or when manually activated by the BAS.

SAFETIES, OVERRIDES AND INTERLOCKS
LOCAL SWITCH INTERLOCK (EF's 1 & 20)
Fan shall be interlocked with local switch.
LOCAL THERMOSTAT INTERLOCK (EF-15)
Fan shall be interlocked with local thermostat. Fan shall energize when local thermostat exceeds setpoint.
ISOLATION DAMPER INTERLOCK (EF-15):
Interlock the motorized isolation damper with the associated fan. Prove damper position is open and include time delay prior to starting fan. Close damper after fan is commended OFF.

COMPONENT CONTROL LOOPS

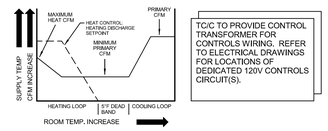
FAN CONTROL – CONSTANT VOLUME LOCAL LIGHT SWITCH (EF's 1 & 20)
All modes:
The fan shall be on when local light switch is in the on position.
The fan shall be off when the local light switch is in the off position.

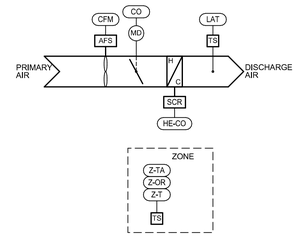
FAN CONTROL – CONSTANT VOLUME BAS SCHEDULED (EF's 2-6,16-19)
When in Occupied Mode:
The fan shall be ON.
The ECM motor shall be used for soft start and to balance the fan for constant speed operation to achieve the scheduled airflow value.
When in Unoccupied Mode:
The fan shall be OFF.

FAN CONTROL – CONSTANT VOLUME BAS THERMOSTATIC CONTROL (EF-15)
When in Occupied Mode:
The BAS shall energize the fan motor starter. Exhaust fan shall run if the motor starter switch is set to ON by local user or if local thermostat setpoint is above 80°F (adj.).
The ECM motor shall be used for soft start and to balance the fan for constant speed operation to achieve the scheduled airflow value.
Interlock motorized transfer air damper to open when fan is running. Damper shall close when fan turns off and after a 1 minute (adj.) time delay.
When in Unoccupied Mode:
The fan shall operate as if in Occupied Mode.

FAN CONTROL – CONSTANT VOLUME WITH EMERGENCY MODE (EF's 7-14)
When in Occupied Mode:
The fan shall energize and slowly ramp to the minimum fan speed that correlates to the scheduled minimum airflow setpoint.
The ECM motor shall be used for soft start and to balance the fan for constant speed operation to achieve the scheduled airflow value.
When in Emergency Mode:
The fan ECM shall ramp up the exhaust airflow to the scheduled maximum setpoint for 15 minutes (adj.).
If the CO/NO2 concentration level (as measured by the vehicle emission montoring system) falls below the setpoint after the time period is complete, the fan shall slow down to the scheduled minimum airflow setpoint.
If the CO/NO2 concentration level (as measured by the vehicle emission montoring system) is still above the setpoint, the fan shall remain at the scheduled maximum airflow setpoint and an alarm shall be sent to the BAS.
When the concentration level (as measured by the vehicle emission montoring system) drops below the setpoint, the fan shall slow down to the scheduled minimum airflow setpoint.
When in Unoccupied Mode:
The fan shall be OFF.

VAV CONTROL SCHEMATIC
VAV COOLING AND HEATING
DUAL MAXIMUM
MODULATING HEATER





5 AIR TERMINAL CONTROL SCHEMATIC
NTS

SEQUENCE OF OPERATIONS
SINGLE DUCT BOX WITH ELECTRIC HEAT

This sequence of operations is organized into the following main categories: operating modes, control setpoint resets, safeties, overrides and interlocks, and component control loops. The operating modes describe the criteria that either enable or disable the various modes of operation. If a mode of operation is not listed within a component control loop section then that mode of operation has no direct influence on the operation of the component. The control setpoint reset section describes the logic and reference variables that will be used to reset control setpoints to a new value within its reset range. The safeties, overrides, and interlocks section outlines the hardwired interlocks that are required to meet life safety requirements. Safeties and interlocks take precedence over all other control strategies outlined in this document. The control responses of each component for the various modes of operation are described in the component control loop sections. Setpoints shall be adjustable (adj.) as noted.

The sequence of operations, the points list and control diagrams shall be used to provide a complete description of the control philosophy for the controlled equipment. Individual setpoint values, reset ranges, and alarm action levels are listed in the points list. Components and control sensor locations are graphically depicted on the control diagram. The controls contractor shall be responsible for coordinating any necessary time delay setpoints to establish stable system operation.

GENERAL DESCRIPTION

The air terminal units described by this sequence consist of a primary air damper and an electric heating coil that operate to provide heating, ventilation, and air conditioning for the conditioned space as shown on the drawings.

OPERATING MODES
UNOCCUPIED MODE:
The unit shall be in unoccupied mode for all periods not included in the occupied hours of operation. Overrides of unoccupied schedule are defined at the zone level control.
OCCUPIED MODE:
The unit shall be in occupied mode per the Project Design Conditions schedule shown on the control drawings.
COOLING MODE:
The unit shall be in cooling mode when the zone temperature (Z-T) rises above the dead band (Z-T-DB).
HEATING MODE (HEATING BOXES ONLY):
The unit shall be in heating mode when the zone temperature (Z-T) falls below the dead band (Z-T-DB).
MORNING WARM UP/COOL DOWN MODE:
The unit shall be in morning warm up/cool down mode when the associated air handler activates its morning warm up/cool down mode.
LOSS OF POWER RESTART DELAY MODE:
The unit shall be in loss of power mode upon restoration of power after an unexpected loss of power. The unit shall remain in this mode for the duration as defined by the unit start delay (USD) setpoint. Once the unit start delay duration has expired, the unit shall return to its previous mode prior to loss of power.

CONTROL SETPOINT RESETS
SPACE TEMPERATURE SETPOINT RESET
When in unoccupied mode the zone temperature set point shall be reset to the setback value indicated in the Project Design Conditions Schedule on the controls drawings.

SAFETIES, OVERRIDES AND INTERLOCKS
MANUAL OCCUPANCY OVERRIDE:
Unit shall be forced into the occupied mode of operation based on input from zone manual occupancy override (Z-OR).
ELECTRIC HEATER AIRFLOW INTERLOCK:
The unit electric heating coil shall not energize unless minimum airflow is across the heating coil.
FIRE ALARM CONTROL PANEL INTERLOCK:
The unit shall be disabled upon signal from the fire alarm control panel.

COMPONENT CONTROL LOOPS
PRIMARY AIR DAMPER – DUAL MAXIMUM
Correlate the minimum primary airflow setpoint and design primary airflow cooling setpoint to a 0-10 Vac signal for each box.
When in Occupied Mode:
When in Cooling Mode:
The unit shall modulate the primary air damper between the primary airflow setpoint and minimum primary airflow setpoint as required to maintain zone temperature setpoint. An increase in room temperature causes airflow to increase.
When in Heating Mode:
The unit shall remain at the minimum primary airflow setpoint while heating coil operates as described in the Heating Coil component control loop.
After the unit discharge temperature (LAT) has reached its maximum value, the primary air damper shall be allowed to modulate between the minimum primary airflow setpoint and maximum heating airflow setpoint as required to maintain space temperature. A decrease in room temperature causes airflow to increase.
When in Unoccupied Mode:
The unit shall operate as if in Occupied Mode, but the damper shall be allowed to modulate to a fully closed position.
When in Morning Warm Up/Cool Down Mode:
The primary air damper shall operate as if in Occupied Mode.

HEATING COIL - ELECTRIC SCR - MODULATING WITH DUAL MAXIMUM
When in Cooling Mode:
The heating coil shall remain off.
When in Heating Mode:
The heating coil SCR controller shall modulate as required to maintain zone temperature setpoint (Z-T) up to discharge temperature (LAT) maximum value.
Once the discharge temperature (LAT) has reached its maximum scheduled value the heating coil SCR controller shall modulate as required to maintain constant discharge temperature (LAT) at maximum scheduled value.
Once primary airflow (CFM) again reaches its scheduled minimum value, the discharge temperature (LAT) shall be permitted to modulate below its maximum value.

POINTS LIST - FAN

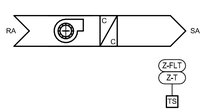
POINT ID	DESCRIPTION	POINT TYPE	DEFAULT SET POINT	SET POINT RESET RANGE	FAIL POSITION	ALARM STATUS	ALARM RANGE	NOTES
CONSTANT VOLUME LOCAL LIGHT SWITCH (EF's 1 & 20)								
EF-ST	FAN STATUS	BI						
CONSTANT VOLUME BAS SCHEDULED (EF's 2-6,16-19)								
EF-C	FAN COMMAND (START/STOP)	BO						
EF-CO	FAN CONTROL OUTPUT - SPEED	AI		SCHED				
EF-ST	FAN STATUS	BI				X	EF-ST <> EF-C	
CONSTANT VOLUME THERMOSTATIC CONTROL (EF-15)								
EF-C	FAN COMMAND (START/STOP)	BO						
EF-ST	FAN STATUS	BI				X	EF-ST <> EF-C	
CONSTANT VOLUME WITH EMERGENCY MODE (EF's 7-14)								
EF-C	FAN COMMAND (START/STOP)	BO						
EF-ST	FAN STATUS	BI				X	EF-ST <> EF-C	
VEMS-ST	VEHICLE EMISSION MONITORING SYSTEM CONTROL PANEL	AI				X	COMMON ALARM	
DAMPER (TWO-POSITION)								
TD-C	TRANSFER AIR DAMPER COMMAND	BO			NO			

PROVIDE UNIQUE POINT NAME FOR EACH CONTROL POINT CONSISTENT WITH THE MARK IDENTIFER ON THE EQUIPMENT SCHEDULE (E.G. EF01-F-C).
REFER TO SPECIFICATION FOR ADDITIONAL REQUIREMENTS.
BAS CONTRACTOR SHALL PROVIDE POINT AND DEVICE UNLESS OTHERWISE NOTED.

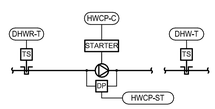
POINTS LIST - VAV W/ ELECTRIC HEAT

POINT ID	DESCRIPTION	POINT TYPE	DEFAULT SETPOINT	FAIL POSITION	STATUS ALARM	ALARM RANGE	NOTES
ZONE LEVEL SENSORS							
Z-T	ZONE TEMPERATURE	AI	SCHED.				C, D
Z-OR	MANUAL OCCUPANCY OVERRIDE	BI	2 HOURS				C
Z-TA	MANUAL TEMPERATURE SETPOINT ADJUST	AI	+/- 2 F				C
SINGLE DUCT BOX							
CFM	PRIMARY AIRFLOW	AI	SCHED.				
CO	PRIMARY AIR DAMPER CONTROL OUTPUT	AO					
LAT	DISCHARGE AIR TEMPERATURE	AI	SCHED.				
TERMINAL HEATING COIL - ELECTRIC SCR MODULATING							
HE-CO	ELECTRIC HEAT SCR CONTROL OUTPUT	AO	SCHED.				

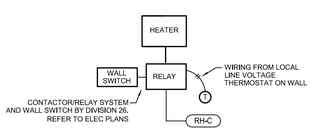
NOTES:
C. POINT SHALL BE ADJUSTABLE.
D. REFERENCE PROJECT DESIGN CONDITIONS SCHEDULE FOR SETPOINT.



6 COMPUTER ROOM UNIT MONITORING (CRU's)
NTS

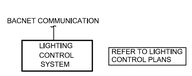


7 DOMESTIC HOT WATER RECIRCULATING PUMP
NTS



8 RADIANT & GAS UNIT HEATERS
NTS

9 EMERGENCY MODE INTAKE LOUVER DAMPERS (LV's 7-12)
NTS



10 RELAY BASED LIGHTING CONTROL SYSTEM
NTS

LOCATED IN 217 WATER SHOP.
318 STEET STORAGE, 437 FACILITIES WAREHOUSE.
SENSORS PROVIDED BY CONTROLS CONTRACTOR.

11 ZONE CO2 AND NO2 SENSORS
NTS

NOTE: REFER TO ELECTRICAL SHEETS FOR QUANTITY AND LOCATION OF GENERATORS.

12 GENERATOR CONTROL DIAGRAM
NTS

SEQUENCE OF OPERATIONS MISCELLANEOUS EQUIPMENT

DOMESTIC HOT WATER RECIRCULATION SYSTEM
The BAS shall monitor the domestic hot water recirculation system. Should the domestic hot water pump error or malfunction, an alarm shall be generated. The pump shall be continuously operated between the hours of 5am and 8pm (adj.).

SPLIT SYSTEM ROOM AC UNITS (CRU's)
The BAS shall monitor the room temperature. If space temperature rises 10°F (adj.) above setpoint, an alarm shall be generated at the BAS.

RADIANT & GAS UNIT HEATERS
OPERATING MODES
Occupied Mode:
The unit shall be in occupied mode per the Project Design Conditions Schedule shown on M700.
Unoccupied Mode:
The unit shall be in unoccupied mode for all periods not included in the occupied hours of operation. Overrides of unoccupied schedule are defined at the zone level control.

COMPONENT CONTROL LOOPS
When in Occupied Mode:
The BAS shall energize the heater relay circuit based on the occupied schedule.
Heater shall be ON and control to the local thermostat setpoint for either of the following scenarios.
If the local wall switch is set to ON by local user.
If the shop exhaust fans (EF's 7-14) are in Emergency mode and the outdor air temperature sensor (OAT) is below 32°F (adj.).
When in Unoccupied Mode:
The heater shall be OFF.

MOTORIZED DAMPERS – LOUVERS LV-7,8,9,10,11,12
OPERATING MODES
Occupied Mode:
The unit shall be in occupied mode per the Project Design Conditions Schedule shown on M700.
Unoccupied Mode:
The unit shall be in unoccupied mode for all periods not included in the occupied hours of operation.

COMPONENT CONTROL LOOPS

When in Occupied Mode:
The damper shall be closed except for the following scenarios.
If the makeup air unit MAU-1 is off, the damper shall open.
If the shop exhaust fans (EF's 7-14) are in Emergency mode, the damper shall open.
When in Unoccupied Mode:
The damper shall be closed.

RELAY BASED LIGHTING CONTROL SYSTEM
Fully integrate the relay based lighting control system into the BAS. The relay based lighting control system controls common area lighting and exterior lighting. The relay based lighting control system will be BACnet compatible. (Reference specification 260943 Relay Based Lighting Controls).

ZONE CO2 AND NO2 SENSORS
If the zone CO/NO2 sensors detect concentration levels above the setpoint, an alarm shall be generated at the BAS. The sensors shall also generate an audible alarm at the zone level.

EMERGENCY GENERATOR CONTROL PANEL
The BAS shall monitor the emergency generator control panel. If the generator control panel is alarming, the BAS shall generate an alarm to alert the facility manager.

MISCELLANEOUS CONTROL POINTS

POINT ID	DESCRIPTION	POINT TYPE	DEFAULT SETPOINT	FAIL POSITION	STATUS ALARM	ALARM RANGE	NOTES
SPLIT SYSTEM ROOM AC UNITS (CRU)							
Z-T	ZONE TEMPERATURE	AI					A
Z-FLT	ZONE TEMPERATURE ALARM	BI			X	Z-T < STPT-10 DEG F	A, D
EMERGENCY MODE INTAKE LOUVER DAMPERS							
EMD-C	DAMPER COMMAD (OPEN/CLOSE)	BO					A
EMD-ST	DAMPER STATUS	BI			X	EMD-ST <> EMD-C	A, C
DOMESTIC HOT WATER RECIRCULATING PUMP							
DHWR-T	DOMESTIC HOT WATER RETURN TEMPERATURE	AI					
DHW-T	DOMESTIC HOT WATER SUPPLY TEMPERATURE	AI	110 DEG F		X	DHW-T > 115 DEG F	A, D
HWCP-C	HOT WATER RECIRCULATING PUMP COMMAND (START/STOP)	BO					
HWCP-ST	HOT WATER RECIRCULATING PUMP STATUS (CT)	BI			X	HWCP-C=ON, HWCP-ST=OFF	A, C
ZONE CO2 AND NO2 SENSORS							
Z-CO	ZONE CARBON MONOXIDE	AI	35 PPM		X	Z-CO > STPT	A, E
Z-NO2	ZONE NITROGEN DIOXIDE	AI	1 PPM		X	Z-NO2 >STPT	A, E
EMERGENCY GENERATOR CONTROL PANEL							
GEN-ST	GENERATOR STATUS	BI			X	COMMON ALARM	
RADIANT & GAS UNIT HEATERS							
RH-C	RADIANT & GAS UNIT HEATER COMMAND	BO					A

NOTES:
A. POINTS APPLY TO MULTIPLE UNITS. SEE DRAWINGS FOR NUMBER OF UNITS.
C. ALARM TO SIGNAL AFTER 30 SECOND TIME DELAY (ADJ.)
D. ALARM TO SIGNAL AFTER 10 MINUTE TIME DELAY (ADJ.)
E. ALARM SHALL BE GENERATED AT THE BAS AS WELL AS AUDIBLE ALARM AT THE ZONE SENSOR.

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DATE: 12.15.22 REVIEWED BY: CJH

STATE OF MISSOURI
CARL J. HOLDEN
HOLDEN
PE-2020016283
PROFESSIONAL ENGINEER
01/24/2023

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LICENSE # PE-2020016283

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY
PROJECT ADDRESS:
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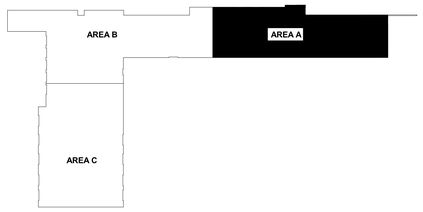
MECHANICAL CONTROLS

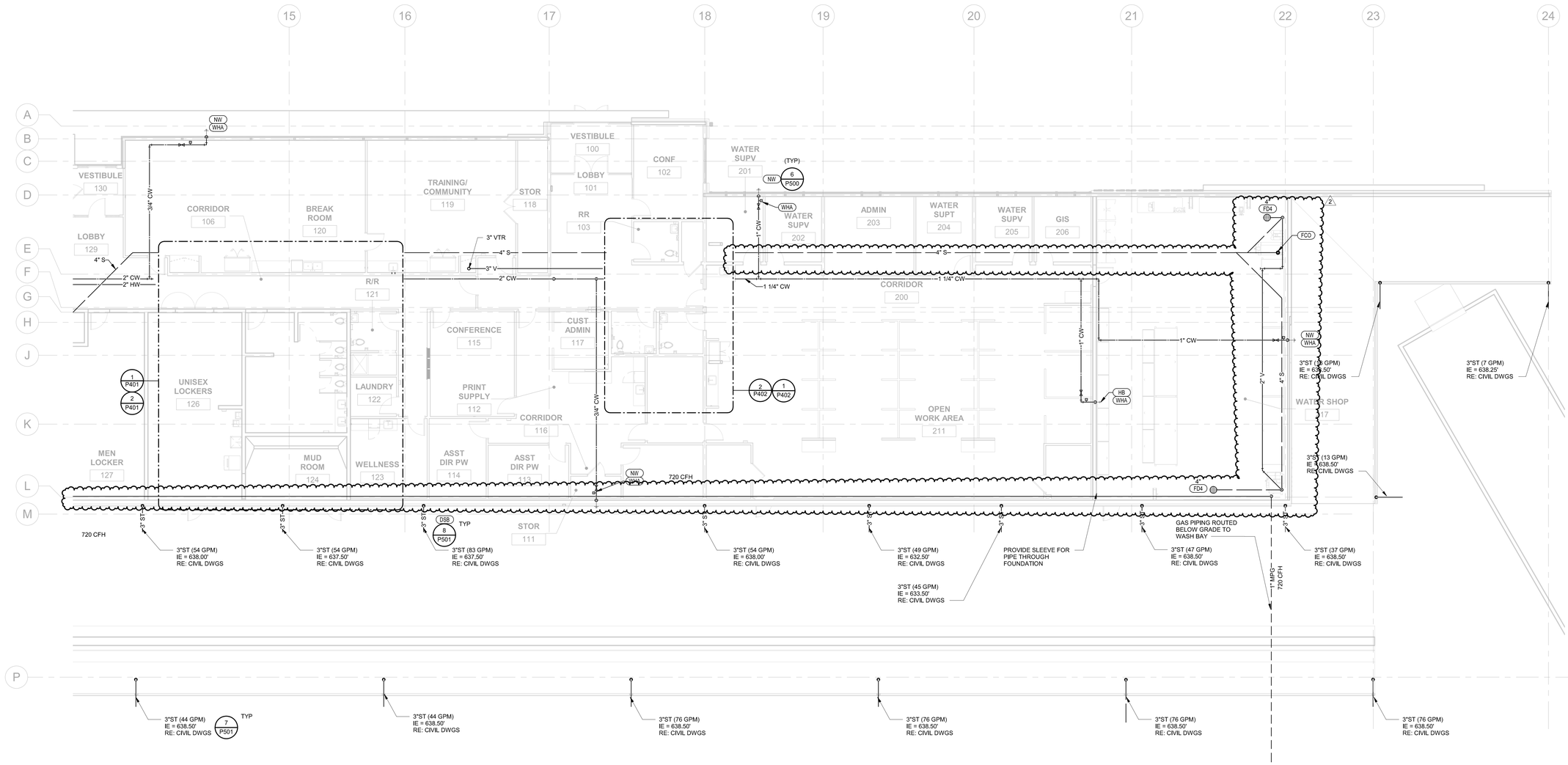
SHEET
M702

CARL J. HOLDEN

PLUMBING PLAN NOTES:



KEY PLAN



1 PLUMBING LEVEL 1 PLAN - AREA A
1/8" = 1'-0"

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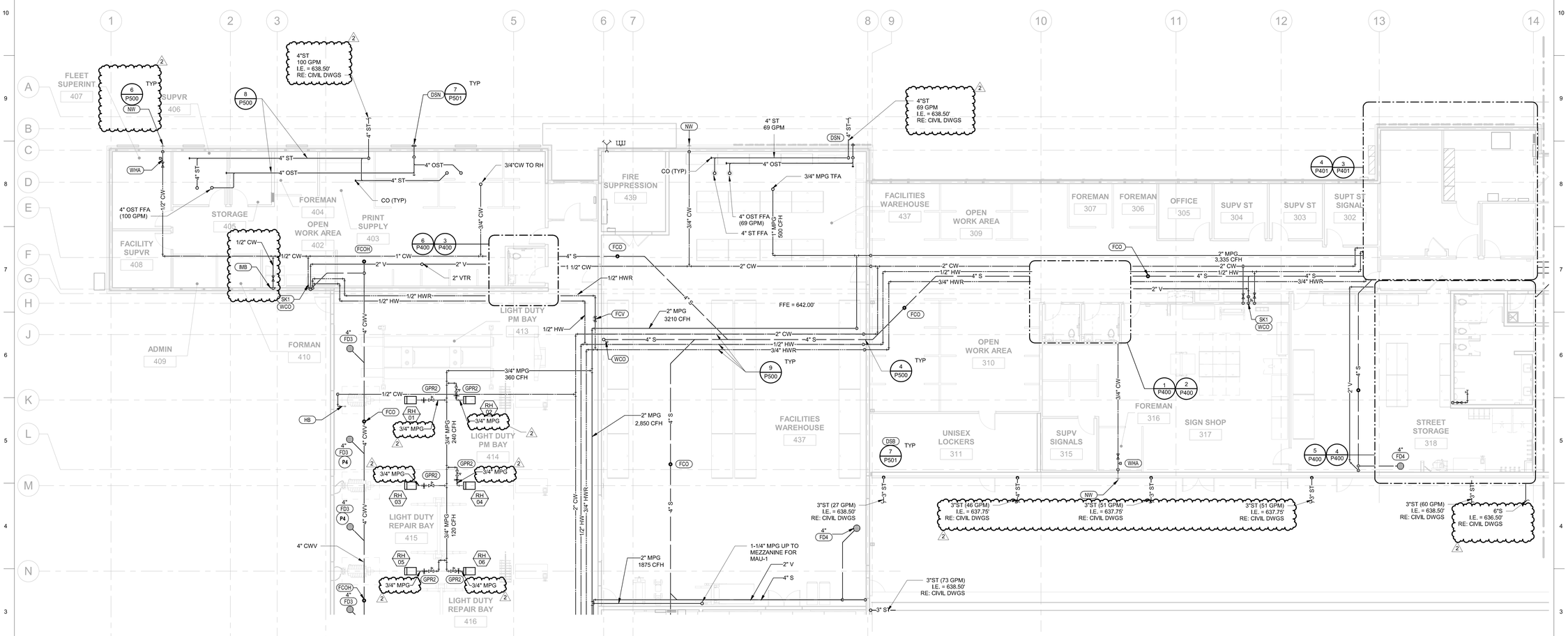
PLUMBING LEVEL 1 PLAN - AREA A

SHEET
P101A

CARL J. HOLDEN

KEY PLAN

RADIANT HEATER COORDINATION:
ALL CONTRACTORS SHALL COORDINATE ROUTING OF DUCTWORK, PIPING, CONDUIT, WIRING AND OTHER ELEMENTS WITH OVERHEAD RADIANT HEATER REQUIRED CLEARANCES. COORDINATE WITH DIVISION 23 CONTRACTOR TO MAINTAIN HEATER MANUFACTURER'S REQUIRED CLEARANCES TO COMBUSTIBLES. CONTRACTORS ARE RESPONSIBLE FOR RESOLVING CONFLICTS AS THEY ARISE.



1 PLUMBING LEVEL 1 PLAN - AREA B
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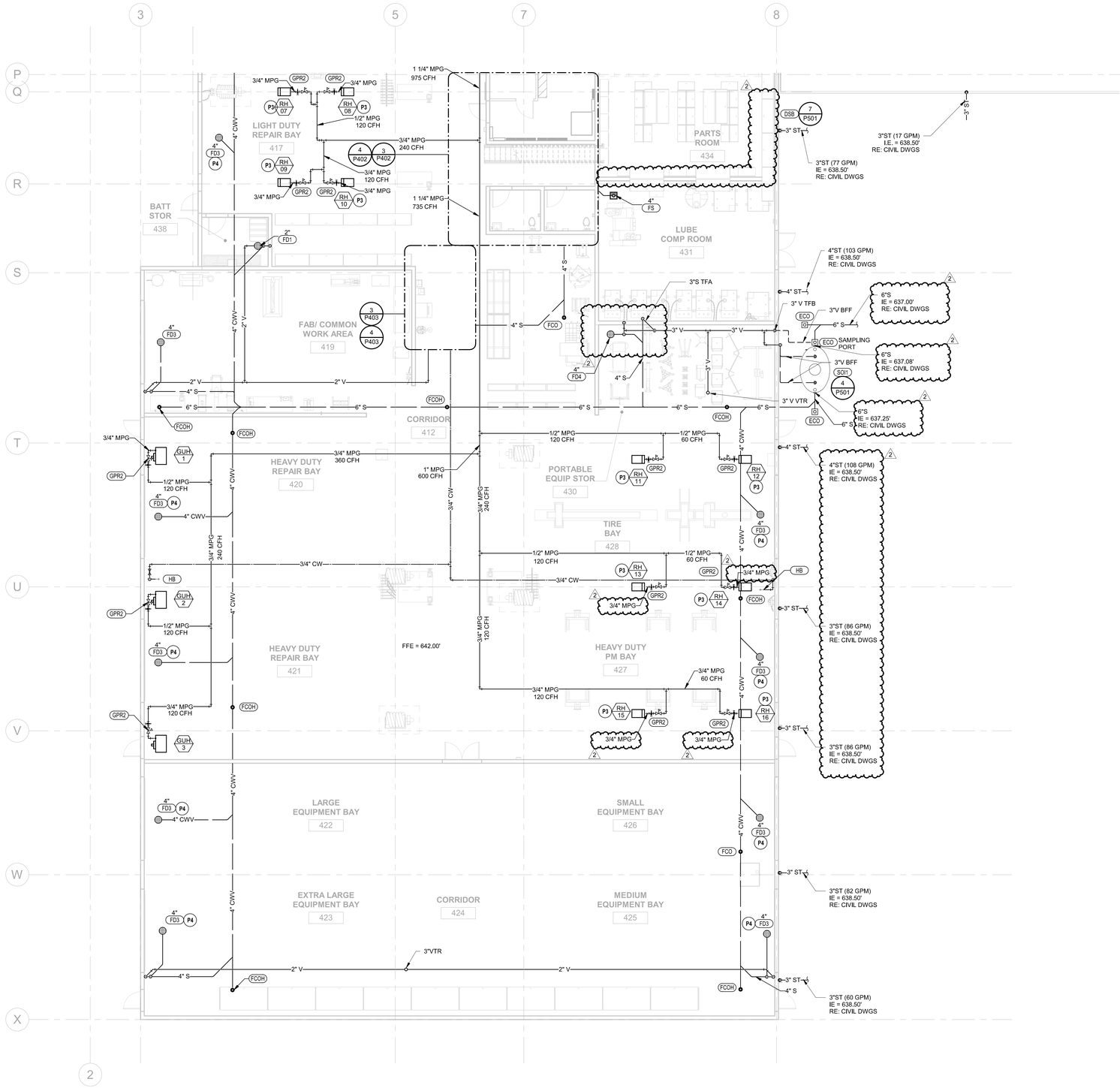
PLUMBING LEVEL 1 PLAN - AREA B

SHEET
P101B

CARL J. HOLDEN



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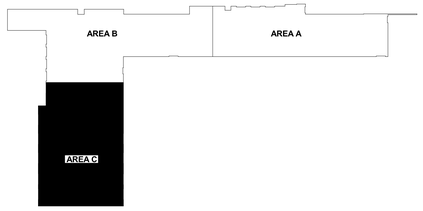

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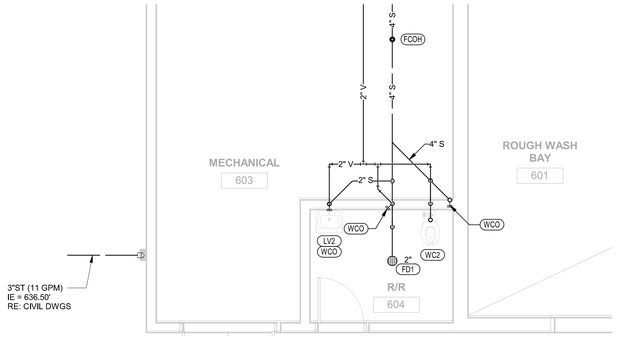
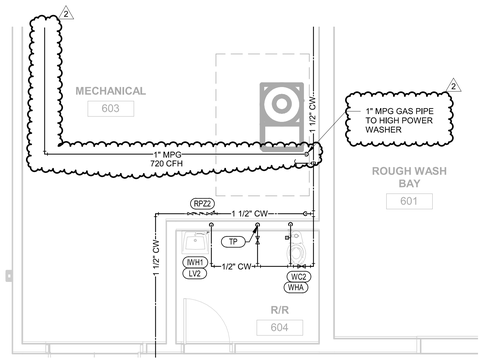
PLUMBING LEVEL 1 PLAN - AREA C

SHEET
P101C

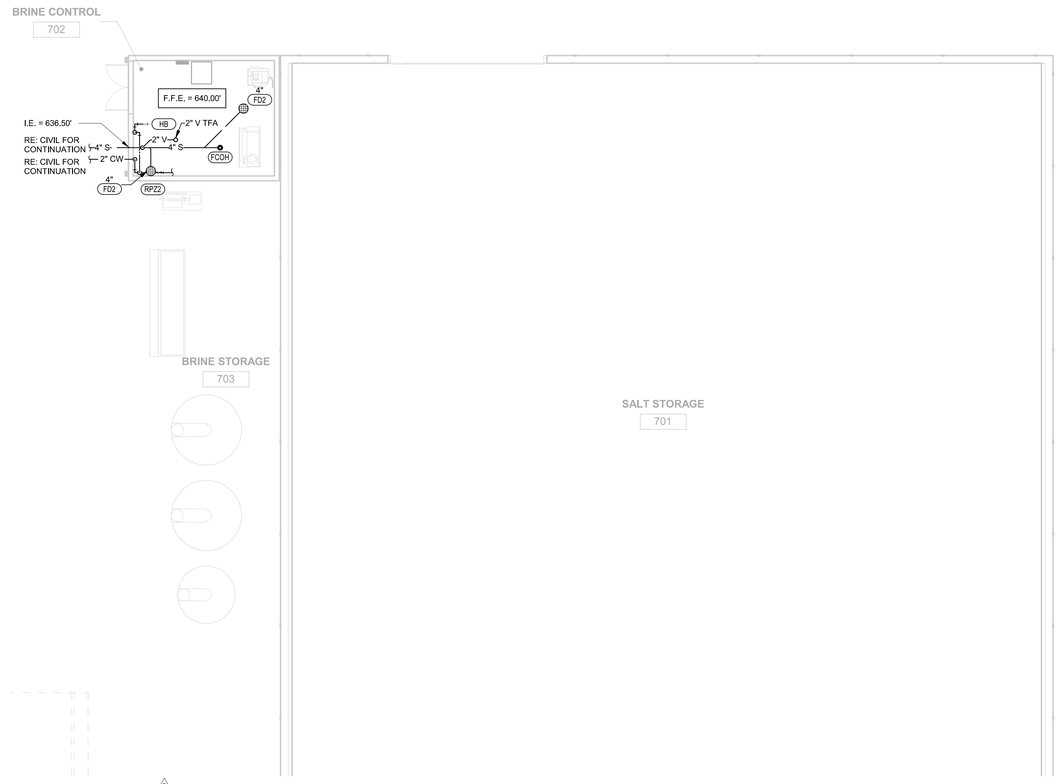
CARL J. HOLDEN



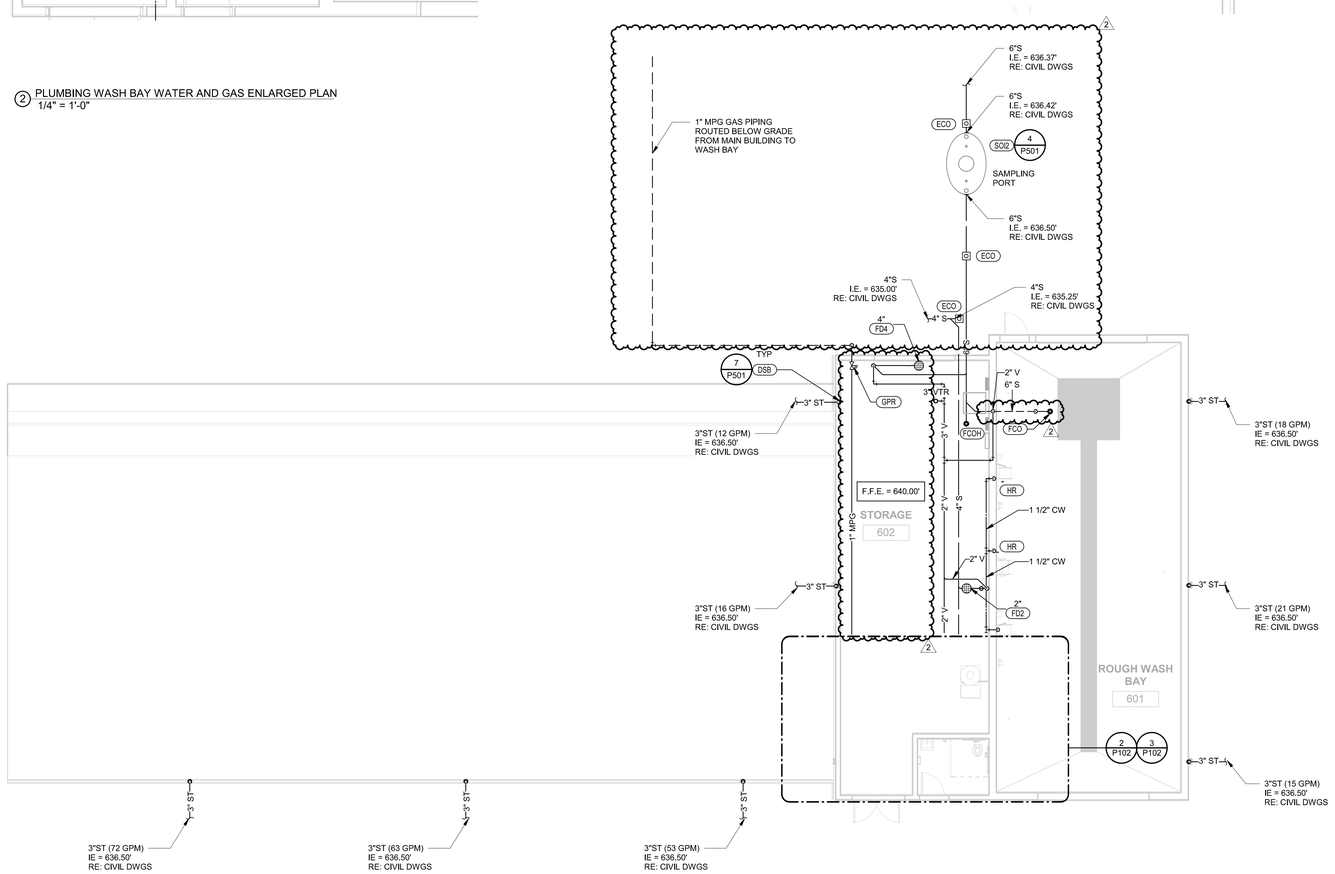
3 PLUMBING WASH BAY SANITARY AND VENT ENLARGED PLAN
1/4" = 1'-0"



2 PLUMBING WASH BAY WATER AND GAS ENLARGED PLAN
1/4" = 1'-0"



1 PLUMBING LEVEL 1 PLAN - BRINE
1/8" = 1'-0"



4 PLUMBING LEVEL 1 PLAN - WASH BAY
1/8" = 1'-0"

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architecture + design
5039 S National Avenue | Springfield, MO 65810 | 417.887.6595

OWNER
CITY OF WENTZVILLE, MISSOURI
1001 SCHROEDER CREEK BLVD
WENTZVILLE, MO 63385
636.327.5101

PROJECT TEAM
CIVIL ENGINEER
PREMIER DESIGN GROUP
100 MIDLAND PARK DRIVE
WENTZVILLE, MO 63385
314.925.7444

MAINTENANCE CONSULTANT
HDR ENGINEERING, INC.
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1950004840
EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: Author
DATE: 12.15.22 REVIEWED BY: Checker

STATE OF MISSOURI
CARL J. HOLDEN
HENDERSON
PE-2020016283
PROFESSIONAL ENGINEER
01/24/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

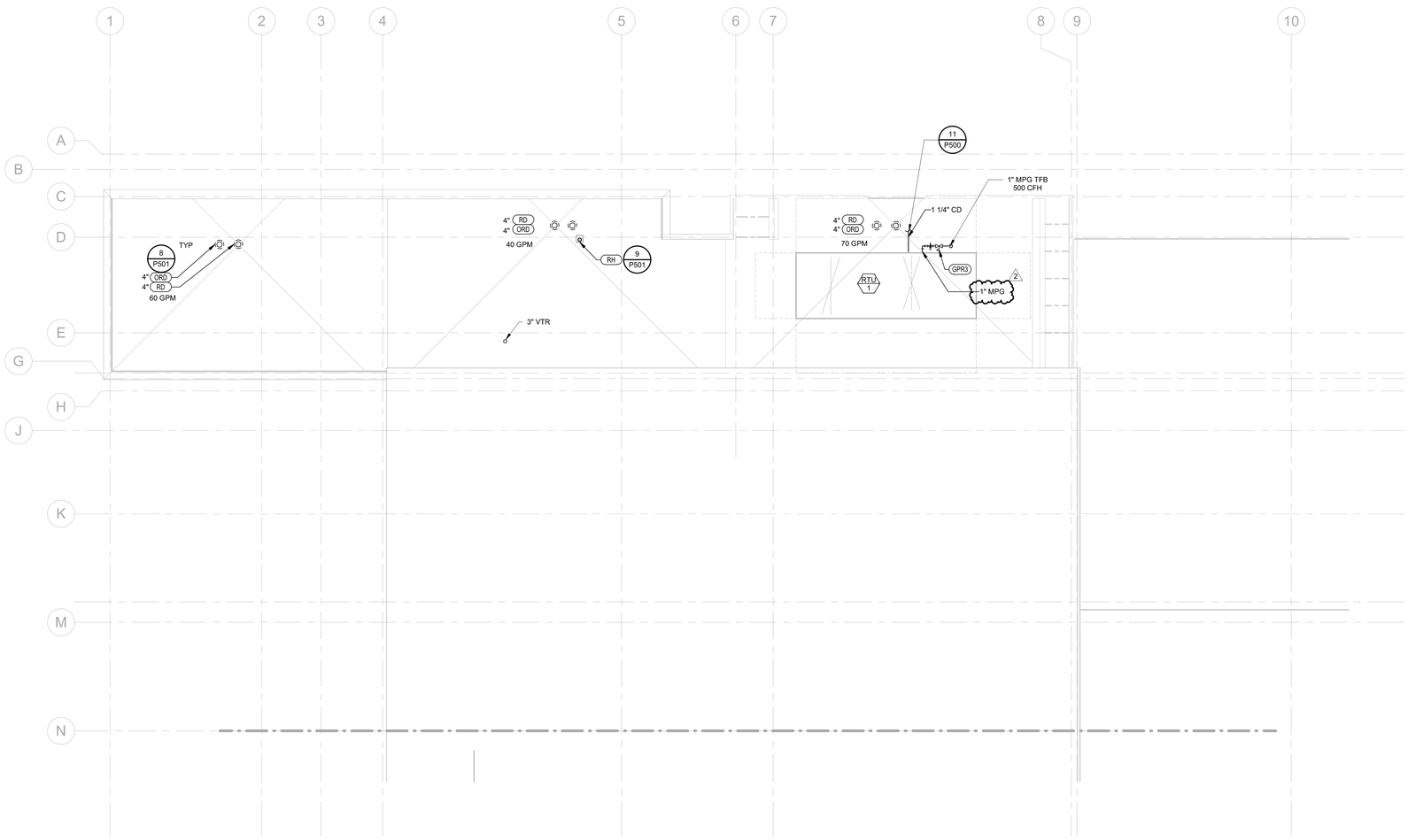
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

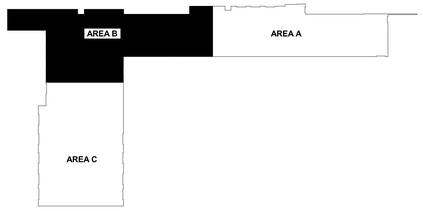
PLUMBING LEVEL 1 PLAN - WASH & SALT STORAGE BUILDINGS

SHEET
P102

CARL J. HOLDEN



1 PLUMBING ROOF PLAN - AREA B
1/8" = 1'-0"



KEY PLAN

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architecture + design
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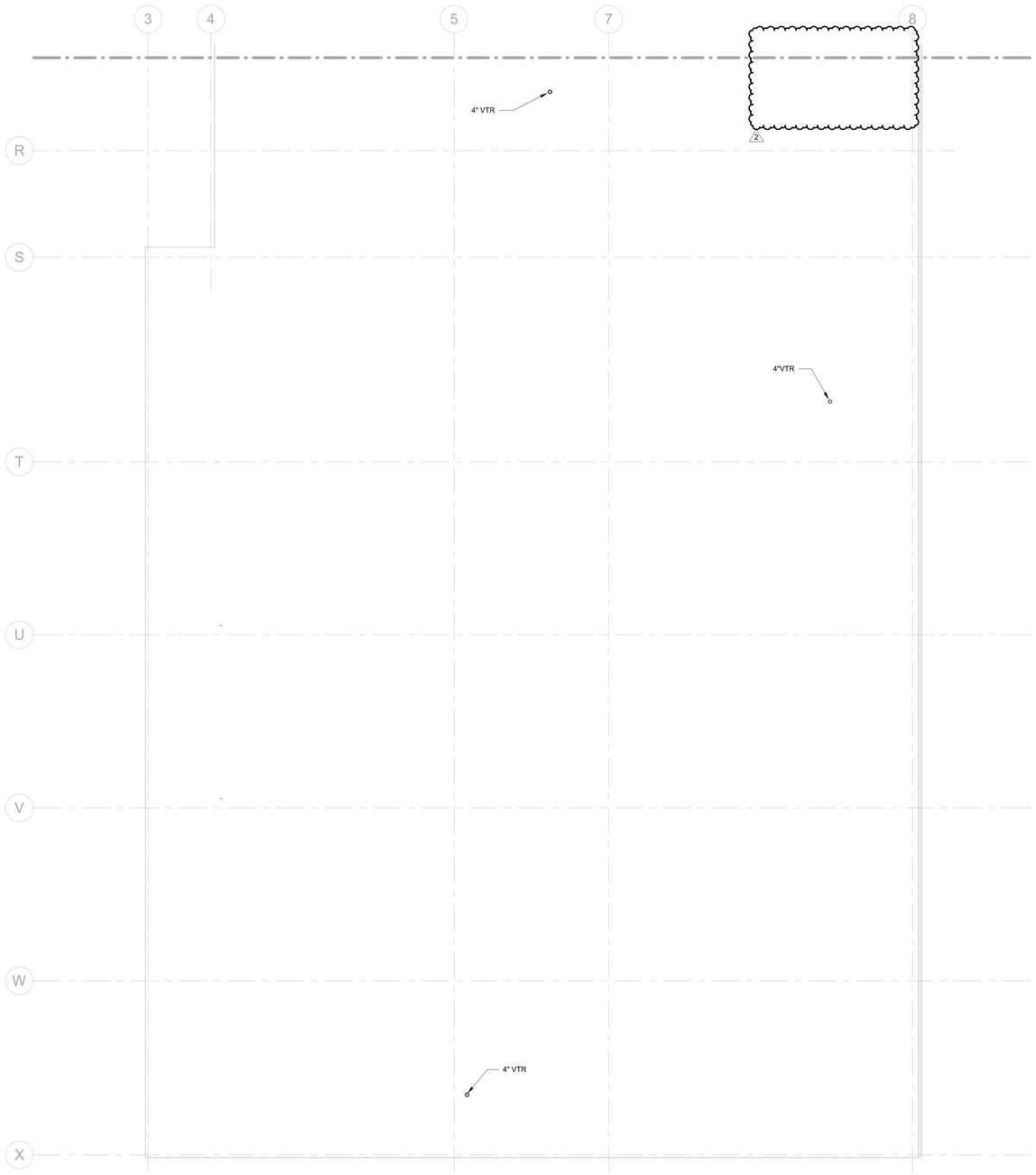
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

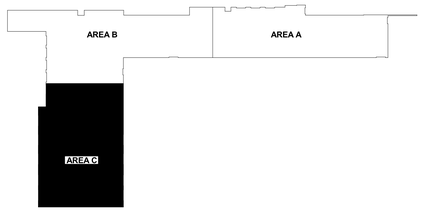
PLUMBING ROOF PLAN - AREA B

SHEET
P203B

CARL J. HOLDEN



1 PLUMBING ROOF PLAN - AREA C
1/8" = 1'-0"



KEY PLAN

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01/24/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

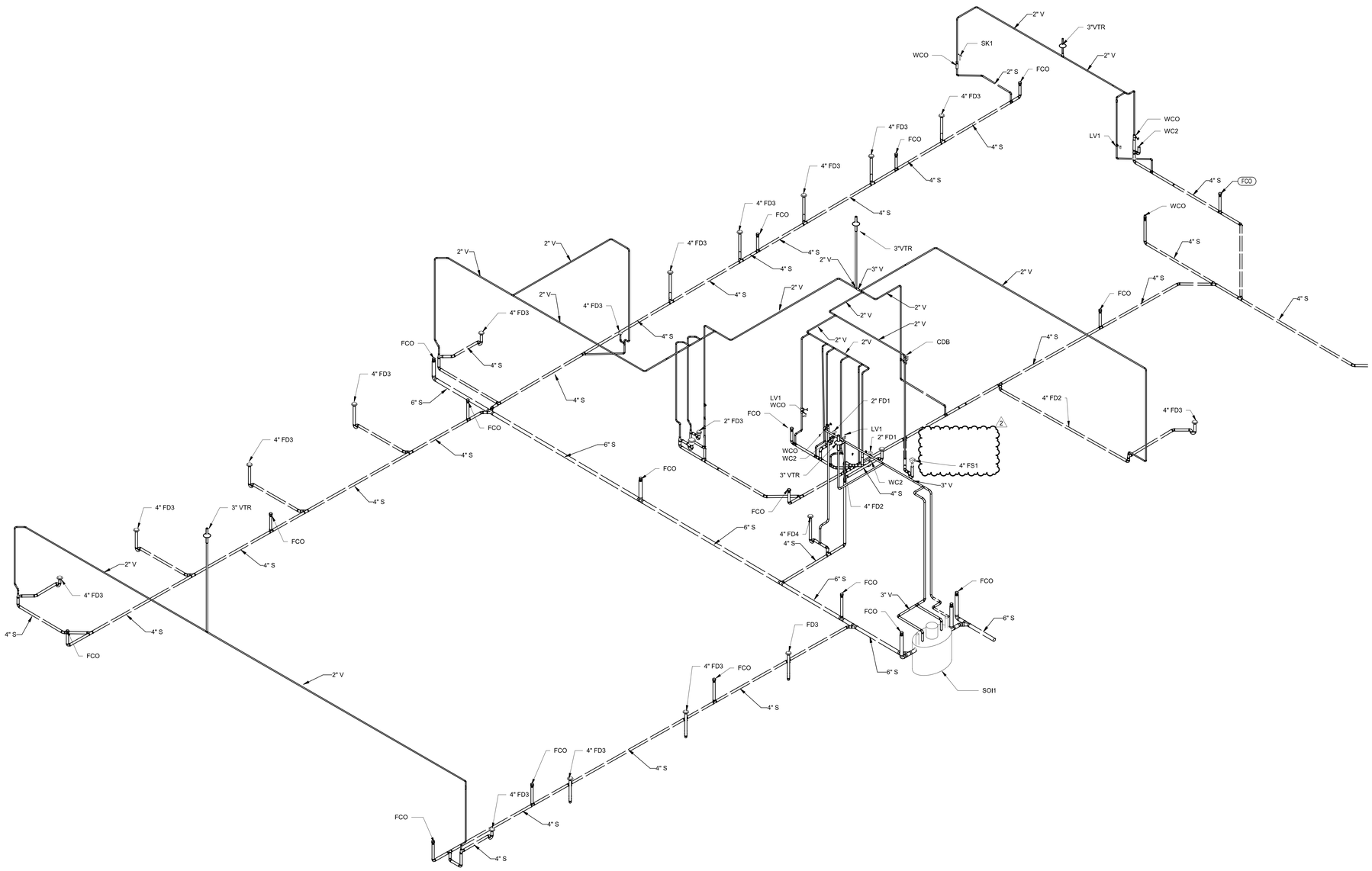
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

PLUMBING ROOF PLAN - AREA C

SHEET
P203C

CARL J. HOLDEN



1 PLUMBING RISER - AREA B & C
NTS

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architecture + design
5039 S National Avenue | Springfield, MO 65810 | 417.887.6595

OWNER
CITY OF WENTZVILLE, MISSOURI
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PROFESSIONAL ENGINEER

01/24/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

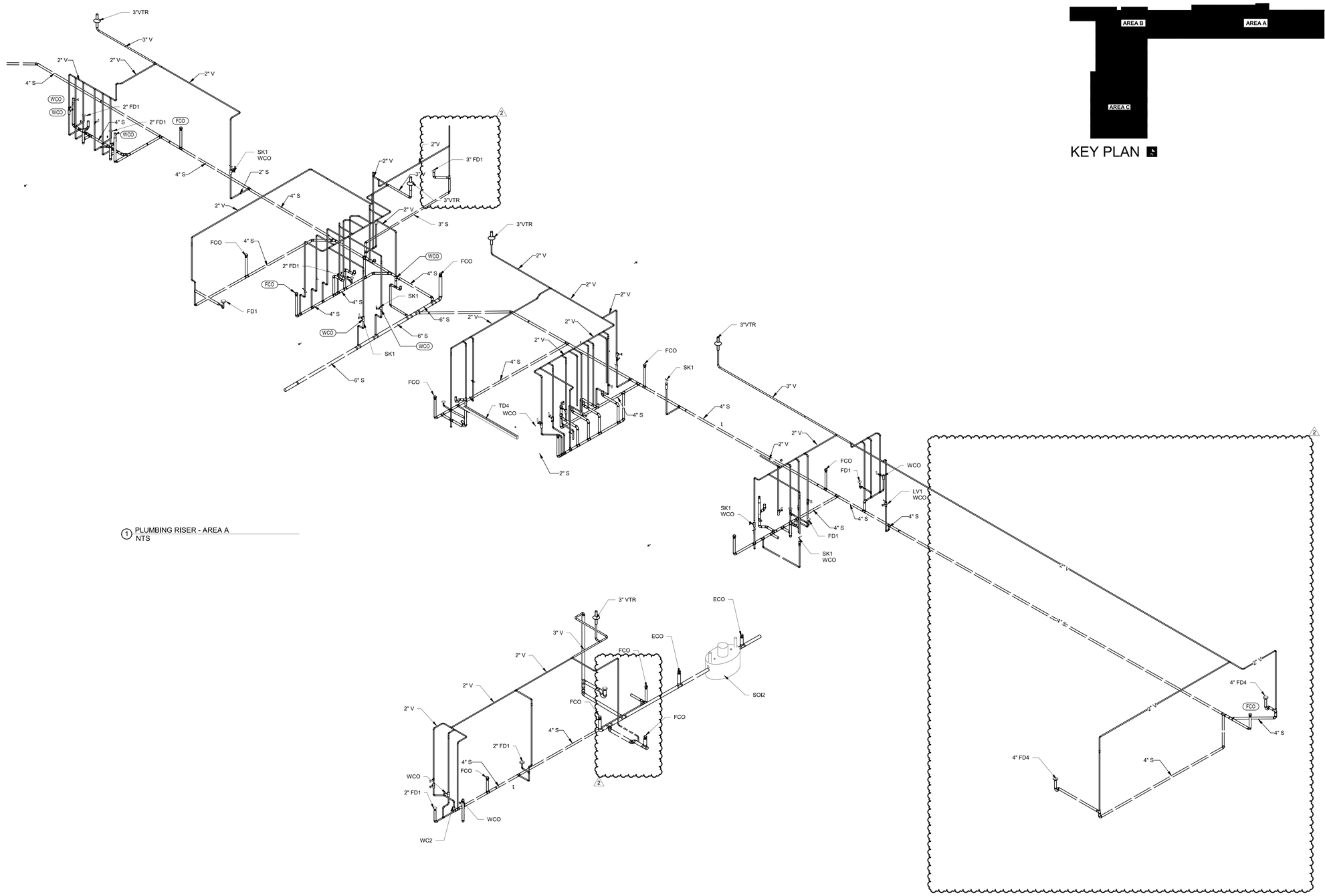
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

PLUMBING SANITARY RISER

SHEET
P300

CARL J. HOLDEN



1 PLUMBING RISER - AREA A
NTS

2 PLUMBING RISER - AREA D
NTS

KEY PLAN

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OWNER
CITY OF WENTZVILLE, MISSOURI
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PROJECT TEAM
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PROJECT TITLE
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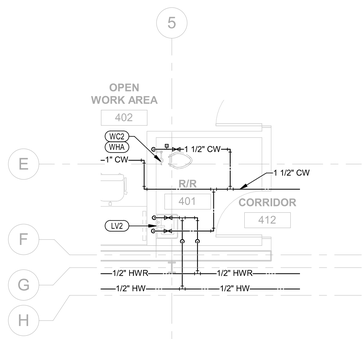
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

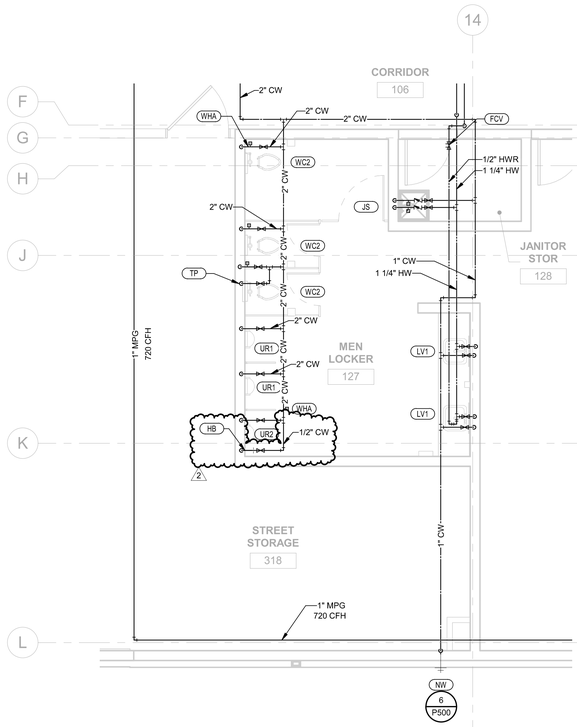
PLUMBING SANITARY RISER

SHEET
P301

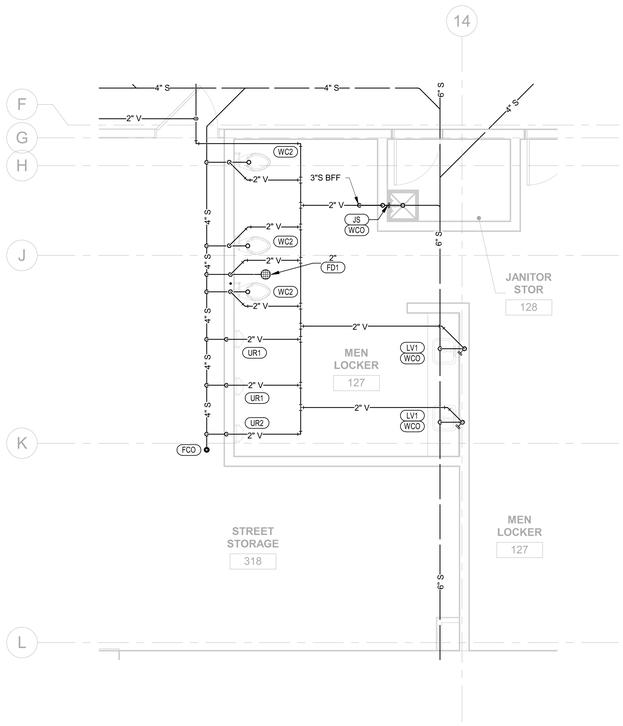
CARL J. HOLDEN



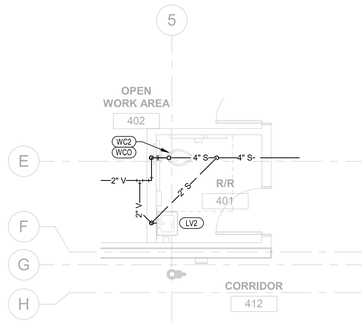
6 PLUMBING LEVEL 1 PLAN - RESTROOM WATER & GAS
1/4" = 1'-0"



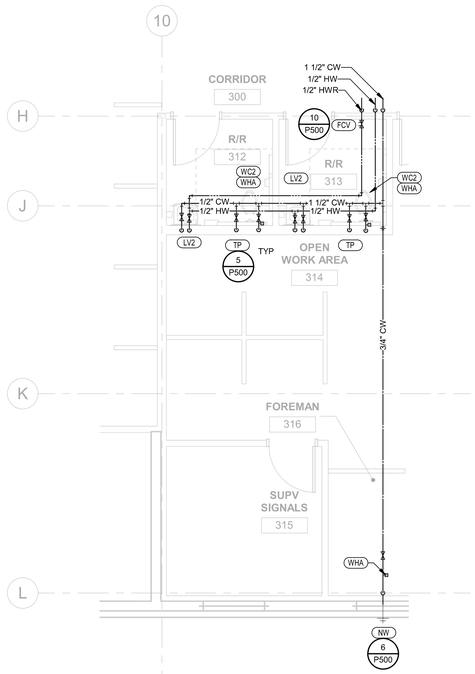
5 PLUMBING LEVEL 1 WATER AND GAS ENLARGED PLAN
1/4" = 1'-0"



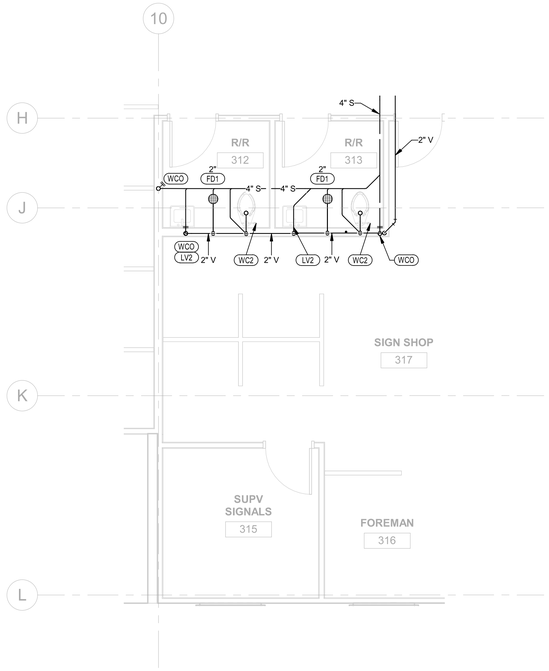
4 PLUMBING LEVEL 1 WASTE AND VENT ENLARGED PLAN
1/4" = 1'-0"



3 PLUMBING LEVEL 1 PLAN - RESTROOM WASTE & VENT
1/4" = 1'-0"



2 PLUMBING LEVEL 1 WATER AND GAS ENLARGED PLAN
1/4" = 1'-0"



1 PLUMBING LEVEL 1 WASTE AND VENT ENLARGED PLAN
1/4" = 1'-0"

PLUMBING PLAN NOTES:

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OWNER
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WENTZVILLE, MO 63385
636.327.5101

PROJECT TEAM

CIVIL ENGINEER
PREMIER DESIGN GROUP
100 MIDLAND PARK DRIVE
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STATE OF MISSOURI
CARL J. HOLDEN
NUMBER PE-2020016283
PROFESSIONAL ENGINEER
01/24/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

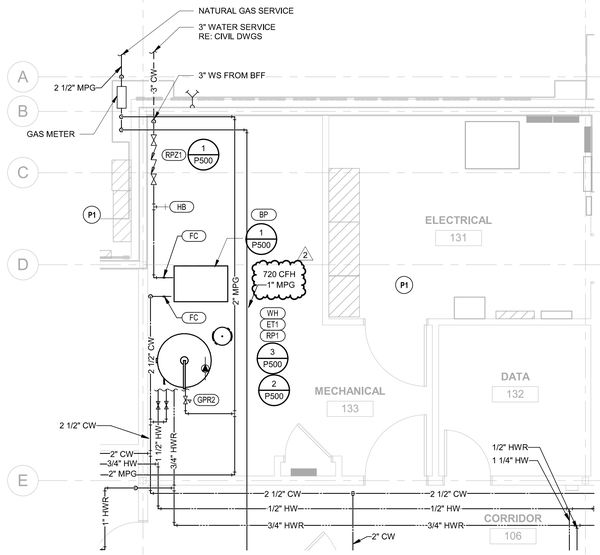
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

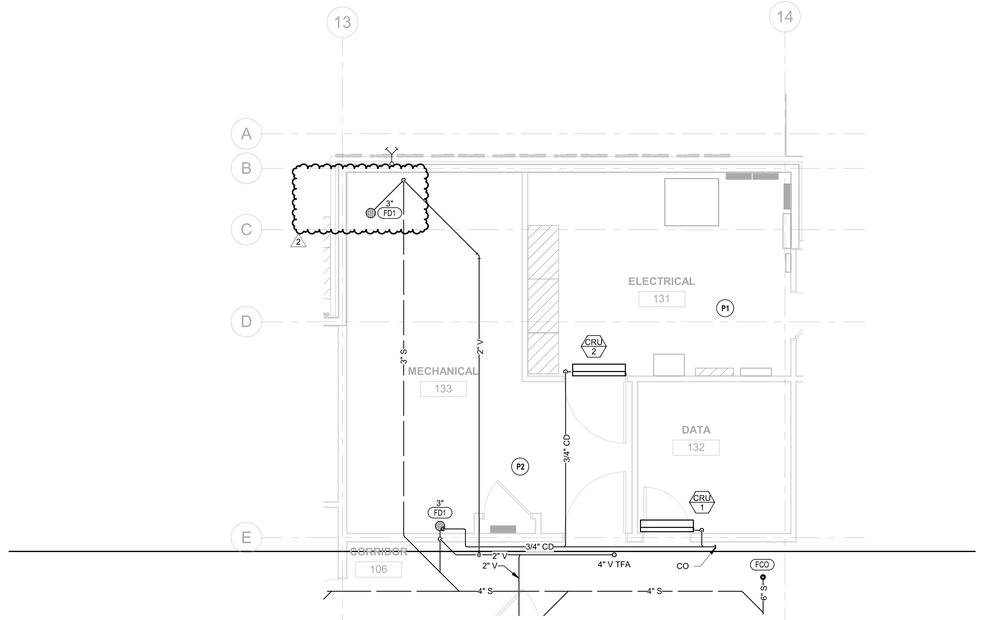
PLUMBING ENLARGED PLANS

SHEET
P400

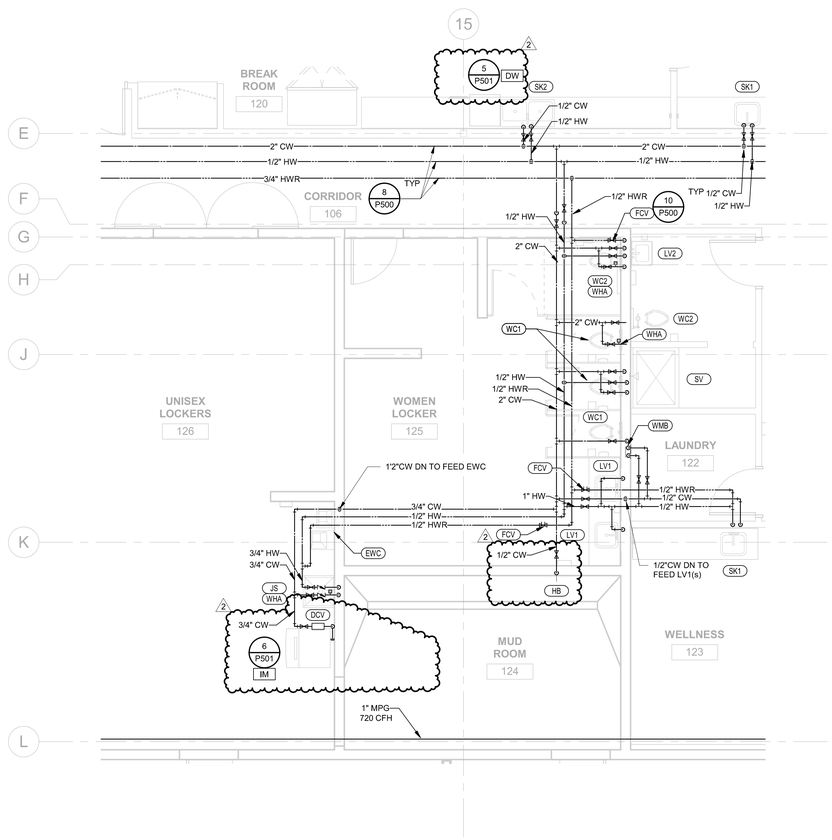
CARL J. HOLDEN



4 PLUMBING LEVEL 1 WATER AND GAS ENLARGED PLAN
1/4" = 1'-0"



3 PLUMBING LEVEL 1 WASTE AND VENT ENLARGED PLAN
1/4" = 1'-0"



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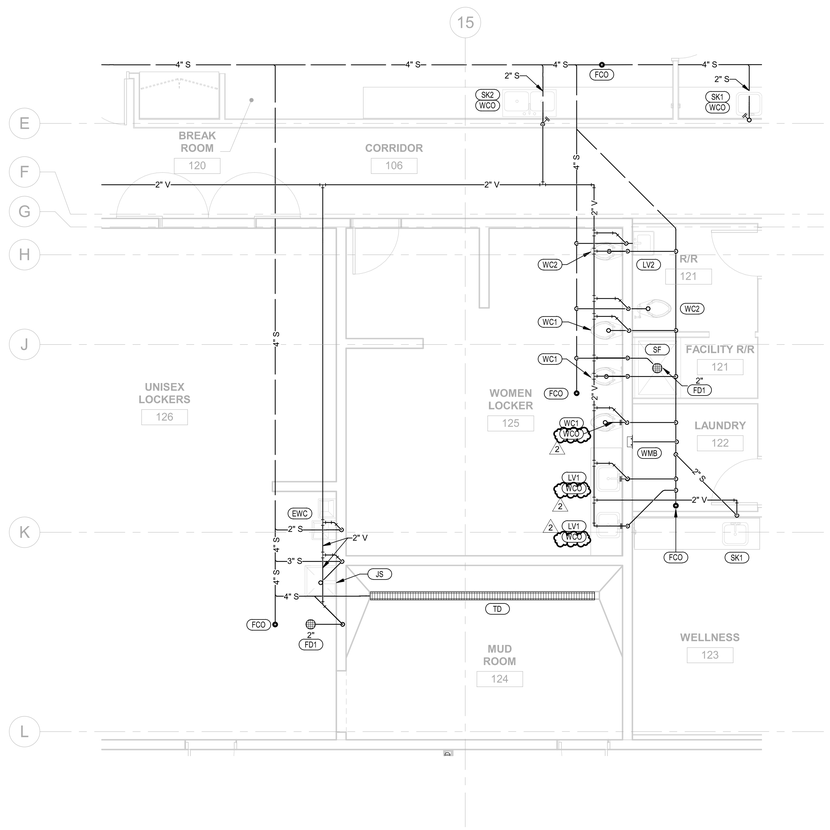
1/4" = 1'-0"



1 PLUMBING LEVEL 1 WASTE AND VENT ENLARGED PLAN
1/4" = 1'-0"

PLUMBING PLAN NOTES:

P1 DO NOT INSTALL PLUMBING PIPING OVER ELECTRICAL PANELS OR EQUIPMENT.

P2 DO NOT ROUTE ANY PLUMBING PIPING OVERHEAD IN THE IDF OR MDF (DATA) ROOMS. ANY PIPING ABOVE THIS AREA SHALL BE PROTECTED WITH DRIP PAN AS PER THE SPECIFICATIONS.

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01/24/2023

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PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

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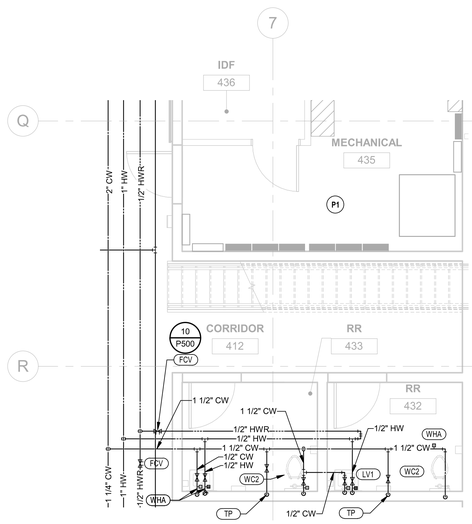
WENTZVILLE, MO 63385

PLUMBING ENLARGED PLANS

SHEET
P401

CARL J. HOLDEN



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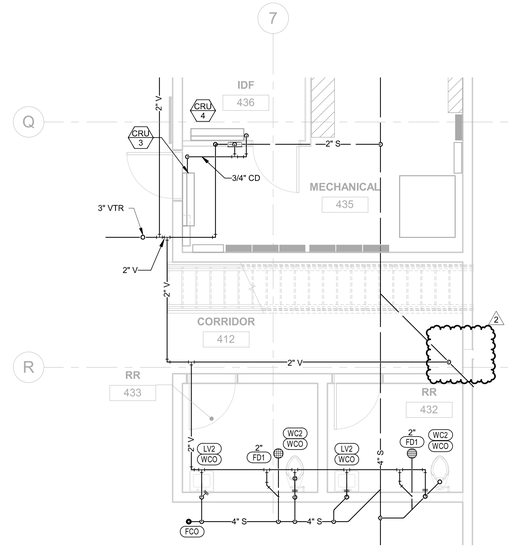
1/4" = 1'-0"



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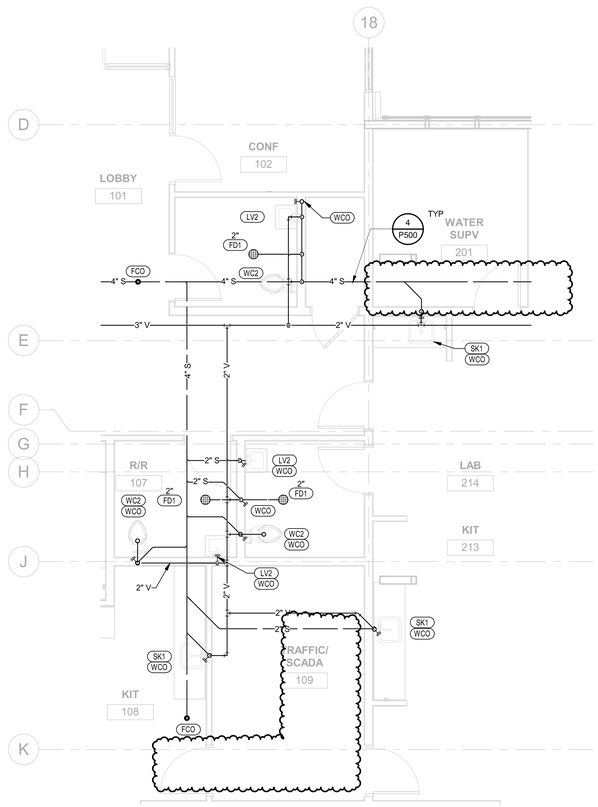
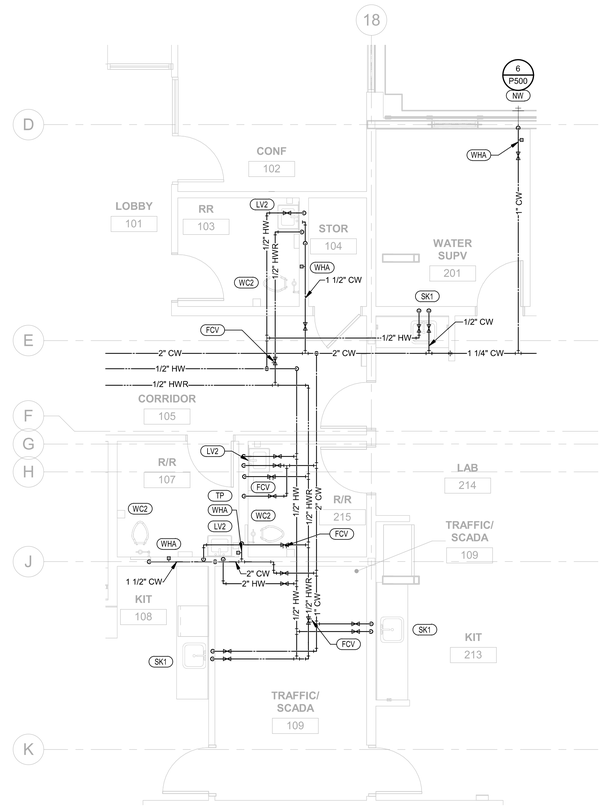
1/4" = 1'-0"



2 PLUMBING LEVEL 1 WASTE AND VENT ENLARGED PLAN
1/4" = 1'-0"



1 PLUMBING LEVEL 1 WATER AND GAS ENLARGED PLAN
1/4" = 1'-0"

PLUMBING PLAN NOTES:

P1 DO NOT INSTALL PLUMBING PIPING OVER ELECTRICAL PANELS OR EQUIPMENT.

hdesigngroup
architecture + design

5039 S National Avenue | Springfield, MO 65810 | 417.887.6595

OWNER

CITY OF WENTZVILLE, MISSOURI
1001 SCHROEDER CREEK BLVD
WENTZVILLE, MO 63385
636.327.5101

PROJECT TEAM

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1950004840
EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: MJ
DATE: 12.15.22 REVIEWED BY: HEI

STATE OF MISSOURI
CARL J. HOLDEN
NUMBER
PE-2020016283
PROFESSIONAL ENGINEER

01/24/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

PROJECT TITLE

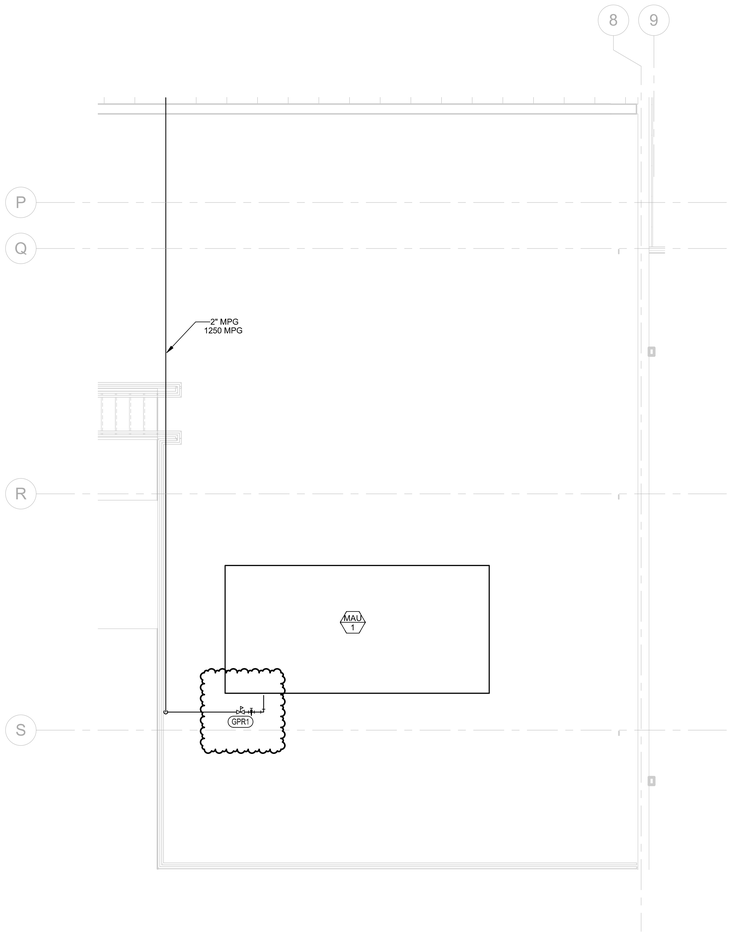
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

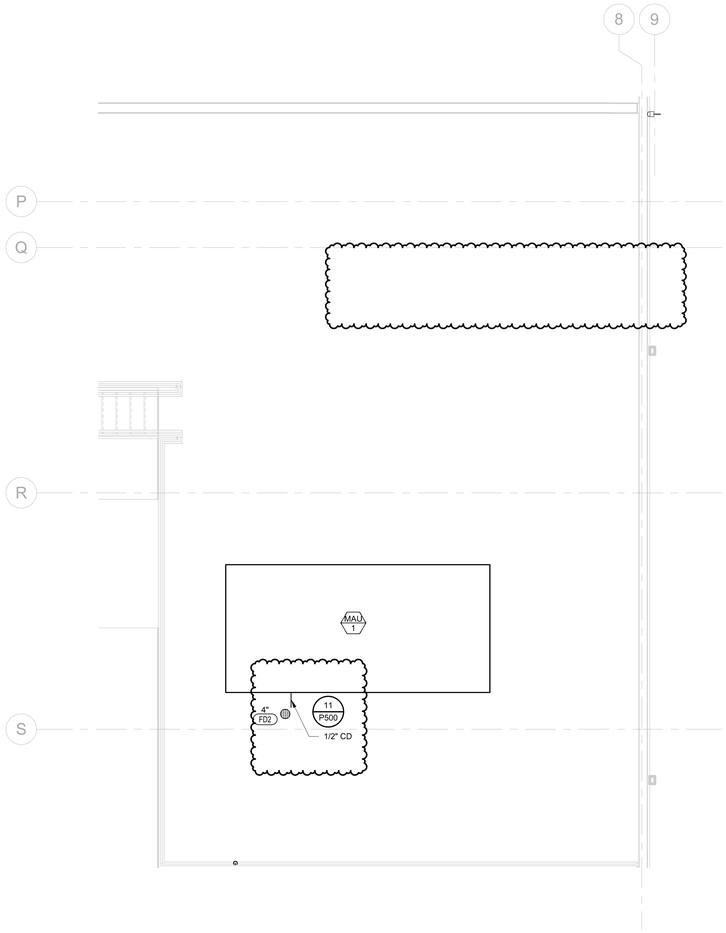
PLUMBING ENLARGED PLANS

SHEET
P402

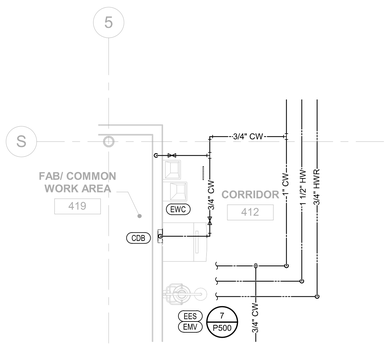
CARL J. HOLDEN



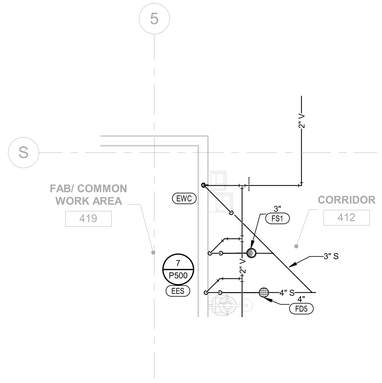
2 PLUMBING MEZZANINE WATER AND GAS PLAN
1/4" = 1'-0"



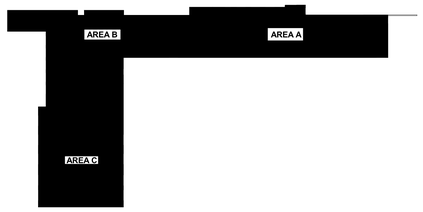
1 PLUMBING MEZZANINE WASTE AND VENT ENLARGED PLAN
1/4" = 1'-0"



4 PLUMBING LEVEL 1 WASTE AND VENT ENLARGED PLAN
1/4" = 1'-0"



3 PLUMBING LEVEL 1 WATER AND GAS ENLARGED PLAN
1/4" = 1'-0"



KEY PLAN

hdesigngroup
architecture + design
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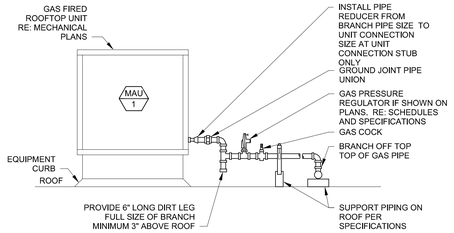
WENTZVILLE, MO 63385

PLUMBING ENLARGED PLANS

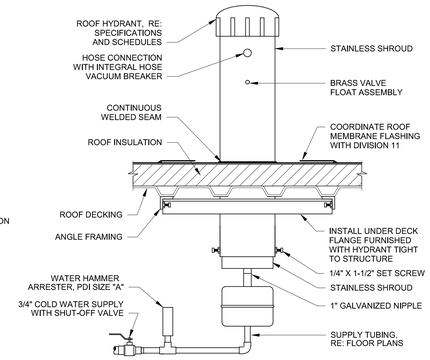
SHEET
P403

CARL J. HOLDEN



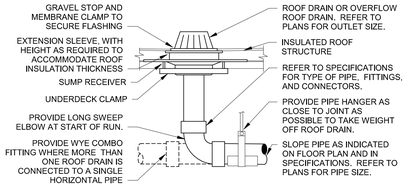
PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. VERIFY CONNECTION LOCATIONS BEFORE INSTALLING PIPIREFER TO SPECIFICATIONS FOR MORE INFORMATION. PROVIDE BRANCH SIZE GAS COCK AND GAS PRESSUERE REGULATOR. REFER TO FLOOR PLANS FOR PIPING SIZE. INSTALL GAS PRESSURE REGULATOR WITH RELIEF VALVE OUTLET FACING DOWN.

10 MAKE-UP AIR UNIT CONNECTIONS
NTS



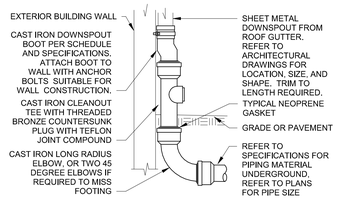
PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. RE: FLOOR PLANS FOR LOCATION.

9 ROOF HYDRANT DETAIL
NTS



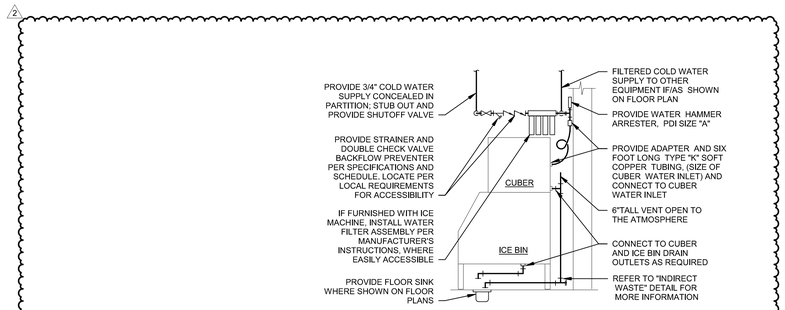
UNDERDECK CLAMP AND SUMP RECEIVER ARE NOT REQUIRED WHEN ROOF DRAIN BODY IS CAST INTO CONCRETE ROOF. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. INSULATE ROOF DRAIN SUMP AND PIPE PER SPECIFICATIONS. LOCATE DRAINS WHERE SHOWN ON ARCHITECTURAL PLANS. VERIFY WITH STRUCTURAL PLANS FOR ROOF LOW POINTS. COORDINATE WITH STRUCTURAL DRAWINGS REGARDING PROVISION FOR SUPPLEMENTARY STEEL FRAMING AROUND ROOF OPENING. COORDINATE ROOF DRAIN INSTALLATION WITH ARCHITECTURAL DETAILS AND ROOFING INSTALLATION. SET OVERFLOW DRAIN WEIR ELEVATION 2" ABOVE PRIMARY ROOF DRAIN WEIR ELEVATION.

8 ROOF DRAIN INSTALLATION
NTS



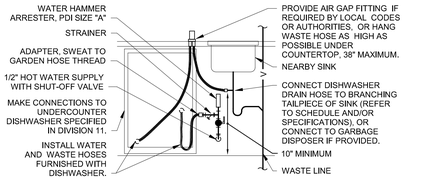
PIPING ARRANGEMENT IS SCHEMATIC, ADJUST TO SUIT FIELD CONDITIONS. COORDINATE DOWNSPOUT LOCATIONS WITH ARCHITECTURAL DRAWINGS, AND COORDINATE UNDERGROUND PIPE WITH SITE UTILITIES DRAWINGS. PROVIDE NEOPRENE ADAPTER COUPLINGS TO CONNECT TO DISSIMILAR UTILITY PIPING IF REQUIRED. REFER TO SPECIFICATIONS.

7 DOWNSPOUT CONNECTION
NTS



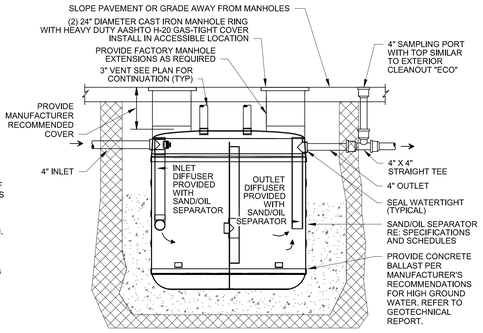
PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST AS REQUIRED TO SUIT ACTUAL INSTALLATION CONDITIONS AND MEET RECOMMENDATIONS OF EQUIPMENT MANUFACTURERS.

6 ICE MACHINE CONNECTIONS
NTS



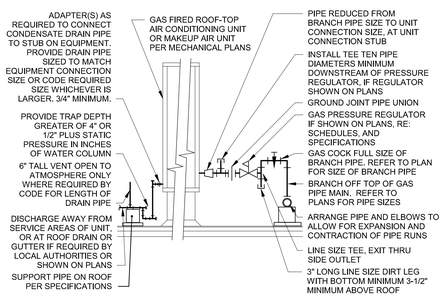
PIPING ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. PROVIDE CONNECTIONS AND INSTALLATION AS RECOMMENDED BY EQUIPMENT MANUFACTURER. REFER TO PLUMBING FIXTURE SCHEDULE AND SPECIFICATIONS FOR ACCESSORIES SHOWN. IF SINK IS ADA, DO NOT ENCROACH ON ACCESSIBILITY ZONE.

5 RESIDENTIAL DISHWASHER CONNECTION
NTS



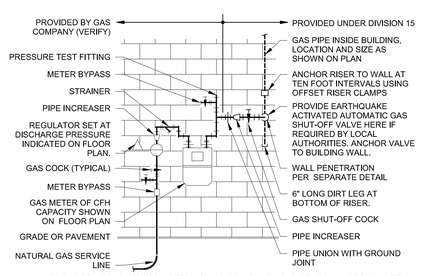
PIPING ARRANGEMENT SHOWN IN SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. SUBMIT PROPOSED SAND/OIL SEPARATOR INSTALLATION PLANS AND SPECIFICATIONS TO LOCAL AUTHORITIES FOR THEIR APPROVAL BEFORE ACQUISITION OF SEPARATOR. PROVIDE CAPACITY AS REQUIRED BY LOCAL AUTHORITIES. INSTALL SEPARATOR PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. REFER TO FLOOR PLANS, SPECIFICATION AND SCHEDULES FOR EXTERIOR CLEANOUT.

4 SAND/OIL SEPARATOR
NTS



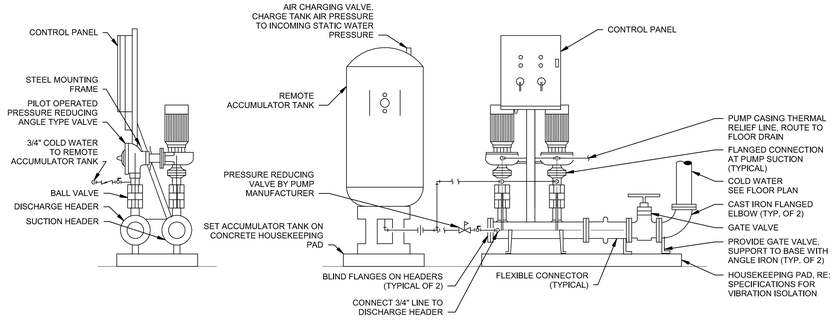
ARRANGEMENT SHOWN IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. PROVIDE CONNECTIONS SHOWN IN EQUIPMENT MANUFACTURER'S INSTALLATION INSTRUCTIONS. VERIFY CONNECTION LOCATIONS BEFORE INSTALLING PIPE RUNS. REFER TO SPECIFICATIONS FOR PIPE AND FITTING MATERIALS AND INSTALLATION. PROVIDE DIELECTRIC UNION IF CONNECTING DISSIMILAR METALS. FOR PIPE SIZE(S) REFER TO FLOOR PLANS, OR CODE REQUIREMENTS FOR HVAC UNIT TONNAGE. PROVIDE GAS COCK, UNION AND DIRT LEG SAME SIZE AS BRANCH PIPE. SLOPE CONDENSATE PIPE AS MUCH AS POSSIBLE TOWARD DISCHARGE, 2% MINIMUM. PROVIDE CLEANOUTS IN ENDS AND TURNS OF PIPE PER LOCAL CODE REQUIREMENTS. ADAPTER WITH THREADED CLEANOUT PLUG. PROVIDE MINIMUM 6" CLEARANCE TO ROOF UNDER PIPES.

3 CONNECTIONS TO ROOF-TOP UNIT
NTS



VERIFY REQUIREMENTS FOR METERING AND PIPING WITH GAS COMPANY. COORDINATE WITH GAS COMPANY WITH REGARD TO INSTALLATION OF OTHER PLUMBING UTILITIES IN VICINITY, IF ANY. APPLY FOR AND PAY GAS COMPANY FEES FOR INSTALLATION. USE WELDED OR SCREWED PIPE AND FITTINGS PER PLUMBING SPECIFICATIONS.

2 GAS METER SETTING
NTS



REFER TO SPECIFICATIONS, SCHEDULES, AND NOTES FOR MORE INFORMATION. PIPING ARRANGEMENT IS SCHEMATIC. ADJUST TO SUIT FIELD CONDITIONS. VERIFY ALL CONNECTION SIZES AND LOCATIONS PER MANUFACTURER'S REQUIREMENTS.

v1.00

1 DOMESTIC BOOSTER PUMP
NTS

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architecture + design
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WENTZVILLE, MO 63385

PLUMBING DETAILS

SHEET
P501

CARL J. HOLDEN

GAS STORAGE WATER HEATER SCHEDULE

MARK	MANUFACTURER/ MODEL#	AREA SERVED	TANK SIZE (GALLONS)	INPUT MBH	ELECTRICAL DATA VOLTS	PHASE	FLA	RECOVERY (GPH)	WEIGHT (LBS)	NOTES
WH	A.O. SMITH # BTHL-300(A)	TOTAL BUILDING	220	300	120	1	5	372	1420	A,B,C,D,E

NOTES:

A. 93° TEMPERATURE RISE WITH 140°F OPERATING TEMPERATURE.
B. AUTOMATIC FLUE DAMPER INTERLOCKED WITH WATER HEATER FIRE CONTROL
C. 150# ASME TANK CONSTRUCTION
D. ULTRA LOW NOx TYPE - RESIDUAL NOx IS LESS THAN 14 ng / joule. COMPLIES WITH SCAQMD RULE 1146.2
E. FURNISH WITH CONDENSATE NEUTRALIZATION KIT TO MATCH HEATER INPUT, AO SMITH # CNS SERIES

EXPANSION TANK SCHEDULE

MARK	MANUFACTURER / MODEL #	TANK SIZE (GALLONS)	MIN. ACCEPTANCE VOLUME (GALLONS)	SERVICE	WEIGHT (LBS)	NOTES
ET-1	AMTROL ST-30V-C	14	8.96	WH1	84	A

NOTES:

A. CHARGE TANK WITH AIR TO IDENTICAL PRESSURE AS STATIC DOMESTIC WATER PRESSURE.

RECIRCULATION PUMP SCHEDULE

MARK	MANUFACTURER / MODEL#	LOCATION	GPM	HEAD (FT.)	CONNECTION SIZE	IMPELLER SIZE (IN.)	ELECTR... VOLTS	PHASE	HP	NOTES
RP-1	BELL & GOSSETT # NBF-45	MECHANICAL ROOM	5	18	3/4"	N/A	115	1	1/18	A, B, C

NOTES:

A. ALL LEAD FREE CAST BRONZE BOOSTER.
B. PROVIDE WITH STRAINER UPSTREAM OF PUMP
C. PROVIDE ADJUSTABLE, SURFACE MOUNTED AQUASTAT - HONEYWELL L6006C

2

GAS PRESSURE REGULATOR SCHEDULE FOR 2 PSI SYSTEMS

2

MARK	MANUFACTURER	MODEL	VALVE TYPE	VALVE BODY SIZE (INCHES)	MAX. FLOW RATE (CFH)	INLET PRESSURE (PSI)	OUTLET PRESSURE (INCHES WATER COLUMN)	SERVICE	NOTES
GPR1	PIETRO-FIORENTINI	31153	C	1-1/4	3457	1	7	MAKE-UP AIR UNIT	A, B, D, E, F, G, H & I
GPR2	PIETRO-FIORENTINI	400	C	3/4	400	1	7	UNIT HEATERS/ WATER HEATER	A, B, D, E, F, G, H & I
GPR3	PIETRO-FIORENTINI	31051	C	3/4	511	1	7	ROOF TOP UNIT	A, B, D, E, F, G, H & I

NOTES:

A. C = SELF CONTAINED "DIRECT ACTING" DIAPHRAGM TYPE WITH INTERNAL VENT LIMITER
B. DROOP = 1" WATER COLUMN MAXIMUM
C. DROOP = 2" WATER COLUMN MAXIMUM
D. 65# ALUMINUM BODY, SCREWED CONNECTIONS AND OVERPRESSURE PROTECTION TO 25 PSI
E. MAXIMUM FLOW RATE SCHEDULED, MATCH BODY SIZE AND MAXIMUM FLOW RATE TO EQUIPMENT FLOW RATE. REFER TO EQUIPMENT SHOP DRAWINGS FOR EXACT LOADS.
F. LISTED TO MEET ANSI Z21.80 / CSA 6.22 WITH CSA LISTING STAMP ON REGULATOR BODY
G. GAS PRESSURE REGULATOR INLET PRESSURE = OPERATING PRESSURE - DESIGN FRICTION LOSS
H. 2 PSI MAXIMUM INLET PRESSURE AND 1 PSI MINIMUM INLET PRESSURE
I. PROVIDE EXTERNAL VENT LIMITER (WHERE APPROVED BY LOCAL AUTHORITIES) FOR INDOOR INSTALLATION AND INSTALL PER SPECIFICATIONS. INSTALL OUTDOORS PER SPECIFICATIONS.

INSTANTANEOUS ELECTRIC WATER HEATER SCHEDULE

MARK	MANUFACTURER/ MODEL#	AREA SERVED	ELECTRICAL DATA VOLTS	PHASE	KW	AMPS	TEMPERATURE RISE (DEGREES F)	RECOVERY (GPM)	FLOW SWITCH FLOW RATE	NOTES
IWH	EEMAX # SPEX65T	WASH BAY RESTROOM	208	1	4.9	24.0	67	0.5 GPM	0.2 GPM	A,B,C,D,E

NOTES:

A. THERMOSTATIC CONTROLLED - SET AT 110F. SET AT 100F FOR SINGLE TEMPEPATURE FAUCETS
B. UNIT IS 240V WITH SCHEDULED INPUT AND CAPACITY REDUCED BY 25% TO OPERATE @ 208V
C. THERMOSTATIC CONTROLLED - SET AT 120F
D. WITH (2) HEATING ELEMENTS REQUIRING (2) 208V CIRCUITS
E. THERMOSTATIC CONTROLLED FACTORY SET AT 105F. ANY ADJUSTMENTS TO TEMP VOID WARRANTY AND MAY CAUSE LOSS OF UPC 413.1 COMPLIANCE.

DOMESTIC BOOSTER PUMP SCHEDULE

MARK	MANUFACTURER	MODEL #	TYPE NOTE A	DISCHARGE HEADER PRESSURE (PSI)	SUCTION HEADER PRESSURE (PSI)	NUMBER OF PUMPS	SYSTEM FLOW RATE (GPM)	INDIVIDUAL PUMP CAPACITY	SUCTION HEADER SIZE (IN.)	DISCHARGE HEADER SIZE (IN.)	ELECTRICAL DATA (NOTE... VOLTS	PHASE	HP	ACCUMULATOR TANK SIZE (GAL.)	NOTES
BP	GRUNDFOS	BOOSTER PAQ CRE-15	D-VFD	60	37	2	100	70%	3	3	480	3	7.5	40	A,B,C,D

NOTES:

A. BOOSTER PUMP CONFIGURATION TYPES: D-VFD = DUPLEX W/ VARIABLE FREQUENCY DRIVE FOR EACH VERTICAL MULTI-STAGE PUMP GRUNDFOS CRE-15. REFER TO SPECIFICATIONS FOR MORE INFORMATION
B. PROVIDE WITH CONTROL PANEL. REFER TO SPECIFICATIONS FOR MORE INFORMATION
C. MINIMUM DISCHARGE HEADER PRESSURE IS 60 PSI
D. PROVIDE PUMPS WITH SCHEDULED DESIGN FLOW RATE WITH TOTAL DYNAMIC HEAD = DISCHARGE PRESSURE - SUCTION PRESSURE + 2PSI FOR SYSTEM...

...

MEDIUM PRESSURE GAS PIPE SIZING CHART

PIPE SIZE	LOAD (CFH)
1/2"	175
3/4"	366
1"	690
1-1/4"	1,416
1-1/2"	2,122
2"	4,087
2-1/2"	6,514
3"	11,516
4"	23,488
5"	42,494
6"	68,807
8"	141,373
10"	256,771
12"	406,501

FOR SCHEDULE 40 STEEL PIPE
SPECIFIC GRAVITY OF GAS = 0.60
UPSTREAM PRESSURE (PSI) = 2
DOWNSTREAM PRESSURE (PSI) = 1
PRESSURE LOSS (PSI) = 1.0
TOTAL DEVELOPED LENGTH (FEET) = 600
BASED ON NFPA 54 EQUATION 4-2

2

SDR11 PE MEDIUM PRESSURE GAS PIPE SIZING CHART

PIPE SIZE	LOAD (CFH)
3/4"	415
1"	749
1-1/4"	1,298
1-1/2"	2,151
2"	3,523

FOR SDR 11 PE GAS PIPE
SPECIFIC GRAVITY OF GAS = 0.60
UPSTREAM PRESSURE (PSI) = 2
DOWNSTREAM PRESSURE (PSI) = 1
PRESSURE LOSS (PSI) = 1.0
TOTAL DEVELOPED LENGTH (FEET) = 585
BASED ON NFPA 54 EQUATION 4-2

PLUMBING FIXTURE SCHEDULE

PLUMBING PLAN MARK	DESCRIPTION
CDB	CONDENSATE DRAIN BOX: SIOUX CHIEF "OXBOX" MODEL # 696-3 OUTLET BOX, MODEL #696-CF SECONDARY DRAINAGE FUNNEL AND #696-SC SOLID COVER PLATE.
DAGF	SIOUX CHIEF # 249, DISHWASHER AIR GAP MEETING ASSE 1021 WITH POLYPROPYLENE BODY, CHROME-PLATED BRASS CAP, 1/2" INLET HOSE BARB, AND 3/4" OUTLET HOSE BARB.
DCV	DOUBLE CHECK VALVE BACKFLOW PREVENTER: WATTS # LF007QT-S, MEETING ASSE 1015, LEAD FREE CAST BRONZE BODY, SCREW DRIVER SLOTTED TEST COCKS, QUARTER TURN BALL VALVES, AND STRAINER.
DSB	DOWNSPOUT BOOT: JAY R. SMITH # 1785-24, 24" LONG CAST IRON BODY WITH CAST IRON SECURING STRAPS, 4" x 3" RECTANGULAR INLET, 2" CLEANOUT PLUG, AND 4" DIAMETER OUTLET.
DSN	DOWNSPOUT NOZZLE: JAY R. SMITH # 1770T, CAST BRONZE BODY AND FLANGE. PROVIDE OUTLET SIZE AS SHOWN ON PLANS.
ECO	EXTERIOR CLEANOUT: JAY R. SMITH # 4261L SERIES DUCO CAST IRON DOUBLE FLANGED HOUSING WITH HEAVY DUTY SECURED SCORIATED CAST IRON COVER WITH LIFTING DEVICE AND CLEANOUT BODY WITH ABS PLASTIC PLUG WITH GASKET SEAL AND PUSH-ON JOINT. REFER TO SPECIFICATIONS FOR INSTALLATION.
EES	EMERGENCY EYEWASH AND SHOWER: GUARDIAN # 1902HFC, 10" SAFETY ORANGE ABS SHOWER HEAD, 30 GPM AT 30 PSI, CHROME-PLATED STAY-OPEN BALL VALVES, 11-1/2" DIAMETER STAINLESS STEEL EYEWASH BOWL, TWO FILTERED SPRAY HEADS WITH SELF REGULATING FLOW CONTROL AND DUST COVERS, POWDER COATED ALUMINUM FLAG HANDLE, , SCHEDULE 40 GALVANIZED STEEL PIPE AND FITTINGS, CAST ALUMINUM FLOOR FLANGE, AND 1-1/4" INLET.
EMV	EMERGENCY MIXING VALVE: POWERS # ETV200-AM000 HYDROGUARD XP BRONZE BODY WITH ROUGH BRONZE FINISH, MEETING ASSE 1071, CORROSION RESISTANT INTERNAL PARTS, CHECK STOPS WITH REMOVABLE STRAINERS, DUAL INTERNAL COLD WATER BYPASS, PARAFFIN FILLED TEMPERATURE ELEMENT, VANDAL RESISTANT LOCKING MECHANISM TO SECURE TEMPERATURE SETTING, DIAL THERMOMETER ON OUTLET, CAPABLE OF 23.2 GPM WITH A 15 PSI DIFFERENTIAL AND A MINIMUM FLOW RATE OF 3.0 GPM. SET TEMPERATURE TO 80F.
EWC	ELECTRIC WATER COOLER (ADA ACCESSIBLE): ELKAY # VRCGRNTL8C WALL-MOUNTED, LEAD FREE, BARRIER FREE, DUAL LEVEL, FRONT PUSH ACTUATOR BUTTON, STAINLESS STEEL BOWL, VANDAL-RESISITANT ONE PIECE BUBBLER, GALVANIZED STEEL CHASIS, STAINLESS STEEL FRONT AND SIDES. CHILLER CAPACITY AND SIDES. CHILLER WITH CAPACITY OF 8.0 GALLONS PER HOUR, AT 50F INLET, 80F OUTLET AND 90F AMBIENT TEMPERATURES. GREENSPEC LISTED. TRIM: McGUIRE # LF2165CC LEAD FREE BRASS COMPRESSION ANGLE STOP VALVE WITH RISER AND ESCUTCHEON, McGUIRE # B8872CF 1-1/4" 17 GAUGE CAST CHROME PLATED BRASS ADJUSTABLE P-TRAP AND WASTE ARM WITH CLEANOUT PLUG AND ESCUTCHEON, AND SUITABLE CARRIER WITH STANCHIONS TO FLOOR. ELECTRICAL REQUIREMENTS: 120-VOLT, 2.8 FULL LOAD AMPS.
FC	FLEXIBLE CONNECTOR: UNITED FLEXIBLE #AFBX1, 1/4" X 12"LONG CORRUGATED 316L STAINLESS STEEL BELLOWS AND 304 STAINLESS STEEL SINGLE BRAID WITH MALE NPT THREADED CONNECTIONS WITH INTREGRAL HEX AND WITH A MAXIMUM OPERATING PRESSURE OF 1825 PSI.
FCO	FLOOR CLEANOUT: JAY R. SMITH, CAST IRON BODY, FLASHING FLANGE WITH CLAMPING COLLAR, ABS PLUG, AND ADJUSTABLE, ROUND, SECURED, NICKEL BRONZE, TOP. # 4031L (-F-C), SCORIATED TOP FOR EXPOSED, FLUSH WITH FINISHED FLOOR, APPLICATION(S), # 4031L (-F-C-Y), STAINLESS STEEL MARKER FOR INSTALLATION IN CARPETED FLOOR AREA(S), # 4151 (-F-C), 1/8" RECESS FOR INSTALLATION IN TILED FLOOR AREA(S), # 4191 (-F-C), 1/2" RECESS FOR INSTALLATION IN TERRAZZO AND SIMILAR POURED FLOOR AREA(S). REFER TO SPECIFICATIONS FOR INSTALLATION.
FCOH	FLOOR CLEANOUT – HEAVY DUTY: JAY R. SMITH # 4111L CAST IRON BODY, FLASHING FLANGE WITH CLAMPING COLLAR, ABS PLUG, AND ADJUSTABLE, ROUND, SECURED, HEAVY DUTY SCORIATED NICKEL BRONZE TOP. REFER TO SPECIFICATIONS FOR INSTALLATION.
FCV	FLOW CONTROL VALVE: FLOWDESIGN # ICSS "AUTOFLOW", SERIES 300 STAINLESS UNION BODY WITH NICKEL PLATED UNION NUT, STAINLESS STEEL PRESSURE COMPENSATING CARTRIDGE, MEETING NSF 61 ANNEX G, NAMEPLATE AND 1/2" VALVE BODY SIZE UNLESS SHOWN OTHERWISE ON PLANS. PROVIDE 0.5 GPM FLOW RATE CARTRIDGE UNLESS SHOWN OTHERWISE ON PLANS.
FD1	FLOOR DRAIN: JAY R. SMITH #2240 (-B), 13" DEEP CAST IRON BODY, 12" ROUND, LOOSE, MEDIUM DUTY, CAST IRON GRATE WITH INTEGRAL SEDIMENT BUCKET, BOTTOM OUTLET, SEEPAGE PAN, MEMBRANE FLASHING CLAMP. PROVIDE TRAP PRIMER PORT IF TRAP PRIMER IS PROVIDED ON THE DRAWINGS. PROVIDE PUSH-ON JOINT OF OUTLET SIZE AS SHOWN ON PLANS. TRAP SEAL: PROVIDE TRAP SEAL PER SPECIFICATIONS FOR ACTUAL FLOOR DRAIN MODEL AND SIZE.
FD2	EQUIPMENT FLOOR DRAIN: JAY R. SMITH # 2220L, CAST IRON BODY, 8-1/2" ROUND, LOOSE, MEDIUM DUTY, CAST IRON GRATE, SEDIMENT BUCKET, BOTTOM OUTLET, SEEPAGE PAN, AND MEMBRANE FLASHING CLAMP. USE PUSH-ON JOINT OF OUTLET SIZE AS SHOWN ON PLANS. TRAP SEAL: PROVIDE TRAP SEAL PER SPECIFICATIONS FOR ACTUAL FLOOR DRAIN MODEL AND SIZE.
FD3	EQUIPMENT FLOOR DRAIN: JAY R. SMITH # 2110L (D), CAST IRON BODY, 8" ROUND, LOOSE, MEDIUM DUTY, CAST IRON DOME GRATE, BOTTOM OUTLET, SEEPAGE PAN, AND MEMBRANE FLASHING CLAMP. USE PUSH-ON JOINT OF OUTLET SIZE AS SHOWN ON PLANS. INSTALL IN BASE OF TRENCH DRAIN AT LOWEST POINT. REFER TO STRUCTURAL. TRAP SEAL: PROVIDE TRAP SEAL PER SPECIFICATIONS FOR ACTUAL FLOOR DRAIN MODEL AND SIZE.
FD4	PVC FLOOR DRAIN: SIOUX CHIEF # 842 SERIES WITH ADJUSTABLE SIX AND ONE-HALF INCH ROUND MEDIUM DUTY CAST NICKEL STRAINER, WITH FLANGED PVC ADAPTER AND TRAP PRIMER PORT. CLEAN AND POLISH STRAINER AFTER INSTALLATION, PROVIDE FLANGED PVC ADAPTER WITH BLANK TRAP PRIMER PORT IF NO TRAP PRIMER IS PROVIDED ON THE DRAWINGS.
FD5	EMERGENCY SHOWER DRAIN: JAY R. SMITH # 2131Y (-NB), CAST IRON BODY, 12" ROUND, LOOSE, MEDIUM DUTY, CAST IRON GRATE, WITH NICKEL BRONZE VENEER, BOTTOM OUTLET, SEEPAGE PAN, AND MEMBRANE FLASHING CLAMP. USE PUSH-ON JOINT OF OUTLET SIZE AS SHOWN ON PLANS. TRAP SEAL: PROVIDE TRAP SEAL PER SPECIFICATIONS FOR ACTUAL FLOOR DRAIN MODEL AND SIZE.
FS	FLOOR SINK: JAY R. SMITH # 3101L (-12), 6" DEEP CAST IRON BODY WITH ACID RESISTING ENAMELED INTERIOR, ANCHOR FLANGE WITH SEEPAGE HOLES, CLAMP COLLAR, ALUMINUM SEDIMENT BUCKET, AND 8-1/2" SQUARE NICKEL BRONZE RIM AND HALF GRATE. USE PUSH-ON JOINT OF OUTLET SIZE AS SHOWN ON PLANS. INSTALL ON EQUIPMENT HOUSEKEEPING PAD.
FS1	FLOOR SINK: JAY R. SMITH # 3041C (-12), 6" DEEP CAST IRON BODY WITH ACID RESISTING ENAMELED INTERIOR, ANCHOR FLANGE WITH SEEPAGE HOLES, CLAMP COLLAR, ALUMINUM SEDIMENT BUCKET, AND 8-1/2" ROUND NICKEL BRONZE RIM AND HALF GRATE. USE CAULK JOINT OF OUTLET SIZE AS SHOWN ON PLANS.
HB	HOSE BIBB: PRIER PRODUCTS # C-155NCP.75, SATIN NICKEL PLATED BRASS 3/4" MALE INLET, 3/4" THREADED HOSE CONNECTION, WHEEL HANDLE, AND ASSE 1011 INTEGRAL VACUUM BREAKER.
HR	HOSE REEL: COXREELS #800-728-E, 20" CRANK WIDTH, 30" LENGTH, 28-12" HEIGHT, HEAVY-DUTY STEEL CONSTRUCTION WITH ROLLED EDGES, SELF-ALIGNING BEARING SUPPORTS, STEEL FRAME AND DRUM, 1-1/2" FEMALE N.P.T. STRAIGHT JOINT, AND BRONZE FRONT BEARING.
IMB	ICE MAKER BOX: GUY GRAY MODEL # BIM875, 20 GAUGE GALVANIZED STEEL BOX, 18 GAUGE STEEL FACEPLATE, BOTTOM INLET WATER SUPPLY WITH LEAD FREE 1/2" x 1/4" COMPRESSION ANGLE STOP VALVE. TRIM: LOOP 4 FEET OF 1/4" TYPE "K" SOFT COPPER TUBING AND PROVIDE EQUIPMENT CONNECTION.
JS	JANITOR'S SINK: STERN-WILLIAMS # MTB-2424, 24" x 24" x 10" HIGH TERRAZZO BASIN WITH INTEGRAL STAINLESS STEEL DRAIN BODY. FAUCET: CHICAGO FAUCET # 897-CP FAUCET WITH WALL BRACE, INTEGRAL VACUUM BREAKER, PAIL HOOK, AND 3/4" MALE HOSE THREADED OUTLET. SECURE FAUCET IN WALL WITH BACKBOARD. TRIM: # BP TYPE 304, 20 GAUGE, STAINLESS STEEL WALL SURROUNDS, # T-35 THREE FOOT LONG REINFORCED HOSE WITH 3/4" CHROME COUPLING AND WALL HOOK, # V-70 EXTRUDED VINYL BUMPER GUARD, AND # T-40 24" STAINLESS STEEL MOP HANGER.
LV1	COUNTERTOP LAVATORY: AMERICAN STANDARD # 0476.028 "AQUALYN" 20" X 17" OVAL SELF-RIMMING WHITE VITREOUS CHINA FIXTURE WITH FAUCET LEDGE AND FRONT OVERFLOW. SET IN BED OF SILICONE SEALANT. FAUCET: SLOAN # ETF-600-LT 4" CENTERSET, HARD WIRED, SENSOR OPERATED FAUCET LESS TRANSFORMER WITH "Y" STRAINER FILTERED SOLENOID VALVE AND 0.5 GPM AERATOR TRIM: McGUIRE # 155A GRID DRAIN WITH TAILPIECE, McGUIRE # LF2165CCLK LEAD FREE BRASS LOOSE KEY COMPRESSION ANGLE STOP VALVES WITH RISERS AND ESCUTCHEONS, McGUIRE # B8872CF 1-1/4" 17 GAUGE CAST CHROME PLATED BRASS ADJUSTABLE P-TRAP AND WASTE ARM WITH CLEANOUT PLUG AND ESCUTCHEON. THERMOSTATIC MIXING VALVE: POWERS # LFG480, SOLID LEAD FREE BRASS OR BRONZE BODY, THERMOSTATIC WAX ELEMENT, CORROSION RESISTANT INTERNAL PARTS, AND INTEGRAL CHECKS, ASSE 1070 COMPLIANT, CAPABLE OF 1.6 GPM WITH A 20 PSI DIFFERENTIAL AND A MINIMUM FLOW RATE OF 0.25 GPM. SET TEMPERATURE TO 100F. MOUNT BELOW THE PLUMBING FIXTURE WHERE INDICATED ON PLAN(S).

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PLUMBING FIXTURE SCHEDULE

PLUMBING PLAN MARK	DESCRIPTION
LV2	WALL-MOUNTED LAVATORY (ADA ACCESSIBLE): AMERICAN STANDARD # 0355.012 "LUCERNE" 20-1/2" X 18-1/4" RECTANGULAR WALL MOUNTED WHITE VITREOUS CHINA FIXTURE WITH FAUCET LEDGE AND FRONT OVERFLOW. FAUCET: SLOAN # ETF-600-LT 4" CENTERSET, HARD WIRED, SENSOR OPERATED FAUCET LESS TRANSFORMER WITH "Y" STRAINER FILTERED SOLENOID VALVE AND 0.5 GPM AERATOR TRIM: McGUIRE # 155A GRID DRAIN WITH TAILPIECE, McGUIRE # LF2165CCLK LEAD FREE BRASS LOOSE KEY COMPRESSION ANGLE STOP VALVES WITH RISERS AND ESCUTCHEONS, McGUIRE # B8872CF 1-1/4" 17 GAUGE CAST CHROME PLATED BRASS ADJUSTABLE P-TRAP AND WASTE ARM WITH CLEANOUT PLUG AND ESCUTCHEON. THERMOSTATIC MIXING VALVE: POWERS # LFG480, SOLID LEAD FREE BRASS OR BRONZE BODY, THERMOSTATIC WAX ELEMENT, CORROSION RESISTANT INTERNAL PARTS, AND INTEGRAL CHECKS, ASSE 1070 COMPLIANT, CAPABLE OF 1.6 GPM WITH A 20 PSI DIFFERENTIAL AND A MINIMUM FLOW RATE OF 0.25 GPM. SET TEMPERATURE TO 100F. MOUNT BELOW THE PLUMBING FIXTURE WHERE INDICATED ON PLAN(S).
NW	NON-FREEZE WALL HYDRANT: PRIER PRODUCTS # C-634N, SATIN NICKEL PLATED BRASS 1" MALE INLET BY 3/4" FEMALE INLET, 3/4" THREADED HOSE CONNECTION, LOOSE KEY HANDLE, HYDRANT LENGTH AS REQUIRED FOR INSTALLED WALL THICKNESS, ADJUSTABLE WALL CLAMP AND INTEGRAL ASSE 1052 DOUBLE CHECK VACUUM BREAKER.
ORD	OVERFLOW ROOF DRAIN: JAY R. SMITH # 1080Y (-E0X-C-R-CID), 15" DIAMETER CAST IRON BODY, FLASHING CLAMP, GRAVEL STOP, UNDERDECK CLAMP, SUMP RECEIVER, HUBLESS OUTLET, FIXED EXTENSION – HEIGHT AS REQUIRED BY INSTALLED INSULATION THICKNESS, CAST IRON DOME BOLTED OR LOCKED DOWN AND 2" HIGH WATER DAM. PROVIDE OUTLET SIZE AS SHOWN ON PLANS.
RD	ROOF DRAIN: JAY R. SMITH # 1010Y (-E0X-C-R-CID), 15" DIAMETER CAST IRON BODY, FLASHING CLAMP, GRAVEL STOP, UNDERDECK CLAMP, SUMP RECEIVER, HUBLESS OUTLET, FIXED EXTENSION – HEIGHT AS REQUIRED BY INSTALLED INSULATION THICKNESS, AND CAST IRON DOME BOLTED OR LOCKED DOWN. PROVIDE OUTLET SIZE AS SHOWN ON PLANS.
RH	ROOF NON-FREEZE POST HYDRANT: MAPA PRODUCTS # MPH-24FP FREEZE PROOF POST HYDRANT MEETING ASSE #1057 WITH BLACK POWDER COATED CAST ALUMINUM WEATHER-GUARD DOME HANDLE, STAINLESS STEEL SHROUD WITH WELDED STAINLESS STEEL FLANGE, UNDER DECK CLAMP, BRONZE GLOBE ANGLE VALVE, 3/4" HOSE CONNECTION, QUICK DISCONNECT WITH BUILT-IN VACUUM BREAKER, STAINLESS STEEL RESERVOIR.
RPZ1	REDUCED PRESSURE ZONE BACKFLOW PREVENTER: WATTS # 957-NRS, MEETING ASSE 1013, 304 STAINLESS STEEL BODY AND SLEEVE, QUARTER TURN TEST COCKS, RESILIENT SEATED NON-RISING STEM GATE VALVES AND WATTS #77F-DI-FDA EPOXY COATED CAST IRON STRAINER AND # 957AG AIR GAP FITTING.
RPZ2	REDUCED PRESSURE ZONE BACKFLOW PREVENTER: WATTS # LFU009AQT-S, MEETING ASSE 1013, LEAD FREE CAST BRONZE BODY, QUARTER TURN TEST COCKS, 90°D SWIVEL UNIONS, QUARTER TURN BALL VALVES, LEAD FREE BRONZE STRAINER, AND # 909AG AIR GAP FITTING.
SF	SHOWER FLOOR (ADA ACCESSIBLE): STERN WILLIAMS # WDA-3610 "PARIAN TRANSFER", 48" x 36" ONE PIECE TERRAZZO WITH INTEGRAL STAINLESS STEEL RAMP, 2" BRASS DRAIN, AND 3 TILING FLANGES.
SK1	SINK (ADA ACCESSIBLE): ELKAY # LRAD-2219-55-3, 22" x 19-1/2" x 5-1/2" DEEP, SINGLE COMPARTMENT, SELF-RIMMING, 18 GAUGE TYPE 302 STAINLESS STEEL, FIXTURE WITH FAUCET LEDGE. SET IN BED OF PUTTY. FAUCET: CHICAGO FAUCET # 201-A317ABVPAXKCP 8" SPREAD LEAD FREE FAUCET WITH VANDAL RESISTANT # 317 WRIST BLADE HANDLES, QUARTER TURN CERAMIC CARTRIDGES AND # E32VPJKCP 2.2 GPM AERATOR. TRIM: McGUIRE # LF2165CC LEAD FREE BRASS WHEEL HANDLE ANGLE STOP VALVES WITH RISERS AND ESCUTCHEONS, McGUIRE # 151M CUP STRAINER WITH 1-1/2" 17 GAUGE TAILPIECE, McGUIRE # B8912CF 1-1/2" 17 GAUGE CAST CHROME PLATED BRASS ADJUSTABLE P-TRAP WITH BRASS CLEANOUT AND ESCUTCHEON, AND PLUMBEREX "PRO-EXTREME" # X-4222 INSULATION KIT FOR WATER AND WASTE PIPES. THERMOSTATIC MIXING VALVE: POWERS # LFG480, SOLID LEAD FREE BRASS OR BRONZE BODY, THERMOSTATIC WAX ELEMENT, CORROSION RESISTANT INTERNAL PARTS, AND INTEGRAL CHECKS, ASSE 1070 COMPLIANT, CAPABLE OF 1.6 GPM WITH A 20 PSI DIFFERENTIAL AND A MINIMUM FLOW RATE OF 0.25 GPM. SET TEMPERATURE TO 120F. MOUNT BELOW THE PLUMBING FIXTURE WHERE INDICATED ON PLAN(S).
SK2	SINK (ADA ACCESSIBLE): ELKAY # LRAD-3319-55-3, 33" x 19-1/2" x 5-1/2" DEEP, DOUBLE COMPARTMENT, SELF-RIMMING, 18 GAUGE TYPE 302 STAINLESS STEEL, FIXTURE WITH FAUCET LEDGE. SET IN BED OF PUTTY. FAUCET: CHICAGO FAUCET # 200-A317ABCP 8" SPREAD LEAD FREE FAUCET WITH VANDAL RESISTANT # 317 WRIST BLADE HANDLES, QUARTER TURN CERAMIC CARTRIDGES AND # E3JKABCP 2.2 GPM AERATOR. TRIM: McGUIRE # LF2165CC LEAD FREE BRASS WHEEL HANDLE ANGLE STOP VALVES WITH RISERS AND ESCUTCHEONS, (2) McGUIRE # 151M CUP STRAINERS WITH 1-1/2" 17 GAUGE TAILPIECE, McGUIRE # 111C16G17 1-1/2" 17 GAUGE CONTINUOUS WASTE, McGUIRE # B8912CF 1-1/2" 17 GAUGE CAST CHROME PLATED BRASS ADJUSTABLE P-TRAP WITH BRASS CLEANOUT AND ESCUTCHEON, AND PLUMBEREX # EO3061 KITCHEN END OUTLET AND P-TRAP INSULATION KIT AND # X-4112 VALVE AND SUPPLY COVERS. THERMOSTATIC MIXING VALVE: POWERS # LFG480, SOLID LEAD FREE BRASS OR BRONZE BODY, THERMOSTATIC WAX ELEMENT, CORROSION RESISTANT INTERNAL PARTS, AND INTEGRAL CHECKS, ASSE 1070 COMPLIANT, CAPABLE OF 1.6 GPM WITH A 20 PSI DIFFERENTIAL AND A MINIMUM FLOW RATE OF 0.25 GPM. SET TEMPERATURE TO 120F. MOUNT BELOW THE PLUMBING FIXTURE WHERE INDICATED ON PLAN(S).
SOI1	SAND/OIL INTERCEPTOR: GREENTURTLE PROCEPTOR OMC 1000, FIBERGLASS REINFORCED PLASTICS BODY, SINGLE BAFFLE DESIGN, 1000 GALLON CAPACITY AND RATED FOR 577 GALLONS OF OIL STORED, WITH (1) 24" GASKETED, AASHTO H-20 LOAD RATED COVER WITH EXTENSIONS. TRAPPED INLET AND OUTLET AND (2) 3" VENT CONNECTIONS. EXTEND CLEANOUTS TO GRADE. UNIT SHALL INCLUDE 30 YEAR WARRANTY AGAINST LEAKS AND STRUCTURAL FAILURE.
SOI2	SAND/OIL INTERCEPTOR: GREENTURTLE PROCEPTOR OMC 200, FIBERGLASS REINFORCED PLASTICS BODY, SINGLE BAFFLE DESIGN, 200 GALLON CAPACITY AND RATED FOR 90 GALLONS OF OIL STORED, WITH (1) 24" GASKETED, AASHTO H-20 LOAD RATED COVER WITH EXTENSIONS. TRAPPED INLET AND OUTLET AND (2) 3" VENT CONNECTIONS. EXTEND CLEANOUTS TO GRADE. UNIT SHALL INCLUDE 30 YEAR WARRANTY AGAINST LEAKS AND STRUCTURAL FAILURE.
SV	SHOWER VALVE (ADA ACCESSIBLE): SYMMONS # 9605-X-PLR, PISTON TYPE PRESSURE BALANCING MIXING VALVE WITH BRASS STEM, MEETING ASSE 1016P, SINGLE BLADE LEVER HANDLE, SET ADJUSTABLE LIMIT STOP SCREW TO 110F, INTEGRAL SERVICE STOPS, DIVERTER VALVE, 2.5 GPM "CLEAR-FLO" SHOWER HEAD WITH ARM AND FLANGE, 2.5 GPM WALL / HAND SHOWER WITH FLEXIBLE METAL HOSE, IN-LINE VACUUM BREAKER, WALL CONNECTION AND FLANGE, AND 30" SLIDE BAR.
TD	TRENCH DRAIN: ZURN # Z-886-RPS-GL-PSC, 6" WIDE HIGH DENSITY POLYETHYLENE STRUCTURAL COMPOSITE TRENCH DRAIN WITH CLASS "C" REINFORCED TYPE 304 STAINLESS STEEL PERFORATED GRATE. CUT IN 20" SECTIONS FOR REQUIRED LENGTH AS SHOWN ON FLOOR PLAN. PROVIDE WITH END CAPS AND BOTTOM OUTLET WITH P-TRAP. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
TMV	THERMOSTATIC MIXING VALVE: POWERS # LFG480, SOLID LEAD FREE BRASS OR BRONZE BODY, THERMOSTATIC WAX ELEMENT, CORROSION RESISTANT INTERNAL PARTS, AND INTEGRAL CHECKS, ASSE 1070 COMPLIANT, CAPABLE OF 1.6 GPM WITH A 20 PSI DIFFERENTIAL AND A MINIMUM FLOW RATE OF 0.25 GPM. SET TEMPERATURE TO 110F FOR DUAL TEMPERATURE LAVATORIES AND HAND SINKS, 100F FOR SINGLE TEMPERATURE LAVATORIES AND HAND SINKS AND 120F FOR SINKS. MOUNT BELOW THE PLUMBING FIXTURE WHERE INDICATED ON PLAN(S).
TP	TRAP PRIMER: PRECISION PLUMBING PRODUCTS # PR-500 "PRIME RITE", CORROSION RESISTANT BRASS BODY, "O" RING SEALS, 1/2" INLET AND OUTLET, AND INTEGRAL VACUUM BREAKER. INSTALL THE VALVE AT A MINIMUM OF 12" ABOVE FINISHED FLOOR.
UR1	URINAL: AMERICAN STANDARD # 6561.017 "TRIMBROOK" WHITE VITREOUS CHINA FIXTURE WITH FLUSHING RIM, 3/4" TOP SPUD, AND SIPHON FLUSH ACTION. VALVE: TOTO #TEU1UA12#CP, "ECO-POWER" WATER TURBINE AND BATTERY POWERED, 0.125 GALLON PER FLUSH, EXPOSED, CHROME PLATED, SENSOR OPERATED FLOW REGULATOR TYPE FLUSH VALVE MECHANICAL OVERRIDE PUSH BUTTON, WITH POM FLOW REGULATOR WITH CHLORAMINE RESISTANT SEAT AND SEALS AND SELF-CLEANING MECHANISM, ESCUTCHEON, INTEGRAL SCREWDRIVER STOP, VACUUM BREAKER, 3/4" FLUSH TUBE AND SWEAT ADAPTER KIT. TRIM: SUITABLE CARRIER WITH STANCHIONS TO FLOOR.

PLUMBING FIXTURE SCHEDULE

PLUMBING PLAN MARK	DESCRIPTION
UR2	URINAL (ADA ACCESSIBLE): AMERICAN STANDARD # 6561.017 "TRIMBROOK" WHITE VITREOUS CHINA FIXTURE WITH FLUSHING RIM, 3/4" TOP SPUD, AND SIPHON FLUSH ACTION. VALVE: TOTO #TEU1UA12#CP, "ECO-POWER" WATER TURBINE AND BATTERY POWERED, 0.125 GALLON PER FLUSH, EXPOSED, CHROME PLATED, SENSOR OPERATED FLOW REGULATOR TYPE FLUSH VALVE MECHANICAL OVERRIDE PUSH BUTTON, WITH POM FLOW REGULATOR WITH CHLORAMINE RESISTANT SEAT AND SEALS AND SELF-CLEANING MECHANISM, ESCUTCHEON, INTEGRAL SCREWDRIVER STOP, VACUUM BREAKER, 3/4" FLUSH TUBE AND SWEAT ADAPTER KIT. TRIM: SUITABLE CARRIER WITH STANCHIONS TO FLOOR.
WC1	FLOOR-MOUNTED WATER CLOSET: AMERICAN STANDARD # 2234.001 "MADERA" WHITE VITREOUS CHINA FIXTURE WITH ELONGATED UNIVERSAL BOWLAND DIRECT-FED SIPHON JET ACTION. VALVE: TOTO TET1LAR#CP, "ECO-POWER" WATER TURBINE AND BATTERY POWERED, 1.28 GALLON PER FLUSH, EXPOSED, CHROME-PLATED, SENSOR OPERATED PISTON TYPE FLUSH VALVE MECHANICAL OVERRIDE PUSH BUTTON, WITH PISTON WITH CHLORAMINE RESISTANT SEAT AND SEALS AND SELF-CLEANING MECHANISM, ESCUTCHEON, INTEGRAL SCREWDRIVER STOP, VACUUM BREAKER, AND SWEAT ADAPTER KIT. TRIM: CHURCH # 9500SSCT WHITE OPEN-FRONT CONTOURED, SOLID PLASTIC, HEAVY DUTY, SEAT LESS COVER WITH SELF-SUSTAINING CHECK HINGES AND STAINLESS STEEL BOLTS. PROVIDE SUITABLE FIXTURE CARRIER.
WC2	FLOOR-MOUNTED WATER CLOSET (ADA ACCESSIBLE): AMERICAN STANDARD # 3043.001 "MADERA" WHITE VITREOUS CHINA FIXTURE WITH ELONGATED UNIVERSAL BOWL AND DIRECT-FED SIPHON JET ACTION. VALVE: TOTO TET1LAR#CP, "ECO-POWER" WATER TURBINE AND BATTERY POWERED, 1.28 GALLON PER FLUSH, EXPOSED, CHROME-PLATED, SENSOR OPERATED PISTON TYPE FLUSH VALVE MECHANICAL OVERRIDE PUSH BUTTON, WITH PISTON WITH CHLORAMINE RESISTANT SEAT AND SEALS AND SELF-CLEANING MECHANISM, ESCUTCHEON, INTEGRAL SCREWDRIVER STOP, VACUUM BREAKER, AND SWEAT ADAPTER KIT TRIM: CHURCH # 9500SSCT WHITE OPEN-FRONT CONTOURED, SOLID PLASTIC, HEAVY DUTY, SEAT LESS COVER WITH SELF-SUSTAINING CHECK HINGES AND STAINLESS STEEL BOLTS. PROVIDE SUITABLE FIXTURE CARRIER.
WCO	WALL CLEANOUT: JAY R. SMITH # 4530S, CAST IRON CLEANOUT TEE, COUNTER SUNK PLUG, STAINLESS STEEL ROUND COVER AND SCREW, AND IRON PLUG WITH GASKET SEAL. REFER TO SPECIFICATIONS FOR INSTALLATION.
WHA	WATER HAMMER ARRESTER: PRECISION PLUMBING PRODUCTS, HARD DRAWN COPPER BODY WITH WROUGHT COPPER FITTINGS, PISTON TYPE WITH LUBRICATED EPDM "O" RING SEALS, MEETING ASSE 1010 OR PDI WH-201. PROVIDE PDI SIZES "A" THROUGH "F" AS SHOWN ON PLANS. PROVIDE SIZE "A" UNLESS SHOWN OTHERWISE ON THE PLANS.
WMB	WASHING MACHINE BOX: GUY GRAY MODEL # B200TS, 20 GAUGE GALVANIZED STEEL BOX, 18 GAUGE STEEL FACEPLATE, TOP INLET WATER SUPPLIES WITH ANGLED WHEEL HANDLE 3/4" HOSE BIBBS, AND 2" BOTTOM OUTLET DRAIN. TRIM: PROVIDE 24" LONG TAIL PIECE AND 2" DIAMETER P-TRAP.

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REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: MJ
DATE: 12.15.22 REVIEWED BY: HEI

STATE OF MISSOURI
CARL J. HOLDEN
NUMBER PE-2020016283
PROFESSIONAL ENGINEER

01/24/2023

CARL J. HOLDEN
LICENSE # PE-2020016283

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

PLUMBING SCHEDULES

SHEET
P600

CARL J. HOLDEN

ELECTRICAL SYMBOLS

THIS IS A MASTER LEGEND AND NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED. V3.00

STANDARD MOUNTING HEIGHTS

AUDIBLE APPLIANCES (CENTERLINE)	84"
ALARMS	48"
ANNUNCIATOR PANELS (DISPLAY)	60"
CONTROLS (TOP OF DEVICE)	48"
EXIT SIGNS (WALL MOUNTED)	80"
FIRE ALARM ANNUNCIATOR PANEL (DISPLAY)	60"
FIRE ALARM BELL (EXTERIOR) (CENTERLINE)	120"
FIRE ALARM CONTROL PANEL/UNIT (DISPLAY)	60"
INTERCOM (AFEA ONLY)	36"
INTERCOMS (TOP OF DEVICE)	48"
PULL STATIONS (TOP OF DEVICE)	48"
PHOTOCELLS	144"
RECEPTACLES	16"
RECEPTACLES (EXTERIOR)	24"
RECEPTACLES (GARAGES)	24"
RECEPTACLES (POOLS)	27"
RECEPTACLES (ABOVE COUNTER) +6" ABOVE BACKSPLASH/COUNTER, 40" MAX	
RECEPTACLES IN EQUIPMENT ROOMS	44"
REMOTE INDICATING LIGHT (EQUIPMENT ROOMS)	48"
REMOTE INDICATING LIGHT (FINISHED AREAS)	CEILING
SAFETY SWITCHES (TOP OF DEVICE)	48"
STARTERS (TOP OF DEVICE)	48"
SWITCHES (TOP OF DEVICE)	44"
TELEPHONE, DATA OUTLETS	SAME AS ADJACENT DEVICE, UNO
TELEPHONE TERMINAL BOARD (BOTTOM)	6"
TELEVISION OUTLETS	REFER TO ARCH DRAWINGS
VISIBLE APPLIANCES (CENTERLINE)	84"

INSTALL OUTLET BOXES AT THE MOUNTING HEIGHTS SHOWN ABOVE UNO IN THE CONSTRUCTION DOCUMENTS. MOUNTING HEIGHTS LISTED ABOVE, OR ELSEWHERE IN THE CONSTRUCTION DOCUMENTS, ARE AFF OR AFG TO BOTTOM OF OUTLET BOX, UNO. ALL DEVICES SHALL BE INSTALLED IN COMPLIANCE WITH CURRENT ADA AND LOCAL REQUIREMENTS.

ABBREVIATIONS

AF	AMPERE FUSE SIZE
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHJ	AUTHORITY HAVING JURISDICTION
AHU	AIR HANDLING UNIT
AIC	AMPERE INTERRUPTING CAPACITY
AS	AMPERE SWITCH SIZE
AT	AMPERE TRIP SETTING
ATS	AUTOMATIC TRANSFER SWITCH
AV	AUDIO VISUAL
BAS	BUILDING AUTOMATION SYSTEM
BKR	BREAKER
C	CONDUIT
CAT	CATEGORY
CATV	CABLE TELEVISION SYSTEM
CCTV	CLOSED CIRCUIT TELEVISION
CD	CANDELA
CKT	CIRCUIT
CODE	APPLICABLE CODE ADOPTED BY JURISDICTION
CT	CURRENT TRANSFORMER
CTR	CENTER
CVD	CUMULATIVE VOLTAGE DROP
D/DEMO	DEMOLITION
DPDT	DOUBLE-POLE, DOUBLE-THROW
DPST	DOUBLE-POLE, DOUBLE-THROW
E/ETR/EX	EXISTING TO REMAIN
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EM	EMERGENCY
EMS	ENERGY MANAGEMENT SYSTEM
ELV	ELECTRONIC LOW-VOLTAGE
ERMS	ENERGY REDUCTION MAINTENCE SWITCH
EWC	ELECTRIC WATER COOLER
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
FCA	FAULT CURRENT AMPS AVAILABLE
FCU	FAN COIL UNIT
FF	FINISHED FLOOR
FLA	FULL LOAD AMPS
FLR	FLOOR
GC	GENERAL CONTRACTOR
GEC	GROUNDING ELECTRODE CONDUCTOR
GES	GROUNDING ELECTRODE SYSTEM
GFR	GROUND FAULT RELAY
G	GROUND
IG	ISOLATED GROUND
ISC	SHORT CIRCUIT CURRENT
JB/J-BOX	JUNCTION BOX
LF	LINEAR FEET
LRA	LOCKED ROTOR AMPS
LTG/LTS	LIGHTING/LIGHTS
MAU	MAKE-UP AIR UNIT
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPACITY
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MFR	MANUFACTURER
MIN	MINIMUM
MLO	MAIN LUGS ONLY
MLV	MAGNETIC LOW-VOLTAGE
MOCP	MAXIMUM OVERCURRENT PROTECTION
MTD	MOUNTED
N/A	NOT APPLICABLE
NF	NON-FUSED
NL	NIGHT LIGHT (24HR ON)
NRTL	NATIONALLY RECOGNIZED TESTING LABORATORY (CSA, ETL, NSF, UL)
NTS	NOT TO SCALE
OS	OCCUPANCY SENSOR
P	POLE
PART	PARTIAL CIRCUIT
PH/Ø	PHASE
PNL	PANEL
PNLBD	PANELBOARD
PROVIDE	FURNISH AND INSTALL
PT	POTENTIAL TRANSFORMER
QTY	QUANTITY
R/REL	RELOCATE
RCPT	RECEPTACLE
RLA	RUNNING LOAD AMPS
RTU	ROOFTOP UNIT
SCCR	SHORT-CIRCUIT CURRENT RATING
SD	SMOKE DUCT DETECTOR
SF	SQUARE FEET
SPDT	SINGLE-POLE, DOUBLE-THROW
SPST	SINGLE-POLE, SINGLE-THROW
SSBJ	SUPPLY-SIDE BONDING JUMPER
ST	SHUNT TRIP
SWBD	SWITCHBOARD
SWGR	SWITCHGEAR
TBB	TELECOMMUNICATIONS BONDING BACKBONE
TBD	TO BE DETERMINED
TGB	TELECOMMUNICATIONS GROUND BUS BAR
TL	TWISTLOCK
TMGB	TELECOMMUNICATIONS MAIN GROUND BUS BAR
TX/XFMR	TRANSFORMER
TYP	TYPICAL
U/F	UNDERFLOOR
U/G	UNDERGROUND
U/S	UNDERSLAB
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
UPS	UNINTERRUPTIBLE POWER SUPPLY
VD	VOLTAGE DROP
VFD	VARIABLE FREQUENCY DRIVE
VS	VACANCY SENSOR
W	WIRE
W/	WITH
WP	WEATHER PROOF
WR	WEATHER RESISTANT
WT	WATERTIGHT
XP	EXPLOSION PROOF

LINETYPE LEGEND

THROUGHOUT THE DRAWINGS DIFFERENT LINETYPES ARE USED IN COMBINATION WITH THE SYMBOLS TO INDICATE THE STATUS OF ITEMS AS EXISTING, TO BE DEMOLISHED, TO BE INCLUDED AS PART OF NEW WORK AND/OR ITEMS WHICH ARE ANTICIPATED TO BE PROVIDED IN THE FUTURE. THE STATUS OF ITEMS USING THESE LINETYPES ARE RELATIVE TO THE VIEW IN WHICH THEY APPEAR. PHASING SHOWN IN DRAWINGS IS NOT INTENDED TO FULLY DESCRIBE ALL NECESSARY CONSTRUCTION PHASING, WHICH IS DETERMINED BY THE CONTRACTOR AS PART OF THEIR RESPONSIBILITIES. ANY SUCH PHASES DESCRIBED IN THE CONSTRUCTION DOCUMENTS ARE GENERAL AND ONLY INTENDED TO INDICATE A BROAD ORDER FOR THE SAKE OF DESCRIBING THE PROJECT. THE FOLLOWING LINETYPES MAY BE USED ON ANY DEVICE, EQUIPMENT, NOTE, LINE, SHAPE, ETC.

EXISTING
DEMOLISH
NEW
FUTURE

ANNOTATION

- 1 — MECHANICAL OR FIRE PROTECTION PLAN NOTE CALLOUT
- 1 — PLUMBING PLAN NOTE CALLOUT
- 1 — ELECTRICAL OR FIRE ALARM PLAN NOTE CALLOUT
- 1 — TECHNOLOGY PLAN CALLOUT
- 1 — PLUMBING EQUIPMENT DESIGNATION. (CONTRACTOR FURNISHED AND INSTALLED), REFER TO PLUMBING FIXTURE OR EQUIPMENT SCHEDULES
- 1 — EQUIPMENT DESIGNATION (OWNER FURNISHED, CONTRACTOR INSTALLED)
- CU 1 — MECHANICAL EQUIPMENT DESIGNATION (CONTRACTOR FURNISHED AND INSTALLED UNLESS NOTED OTHERWISE)
- CONNECTION POINT OF NEW WORK TO EXISTING
- 1 E1 — DETAIL REFERENCE UPPER NUMBER INDICATES DETAIL NUMBER LOWER NUMBER INDICATES SHEET NUMBER
- 1 E1 — SECTION CUT DESIGNATION
- DEDICATED EQUIPMENT ACCESS TILE
- ACCESS PANEL

CIRCUITING & WIRING

- 7 5 3 / OR P1-3,5,7 / [R#] P1 — HOMERUN TO PANELBOARD, INFORMATION AT ARROWS ARE CIRCUIT NUMBERS AND PANELBOARD FOR TERMINATION. REFER TO PANELBOARD SCHEDULES FOR BRANCH CIRCUIT CONDUCTOR SIZES.
- INDICATES RELAY NUMBER
- CIRCUIT CONTINUATION OR PARTIAL CIRCUIT
- CONDUIT CONCEALED
- EM — CONDUIT CONCEALED (EMERGENCY)
- CONDUIT IN/UNDER FLOOR/GROUND CONSTRUCTION
- EXPOSED CONDUIT
- EM — EXPOSED CONDUIT (EMERGENCY)
- FLEXIBLE CONDUIT
- LOW VOLTAGE CABLE (REFER TO SPECS FOR RACEWAY) 2
- CONDUIT TURNING DOWN
- CONDUIT TURNING UP
- CONNECTION POINT OR EQUIPMENT TERMINATION
- EQUIPMENT TERMINATION

CONDUCTOR TICK MARK LEGEND

WHERE TICK MARKS ARE SHOWN, THE FOLLOWING SHALL GOVERN:

- SWITCHED HOT (PHASE) CONDUCTORS (SHOWN TRAILING NEUTRAL)
- NEUTRAL (GROUNDED) CONDUCTOR
- UNSWITCHED HOT (PHASE) CONDUCTORS (SHOWN LEADING NEUTRAL)
- NOTE: HASH MARKS INDICATE QUANTITY OF CONDUCTORS
- EQUIPMENT GROUNDING CONDUCTOR IN CONDUIT (GREEN INSULATION OR BARE)
- ISOLATED GROUNDING CONDUCTOR IN CONDUIT (GREEN INSULATION WITH YELLOW TRACER)

BRANCH CIRCUIT CONDUCTOR TABLE

WHERE TICK MARKS ARE NOT SHOWN, THE FOLLOWING SHALL GOVERN:

# OF POLES	HOT (PHASE)*	NEUTRAL (GROUNDED)**	GROUNDING***
1P	(1)	(1) UNO	(1)
2P	(2)	(1) UNO	(1)
3P	(3)	(1) UNO	(1)

* PROVIDE ADDITIONAL CONDUCTORS THROUGH ENTIRE CIRCUIT (SWITCHED, UNSWITCHED/EM. ETC.) AS INDICATED THROUGHOUT CONSTRUCTION DOCUMENTS AND AS REQUIRED FOR A COMPLETE AND WORKING SYSTEM.

** REFER TO SPECIFICATIONS FOR LIMITATIONS ON SHARING NEUTRAL (GROUNDED) CONDUCTORS. DO NOT CIRCUIT AS A MULTI-WIRE BRANCH CIRCUIT, UNO.

*** PROVIDE ADDITIONAL ISOLATED GROUNDING CONDUCTORS WHERE INDICATED.

REFER TO SPECIFICATIONS, PLANS, NOTES, WIRING AND CONTROL DIAGRAMS FOR ADDITIONAL CIRCUITING REQUIREMENTS.

LIGHTING

- A a — LIGHT FIXTURE
- a = LOWER CASE LETTER IS SWITCH IDENTIFIER
- A = UPPER CASE LETTER INDICATES LIGHT FIXTURE TYPE
- = WALL MOUNT
- = ARROW INDICATED AIMING DIRECTION
- LIGHT FIXTURE CIRCUITED AS A NIGHT LIGHT (NL)
- EMERGENCY LIGHT FIXTURE WITH EMERGENCY LIGHTING BATTERY PACK OR CONNECTED TO EMERGENCY SOURCE
- NIGHT LIGHT/EMERGENCY LIGHT FIXTURE WITH EMERGENCY BATTERY PACK OR CONNECTED TO EMERGENCY SOURCE
- LIGHT FIXTURE WITH DUAL BALLASTS CIRCUITED SEPARATELY (SHADING IMPLIES EMERGENCY LIGHT FIXTURE)
- [#] — LIGHTING TRACK (# INDICATES RELAY NUMBER)
- MIRROR LIGHTS
- EXTERIOR PARKING LOT LIGHT FIXTURE
- EXTERIOR PEDESTRIAN POST TOP LIGHT FIXTURE
- EXTERIOR LIT BOLLARD LIGHT
- EXIT SIGN - CEILING / WALL MOUNTED, ARROWS AS INDICATED. FACE HATCHED
- EMERGENCY LIGHTING UNIT EQUIPMENT WITH BATTERY PACK - CEILING/WALL MOUNTED
- AFEA (AREA FOR EVACUATION ASSISTANCE) SIGN - CEILING/WALL MOUNTED, ARROWS AS INDICATED

REFER TO LIGHT FIXTURE SCHEDULE FOR MORE INFORMATION

POWER EQUIPMENT & DEVICES

- ELECTRICAL PANELBOARD (SURFACE OR FLUSH MOUNT)
- ELECTRICAL CABINET (SURFACE OR FLUSH MOUNT), TYPE AS NOTED
- PLYWOOD TERMINAL BOARD FOR TELEPHONE SYSTEM, UNO. SIZE AS NOTED
- SWITCHBOARD OR MOTOR CONTROL CENTER ON HOUSEKEEPING PAD
- ELECTRICAL DISTRIBUTION PANELBOARD
- TRANSFORMER
- 200/3/150/3R — DISCONNECT SWITCH - "200/3/150/3R" DENOTES AMPERES/POLE/FUSE/NEMA ENCLOSURE RATING, NF= NON-FUSED, CB= CIRCUIT BREAKER (200/3/CB), NO VALUE (200/3/150) FOR NEMA ENCLOSURE MEANS STANDARD NEMA 1 RATING
- 30/3/15/1/3R — COMBINATION DISCONNECT (SAFETY) SWITCH AND MOTOR STARTER "30/3/15/1/3R" DENOTES AMPERES/POLE/FUSE/NEMA STARTER SIZE/NEMA ENCLOSURE RATING, NF= NON-FUSED, CB= CIRCUIT BREAKER (30/3/CB/1), NO VALUE (200/3/150/1) FOR NEMA ENCLOSURE MEANS STANDARD NEMA 1 ENCLOSURE RATING
- 2 — MAGNETIC MOTOR STARTER, NEMA SIZE AS NOTED. 3-POLE, UNO
- VFD — VARIABLE FREQUENCY DRIVE
- INDICATING LIGHT
- EMERGENCY POWER OFF BUTTON
- STOP-START PUSH BUTTON CONTROL STATION
- HAND-OFF-AUTO PUSH BUTTON CONTROL STATION
- MUSHROOM-TYPE PUSH BUTTON
- OVERHEAD PADDLE FAN

BOXES, LIGHTING CONTROL & WIRING DEVICES

$# — SWITCH LETTER DESIGNATIONS AS FOLLOWS:
BLANK = SINGLE
2 = TWO POLE
3 = THREE-WAY
4 = FOUR-WAY
D = DIMMER
F = FAN SPEED CONTROL
FH = FRACTIONAL HORSEPOWER MANUAL CONTROLLER
IH = INTEGRAL HORSEPOWER MANUAL CONTROLLER
K = KEYED
LV# = LOW VOLTAGE / DIGITAL
M = MANUAL MOTOR STARTER DISCONNECT
OS# = OCCUPANCY SENSOR
P = SPST PILOT LIGHT
WP = WEATHER PROOF
# = REFER TO LIGHTING CONTROL DEVICE SCHEDULE

- ELU — AUTOMATIC LOAD CONTROL RELAY
- BTS — BRANCH CIRCUIT TRANSFER SWITCH
- CEILING / WALL MOUNTED OCCUPANCY SENSOR (# INDICATES TYPE PER SCHEDULE)
  - CORNER 90 DEGREE SENSING
  - ONE-DIRECTION SENSING, CEILING/WALL MOUNT
  - CEILING MOUNT, TWO DIRECTION SENSING
  - CEILING MOUNT, FOUR DIRECTION SENSING
- C# — CONTACTOR (SIZE, COIL VOLTAGE AND NUMBER OF POLES AS INDICATED)
- CL## — TRACK-MOUNTED CURRENT LIMITER (## INDICATES AMPERAGE)
- D# — DAYLIGHT SENSOR (# INDICATES TYPE PER SCHEDULE)
- LC — LIGHTING CONTROLS PROCESSOR AND/OR EQUIPMENT
- P# — POWER PACK (# INDICATES TYPE PER SCHEDULE)
- PS# — PHOTOELECTRIC SWITCH
- R## — ROOM CONTROLLER (# INDICATES TYPE PER SCHEDULE)
- TS# — TIME SWITCH
- SIMPLEX RECEPTACLE - NEMA 5-20R, UNO
- DUPLEX RECEPTACLE - NEMA 5-20R, UNO
- DOUBLE DUPLEX RECEPTACLE - NEMA 5-20R, UNO
- SPECIAL RECEPTACLE - NEMA TYPE AS NOTED
- TWIST-LOCK TYPE RECEPTACLE
- G GFCI — BLANK FACE GFCI FEED THROUGH DEVICE
- GFCI — GFCI TYPE RECEPTACLE*
- IG — ISOLATED GROUND TYPE RECEPTACLE*
- EM — EMERGENCY RECEPTACLE*
- RECEPTACLE INSTALLED ABOVE COUNTER OR BACKSPLASH*
- RECEPTACLE INSTALLED IN CEILING*
- RECEPTACLE INSTALLED IN FLOOR*
- RECEPTACLE INSTALLED VIA DROP CORD*
- # — RECEPTACLE LETTER DESIGNATIONS AS FOLLOWS:
  C = AUTOMATICALLY CONTROLLED
  CH = CLOCK HANGER TYPE
  G=RCPT PROTECTED BY GFCI CIRCUIT BREAKER OR UPSTREAM GFCI DEVICE
  H = HORIZONTALLY MOUNTED
  S = MANUALLY CONTROLLED
  SP / TVSS = SURGE PROTECTION
  TR = TAMPER RESISTANT
  TV = TELEVISION
  USB = USB/DUPLEX
  WP = WEATHER PROOF COVER
  WR = WEATHER RESISTANT
- MULTI-OUTLET ASSEMBLY
- TELEPHONE OUTLET
- DATA OUTLET
- MULTI-SERVICE OUTLET; TELEPHONE AND DATA
  - ABOVE COUNTER, TYP
  - WALL, TYP
  - FLOOR, TYP
- A — MULTI-SERVICE POWER POLE WITH TELEPHONE, DATA AND POWER OUTLETS A = TYPE, REFER TO PLANS, SCHEDULES AND SPECIFICATIONS
- A — MULTI-SERVICE FLOOR BOX WITH TELEPHONE, DATA AND POWER OUTLETS A = TYPE, REFER TO PLANS, SCHEDULES AND SPECIFICATIONS
- A — POKE THROUGH. A = TYPE, REFER TO PLANS, SCHEDULES AND SPECIFICATIONS
- THERMOSTAT
- CEILING/FLOOR MOUNT JUNCTION/OUTLET BOX
- WALL MOUNT JUNCTION/OUTLET BOX

* SYMBOL DEMONSTRATED WITH DUPLEX RECEPTACLE, WHEN USED IN COMBINATION WITH OTHER DEVICES MEANING IS SIMILAR FOR THOSE DEVICE TYPES.

REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR MORE INFORMATION.

ELECTRICAL ONE-LINE & RISER DIAGRAM

- ###A 3P — SWITCH (RATING AS INDICATED)
- ###A 3P — DRAWOUT CIRCUIT BREAKER (RATINGS AS INDICATED)
- ###AS 3P ###AF FRS — FUSED SWITCH (RATING, POLES AND FUSE TYPE AS INDICATED)
- ###AS 3P ###AF FRS NEMA # — COMBINATION FUSED SWITCH/STARTER AND STARTER SIZE
- ###AS 3P FRS NEMA # — CIRCUIT BREAKER (RATINGS AS INDICATED)
- ###A 3P NEMA # — COMBINATION CIRCUIT BREAKER/STARTER AND STARTER SIZE
- PANELBOARD, SINGLE OR MULTI-SECTION (REFER TO SCHEDULES)
- ISOLATED POWER PANELBOARD W/ INTEGRAL TRANSFORMER (REFER TO SCHEDULES)
- TX## — TRANSFORMER (TYPE AND RATINGS AS INDICATED)
- TX## ### — SHIELDED TRANSFORMER (TYPE AND RATINGS AS INDICATED)
- ATS# ###A — AUTOMATIC TRANSFER SWITCH (RATINGS AS INDICATED)
  ATS# (W/BYPASS)
- ATS# (W/BYPASS) ###A — AUTOMATIC TRANSFER SWITCH WITH BYPASS (RATINGS AS INDICATED)
- ##KW GENERATOR 480Y/277V, 3Ø, 4W ###A, 3P IM/G — GENERATOR (RATINGS AS INDICATED)
  - NON-SEPARATELY DERIVED SOURCE
  - OR
  - SEPARATELY DERIVED SOURCE
- MDP SWITCHBOARD ELEC ROOM ### AMPS 480Y/277V 3Ø 4W — SWITCHGEAR, SWITCHBOARD AND/OR DISTRIBUTION PANELBOARD (TYPE, RATING, DEVICES AND ACCESSORIES AS INDICATED)
- DIGITAL VM AM — COMBINATION DIGITAL VOLT METER/AMMETER
- ### — CIRCUIT IDENTIFICATION (REFER TO CIRCUIT SCHEDULE)
- GFR — GROUND FAULT RELAY
- PFR — PHASE FAILURE RELAY
- KK# — KIRK-KEY INTERLOCK (# INDICATES KEY PAIR)
- ST — SHUNT TRIP
- AM — AMMETER (RANGE AS SPECIFIED OR REQUIRED)
- VM — VOLTMETER (RANGE AS SPECIFIED OR REQUIRED)
- UTILITY METER M — UTILITY METER (AS REQUIRED BY UTILITY)
- AS — AMMETER SWITCH
- VS — VOLTMETER SWITCH
- WH D 15 — WATT-HOUR METER, "D" DENOTES DEMAND REGISTER, "15" DENOTES MINUTES OF DEMAND INTERVAL
- CURRENT TRANSFORMER RATING AS SPECIFIED OR REQUIRED
- POTENTIAL TRANSFORMER RATING AS SPECIFIED OR REQUIRED
- SPD — SURGE-PROTECTIVE DEVICE
- GROUND CONNECTION
- GROUND CONNECTION WITH TEST WELL
- GROUND ROD
- LIGHTNING ARRESTER
- CAPACITOR
- CONTACT (OPEN OR CLOSED)
- HEATER
- HP — MOTOR
- ## — BLOCK LOAD KW OR KVA
- ×F# ×FP# — FAULT POINT REFERENCED IN SHORT CIRCUIT CURRENT AND VOLTAGE DROP SPREADSHEET

APPLICABLE DESIGN CODES IN ST. CHARLES COUNTY, MISSOURI*:
INTERNATIONAL BUILDING CODE: 2015
INTERNATIONAL ENERGY CODE: 2015
NFPA 70 (NATIONAL ELECTRICAL CODE): 2014

*PROJECT IS DESIGNED IN COMPLIANCE WITH THE ABOVE CODES, THIS IS NOT AN EXHAUSTIVE LIST. PROJECT SHALL COMPLY WITH ALL APPLICABLE CODES, STANDARDS, AND LOCAL REQUIREMENTS. REFER TO THE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

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EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.:	19-040	DRAWN BY:	NS
DATE:	12.15.22	REVIEWED BY:	HEI

STATE OF MISSOURI — DOUGLAS M. EVERHART — NUMBER PE-2019007648 — PROFESSIONAL ENGINEER

01/24/2023

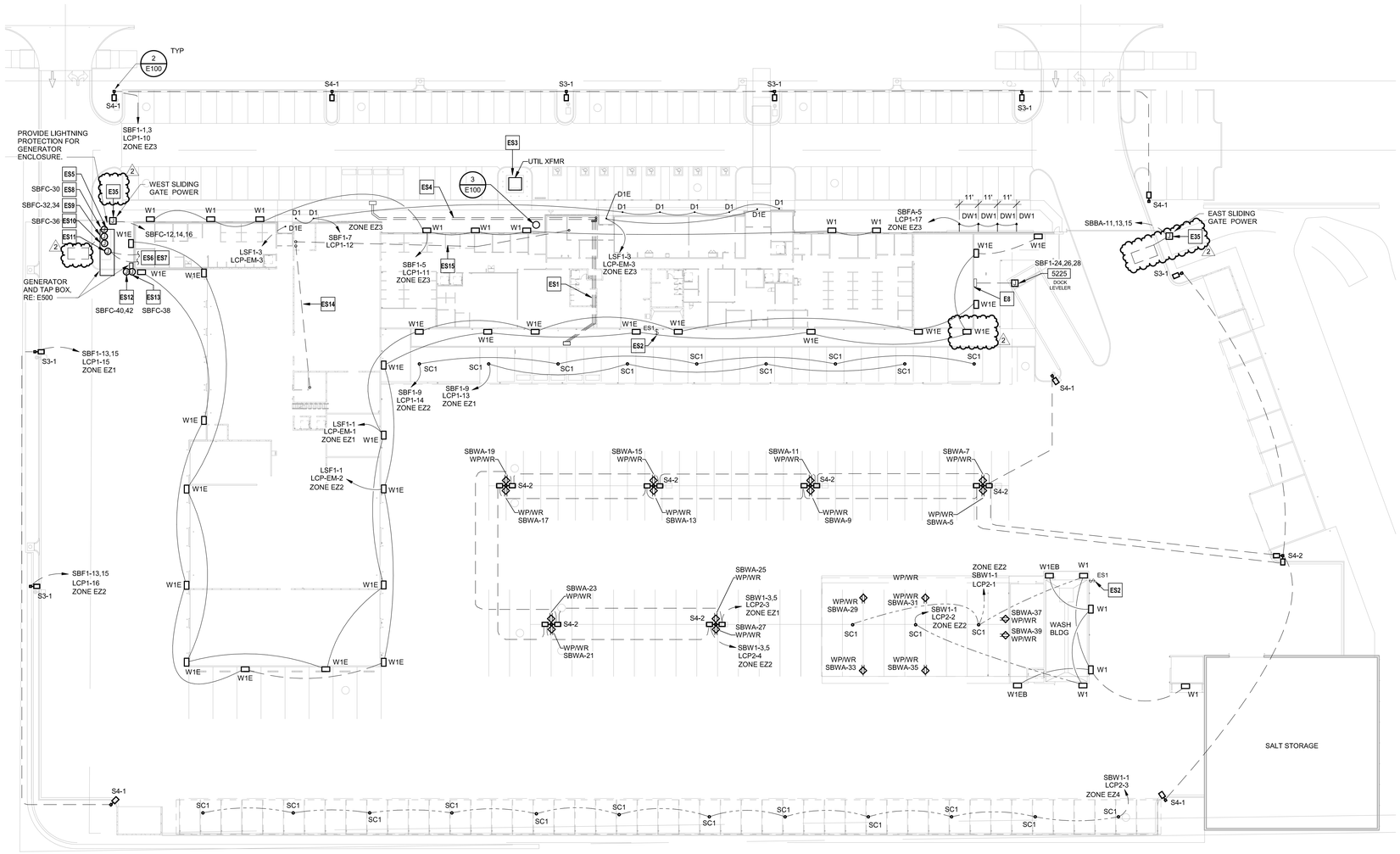
DOUGLAS M. EVERHART
LICENSE # PE-2019007648

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

ELECTRICAL LEGEND

SHEET
E000



1 ELECTRICAL SITE PLAN
1" = 30'-0"

N

SITE ELECTRICAL GENERAL NOTES:

1. REFER TO CIVIL DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION. COORDINATE THE FINAL LOCATION OF ALL SITE LIGHTING POLES, SIGNAGE, UNDERGROUND UTILITIES, CONDUITS, CIRCUITRY, TRANSFORMERS AND OTHER EQUIPMENT WITH CIVIL DRAWINGS, LANDSCAPING DRAWINGS AND OWNER PRIOR TO INSTALLATION.

2. COORDINATE ALL SITE ELECTRICAL REQUIREMENTS WITH EQUIPMENT MANUFACTURER INFORMATION AND OTHER TRADES AND ADJUST ELECTRICAL PROVISIONS AS REQUIRED TO MEET REQUIREMENTS.

3. SITE ELECTRICAL CONDUITS SHALL BE **1"** MINIMUM, UNLESS NOTED OTHERWISE. WHERE PRACTICABLE, ALL SITE ELECTRICAL CONDUITS SHALL BE INSTALLED A MINIMUM OF **24"** BELOW GRADE, UNLESS NOTED OTHERWISE. COORDINATE FINAL CONDUIT ROUTING WITH EXISTING OBSTRUCTIONS AND OTHER TRADES AND ADJUST AS NECESSARY.

4. CAP AND MARK ALL UNDERGROUND CONDUITS PROVIDED FOR FUTURE USE AND INCLUDE PULL STRINGS. PROVIDE DIMENSIONED LOCATIONS OF TERMINATION POINTS ON AS-BUILT DRAWINGS AND SUBMIT TO OWNER.

5. MINIMUM WIRE SIZE FOR SITE ELECTRICAL CIRCUITS SHALL BE **#10** AWG CU, UNLESS NOTED OTHERWISE. ALL SITE ELECTRICAL BRANCH CIRCUIT WIRING SHALL BE SIZED SUCH THAT THE MAXIMUM BRANCH CIRCUIT VOLTAGE DROP IS LESS THAN **3** PERCENT.

6. PROVIDE SPLICE AND PULL BOXES FOR SITE LIGHTING AND SITE ELECTRICAL POWER TO LIMIT MAXIMUM CONDUIT RUN TO 300'. PLACE BOXES IN A PLANTER AREA CLEAR OF VEGETATION WHEREVER PRACTICABLE. (COORDINATE FINAL LOCATION WITH CIVIL, LANDSCAPE CONTRACTOR AND OWNER). BOXES SHALL BE SUITABLE FOR LOCATION AND PROPERLY SIZED FOR QUANTITY AND SIZE OF CONDUITS IN AND OUT AND SHALL BE MARKED "ELECTRICAL". NOT ALL OF THESE BOXES ARE SHOWN ON SITE ELECTRICAL DRAWINGS; CONTRACTOR SHALL PROVIDE LOCATION ON AS-BUILT DRAWINGS AND SUBMIT TO OWNER. SPLICE BOX SHALL BE APPROPRIATE FOR LOCATION AND SHALL BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS. SPLICE BOX SHALL HAVE A MINIMUM NOMINAL SIZE OF 12"X12"X12", SHALL BE AN OPEN BOTTOM NRTL LISTED UNDERGROUND ENCLOSURE, AND SHALL AT A MINIMUM BE TIER 15 TRAFFIC RATED.

7. THE SITE LIGHTING IS DESIGNED TO MEET THE FOLLOWING CRITERIA EXCEPT WHERE LIMITED BY SITE CONSTRAINTS AND LOCAL REQUIREMENTS:

   A. MINIMUM MAINTAINED HORIZONTAL ILLUMINATION LEVEL AT FINISHED GRADE OF **0.5** FC AT ALL PAVED PARKING AND WALKING SURFACES.

   B. MAXIMUM INITIAL LEVEL AT FINISHED GRADE OF 12.0 FC AT ALL PAVED PARKING AND WALKING SURFACES.

   C. MAXIMUM HORIZONTAL ILLUMINATION LEVEL OF **0.5** FC AT FINISHED GRADE AT ALL RESIDENTIAL PROPERTY LINES.

   D. THE TOTAL LIGHT LOSS FACTOR USED FOR THE CALCULATIONS SHALL BE **1.0** OF INITIAL LUMEN OUTPUT FOR LED SOURCES.

   E. MAXIMUM LUMINAIRE MOUNTING HEIGHT (INLCUDING POLE AND BASE) OF **25'** ABOVE FINISHED GRADE.

☐ ELECTRICAL PLAN NOTES:

E8 DOCK LEVELER CONTROL PANEL/STARTER. COORDINATE ELECTRICAL REQUIREMENTS AND DESIRED CONTROLLER LOCATION WITH OWNER PRIOR TO ROUGH-IN. CONNECT COMPLETE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

E35 PROVIDE 2" CONDUIT AN PULL BOXES AS NECESSARY TO PROVIDE POWER FOR GATES AND KEY PAD PEDESTALS. PROVIDE UNDERGROUND VEHICLE DETECTOR LOOP FOR VEHICLE EXIT. COORDINATE POWER ROUGH-IN AND DETECTOR LOOP REQUIREMENTS WITH GATE MANUFACTURER. REFER TO TECHNOLOGY T-SHEETS FOR CONTROL CONDUIT.

ES1 PROVIDE (3) 1-1/2" CONDUIT WITH PULLSTRING FOR FUTURE EV CHARGERS. STUB CONDUITS THROUGH FLOOR BELOW PANEL SBAB AND TERMINATE AT EXTERIOR IN GRADE FLUSH PULLBOX.

ES2 EXTERIOR LIGHTING SWITCH TO CONTROL EXTERIOR LIGHTING ZONE EZ1 AND EZ2 FOR OVERRIDE FOR AFTER HOURS USAGE.

ES3 APPROXIMATE LOCATION OF NEW PAD-MOUNT UTILITY TRANSFORMER. COORDINATE LOCATION AND PAD SIZE WITH CIVIL PLANS AND ELECTRIC UTILITY.

ES4 PROVIDE (2) 1-1/2" CONDUIT WITH PULLSTRING FOR FUTURE EV CHARGERS. STUB CONDUITS THROUGH FLOOR BELOW PANEL SBAB AND TERMINATE AT EXTERIOR IN GRADE FLUSH PULLBOX.

ES5 PROVIDE ALL NECESSARY CIRCUITRY FOR GENERATOR. GENERATOR CRANKCASE/JACKET HEATER, BATTERY CHARGER, MONITORING AND CONTROLS FOR PROPER OPERATION. COORDINATE REQUIREMENTS WITH GENERATOR MANUFACTURER, OWNER AND OTHER TRADES. REFER TO THE ONE-LINE DIAGRAM AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

ES6 PROVIDE 3/4" CONDUIT WITH PULL-WIRE TO BMS CABINET FOR METER CONTROLS.

ES7 CONTRACTOR SHALL ROUTE (1) 1"C. WITH PULL-WIRES FROM GENERATOR'S CONTROL PANEL TO GENERATOR ANNUNCIATOR FOR CONTROLS.

ES8 CONNECTION TO GENERATOR BATTERY CHARGER.

ES9 CONNECTION TO GENERATOR CRANK HEATER.

ES10 CONNECTION TO CONTROL POWER.

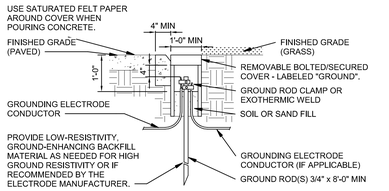
ES11 CONNECTION TO GENERATOR CONTROL WIRING.

ES12 CONNECTION TO ROLL UP GENERATOR CRANK HEATER.

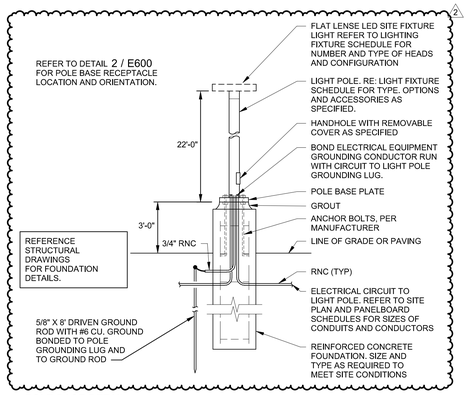
ES13 CONNECTION TO ROLL UP GENERATOR BATTERY CHARGER.

ES14 ROUTE FEEDER UNDERGROUND FROM PANELBOARD EMDP TO FIRE PUMP CONTROLLER. REFER TO ONE-LINE ON SHEET E500 FOR FEEDER SIZE.

ES15 ROUTE FEEDER UNDERGROUND FROM SWTICH BOARD SWBD-N TO FIRE PUMP CONTROLLER. REFER TO ONE-LINE ON SHEET E500 FOR FEEDER SIZE.



3 GROUNDING TEST WELL INSTALLATION
NTS



2 POLE BASE DETAIL
NTS

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REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: NS
DATE: 12.15.22 REVIEWED BY: HEI

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

01/24/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY
PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

ELECTRICAL SITE PLAN

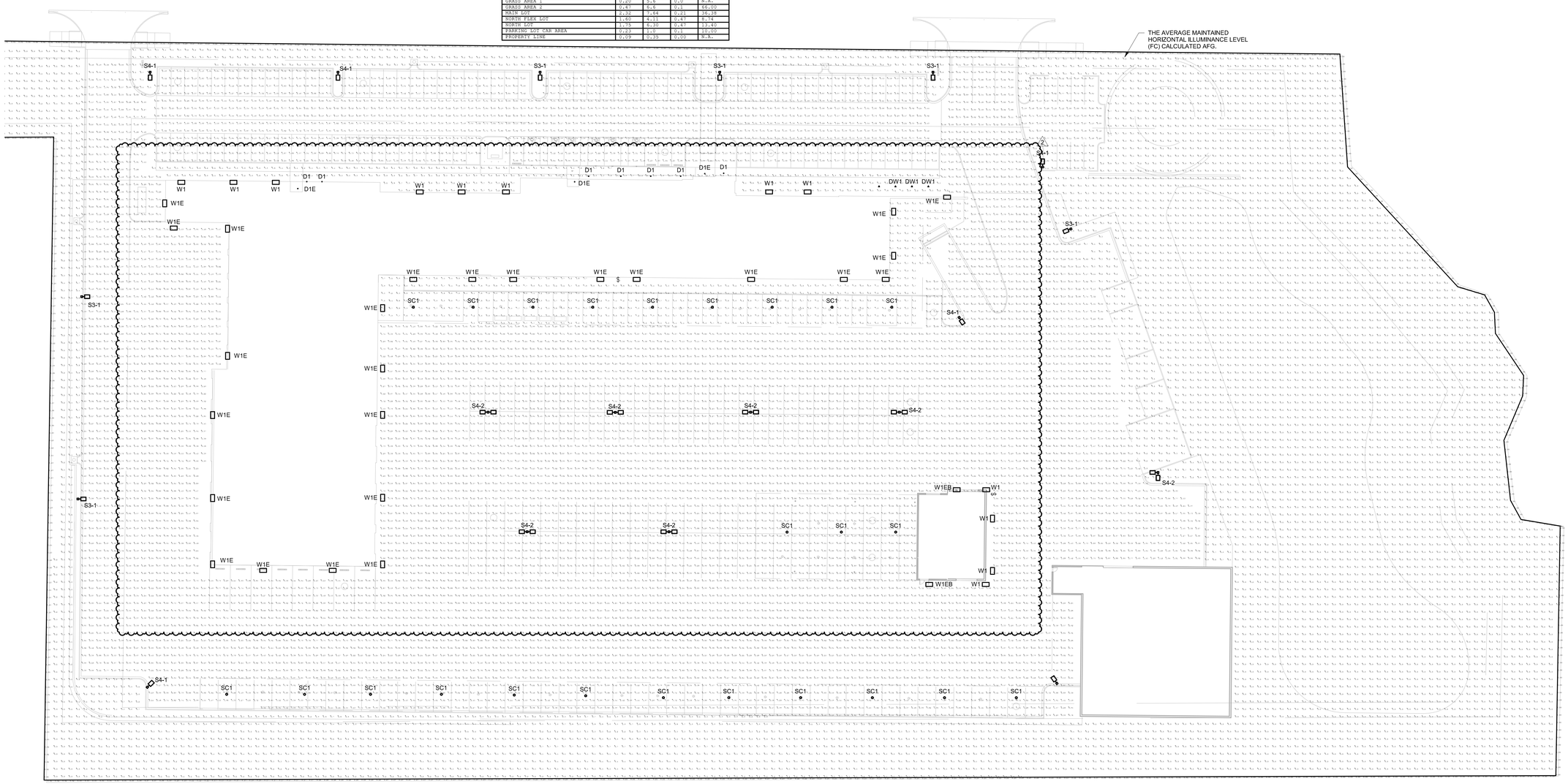
SHEET
E100

DOUGLAS M. EVERHART

Luminaire Schedule				
Qty	Tag	Lum. Lumens	LLF	Description
19	S4TYPE HEAD	16305	0.850	GLEON-SA3C-830-U-SL4
25	SC1	9516	0.850	PGL8-SQ-12SL-83-4K7
4	S1	1333	0.850	J2R-L13-833-DIM-DNV-CW-OF-CS-WET-CC
7	S3TYPE HEAD	17161	0.650	GLEON-SA3C-830-U-SL3
14	S2	9162	0.850	PGL8-SQ-12SL-83-4K7
2	W1	2162	0.900	I2S-SA1A-740-U-T4F2
24	W1E	2162	0.900	I2S-SA1A-740-U-T4F2

PARKING LOT ILLUMINATION CONTRIBUTIONS FROM BUILDING MOUNTED EXTERIOR LIGHT FIXTURES AND RELEVANT NEARBY LIGHT FIXTURES ARE INCLUDED IN THE PHOTOMETRIC CALCULATIONS. REFER TO FINAL LIGHTING PLANS FOR BUILDING MOUNTED LIGHT FIXTURE LOCATIONS.

Calculation Summary				
Label	Avg	Max	Min	Max/Min
BACK BUILDING CANOPY	9.42	18.2	2.9	3.52
FRONT BUILDING AREA	3.01	13.1	0.2	65.50
GRASS AREA 1	0.20	5.6	0.0	N.A.
GRASS AREA 2	0.47	6.6	0.1	66.00
MAIN LOT	2.32	7.64	0.21	36.38
NORTH FLEX LOT	1.60	4.11	0.47	8.74
NORTH LOT	1.75	6.30	0.47	13.40
PARKING LOT CAR AREA	0.23	1.9	0.1	19.00
PROPERTY LINE	0.09	0.35	0.00	N.A.



1 ELECTRICAL SITE PHOTOMETRICS
1" = 30'-0"

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WENTZVILLE, MO 63385

ELECTRICAL SITE PHOTOMETRICS

SHEET
E100A

DOUGLAS M. EVERHART

LIGHTING GENERAL NOTES:

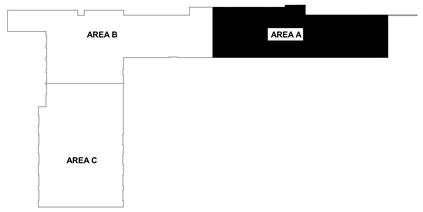
1. THE EMERGENCY LIGHTING SYSTEM HAS BEEN DESIGNED TO PROVIDE AN INITIAL FLOOR ILLUMINANCE LEVEL OF 1 FC AVERAGE, 0.1 FC MINIMUM AND NO MORE THAN A 40:1 MAX/MIN RATIO ALONG THE EMERGENCY EGRESS PATHS, WHERE APPLICABLE. ADJUST AIMING OF EMERGENCY LIGHTS AS REQUIRED TO PROVIDE PROPER ILLUMINATION AT FLOOR AVOIDING OBSTACLES AND SHADOWS AFTER STORE SET-UP IS COMPLETE.
2. WALL MOUNTED EXITS SIGNS SHALL BE MOUNTED 12" ABOVE DOOR FRAME AND CENTERED ABOVE DOOR OPENING, UNLESS NOTED OTHERWISE. CEILING/PENDANT MOUNTED EXIT SIGNS SHALL BE SUSPENDED TO 12'-0" AFF IN FINISHED AREAS OPEN TO STRUCTURE, AT BOTTOM OF BAR JOISTS IN BACKROOM AREAS AND ON FINISHED CEILING WHERE APPLICABLE, UNLESS NOTED OTHERWISE. EXIT SIGNS SHALL BE READILY VISIBLE FROM DIRECTION OF EGRESS TRAVEL. COORDINATE FINAL EXIT SIGN LOCATIONS WITH AHJ AND OWNER.
3. SUSPEND BACK OF HOUSE, RECEIVING AND STOCKROOM AREA LIGHT FIXTURES AS HIGH AS PRACTICABLE IN ORDER TO AVOID DAMAGE DURING STOCKING, UNLESS NOTED OTHERWISE. SUSPEND JUST BELOW REFRIGERATION PIPING, DUCTWORK AND SIMILAR OBSTRUCTIONS WHERE NECESSARY TO AVOID SHADOWS. COORDINATE REQUIREMENTS WITH OWNER AND OTHER DISCIPLINES PRIOR TO INSTALLATION.
4. PROVIDE LABEL AT EACH MANUAL LIGHT SWITCH INDICATING THE LIGHT FIXTURE(S) THAT THE SWITCH CONTROLS AND THE RESPECTIVE "PNLBD-CKT#" DESIGNATION. A SINGLE LIGHT SWITCH FOR A SMALL ROOM DOES NOT NEED TO INDICATE THE SPACE CONTROLLED SINCE IT IS INTUITIVELY OBVIOUS. COORDINATE LABEL REQUIREMENTS WITH THE OWNER PRIOR TO INSTALLATION. REFER TO THE SPECIFICATIONS FOR MORE INFORMATION.
5. ALL REMOTELY LOCATED LIGHT FIXTURE POWER SUPPLIES SHALL BE LOCATED IN AN ACCESSIBLE LOCATION WITH PROPER VENTILATION IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. CONCEAL DEVICES AND RELATED WIRING FROM CUSTOMER/PUBLIC VIEW. PROVIDE ENCOSURE IF REQUIRED. COORDINATE LOCATION AND ENCLOSURE TYPE WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION.
6. PER NEC 700.24, ALL DIRECTLY CONTROLLED LUMINAIRES USED FOR EMERGENCY ILLUMINATION AND ALL APPLICABLE CONTROLS SHALL HAVE UL 924 LISTING OR EQUIVALENT NRTL LISTING. IF EMERGENCY LUMINAIRE OR CONTROL MANUFACTURER DOES NOT HAVE APPROPRIATE LISTING THEN FIELD LISTING OF EQUIPMENT IS ACCEPTABLE (AT CONTRACTOR'S COST), IF APPROVED BY THE AHJ. ALTERNATIVELY, AS ALLOWED PER NEC 90.4, THE CONTRACTOR MAY OBTAIN SPECIAL PERMISSION FROM THE AHJ AND SUBMIT SAID PERMISSION IN WRITING TO THE ENGINEER FOR REVIEW. IF USING NON-LISTED EQUIPMENT FOR APPLICABLE EMERGENCY SYSTEMS, THE ALTERNATIVE METHOD MUST BE FIELD TESTED AND ACHIEVE EQUIVALENT OBJECTIVES TO CODE INTENT. IN ADDITION, ALTERNATE METHOD AND EQUIPMENT USED MUST BE DEEMED SAFE AND ACCEPTABLE TO BOTH THE AHJ AND THE ENGINEER.

LIGHTING SUPPLEMENTAL SPECIFICATIONS:

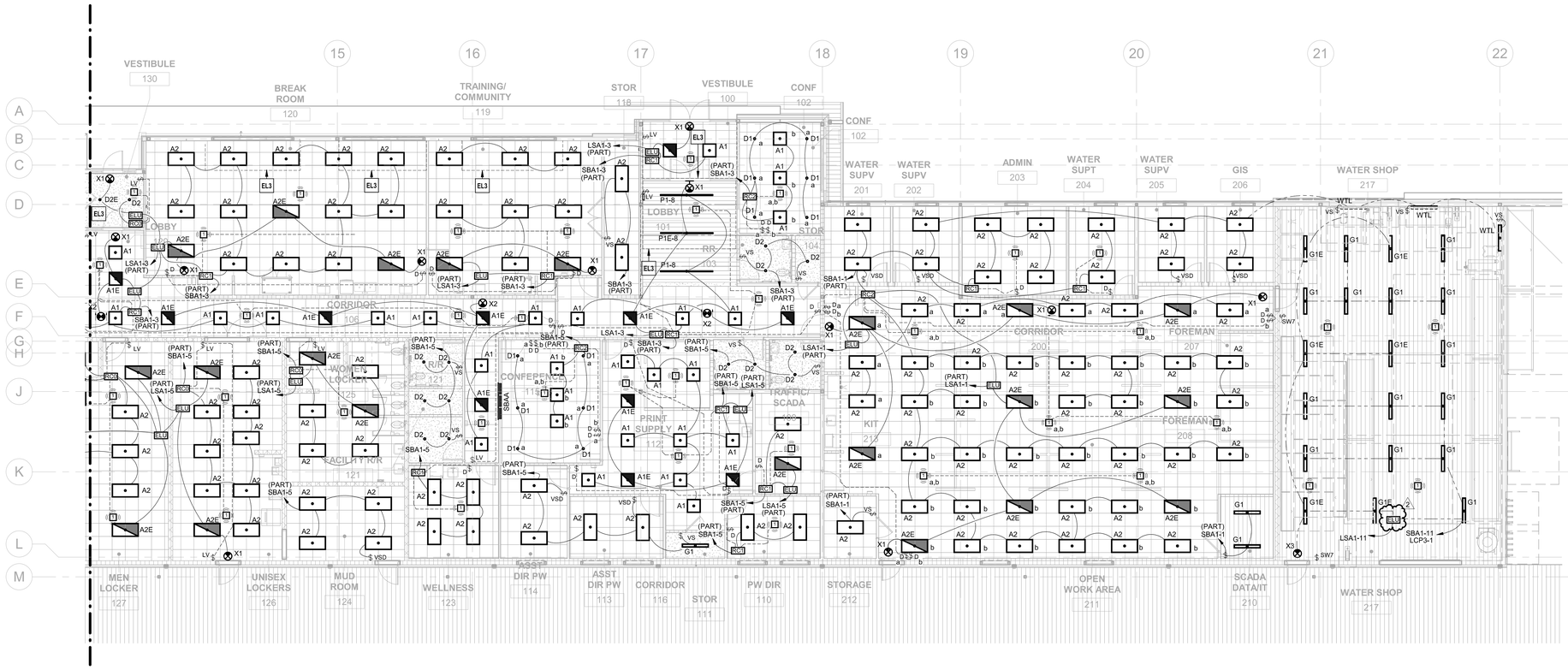
1. REFER TO THE ARCHITECTURAL DRAWINGS FOR LIGHT FIXTURE LOCATIONS, MOUNTING HEIGHTS, TRACK LENGTHS AND ADDITIONAL MOUNTING INFORMATION. CONTRACTOR SHALL BE RESPONSIBLE FOR INSURING THAT COORDINATION AND CONFLICT ISSUES ARE RESOLVED PRIOR TO INSTALLATION OF LIGHT FIXTURES. CONTACT ARCHITECT/ENGINEER IMMEDIATELY IF THERE ARE DISCREPANCIES.
2. THROUGH WIRING OF RECESSED LIGHT FIXTURES, IN SUSPENDED CEILINGS, IS NOT PERMITTED. CONNECT EACH LIGHT FIXTURE BY A WHIP TO A JUNCTION BOX. PROVIDE CABLE WHIPS OF SUFFICIENT LENGTHS TO ALLOW FOR RELOCATING EACH LIGHT FIXTURE WITHIN A 5'-0" RADIUS OF ITS INDICATED LOCATION. CABLE WHIPS SHALL NOT EXCEED 6'-0" OF UNSUPPORTED LENGTHS.
3. ALL EMERGENCY LIGHTS AND EXIT SIGNS WITH INTEGRAL BATTERY BACK-UP SHALL BE CONNECTED TO A SEPARATE UNSWITCHED CONDUCTOR BYPASSING ALL OTHER CONTROLS AND CONTACTORS, UNLESS NOTED OTHERWISE. EXIT SIGNS SHALL NOT BE SWITCHED. REFER TO MANUFACTURER'S WRITTEN INSTRUCTIONS FOR PROPER INSTALLATION AND TESTING. ALLOW BATTERY TO CHARGE FOR A MINIMUM OF 48 HOURS BEFORE LIGHT LEVEL TESTING. IN ORDER TO PREVENT BATTERY DAMAGE, DO NOT TURN OFF POWER FOR EXTENDED PERIODS OF TIME AFTER EMERGENCY LIGHT HAS BEEN POWERED.
4. PROVIDE A NEUTRAL CONDUCTOR TO ALL WALL MOUNTED LINE VOLTAGE LIGHT SWITCHES, UNLESS NOTED OTHERWISE. IF NEUTRAL TERMINATION IS NOT REQUIRED FOR THE DEVICE THEN CAP CONDUCTOR AND TAG AS "NEUTRAL FOR FUTURE USE".
5. COORDINATE ALL OCCUPANCY/VACANCY SENSOR SETTINGS WITH OWNER AND ADJUST AS NECESSARY FOR PROPER OPERATION. SETTINGS MUST COMPLY WITH AHJ AND LOCAL ENERGY CODE REQUIREMENTS.
6. DO NOT INSTALL OCCUPANCY/VACANCY SENSORS WITHIN 48" OF AIR DIFFUSER OR SIMILAR OBSTRUCTION THAT MAY ADVERSLY AFFECT THE SENSOR PERFORMANCE. COORDINATE FINAL SENSOR LOCATIONS WITH OTHER TRADES AND INSTALL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

☐ ELECTRICAL PLAN NOTES:

EL3 DAYLIGHT ZONE INDICATED BY LINE HAS LESS THAN 150W OF GENERAL LIGHTING WITHIN THE PRIMARY SIDELIT DAYLIGHT ZONE AND THUS DOES NOT REQUIRE SEPARATE DAYLIGHT CONTROLS.



KEY PLAN



1 LIGHTING LEVEL 1 RCP - AREA A
1/8" = 1'-0"

N

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PROFESSIONAL ENGINEER

01/24/2023

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LICENSE # PE-2019007648

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

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WENTZVILLE, MO 63385

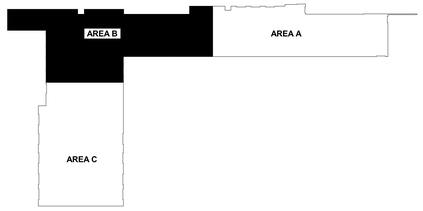
LIGHTING LEVEL 1 RCP - AREA A

SHEET
E101A

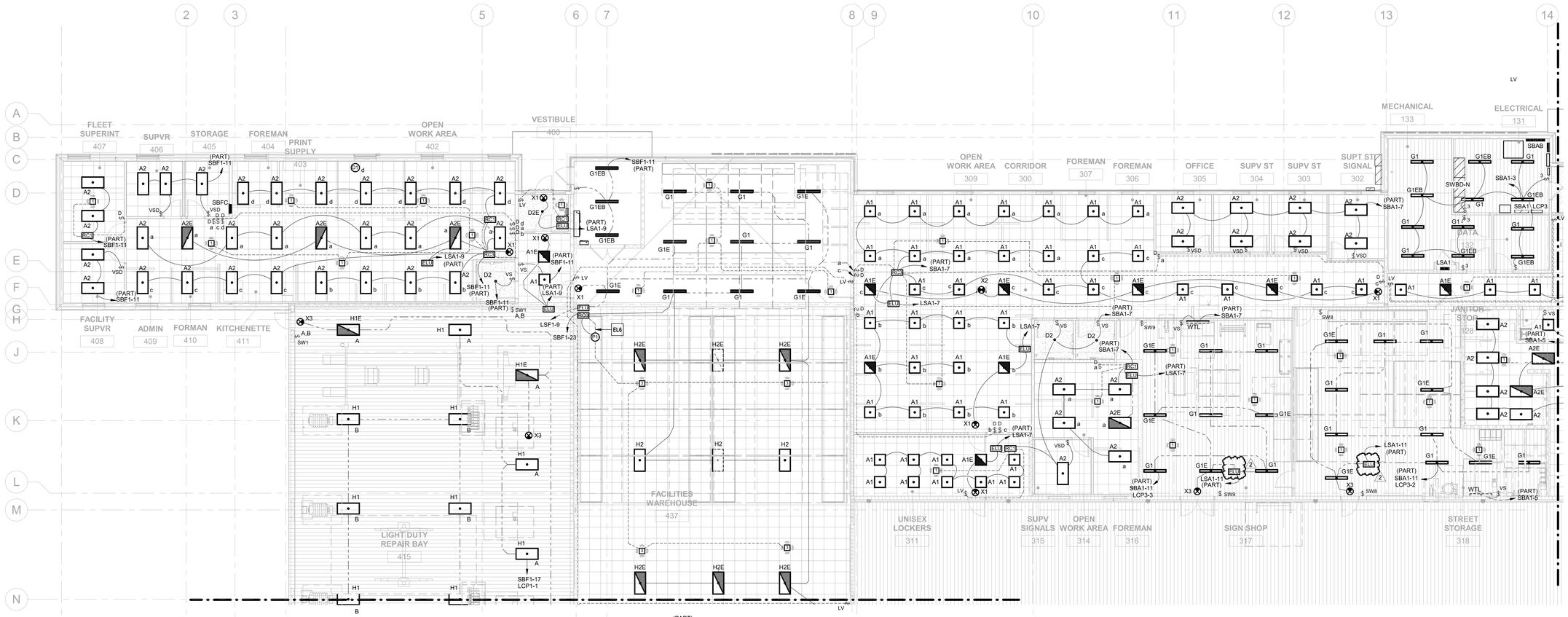
DOUGLAS M. EVERHART

ELECTRICAL PLAN NOTES:

EL6 PROVIDE LOW VOLTAGE / DIGITAL INTERFACE TO INTEGRATE SIGNAL FROM LOW VOLTAGE DEVICES WITH ROOM LIGHTING CONTROLS, WATTSTOPPER LMIO-101.



KEY PLAN



1 LIGHTING LEVEL 1 RCP - AREA B
1/8" = 1'-0"

N

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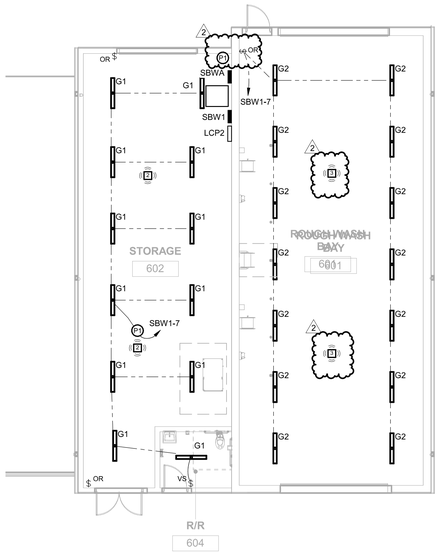
LIGHTING LEVEL 1 RCP - AREA B

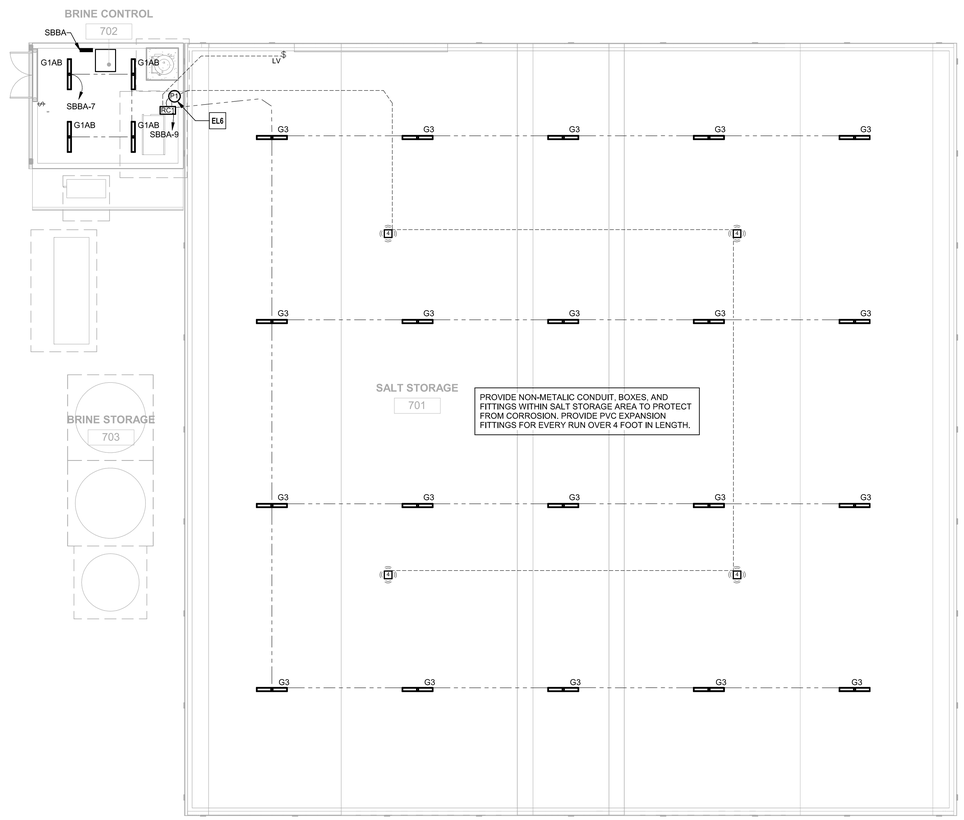
SHEET
E101B

DOUGLAS M. EVERHART

ELECTRICAL PLAN NOTES:

EL6 PROVIDE LOW VOLTAGE / DIGITAL INTERFACE TO INTEGRATE SIGNAL FROM LOW VOLTAGE DEVICES WITH ROOM LIGHTING CONTROLS, WATTSTOPPER LMIO-101.





1 LIGHTING LEVEL 1 RCP - WASH AND SALT STORAGE BUILDINGS
1/8" = 1'-0"

N

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WENTZVILLE, MO 63385

LIGHTING LEVEL 1 RCP - WASH & SALT STORAGE BUILDINGS

SHEET
E102

DOUGLAS M. EVERHART

ELECTRICAL SYSTEMS SUPPLEMENTAL SPECIFICATIONS:

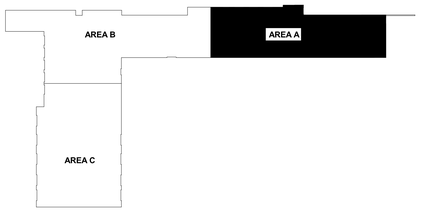
1. PROVIDE NECESSARY BOXES AND CONDUIT FOR MECHANICAL SYSTEM CONTROL DEVICES. THIS INCLUDES BUT IS NOT LIMITED TO: MAIN CONTROL PANELS, THERMOSTATS, HUMIDISTATS, AC SOLENOIDS, HEAT RECLAIM WIRING, AHU CONTROL WIRING, DUCT FURNACE CONTROL WIRING, TIMERS, AND SIMILAR EQUIPMENT. PROVIDE BOX, (FLUSH MOUNT WHEREVER PRACTICABLE), AND 3/4" CONDUIT FOR ALL WIRING WITHIN WALLS AND SIMILAR UNACCESSIBLE LOCATIONS. PROVIDE CONTROL AND INTERLOCK WIRING WHEN NOT PROVIDED BY OTHER TRADES. COORDINATE REQUIREMENTS WITH EQUIPMENT SUPPLIERS AND OTHER TRADES PRIOR TO ROUGH-IN.
2. PROVIDE LINE VOLTAGE WIRING AND MAKE FINAL CONNECTIONS TO ALL DUCT-MOUNTED SMOKE DETECTORS, FIRE/SMOKE AND SMOKE DAMPERS WHERE APPLICABLE. COORDINATE REQUIREMENTS WITH OTHER TRADES PRIOR TO INSTALLATION.
3. DEVICES MOUNTED ON ACOUSTICAL TILE CEILINGS SHALL BE CENTERED ON THE TILE, UNO.
4. PROVIDE BOXES AND CONDUITS FOR THE FIRE PROTECTION SYSTEM LOW VOLTAGE WIRING AS REQUIRED. THIS INCLUDES EXPOSED WIRING LESS THAN 96" AFF. AT A MINIMUM, PROVIDE 3/4" CONDUIT, UNLESS NOTED OTHERWISE. COORDINATE REQUIREMENTS AND LOCATIONS WITH SYSTEM INSTALLER AND FIRE ALARM SPECIFICATIONS.
5. AT A MINIMUM, PROVIDE EXTRA DEEP, DOUBLE GANG COMMUNICATION OUTLET BOXES, (FLUSH MOUNTED WHEREVER PRACTICABLE), WITH SINGLE-GANG PLASTER RING AND 1" CONDUIT STUBBED-UP CONCEALED TO ACCESSIBLE CEILING SPACE, UNLESS NOTED OTHERWISE. PROVIDE SURFACE MOUNTED DATA BOXES WITHIN CABINETRY, AND SELECT OTHER LOCATIONS AS INDICATED ON THE DRAWINGS. COORDINATE TELEPHONE/DATA BOX AND CONDUIT LOCATIONS AND SIZES WITH OWNER AND OTHER TRADES PRIOR TO ROUGH-IN.
6. PROVIDE NYLON BUSHINGS FOR ALL COMMUNICATIONS AND LOW VOLTAGE WIRING CONDUITS AND SLEEVES, UNLESS NOTED OTHERWISE.
7. ALL COMMUNICATIONS AND LOW VOLTAGE WIRING CONDUIT SHALL BE INSTALLED WITH AN ACCESSIBLE PULLBOX BETWEEN EVERY 180 DEGREE CHANGE IN DIRECTION AND AT 100' INTERVALS OF CONTINUOUS RUNS.
8. MINIMUM BEND RADIUS FOR COMMUNICATIONS CONDUIT IS 6 TIMES THE INSIDE DIAMETER FOR CONDUITS 2" IN DIAMETER AND SMALLER AND 10 TIMES THE INSIDE DIAMETER FOR CONDUITS GREATER THAN 2" IN DIAMETER, UNLESS NOTED OTHERWISE.
9. PROVIDE BOXES AND CONDUIT IN FINISHED AND RATED FLOORS/WALLS/CEILINGS TO ACCESSIBLE LOCATIONS FOR ALL LOW VOLTAGE COMMUNICATION, ENERGY MANAGEMENT, SOUND SYSTEM, SECURITY AND RELATED WIRING. PROVIDE ALL LINE VOLTAGE CIRCUITRY (120V AND HIGHER) AND LOW VOLTAGE STEP-DOWN TRANSFORMERS AS REQUIRED. COORDINATE ELECTRICAL REQUIREMENTS AND LOCATIONS WITH SYSTEM INSTALLER AND OWNER.
10. ALL LOW VOLTAGE CLASS 2 OR 3 WIRING NOT IN CONDUIT SHALL BE PLENUM RATED WHERE APPLICABLE.
11. LOW VOLTAGE CABLE SHEATH LABELS AND RELATED MANUFACTURER INFO SHALL REMAIN APPARENT IN ALL EXPOSED APPLICATIONS. PROTECT ALL EXPOSED CABLING FROM PAINTING AND OVERSPRAY (INCLUDES CABLE NOT ROUTED IN CONDUIT AND THAT IS IN CABLE TRAY).
12. CABLES SHALL BE ROUTED THROUGH THE BUILDING CABLE TRAY/RACEWAY SYSTEM, UNLESS NOTED OTHERWISE. EXPOSED CABLING SHALL NOT BE ROUTED IN AREAS EXPOSED TO STRUCTURE UNLESS SPECIFICALLY PERMITTED BY THE OWNER. IN AREAS WHERE EXPOSED CABLES ARE ALLOWED, IT SHALL BE INSTALLED IN A NEAT AND WORKMAN LIKE MANNER IN ACCORDANCE WITH THE OWNER'S REQUIREMENTS. WHERE REQUIRED, PROVIDE CONDUIT TO ROUTE LOW VOLTAGE CABLING TO THE CABLE TRAY OR NEAREST ACCESSIBLE CEILING SPACE.
13. CONDUITS FOR COMMUNICATIONS OUTLETS SERVING ELEVATOR EQUIPMENT ROOMS, FACP, AND SIMILAR CRITICAL EQUIPMENT AS DESIGNATED BY THE OWNER SHALL BE CONTINUOUS ("HOMERUN") FROM OUTLET TO SERVING COMMUNICATIONS ROOM.

ELECTRICAL GENERAL NOTES:

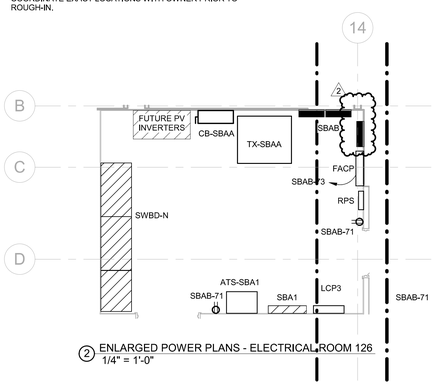
1. PRIOR TO SUBMITTING BID, VISIT THE JOB SITE AND BECOME FULLY ACQUAINTED WITH THE EXISTING CONDITIONS. AS APPLICABLE, REVIEW OWNER CRITERIA, GENERAL NOTES, OTHER TRADE DRAWINGS AND SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS THAT MAY NOT BE CALLED OUT IN THIS PORTION OF THE CONSTRUCTION DOCUMENTS. NOTIFY ARCHITECT AND ENGINEER OF ANY CONFLICTS OR DISCREPANCIES PRIOR TO SUBMITTING BID.
2. ALL WORK SHALL CONFORM TO ALL LOCAL CODES AND ORDINANCES AS WELL AS APPLICABLE INDUSTRY STANDARDS. ALL EQUIPMENT SHALL BEAR LABELS FOR THE USE INTENDED BY AN AHJ ACCEPTED NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL), SUCH AS UL OR ETL. THE FINAL ELECTRICAL INSTALLATION OF THE FACILITY OCCUPIED BY OWNER SHALL BE FREE FROM ELECTRICAL DEFECTS TO THE SATISFACTION OF THE AHJ, OWNER, ARCHITECT AND ENGINEER.
3. COORDINATE FINAL LOCATION AND INSTALLATION REQUIREMENTS OF ALL LIGHT FIXTURES, ELECTRICAL EQUIPMENT AND ELECTRICAL DEVICES WITH ARCHITECTURAL DRAWINGS, EXISTING CONDITIONS AND OTHER TRADES PRIOR TO ROUGH-IN. PROVIDE ALL NECESSARY DEVICES, CORDS, PLUGS, DISCONNECTS AND FINAL CONNECTIONS TO ELECTRICAL EQUIPMENT FOR PROPER OPERATION IN ACCORDANCE WITH CODE, OWNER AND MANUFACTURER REQUIREMENTS.
4. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC/SCHEMATIC IN NATURE AND REPRESENT THE GENERAL SCOPE OF WORK. IT IS NOT WITHIN THE SCOPE OF THE ELECTRICAL DRAWINGS TO SHOW ALL NECESSARY RACEWAY ROUTING, BENDS, OFFSETS, PULL BOXES AND OBSTRUCTIONS. CONTRACTOR SHALL COORDINATE THE FINAL LOCATION OF EQUIPMENT AND WIRING DEVICES WITH OTHER TRADES PRIOR TO INSTALLATION AND INSTALL ALL WORK TO CONFORM TO THE OWNER REQUIREMENTS.
5. ALL CONDUCTOR AND CONDUIT LENGTHS SHOWN IN THESE DESIGN DOCUMENTS ARE INTENDED SOLELY FOR USE IN THE DESIGN CALCULATIONS BY THE DESIGN PROFESSIONAL, UNLESS NOTED OTHERWISE. LENGTHS SHOWN SHALL NOT BE USED TO ASSIST IN THE BIDDING TAKEOFF PROCESS. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE MATERIAL QUANTITIES REQUIRED TO BID AND CONSTRUCT THE COMPLETE PROJECT.
6. PROVIDE PROPER FIRE PROOFING AND SEALANT FOR PENETRATIONS THROUGH FIRE RATED ASSEMBLIES. THE FIRE STOPPING METHOD, MATERIAL AND ITS APPLICATION SHALL BE NRTL LISTED, CODE COMPLIANT AND APPROVED BY AHJ.
7. FOR CAST-IN-PLACE CONCRETE, TILT-UP WALLS, PRECAST OR SIMILAR PRE-ENGINEERED WALL SYSTEMS: COORDINATE THE FINAL LOCATION OF ALL ELECTRICAL DEVICES, RACEWAYS, LIGHT FIXTURES AND PENETRATIONS WITH ARCHITECT, WALL SUPPLIER AND OTHER TRADES PRIOR TO WALL CONSTRUCTION. CONDUIT/RACEWAY IMBEDDED IN CONCRETE WALLS SHALL BE SCHEDULE 80 PVC OR LFMC; OTHER TYPES MAY BE ALLOWED IF APPROVED BY WALL SYSTEM MANUFACTURER AND ENGINEER.
8. WHEN CONCRETE TRENCHING/CORING IS REQUIRED, THE METHODS, DEPTHS, AND LOCATIONS SHALL BE PRE-APPROVED BY OWNER, ARCHITECT, AND STRUCTURAL ENGINEER PRIOR TO THE START OF WORK. X-RAY SLAB AS NECESSARY TO AVOID DAMAGING ANY UNDER-SLAB UTILITIES OR STRUCTURE. SLAB REPLACEMENT SHALL BE INSTALLED WITH DOWELLING AND REINFORCED CONCRETE AS DIRECTED BY THE STRUCTURAL ENGINEER. WHERE SLAB ON GRADE IS SAW-CUT AND REMOVED FOR TRENCHING THE CONTRACTOR SHALL INSTALL MOISTURE BARRIER PER OWNER'S REQUIREMENTS. PROVIDE 3/4" MINIMUM CONDUITS ROUTED THROUGH SLAB AND STUBBED UP INTO DEVICES. FOR SLAB ON DECK, THE FLOOR SHALL BE SLEEVED AND EQUIPPED WITH THE APPROPRIATE LISTED ASSEMBLY. PROVIDE 3/4" MINIMUM CONDUITS ROUTED BELOW SLAB, TIGHT TO STRUCTURE, AND STUBBED UP INTO DEVICES.
9. ALL APPLICABLE SWITCHES, RECEPTACLES, OUTLETS, AND CONTROLS SHALL BE PLACED AT HEIGHTS THAT ARE IN ACCORDANCE WITH ADA ACCESSIBILITY GUIDELINES.
10. COORDINATE FLOOR MOUNTED BOX, RECEPTACLE, AND COVER PLATE TYPES WITH ARCHITECT AND OWNER PRIOR TO ORDER.
9. WIRING DEVICES ADJACENT TO EACH OTHER SHALL BE INSTALLED UNDER A SINGLE COVER PLATE, UNO.
10. WIRING DEVICES SHOWN BACK-TO-BACK ON A COMMON WALL SHALL BE OFFSET A MINIMUM OF 12" HORIZONTALLY TO REDUCE SOUND TRANSMISSION BETWEEN ROOMS, UNO.
11. ALL WP OUTLET BOX HOODS SHALL BE "EXTRA-DUTY" AND "WHILE-IN-USE COVER" TYPE. OUTLET BOX HOODS SHALL BE LOW PROFILE WHEREVER PRACTICABLE, UNLESS NOTED OTHERWISE. THE USE OF LARGE BUBBLE COVERS SHALL BE AVOIDED ON THE EXTERIOR OF THE BUILDING OR BEHIND EQUIPMENT IN ORDER TO PREVENT DAMAGE TO THE COVER AND TO ALLOW THE EQUIPMENT TO BE LOCATED CLOSE TO THE WALL.
12. ALL RECEPTACLES AND APPLIANCES SHALL BE GFCI PROTECTED IN LOCATIONS REQUIRED BY CODE. THIS INCLUDES BATHROOMS, KITCHENS/FOOD PREP AREAS, EXTERIOR LOCATIONS AND RECEPTACLES WITHIN 6 FEET OF A SINK. GFCI DEVICES SHALL BE READILY ACCESSIBLE AND SHALL NOT BE LOCATED BEHIND OBSTACLES. LABEL WIRING DEVICES PROTECTED BY AN UPSTREAM GFCI DEVICE.
13. PROVIDE TAMPER-RESISTANT (TR) TYPE RECEPTACLES AT ALL CODE REQUIRED LOCATIONS AND AT LOCATIONS WHERE RECEPTACLES ARE MOUNTED LESS THAN 5'-6" AFF AND ARE EASILY ACCESSIBLE BY CHILDREN, UNLESS NOTED OTHERWISE.
14. FLEXIBLE CONDUIT IS ONLY PERMITTED WHERE SPECIFICALLY ALLOWED IN THE CONSTRUCTION DOCUMENTS. WHERE CONCEALED FROM VIEW OR EXPOSED FINAL CONNECTIONS TO LIGHT FIXTURES AND EQUIPMENT IN LENGTHS OF 6'-0" OR LESS.
15. ALL EMPTY CONDUIT/RACEWAY SHALL BE INSTALLED WITH PULL STRINGS. TERMINATE CONDUIT STUB-UP WITH A NYLON BUSHING.
16. EXPOSED CONDUIT/RACEWAY SHALL BE PAINTED TO MATCH ADJACENT SURFACE, UNLESS NOTED OTHERWISE. COORDINATE REQUIREMENTS WITH ARCHITECT AND OWNER PRIOR TO INSTALLATION.
17. CONDUITS/RACEWAYS SHALL BE CONCEALED FROM VIEW WHEREVER PRACTICABLE, UNLESS NOTED OTHERWISE. ROUTE CONDUITS SERVING ROOFTOP EQUIPMENT CONCEALED INSIDE EQUIPMENT CURB AND MINIMIZE ROOF PENETRATIONS AND EXTERIOR CONDUIT RUNS WHERE PRACTICABLE. SUPPORT RACEWAY FROM STRUCTURE, NOT ROOF DECK. MAINTAIN 2" MIN SPACING FROM BOTTOM OF ROOF DECK TO PREVENT ROOFING SCREWS FROM PENETRATING RACEWAY. DO NOT ROUTE CONDUITS ACROSS SKYLIGHTS, ACCESS PANELS, HATCHED TILES, HVAC DIFFUSERS, OR EQUIPMENT WORKING CLEARANCE SPACE. ROUTE ALL EXPOSED NON-FLEXIBLE CONDUITS TIGHT TO STRUCTURE, PARALLEL TO BUILDING LINES AND IN STRUT OR CABLE/PIPE TRAY WHERE PRACTICABLE. INSTALL CONDUITS PLUMB/LEVEL WHERE EXPOSED TO VIEW. COORDINATE RACEWAY ROUTING AND INSTALLATION WITH OTHER TRADES PRIOR TO ROUGH-IN.
18. WHERE PRACTICABLE, ALL UNDER-FLOOR/UNDER-GROUND CONDUITS/RACEWAY SHALL BE INSTALLED A MINIMUM OF 24" BELOW BOTTOM OF SLAB/PAVING/GRADE, UNLESS NOTED OTHERWISE. NOTE: THE DESIGN INTENT FOR INSTALLING ELECTRICAL CIRCUITRY AT THIS DEPTH IS TO PROTECT THE ELECTRICAL CIRCUITRY FROM DAMAGE DUE TO FUTURE WORK.
19. PROVIDE LABEL AT EACH RECEPTACLE COVER PLATE WITH THE RESPECTIVE "PNLBD-CKT#" DESIGNATION. COORDINATE LABEL REQUIREMENTS WITH THE OWNER PRIOR TO INSTALLATION. REFER TO THE SPECIFICATIONS FOR MORE INFORMATION.
20. MULTIWIRE BRANCH CIRCUITS ARE NOT ALLOWED, UNLESS NOTED OTHERWISE.
21. PROVIDE INSULATED EQUIPMENT GROUNDING CONDUCTOR FOR ALL CIRCUITS, UNLESS NOTED OTHERWISE.
22. COORDINATE ALL STARTUP TESTING AND COMMISSIONING WITH OWNERS THIRD PARTY COMMISSIONING AGENT: FAITH GROUP, 3101 S. HANLEY RD, ST LOUIS MO 314-991-2228.

ELECTRICAL PLAN NOTES:

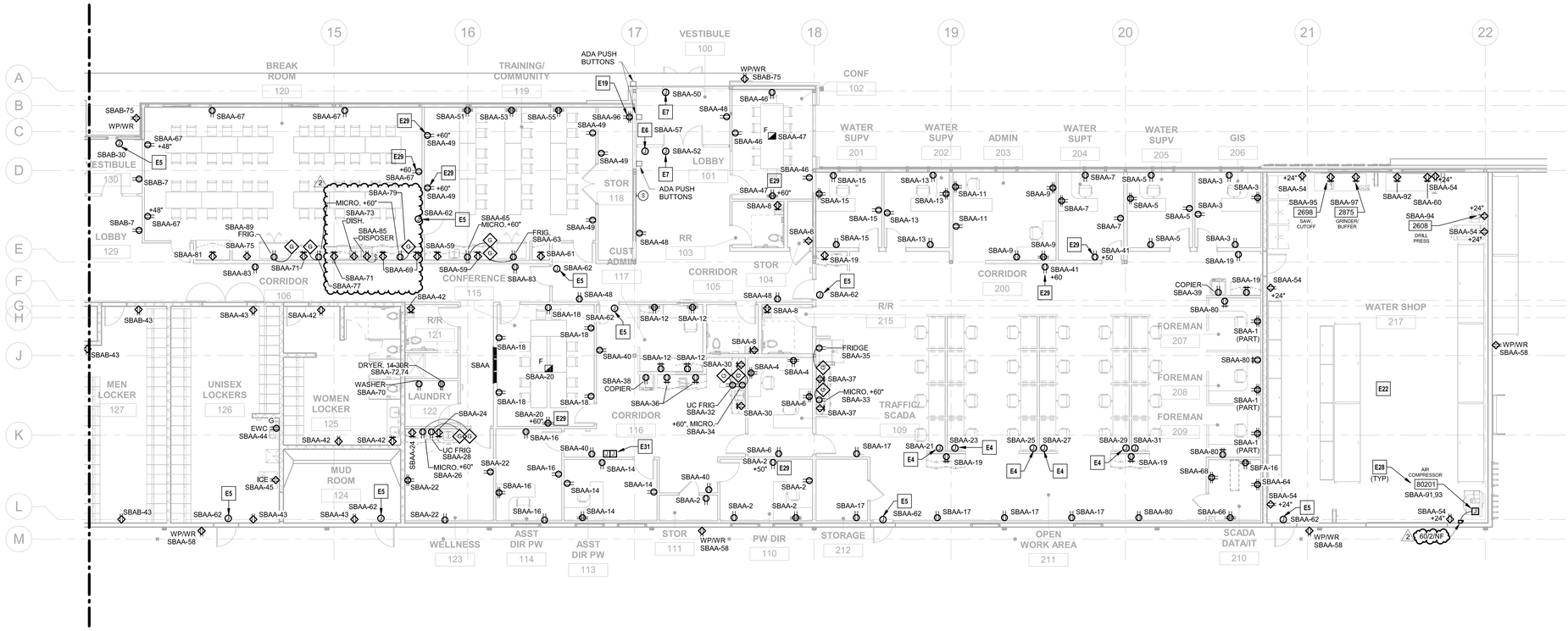
E4 PROVIDE CONNECTION TO SYSTEM FURNITURE WHIP. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.
E5 MAKE FINAL CONNECTION TO ELECTRICAL DOOR STRIKE/CARD READER. VERIFY REQUIREMENTS WITH DOOR HARDWARE TO BE INSTALLED. PROVIDE TRANSFORMER AND PUSHBUTTON IF NOT FURNISHED WITH HARDWARE.
E6 PROVIDE LOW VOLTAGE TRANSFORMER MOUNTED AT 12'-0" AFF AND CONNECT TO WEATHERPROOF ADA PUSHBUTTON AT EXTERIOR BUILDING WALL. COORDINATE REQUIREMENTS WITH OWNER PRIOR TO ROUGH-IN
E7 PROVIDE POWER CONNECTION TO MOTORIZED DOORS. PROVIDE ALL ACCESSORIES AND COMPONENT TO TIE ADA PUSH BUTTON INTO DOOR OPERATIONS.
E19 RECEPTACLE FOR AV RACK, MOUNT RECEPTACLE BEHIND AV RACK COORDINATE FINAL MOUNTING WITH AV INSTALLER.
E22 ALL CONDUIT WITHIN ROOM TO BE ROUTED ABOVE 18" OF THE FLOOR LEVEL, NO CONDUIT BELOW 18" AFF.
E28 REFER TO SHEET E501 FOR EQUIPMENT CONNECTION SCHEDULE.
E29 RECEPTACLE LOCATED WITHIN WALL BOX, COORDINATE EXACT LOCATION WITH AV DRAWINGS.
E31 PROVIDE GENERATOR REMOTE ANNUNCIATOR PANEL AND TRANSFER SWITCH CONTROL PANEL ON WALL. COORDINATE EXACT LOCATIONS WITH OWNER PRIOR TO ROUGH-IN.



KEY PLAN



2 ENLARGED POWER PLANS - ELECTRICAL ROOM 126
1/4" = 1'-0"



1 POWER LEVEL 1 PLAN - AREA A
1/8" = 1'-0"

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EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: NS
DATE: 12.15.22 REVIEWED BY: HEI

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

01/24/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
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POWER LEVEL 1 PLAN - AREA A

SHEET
E201A

DOUGLAS M. EVERHART

GENERAL ELECTRICAL SHOP EQUIPMENT NOTES:

1. EQUIPMENT HIGHLIGHTED WITH RECTANGULAR NUMBERS CORRESPONDS TO EQUIPMENT SHOWN ON SERVICE EQUIPMENT DRAWINGS.
2. VERIFY ROUGH-IN REQUIREMENTS, LOCATIONS, MOUNTING HEIGHTS, VOLTAGE, PHASE, AMPS, HP, KW, NEMA RATINGS, ETC FOR ALL SERVICE EQUIPMENT PRIOR TO ROUGH-IN. DEVICE LOCATIONS SHOWN ON ELECTRICAL PLANS ARE APPROXIMATE. REFER TO SERVICE EQUIPMENT PLANS FOR EXACT POWER ROUGH-IN LOCATIONS AND REQUIREMENTS.
3. FURNISH AND INSTALL DISCONNECT SWITCHES, INTERLOCKS, CONDUIT AND WIRING, AND INSTALL AS SPECIFICALLY OUTLINED WITHIN THE SERVICE EQUIPMENT CONSULTANT DRAWINGS.
4. FOR EACH EQUIPMENT ITEM NOT PROVIDED WITH CORD AND PLUG CONNECTIONS, VERIFY THE EQUIPMENT CONTAINS AN INTEGRAL UNIT SWITCH. IF EQUIPMENT HAS NO SWITCH, PROVIDE A PERMANENTLY INSTALLED LOCK-OFF DEVICE AT THE BRANCH CIRCUIT BREAKER FEEDING THE EQUIPMENT.
5. ALL SERVICE EQUIPMENT JUNCTION BOXES SHALL INCLUDE FINAL CONNECTION TO THEIR RESPECTIVE PIECE OF EQUIPMENT. VERIFY REQUIREMENTS WITH EQUIPMENT SUPPLIER AND PROVIDE ALL NECESSARY ITEMS TO MEET THE EQUIPMENT'S ELECTRICAL INSTALLATION REQUIREMENTS.

ELECTRICAL PLAN NOTES: 2

E3 PROVIDE LOCAL DISCONNECT SWITCH AND CONTACTOR FOR CONNECTION TO MOTOR OPERATED OVERHEAD DOOR. LOCATE DISCONNECT ON WALL AT 48" AND CONTACTOR ADJACENT TO DOOR MOTOR. REFER TO DETAIL 4 ON SHEET E600 FOR MORE INFORMATION. COORDINATE ADDITIONAL ELECTRICAL REQUIREMENTS FOR BUTTON OPERATOR LOCATION, CONTROLS, WIRING AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

E4 PROVIDE CONNECTION TO SYSTEM FURNITURE WHIP. INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

E5 MAKE FINAL CONNECTION TO ELECTRICAL DOOR STRIKE/CARD READER. VERIFY REQUIREMENTS WITH DOOR HARDWARE TO BE INSTALLED. PROVIDE TRANSFORMER AND PUSHBUTTON IF NOT FURNISHED WITH HARDWARE.

E15 PROVIDE CONNECTION TO HOSE REEL MOTOR AND CONNECTION TO HOSE REEL CONTROLS. COORDINATE ELECTRICAL REQUIREMENTS WITH MANUFACTURER FOR ANY ADDITIONAL WIRING REQUIREMENT.

E21 POWER CONNECTION TO SECURITY PANEL. COORDINATE FINAL POWER CONNECTION LOCATION WITH SECURITY SYSTEM INSTALLER.

E22 ALL CONDUIT WITHIN ROOM TO BE ROUTED ABOVE 18" OF THE FLOOR LEVEL. NO CONDUIT BELOW 18" AFF.

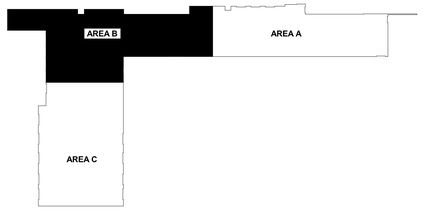
E23 CONNECTION TO OVERHEAD SWITCH AND 3P DRUM SWITCH TO THE TWO POST LIFT COORDINATE FINAL MOUNTING LOCATION/BRACKET AND POWER CONNECTION LOCATION WITH MANUFACTURER REQUIREMENTS. POWER FEEDER TO COME FROM OVERHEAD.

E24 CONNECTION TO MOTOR AND EC TO MAKE CONNECTION TO CONTROL UNIT. POWER FEEDER TO COME FROM OVERHEAD SUPPLY.

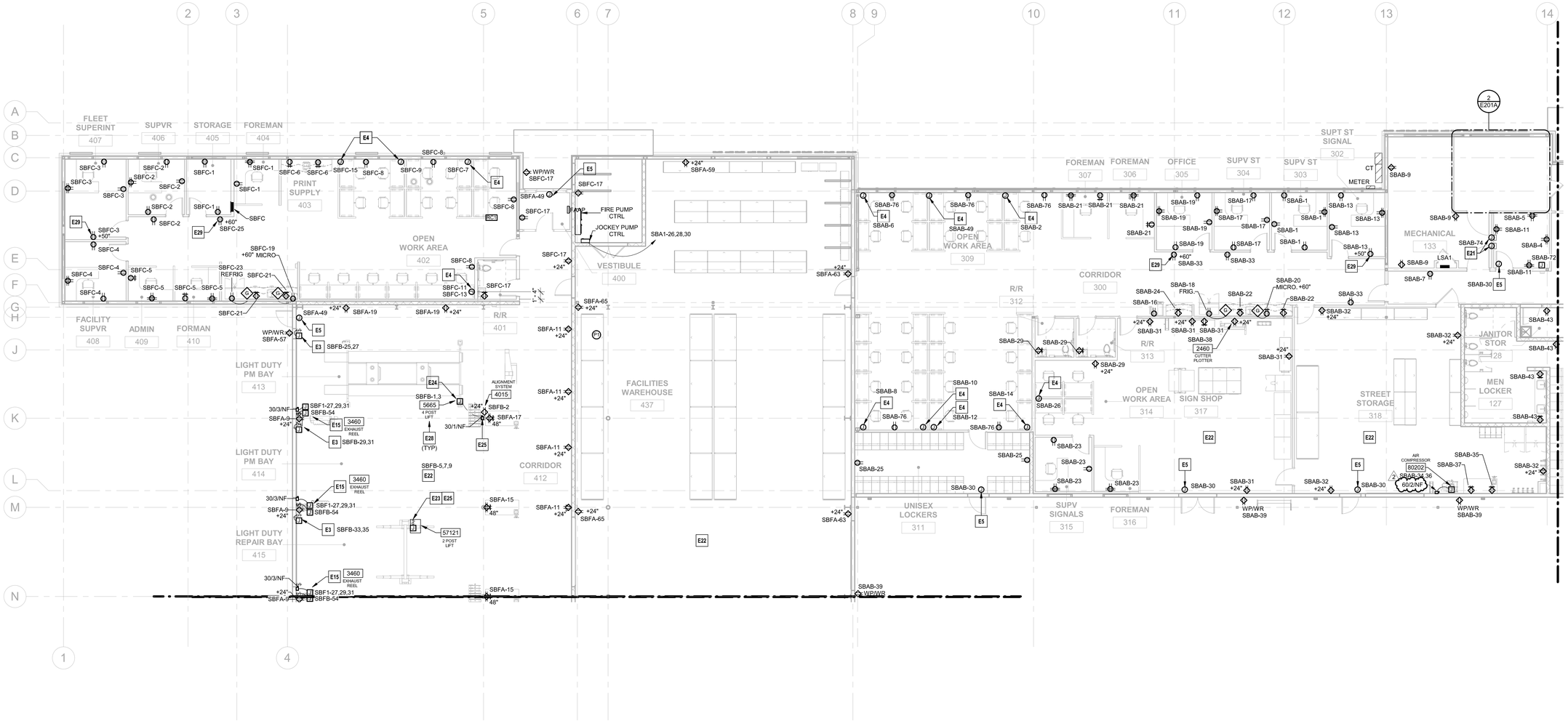
E25 ANY CONNECTIONS ROUTED BELOW 18" AFF SHALL BE SUITABLE FOR CLASS 1 DIVISION 2 AREAS, AND SHALL INCLUDE IMC CONDUIT WITH THREADED FITTINGS AND CONDUIT SEAL OFF'S.

E28 REFER TO SHEET E501 FOR EQUIPMENT CONNECTION SCHEDULE.

E29 RECEPTACLE LOCATED WITHIN WALL BOX, COORDINATE EXACT LOCATION WITH AV DRAWINGS.



KEY PLAN



1 POWER LEVEL 1 PLAN - AREA B
1/8" = 1'-0"

N

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195000840

EXPIRES 12/31/2023

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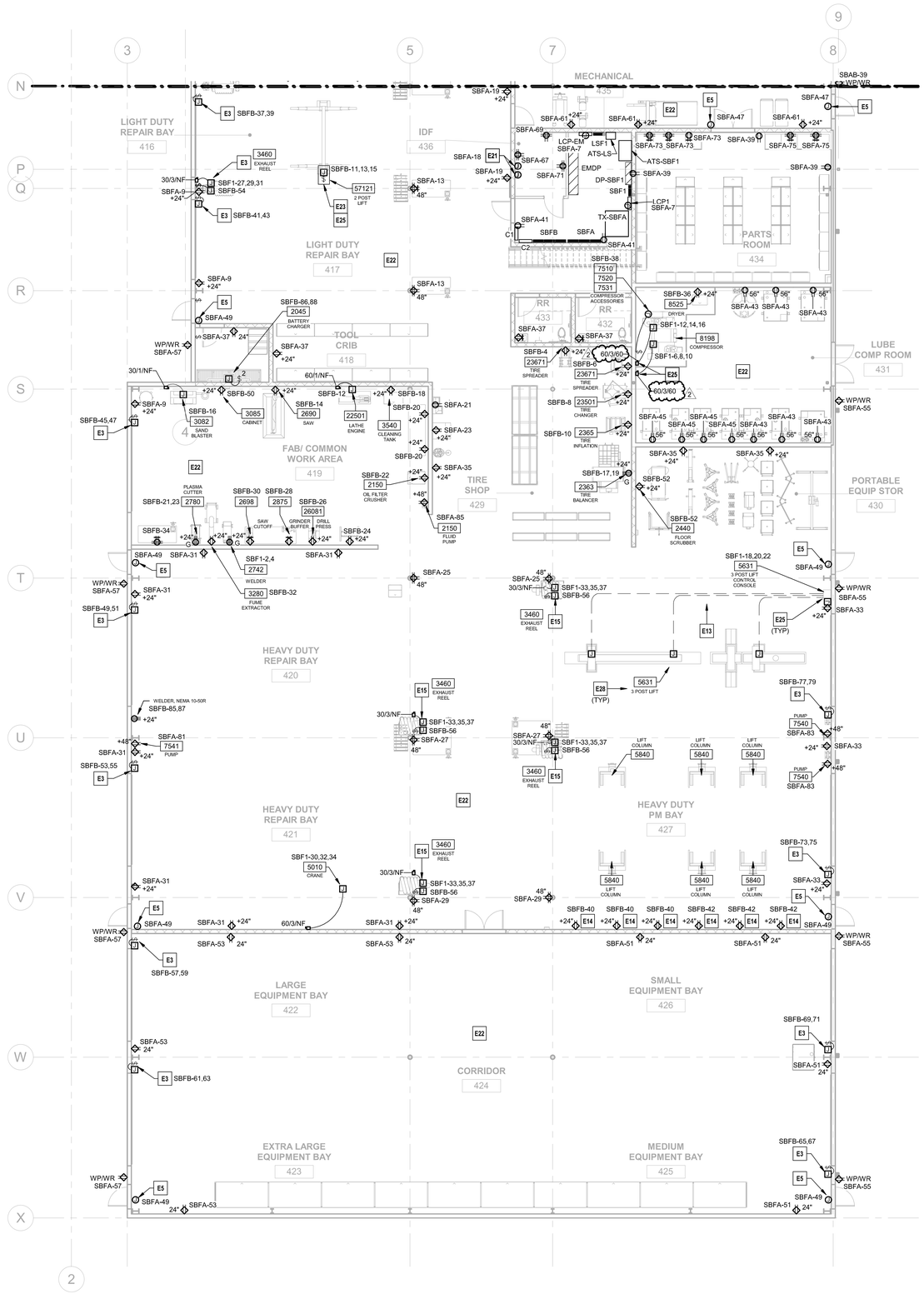
POWER LEVEL 1 PLAN - AREA B

SHEET
E201B

DOUGLAS M. EVERHART



1 POWER LEVEL 1 PLAN - AREA C
1/8" = 1'-0"

ELECTRICAL PLAN NOTES:

2

E3 PROVIDE LOCAL DISCONNECT SWITCH AND CONTACTOR FOR CONNECTION TO MOTOR OPERATED OVERHEAD DOOR. LOCATE DISCONNECT ON WALL AT 48" AND CONTACTOR ADJACENT TO DOOR MOTOR. REFER TO DETAIL 4 ON SHEET E600 FOR MORE INFORMATION. COORDINATE ADDITIONAL ELECTRICAL REQUIREMENTS FOR BUTTON OPERATOR LOCATION, CONTROLS, WIRING AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.

E5 MAKE FINAL CONNECTION TO ELECTRICAL DOOR STRIKE/CARD READER. VERIFY REQUIREMENTS WITH DOOR HARDWARE TO BE INSTALLED. PROVIDE TRANSFORMER AND PUSHBUTTON IF NOT FURNISHED WITH HARDWARE.

E13 3 POST LIFT REQUIRED CONDUIT BETWEEN LIFT AND CONTROL CONSOLE. REFER TO MANUFACTURER INSTALLATION MANUAL FOR QUANTITY, SIZE AND LOCATION FOR ALL REQUIRED CONDUITS.

E14 RECEPTACLE DEDICATED FOR CHARGING 5840 LIFT, COLUMN.

E15 PROVIDE CONNECTION TO HOSE REEL MOTOR AND CONNECTION TO HOSE REEL CONTROLS. COORDINATE ELECTRICAL REQUIREMENTS WITH MANUFACTURER FOR ANY ADDITIONAL WIRING REQUIREMENT.

E21 POWER CONNECTION TO SECURITY PANEL. COORDINATE FINAL POWER CONNECTION LOCATION WITH SECURITY SYSTEM INSTALLER.

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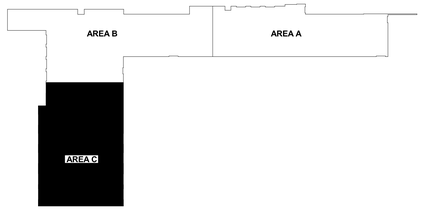

KEY PLAN

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POWER LEVEL 1 PLAN - AREA C

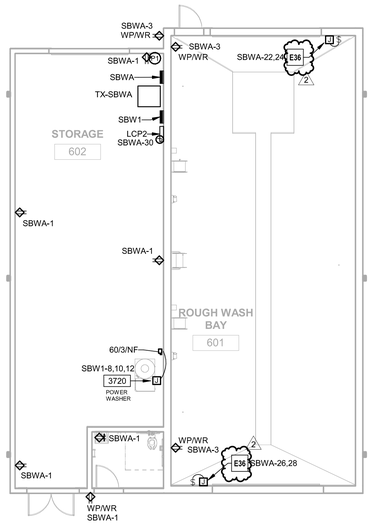
SHEET
E201C

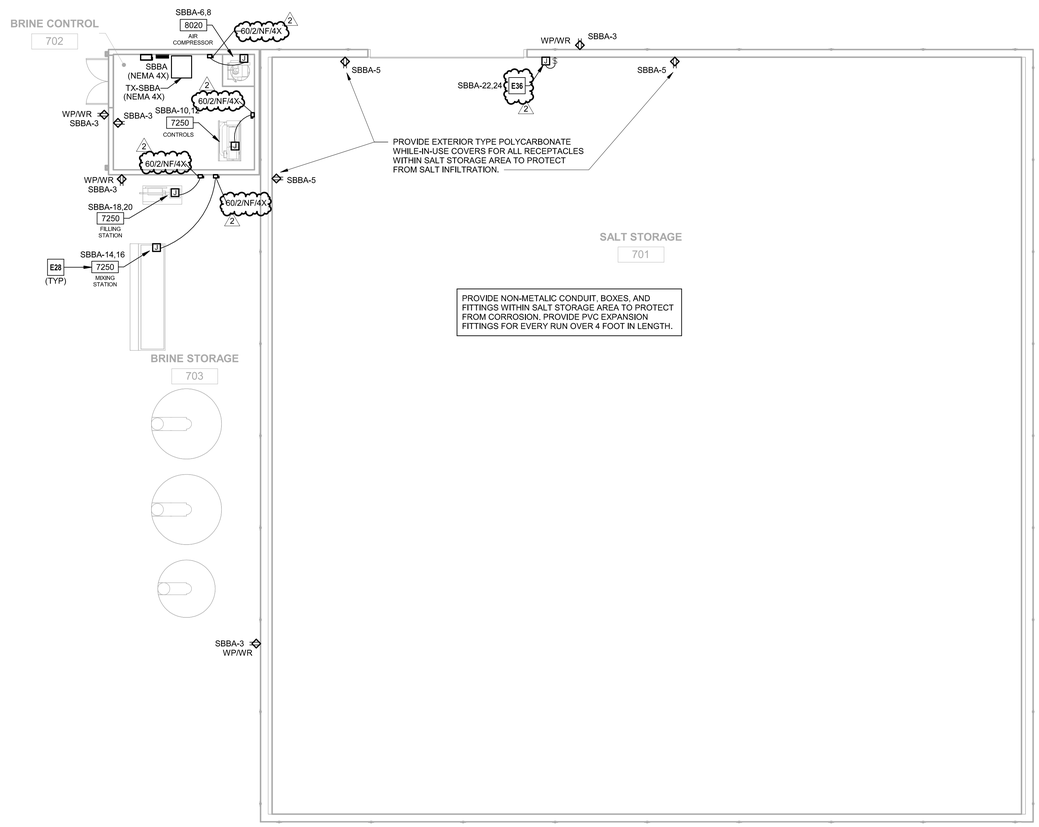
DOUGLAS M. EVERHART

ELECTRICAL PLAN NOTES:

E28 REFER TO SHEET E501 FOR EQUIPMENT CONNECTION SCHEDULE.

2 E36 PROVIDE NEMA 4X DISCONNECT SWITCH FOR CONNECTION TO MOTOR OPERATED GHERHEAD DOOR. COORDINATE EXACT LOCATION OF DISCONNECT WITH ARCHITECT PRIOR TO ROUGHIN. COORDINATE ADDITIONAL ELECTRICAL REQUIREMENTS FOR BUTTON OPERATOR LOCATION, CONTROLS, WIRING AND INSTALL PER MANUFACTURER'S RECOMMENDATIONS.





1 POWER LEVEL 1 PLAN - WASH AND SALT STORAGE BUILDINGS
1/8" = 1'-0"

N

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architecture + design

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OWNER

CITY OF WENTZVILLE, MISSOURI
1001 SCHROEDER CREEK BLVD
WENTZVILLE, MO 63385
636.327.5101

PROJECT TEAM

CIVIL ENGINEER
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1950004840
EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.:	19-040	DRAWN BY:	NS
DATE:	12.15.22	REVIEWED BY:	HEI

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

01/24/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

POWER LEVEL 1 PLAN - WASH & SALT STORAGE BUILDINGS

SHEET
E202

DOUGLAS M. EVERHART

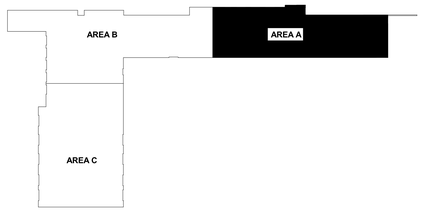
ELECTRICAL PLAN NOTES:

E16 EC TO PROVIDE DISCONNECT MOUNTED ON SIDE OF EQUIPMENT.

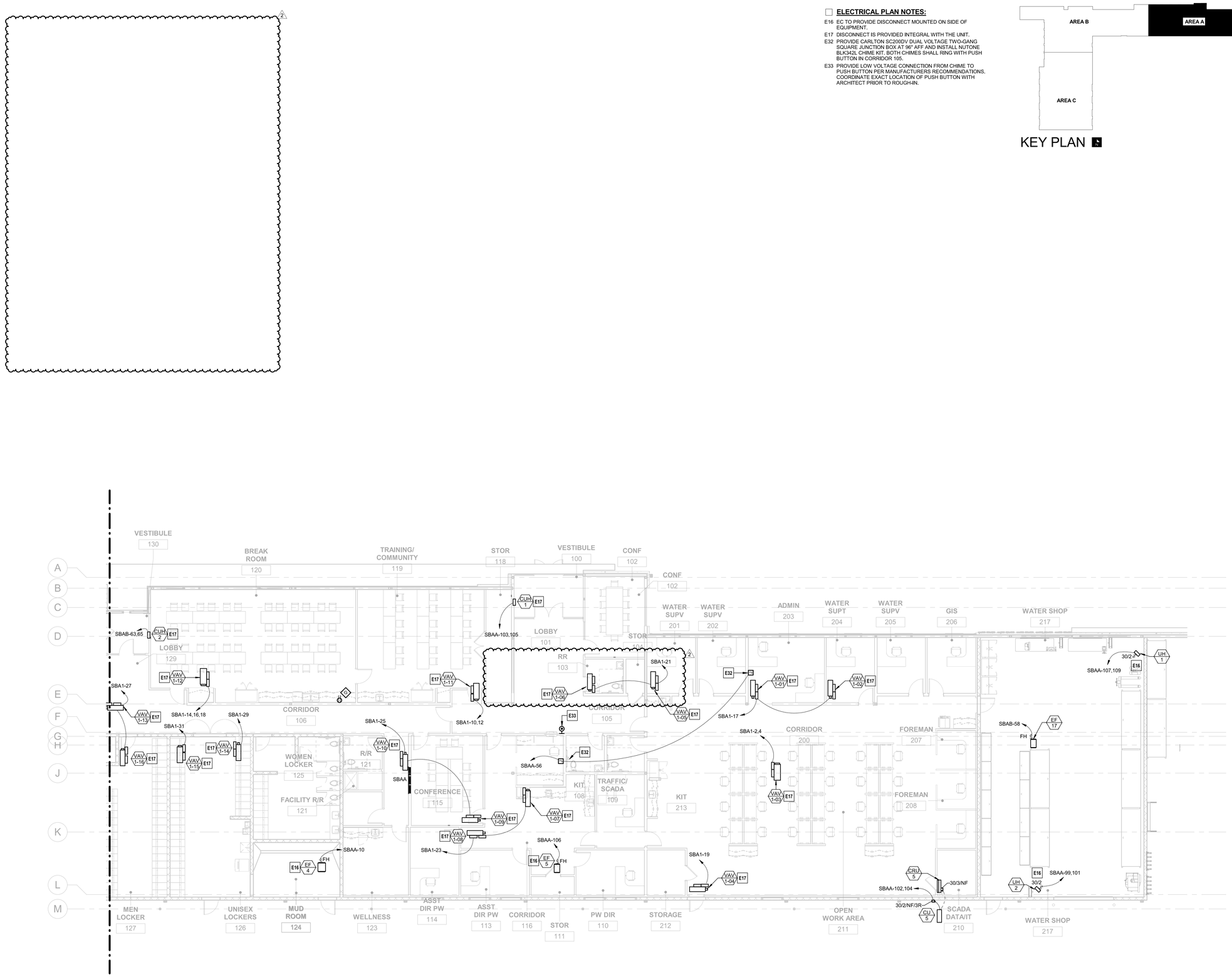
E17 DISCONNECT IS PROVIDED INTEGRAL WITH THE UNIT.

E32 PROVIDE CARLTON SC2000V DUAL VOLTAGE TWO-GANG SQUARE JUNCTION BOX AT 96" AFF AND INSTALL NUTONE BLK342L CHIME KIT. BOTH CHIMES SHALL RING WITH PUSH BUTTON IN CORRIDOR 105.

E33 PROVIDE LOW VOLTAGE CONNECTION FROM CHIME TO PUSH BUTTON PER MANUFACTURERS RECOMMENDATIONS. COORDINATE EXACT LOCATION OF PUSH BUTTON WITH ARCHITECT PRIOR TO ROUGH-IN.



KEY PLAN



1 EQUIPMENT CONNECTION LEVEL 1 PLAN - AREA A
1/8" = 1'-0"

N

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EQUIPMENT CONNECTION LEVEL 1 PLAN - AREA A

SHEET
E301A

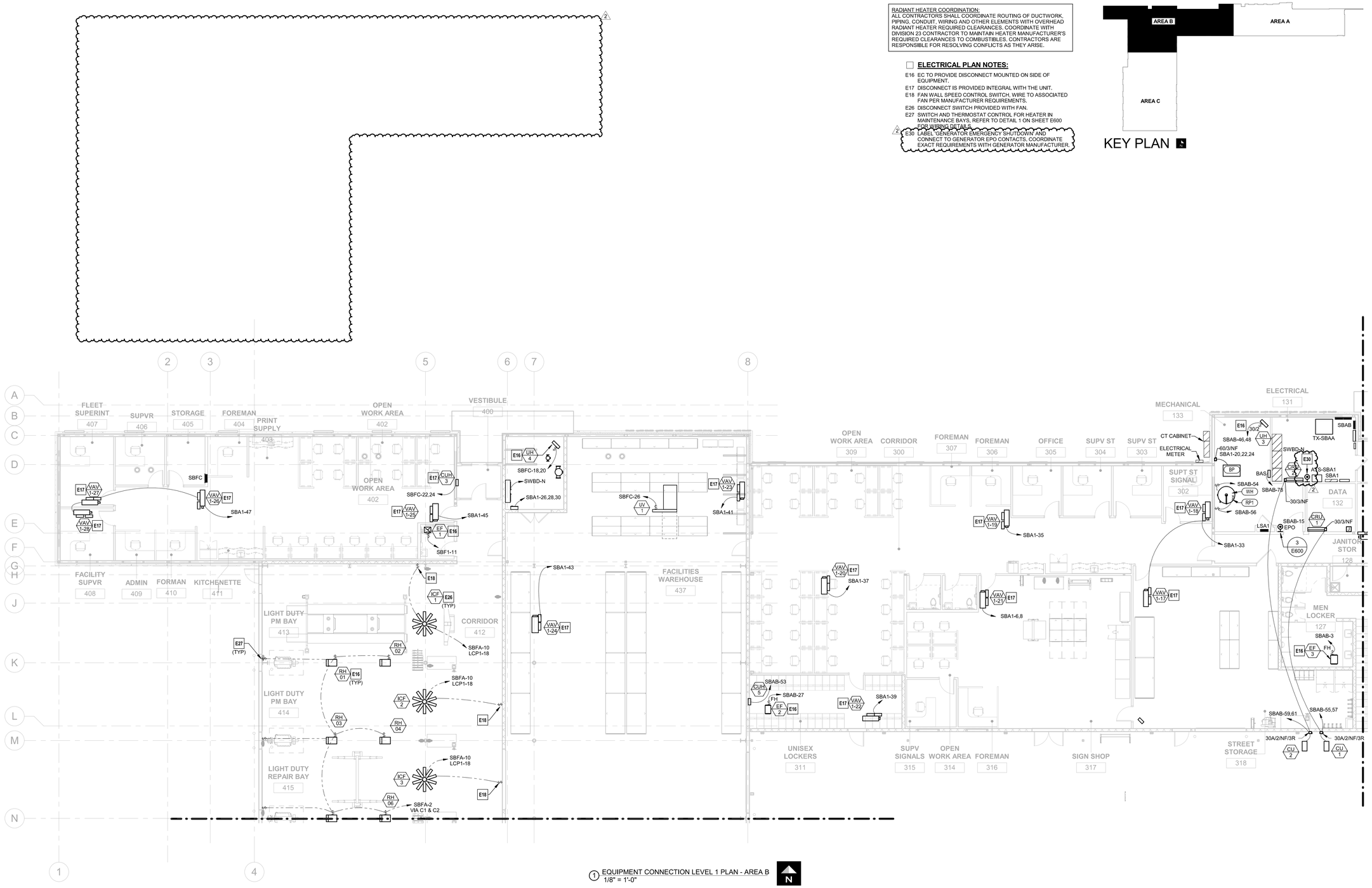
DOUGLAS M. EVERHART

RADIANT HEATER COORDINATION:
ALL CONTRACTORS SHALL COORDINATE ROUTING OF DUCTWORK, PIPING, CONDUIT, WIRING AND OTHER ELEMENTS WITH OVERHEAD RADIANT HEATER REQUIRED CLEARANCES. COORDINATE WITH DIVISION 23 CONTRACTOR TO MAINTAIN HEATER MANUFACTURER'S REQUIRED CLEARANCES TO COMBUSTIBLES. CONTRACTORS ARE RESPONSIBLE FOR RESOLVING CONFLICTS AS THEY ARISE.

ELECTRICAL PLAN NOTES:

E16 EC TO PROVIDE DISCONNECT MOUNTED ON SIDE OF EQUIPMENT.
E17 DISCONNECT IS PROVIDED INTEGRAL WITH THE UNIT.
E18 FAN WALL SPEED CONTROL SWITCH, WIRE TO ASSOCIATED FAN PER MANUFACTURER REQUIREMENTS.
E26 DISCONNECT SWITCH PROVIDED WITH FAN.
E27 SWITCH AND THERMOSTAT CONTROL FOR HEATER IN MAINTENANCE BAYS. REFER TO DETAIL 1 ON SHEET E600 FOR WIRING DETAILS.
2 E30 LABEL "GENERATOR EMERGENCY SHUTDOWN" AND CONNECT TO GENERATOR EPO CONTACTS. COORDINATE EXACT REQUIREMENTS WITH GENERATOR MANUFACTURER.

KEY PLAN



1 EQUIPMENT CONNECTION LEVEL 1 PLAN - AREA B
1/8" = 1'-0"

N

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PROFESSIONAL ENGINEER

01/24/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
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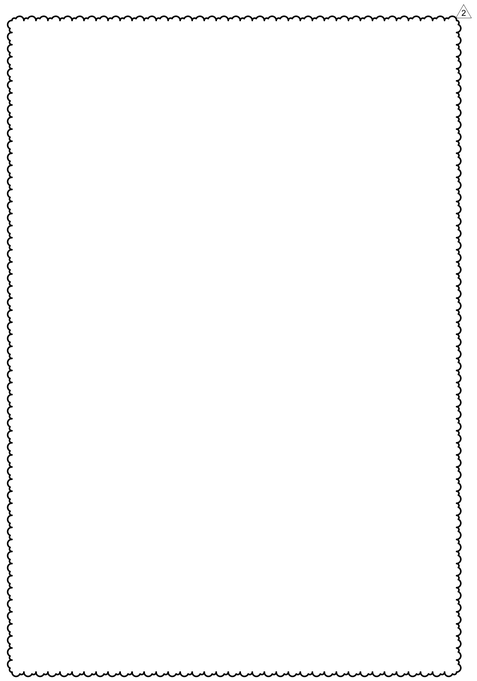
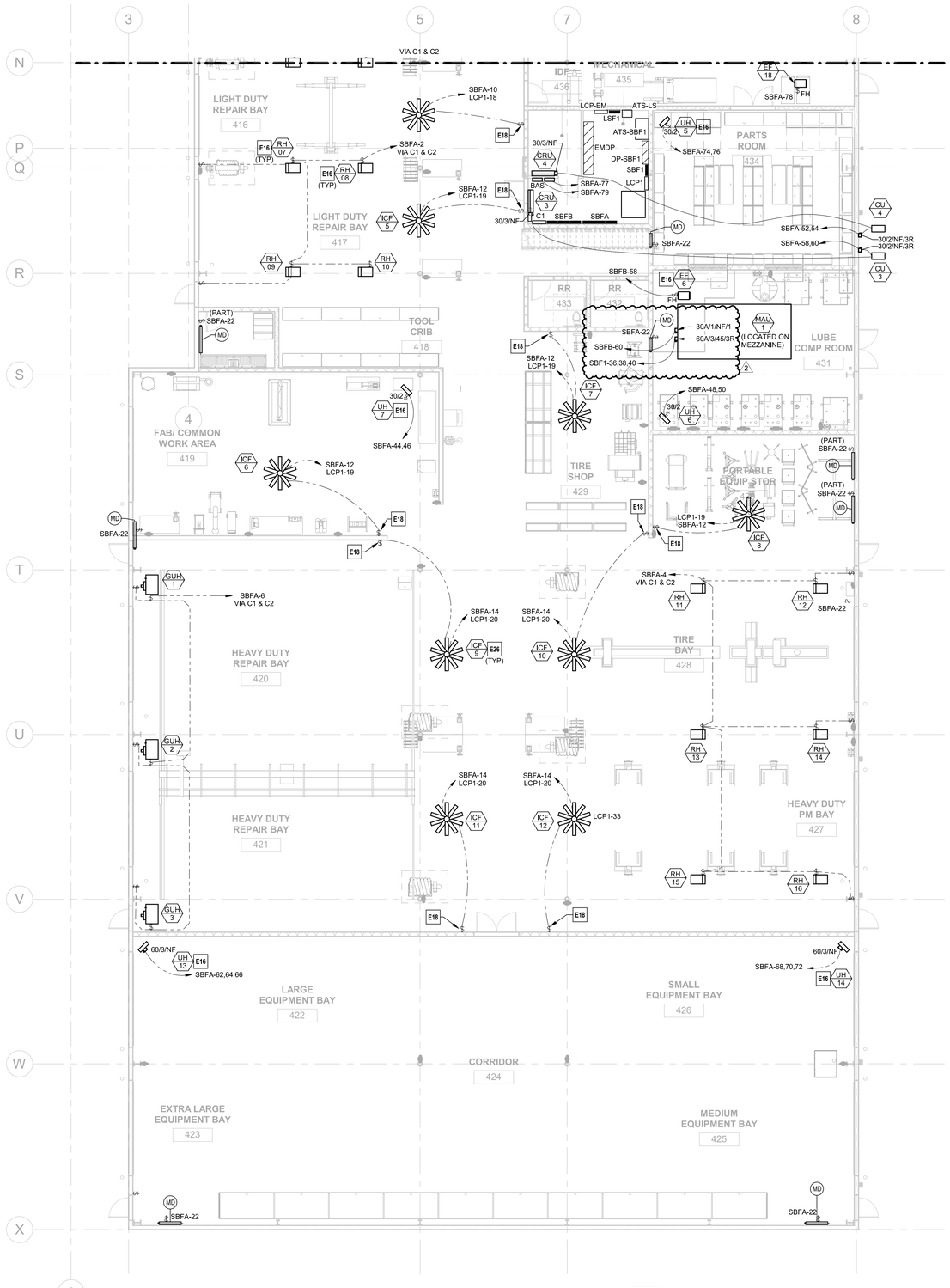
WENTZVILLE, MO 63385

EQUIPMENT CONNECTION LEVEL 1 PLAN - AREA B

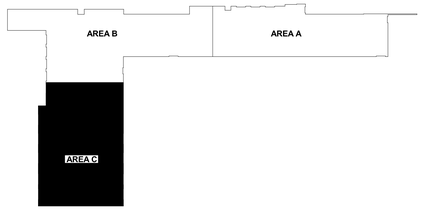
SHEET
E301B

DOUGLAS M. EVERHART





1 EQUIPMENT CONNECTION LEVEL 1 PLAN - AREA C
1/8" = 1'-0"



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ELECTRICAL PLAN NOTES:

E16 EC TO PROVIDE DISCONNECT MOUNTED ON SIDE OF EQUIPMENT.
E18 FAN WALL SPEED CONTROL SWITCH, WIRE TO ASSOCIATED FAN PER MANUFACTURER REQUIREMENTS.
E26 DISCONNECT SWITCH PROVIDED WITH FAN.

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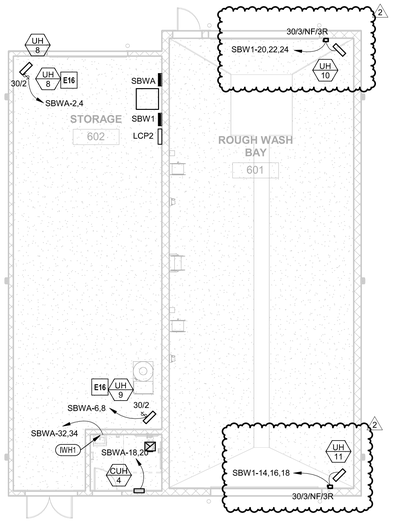
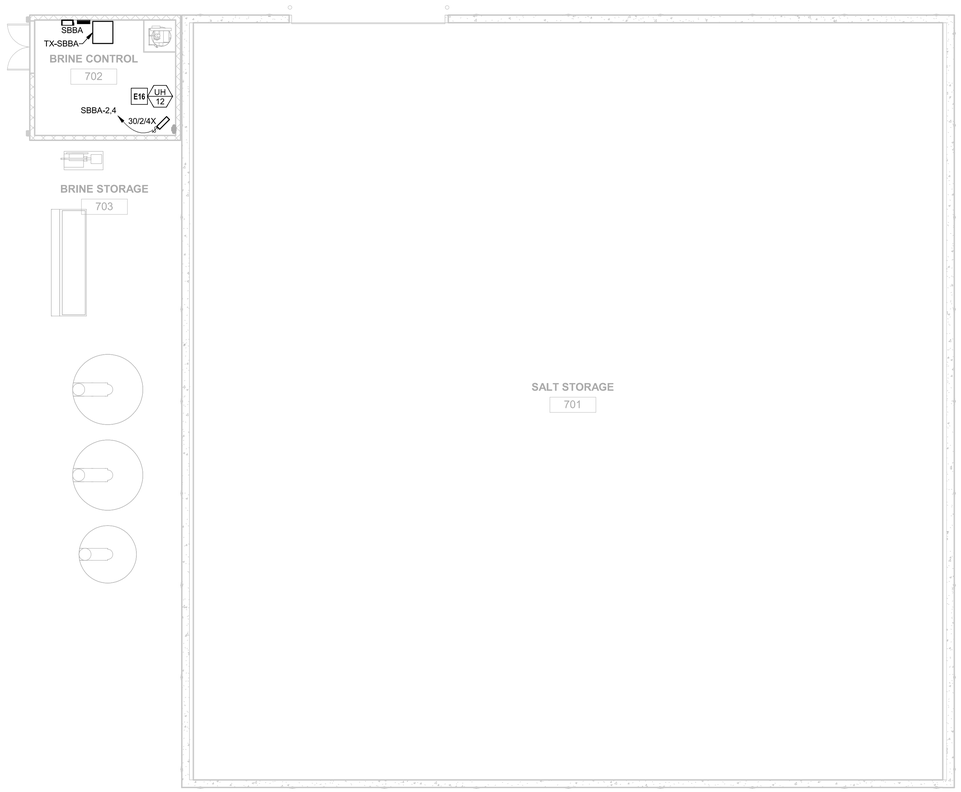
WENTZVILLE, MO 63385

EQUIPMENT CONNECTION LEVEL 1 PLAN - AREA C

SHEET
E301C

DOUGLAS M. EVERHART





1 EQUIPMENT CONNECTION LEVEL 1 PLAN - WASH AND SALT STORAGE BUILDINGS
1/8" = 1'-0"

N

ELECTRICAL PLAN NOTES:

E16 EC TO PROVIDE DISCONNECT MOUNTED ON SIDE OF EQUIPMENT.

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DATE: 12.15.22 REVIEWED BY: Checker

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

01/24/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

EQUIPMENT CONNECTION LEVEL 1 PLAN - WASH & SALT STORAGE BUILDINGS

SHEET
E302

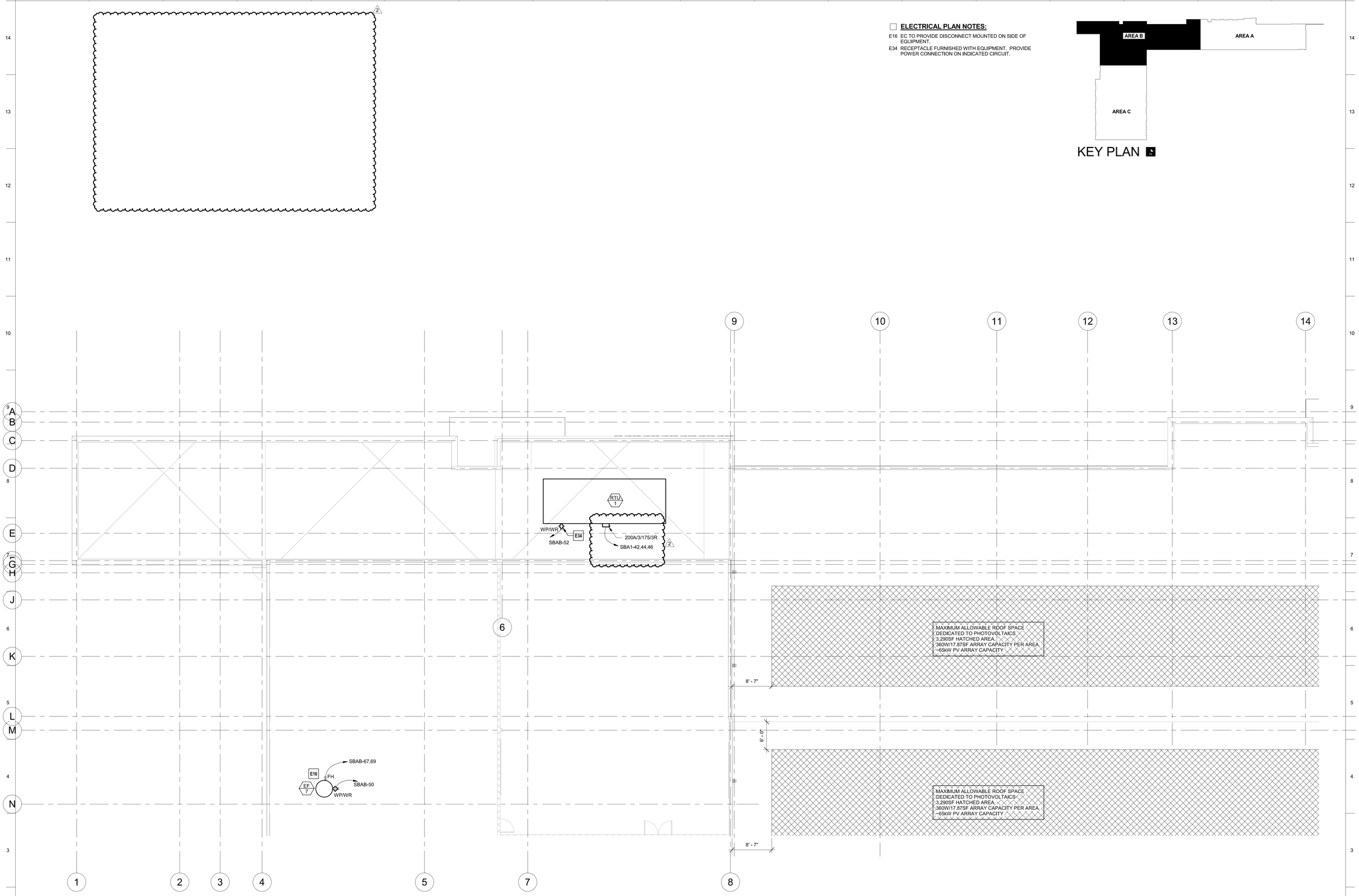
DOUGLAS M. EVERHART

ELECTRICAL PLAN NOTES:

E16 EC TO PROVIDE DISCONNECT MOUNTED ON SIDE OF EQUIPMENT.

E34 RECEPTACLE FURNISHED WITH EQUIPMENT. PROVIDE POWER CONNECTION ON INDICATED CIRCUIT.

KEY PLAN



1 EQUIPMENT CONNECTION ROOF PLAN - AREA B
1/8" = 1'-0"

N

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OWNER

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PROJECT TEAM

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PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

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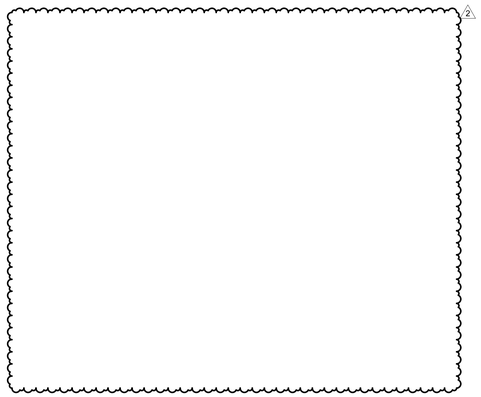
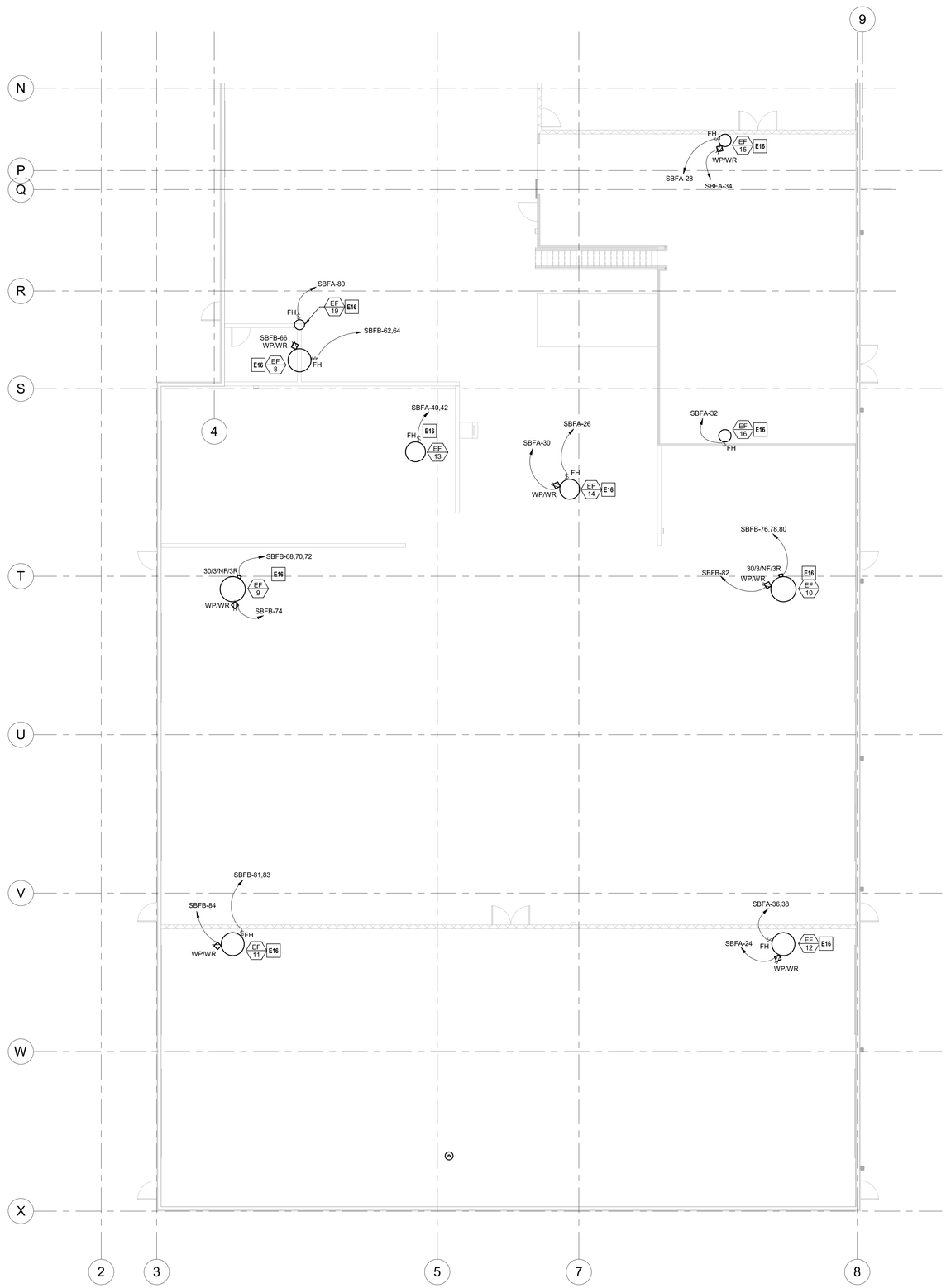
EQUIPMENT CONNECTION ROOF PLAN - AREA B

SHEET

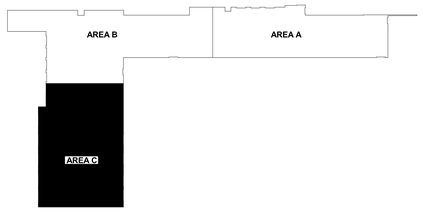
E303B

DOUGLAS M. EVERHART





1 EQUIPMENT CONNECTION ROOF PLAN - AREA C
1/8" = 1'-0"



KEY PLAN

ELECTRICAL PLAN NOTES:

E16 EC TO PROVIDE DISCONNECT MOUNTED ON SIDE OF EQUIPMENT.

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PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

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EQUIPMENT CONNECTION ROOF PLAN - AREA C

SHEET
E303C

DOUGLAS M. EVERHART

LIGHTING CONTROL DEVICE SCHEDULE

LINE-VOLTAGE WALL SWITCH OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
$VSD	LEGRAND DW-100	ACUITY, COOPER CRESTRON, HUBBELL LEVITON, LUTRON	WALL MOUNT DUAL TECHNOLOGY OCCUPANCY SENSOR. INTEGRAL MANUAL OVERRIDE SWITCH, SINGLE RELAY. LINE-VOLTAGE. LOAD: 120V=800W, 277V=1200W.	PIR MAJOR 30' x 35' PIR MINOR 15' x 20' ULT MAJOR 20' x 20' ULT MINOR 15' x 15'	120/ 277	

LINE-VOLTAGE DIMMING WALL SWITCH OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
$ VS	LEGRAND DW-311	ACUITY, CRESTRON HUBBELL, LUTRON	WALL MOUNT DUAL TECHNOLOGY OCCUPANCY SENSOR. MULTI-WAY. INTEGRAL MANUAL OVERRIDE SWITCH, SINGLE RELAY. LINE-VOLTAGE. 0-10V DIMMING. 50mA SINK. LOAD: 120V=1000W, 277V=1200W.	PIR MAJOR 30' x 35' PIR MINOR 15' x 20' ULT MAJOR 20' x 20' ULT MINOR 15' x 15'	120/ 277	

STAND-ALONE LOW-VOLTAGE LIGHTING CONTROL SYSTEMS

STAND-ALONE LOW-VOLTAGE OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
2	LEGRAND HBL2W	ACUITY, COOPER HUBBELL, LEVITON	CEILING MOUNT PASSIVE INFRARED OCCUPANCY SENSOR. WEL LOCATION RATED. 360 DEGREE COVERAGE. LOW-VOLTAGE.	48' Ø (8' MOUNTING)	24	
3	LEGRAND HBL3W	ACUITY, COOPER HUBBELL, LEVITON	CEILING MOUNT PASSIVE INFRARED OCCUPANCY SENSOR. WEL LOCATION RATED. 360 DEGREE COVERAGE. LOW-VOLTAGE.	40' Ø (20' MOUNTING)	24	
4	LEGRAND HBL7W	ACUITY, COOPER HUBBELL, LEVITON	CEILING MOUNT PASSIVE INFRARED OCCUPANCY SENSOR. WEL LOCATION RATED. 360 DEGREE COVERAGE. LOW-VOLTAGE.	100' Ø (40' MOUNTING)	24	

STAND-ALONE LOW-VOLTAGE PHOTOELECTRIC SWITCHES

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
PS1	LEGRAND EM-24D2	ACUITY HUBBELL LEVITON	EXTERIOR LOW-VOLTAGE PHOTOELECTRIC SWITCH. FACE SENSOR NORTH AND ORIENT VERTICALLY. 0-15 FC.	24	

STAND-ALONE LOW-VOLTAGE POWER PACKS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
PP	LEGRAND BZ-250	ACUITY, COOPER HUBBELL, LEVITON	POWER PACK FOR LOW-VOLTAGE OCCUPANCY SENSORS. 20A LOAD. (1) RELAY. MANUAL- AND AUTO-ON MODES. HOLD-ON AND -OFF INPUTS. LOAD: 16A AT 120V OR 277V. OUTPUT: 225mA AT 24V. PLENUM RATED.	120/ 277	

STAND-ALONE LOW-VOLTAGE SWITCHES

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
$ OR	LEGRAND DDC2	ACUITY, COOPER HUBBELL, LEVITON	MOMENTARY 1-BUTTON DECORATOR SWITCH FOR MANUAL ON/OFF CONTROL OF STAND-ALONE LOW-VOLTAGE OCCUPANCY SENSORS. INTEGRAL LED ILLUMINATES WHEN LOAD IS ON.	24	

NETWORK LIGHTING CONTROL SYSTEMS

NETWORK OCCUPANCY SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	COVERAGE (W X D)	VOLTAGE	NOTES
1	LEGRAND LMDC-100	ACUITY, CRESTRON ETC, HUBBELL	CEILING MOUNT DUAL TECHNOLOGY OCCUPANCY SENSOR. 360 DEGREE COVERAGE, DIGITAL. (2) RJ45 PORTS. IR TRANSCEIVER FOR WIRELESS SETUP.	PIR MAJOR 32' Ø PIR MINOR 15' Ø ULT MAJOR 25' x 25'	24	

NETWORK DAYLIGHT SENSORS

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
3	LEGRAND LMLS-400	ACUITY, CRESTRON ETC, HUBBELL	CLOSED LOOP DAYLIGHT SENSOR FOR (1) ZONE, ON/OFF SWITCHING, BI-LEVEL, TRI-LEVEL, OR CONTINUOUS DIMMING. CEILING MOUNTED. 0-6,500 FC. DIGITAL. (1) RJ45 PORT. IR TRANSCEIVER FOR WIRELESS SETUP.	24	

NETWORK ROOM CONTROLLERS (POWER PACK)

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
RC0	LEGRAND LMRC-101 (NON-DIM)	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL ROOM CONTROLLER FOR ON/OFF CONTROL OF LIGHTING LOADS. (1) 20A LOAD INPUT, (1) RELAY OUTPUT, MANUAL- AND AUTO-ON MODES.	120/ 277	
RC1	LEGRAND LMRC-211 (0-10V)	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL ROOM CONTROLLER FOR ON/OFF/0-10V DIMMING CONTROL OF LIGHTING LOADS. (1) 20A LOAD INPUT, (1) RELAY OUTPUT, 100mA SINK PER RELAY. MANUAL-, PARTIAL-, AND AUTO-ON MODES.	120/ 277	
RC2	LEGRAND LMRC-212 (0-10V)	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL ROOM CONTROLLER FOR ON/OFF/0-10V DIMMING CONTROL OF LIGHTING LOADS. (1) 20A LOAD INPUT, (2) RELAY OUTPUTS. 100mA SINK PER RELAY. MANUAL-, PARTIAL-, AND AUTO-ON MODES.	120/ 277	
RC3	LEGRAND LMRC-213 (0-10V)	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL ROOM CONTROLLER FOR ON/OFF/0-10V DIMMING CONTROL OF LIGHTING LOADS. (1) 20A LOAD INPUT, (3) RELAY OUTPUTS, 100mA SINK PER RELAY. MANUAL-, PARTIAL-, AND AUTO-ON MODES.	120/ 277	

NETWORK LIGHTING SWITCHES

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
$ D	LEGRAND LMSW-102 SERIES	ACUITY, CRESTRON ETC, HUBBELL	2- BUTTON DIGITAL SWITCH FOR MANUAL ON/OFF/DIMMING. EACH BUTTON HAS INTEGRAL LED THAT ILLUMINATES WHEN LOAD IS ON. (2) RJ45 PORTS.	24	
$ LV	LEGRAND LMSW-102 SERIES	ACUITY, CRESTRON ETC, HUBBELL	2- BUTTON DIGITAL SWITCH FOR MANUAL ON/OFF. EACH BUTTON HAS INTEGRAL LED THAT ILLUMINATES WHEN LOAD IS ON. (2) RJ45 PORTS.	24	
$SW#	LEGRAND LMSW SERIES	ACUITY, CRESTRON ETC, HUBBELL	DIGITAL SWITCH FOR MANUAL ON/OFF. EACH BUTTON HAS INTEGRAL LED THAT ILLUMINATES WHEN LOAD IS ON. (2) RJ45 PORTS. REFER TO MULTI-BUTTON SWITCH SCHEDULE ON SHEET E401 FOR PROGRAMMING AND NUMBER OF BUTTONS REQUIRED.	24	

AUXILIARY EQUIPMENT

SYMBOL TAG	MANUFACTURER MODEL/SERIES	ALTERNATE MANUFACTURER	DEVICE DESCRIPTION	VOLTAGE	NOTES
ELR	SIGNIFY BLCD16DIM	SEE DESCRIPTION	AUTOMATIC LOAD CONTROL RELAY WITH 0-10V OVERRIDE. UL924 LISTED. OPERATES AS CONTROL DEVICE OR BYPASS PER SEQUENCE OF OPERATIONS. INTEGRAL TEST BUTTON. ALTERNATE MANUFACTURERS: EATON/COOPER, ETC (REQUIRES ENCLOSURE), ACUITY/IOTA, LUTRON, LVS CONTROLS. EMERGENCY LIGHT FIXTURE MUST BE UL924 LISTED ALSO.	120/ 277	

GENERAL NOTES:

A. OCCUPANCY SENSOR LAYOUT DESIGNED FROM BASIS-OF-DESIGN COVERAGE PATTERNS. IF SUBMITTING ALTERNATE PER 'EQUIVALENT MANUFACTURER' COLUMN, ADJUST SENSOR QUANTITIES AND LOCATIONS PER MANUFACTURER-SPECIFIC SPACING CRITERIA.
B. PROVIDE SHOP DRAWINGS FOR ENGINEER AND ARCHITECT REVIEW THAT INCLUDE PRODUCT CUTSHEETS AND PROJECT-SPECIFIC LAYOUTS. LAYOUTS MUST INCLUDE SENSOR LOCATIONS, HEIGHTS, ORIENTATION, AND COVERAGE AREAS. SHOW COORDINATION WITH ALL OTHER CEILING DEVICES INCLUDING BUT NOT LIMITED TO HVAC SUPPLY AND RETURN GRILLES, SPRINKLERS, LIGHT FIXTURES, AND OTHER OWNER-PROVIDED CEILING MOUNTED DEVICES SUCH AS SPEAKERS, SECURITY CAMERAS, PROJECTORS, ETC. (SENSORS MAY BE ADVERSELY AFFECTED IF LOCATED TOO CLOSE TO OTHER CEILING MOUNTED DEVICES). ALSO PROVIDE SCHEMATICS AND SCHEDULES WHEN APPLICABLE.
C. LIGHTING CONTROLS PRICING SHALL BE COMPLETELY SEPARATE OF ANY LIGHT FIXTURE PRICING.
D. VERIFY COLOR(S) FOR ALL WALL AND CEILING MOUNTED DEVICES WITH THE ARCHITECT.
E. ALL WALL SWITCH AND CEILING SENSORS SHALL HAVE AN ADJUSTABLE TIME DELAY RANGE OF 0-30 MIN. UNO. CONFIRM SENSOR SETTINGS WITH SEQUENCE OF OPERATIONS AND OWNER PRIOR TO SYSTEM COMMISSIONING.
F. PROVIDE COPIES OF OPERATION AND MAINTENANCE INSTRUCTIONS FOR ALL DEVICES TO OWNER.
G. PROVIDE A NEUTRAL CONDUCTOR TO ALL WALL SWITCH LOCATIONS PER NEC REQUIREMENTS.
H. DO NOT SHARE NEUTRAL CONDUCTOR ON LOAD SIDE OF DIMMERS.

VERSION: 4.06

LIGHT FIXTURE SCHEDULE

TYPE	MANUFACTURER	MODEL	APPROVED EQUALS	LAMPS NO.	LAMPS TYPE	LAMPS VOLT	BALLAST TYPE	BALLAST INPUT WATTS	BALLAST INPUT VA	DESCRIPTION	NOTES
A1	HE WILLIAMS	AT1-2-2-L30-8-35-D-DIM-UNV	XTRALIGHT ART UTOPIA	1	INTEGRAL LED 3,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	30	33	NOMINAL 2'W x 2'L x 4-3/8"D RECESSED ARCHITECTURAL TROFFER, PRECISION DIE-FORMED 22-GAUGE COLD ROLLED STEEL HOUSING, ALUMINUM DOOR FRAME WITH OPTICAL ASSEMBLY, DIFFUSE POLYCARBONATE LENSING WITH ACRYLIC CENTER, REFLECTIVE WHITE POLYESTER POWDER COAT FINISH WITH PAINT AFTER FABRICATION, UNIVERSAL VOLTAGE DRIVER, UL DAMP LOCATION LISTED.	
A1E	HE WILLIAMS	AT1-2-2-L30-8-35-D-DIM-UNV	XTRALIGHT ART UTOPIA	1	INTEGRAL LED	277	0-10V	30	33	SIMILAR TO A1 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
A2	HE WILLIAMS	AT1-2-4-L40-8-35-D-DIM-UNV	XTRALIGHT ART UTOPIA	1	INTEGRAL LED 4,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	35	38	NOMINAL 2'W x 4'L x 4-3/8"D RECESSED ARCHITECTURAL TROFFER, PRECISION DIE-FORMED 22-GAUGE COLD ROLLED STEEL HOUSING, ALUMINUM DOOR FRAME WITH OPTICAL ASSEMBLY, DIFFUSE POLYCARBONATE LENSING WITH ACRYLIC CENTER, REFLECTIVE WHITE POLYESTER POWDER COAT FINISH WITH PAINT AFTER FABRICATION, UNIVERSAL VOLTAGE DRIVER, UL DAMP LOCATION LISTED.	
A2E	HE WILLIAMS	AT1-2-4-L40-8-35-D-DIM-UNV	XTRALIGHT ART UTOPIA	1	INTEGRAL LED 4,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	35	38	SIMILAR TO A2 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
D1	HE WILLIAMS	4DR-L15-8-35-DIM-UNV-O-M-OF-WH-MWT-N-WE T/CC	PRESCOLITE LIGHTOLIER	1	INTEGRAL LED 1,500 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	18	20	NOMINAL 4"DIA x 5"H LED DOWNLIGHT, DIE-CAST ALUMINUM HOUSING WITH FORGED ALUMINUM HEAT SINK, DIE-CAST ALUMINUM LENSED TRIM, UNIVERSAL VOLTAGE DRIVER, UL LISTED FOR DRY AND DAMP LOCATIONS.	
D1E	HE WILLIAMS	4DR-L15-8-35-DIM-UNV-O-M-OF-WH-MWT-N-WE T/CC	PRESCOLITE LIGHTOLIER	1	INTEGRAL LED	277	0-10V	18	20	SIMILAR TO D1 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
D2	HE WILLIAMS	4DR-L15-8-35-DIM-UNV-O-M-OF-WH-MWT-N-WE T/CC	PRESCOLITE LIGHTOLIER	1	INTEGRAL LED	277	0-10V	18	20	SIMILAR TO D1 FOR GYP, CEILINGS	
D2E	HE WILLIAMS	4DR-L15-8-35-DIM-UNV-O-M-OF-WH-MWT-N-WE T/CC	PRESCOLITE LIGHTOLIER	1	INTEGRAL LED	277	0-10V	18	20	SIMILAR TO D2 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
DW1	WAC	WP-LEB529-30	-	2	INTEGRAL LED 1000 LM/HEAD 4000K 80 CRI	120	NON-DIMMING	30	34	STEM MOUNTED SIGN LIGHT WITH 60 DEGREE DUAL AIMABLE HEADS MOUNTED 2'-6" ABOVE CENTERLINE OF LETTERING	
G1	HE WILLILAMS	75S-4-L30-835-[VBY-2]-DIM-UNV	COLUMBIA UTOPIA	1	INTEGRAL LED 3,200 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	23	25	NOMINAL 3W" x 3"H x 4'L CHAIN HUNG OR SURFACE/WALL MOUNTED LED STRIP FIXTURE WITH COLD ROLLED STEEL HOUSING AND DIFFUSED ACRYLIC LENS. REFER TO PLANS FOR MOUNTING. WHITE POLYESTER POWDER COAT FINISH APPLIED AFTER FABRICATION OF ALL PARTS. UNIVERSAL VOLTAGE DRIVER. UL LISTED FOR DRY OR DAMP LOCATIONS.	
G1AB	HE WILLILAMS	75S-4-L30-835-[VBY-2]-DIM-UNV	COLUMBIA UTOPIA	1	INTEGRAL LED 3,200 LUMENS 3,500K 80 CRI	120	0-10V (STANDARD)	23	25	NOMINAL 3W" x 3"H x 4'L CHAIN HUNG OR SURFACE/WALL MOUNTED LED STRIP FIXTURE WITH COLD ROLLED STEEL HOUSING AND DIFFUSED ACRYLIC LENS. REFER TO PLANS FOR MOUNTING. WHITE POLYESTER POWDER COAT FINISH APPLIED AFTER FABRICATION OF ALL PARTS. UNIVERSAL VOLTAGE DRIVER. UL LISTED FOR DRY OR DAMP LOCATIONS.	
G1E	HE WILLILAMS	75S-4-L30-835-[VBY-2]-DIM-UNV	COLUMBIA UTOPIA	1	INTEGRAL LED	277	0-10V	23	25	SIMILAR TO G1 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
G1EB	HE WILLIAMS	75S-4-L30-835-[VBY-2]-DIM-UNV-EM/10WLP	COLUMBIA UTOPIA	1	INTEGRAL LED	277	0-10V	23	25	SIMILAR TO G1 WITH 10W EMERGENCY BATTERY PACK.	
G2	HE WILLIAMS	96-4-L40-8-HIAFR-DIM-UNV	COLUMBIA UTOPIA	1	INTEGRAL LED 4,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	30	33	NOMINAL 7-3/8W" x 4"H x 4'L CHAIN HUNG OR SURFACE/WALL MOUNTED FULLY SEALED AND GASKETED LED STRIP FIXTURE WITH FIBERGLASS AND ALUMINUM HOUSING, STAINLESS STEEL LATCHES, CLOSED-CELL POLYURETHANE GASKET, FROSTED AND RIBBED IMPACT RESISTANT ACRYLIC. POLYESTER POWDER COAT REFLECTOR, IP65, IP67 RATED, PAINTED AFTER FABRICATION, UNIVERSAL VOLTAGE DRIVER, UL LISTED FOR DRY AND DAMP LOCATION.	
G2E	HE WILLIAMS	96-4-L40-8-HIAFR-DIM-UNV	COLUMBIA UTOPIA	1	INTEGRAL LED 3,200 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	23	25	SIMILAR TO G2 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
G3	HE WILLILAMS	96-4-L81-8-HIAFR-DIM-UNIV	COLUMBIA UTOPIA	1	INTEGRAL LED 8000 LUMENS 3,500K 80 CRI	120	0-10V (STANDARD)	61	63	NOMINAL 7-3/8W" x 4"H x 4'L CHAIN HUNG OR SURFACE/WALL MOUNTED FULLY SEALED AND GASKETED LED STRIP FIXTURE WITH FIBERGLASS AND ALUMINUM HOUSING, STAINLESS STEEL LATCHES, CLOSED-CELL POLYURETHANE GASKET, FROSTED AND RIBBED IMPACT RESISTANT ACRYLIC. POLYESTER POWDER COAT REFLECTOR, IP65, IP66, IP67 RATED, PAINTED AFTER FABRICATION, UNIVERSAL VOLTAGE DRIVER, UL LISTED FOR DRY AND DAMP LOCATION.	
H1	HE WILLIAMS	GL-4-L150-8-35-VBY-2-DIM-UNV	COLUMBIA DAYBRITE	1	INTEGRAL LED 15,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	90	99	NOMINAL 14"W x 48"L x 4"H SUSPENDED HIGH-BAY INDUSTRIAL TROFFER , DIE-FORMED ALUMINUM HOUSING, WHITE POLYESTERDAY POWDER COAT, PAINTED AFTER FABRICATION, UNIVERSAL VOLTAGE DRIVER, UL DRY OR DAMP LOCATION LISTED.	
H1E	HE WILLIAMS	GL-4-L150-8-35-VBY-2-DIM-UNV	COLUMBIA DAYBRITE	1	INTEGRAL LED 15,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	90	99	SIMILAR TO H1 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
H2	HE WILLIAMS	PT-24-L90-8-35-RA	COLUMBIA DAYBRITE	1	INTEGRAL LED 15,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	71	74	2X4 LED RECESSED TROFFER	
H2E	HE WILLIAMS	PT-24-L90-8-35-RA	COLUMBIA DAYBRITE	1	INTEGRAL LED 15,000 LUMENS 3,500K 80 CRI	277	0-10V (STANDARD)	71	74	SIMILAR TO H2 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
P1-8	FOCAL POINT	FSM2BS-BWFL-500DN-250UP-35K-1C-UNV-LD1-C##-BKCD-WH-##	LUX, LITECONTROL	1	INTEGRAL LED 250 LUMENS UP 500 LUMENS DN 3500K 80 CRI	277	0-10V, 10%	60	66	NOMINAL 2-1/2"W x 4-1/2"H x 8'L LINEAR DIRECT/INDIRECT LED PENDANT, EXTRUDED ALUMINUM HOUSING FINISHED IN MATTE WHITE POWDER COAT OR AS SELECTED BY ARCHITECT FROM MANUFACTURER'S STANDARD OPTIONS, FROSTED ACRYLIC FLUSH SATIN LENSING DOWN, BATWING OPTICS UP	
P1E-8		-	LUX, LITECONTROL	1	-	277		60	66	SIMILAR TO P1-8 EXCEPT CONNECTED TO EMERGENCY GENERATOR	
S3-1	COOPER	GLEON-SA3B-740-U-SL3	LITHONIA DSX1 LED BEACON VIPER LSI	1	INTEGRAL LED 17,200 LUMENS 4,000K 80 CRI 416,000 HRS	480	NON-DIMMING	124	131	SINGLE HEAD SITE LIGHT FIXTURE. TYPE III WITH SPILL CONTROL DISTRIBUTION. EXTRUDED ALUMINUM DRIVER ENCLOSURE THERMALLY ISOLATED. HIGH-EFFICIENCY LED OPTICS. STANDARD ARM MOUNT WITH EXTRUDED ALUMINUM ARM WITH INTERNAL BOLT GUIDES. POWDER COATED HEAT SINK, BRONZE FINISH. 800mA DRIVER RATING. 5" SQUARE, 22' TALL STEEL POLE, DARK BRONZE FINISH WITH 2' ARM LENGTH AND VIBRATION DAMPENER.	
S4-1	COOPER	GLEON-SA3B-740-U-SL4	LITHONIA DSX1 LED BEACON VIPER LSI	1	INTEGRAL LED 16,500 LUMENS 4,000K 80 CRI 416,000 HRS	480	NON-DIMMING	124	131	SINGLE HEAD SITE LIGHT FIXTURE. TYPE IV WITH SPILL CONTROL DISTRIBUTION. EXTRUDED ALUMINUM DRIVER ENCLOSURE THERMALLY ISOLATED. HIGH-EFFICIENCY LED OPTICS. STANDARD ARM MOUNT WITH EXTRUDED ALUMINUM ARM WITH INTERNAL BOLT GUIDES. POWDER COATED HEAT SINK, BRONZE FINISH. 800mA DRIVER RATING. 5" SQUARE, 22' TALL STEEL POLE, DARK BRONZE FINISH WITH 2' ARM LENGTH AND VIBRATION DAMPENER.	
S4-2	COOPER	(2) GLEON-SA3B-740-U-SL4	LITHONIA DSX1 LED BEACON VIPER LSI	2	INTEGRAL LED 16,500 LUMENS 4,000K 80 CRI 416,000 HRS	480	NON-DIMMING	248	262	DUAL HEAD 180 DEGREE HEAD SITE LIGHT FIXTURE. TYPE IV WITH SPILL CONTROL DISTRIBUTION. EXTRUDED ALUMINUM DRIVER ENCLOSURE THERMALLY ISOLATED. HIGH-EFFICIENCY LED OPTICS. STANDARD ARM MOUNT WITH EXTRUDED ALUMINUM ARM WITH INTERNAL BOLT GUIDES. POWDER COATED HEAT SINK, BRONZE FINISH. 800mA DRIVER RATING. 5" SQUARE, 22' TALL STEEL POLE, DARK BRONZE FINISH WITH 2' ARM LENGTH AND VIBRATION DAMPENER.	
SC1	KIM LIGHTING	PGL8-SQ-128L-110-4K8-UNV-NXSP-30F	GARDCO	1	INTEGRAL LED 11,500 LUMENS 4,000K 80 CRI	277	NON-DIMMING	111	122	ARCHITECTURAL SURFACE MOUNTED GARAGE LIGHT. COORDINATE AND VERIFY MOUNTING METHOD REQUIRED PRIOR TO ORDERING. TWO-PIECE HINGED DIE-CAST ALUMINUM ENCLOSURE. INTEGRAL DIE-CAST ALUMINUM HEAT SINK AND PASSIVE LED THERMAL MANAGEMENT. TYPE V SQUARE DISTRIBUTION. CLEAR TEMPERED GLASS LENS. POLYESTER POWDER COAT FINISH. PROVIDED WITH UNIVERSAL VOLTAGE DRIVER. IP66 WET LOCATION LISTED.	
W1	MCGRAW-EDISON	IST-SA1-A-740-U-T4FT	GARDCO HUBBELL LITHONIA BEACON	1	INTEGRAL LED 2,530 LUMENS 4,000K 70 CRI	277	NON-DIMMING	20	21	NOMINAL 16-1/2" x 9"D x 7"H LED FULL CUTOFF WALL SCONCE DOWNLIGHT FIXTURE WITH SINGLE PIECE DIE-CAST ALUMINUM HOUSING. TYPE IV FORWARD THROW OPTICS WITH INTEGRAL UNIVERSAL VOLTAGE DRIVER. CONFIRM FINISH WITH ARCHITECT PRIOR TO ORDER. MOUNT FIXTURE +9' AFF TO BOTTOM OF FIXTURE. IP66 WET LOCATION LISTED.	
W1E	MCGRAW-EDISON	IST-SA1-A-740-U-T4FT	GARDCO HUBBELL LITHONIA BEACON	1	INTEGRAL LED 2,530 LUMENS 4,000K 70 CRI	277	NON-DIMMING	20	21	EXTERIOR WALL PACK. NOMINAL 16-1/2" x 9"D x 7"H LED FULL CUTOFF WALL SCONCE DOWNLIGHT FIXTURE WITH SINGLE PIECE DIE-CAST ALUMINUM HOUSING. TYPE IV FORWARD THROW OPTICS WITH INTEGRAL UNIVERSAL VOLTAGE DRIVER. CONFIRM FINISH WITH ARCHITECT PRIOR TO ORDER. MOUNT FIXTURE +9' AFF TO BOTTOM OF FIXTURE. IP66 WET LOCATION LISTED.	
W1EB	MCGRAW-EDISON	IST-SA1-A-740-U-T4FT-CBP	GARDCO HUBBELL LITHONIA BEACON	1	INTEGRAL LED 2,530 LUMENS 4,000K 70 CRI	277	NON-DIMMING	20	21	EXTERIOR WALL PACK WITH EMERGENCY BATTERY PACK. NOMINAL 16-1/2" x 9"D x 7"H LED FULL CUTOFF WALL SCONCE DOWNLIGHT FIXTURE WITH SINGLE PIECE DIE-CAST ALUMINUM HOUSING. TYPE IV FORWARD THROW OPTICS WITH INTEGRAL UNIVERSAL VOLTAGE DRIVER. CONFIRM FINISH WITH ARCHITECT PRIOR TO ORDER. INTEGRAL MOTION SENSOR, TO DIM FIXTURE TO 20% OUTPUT, WHEN AREA IS UNOCCUPIED FOR AT LEAST 10-MINUTES. MOUNT FIXTURE +9' AFF TO BOTTOM OF FIXTURE. IP66 WET LOCATION LISTED.	
WTL	HE WILLIAMS	AX2W-4-L33-8-40	LITECONTROL LEDALITE	1	INTEGRAL LED	277	0-10V	23	25	WALL MOUNTED LED TASK LIGHT, MOUNTED 7' AFF	
X1	EXITRONIX	902-R-LB-RM-BA	DUALITE EMERGILITE	1	INTEGRAL LED	277	NON-DIMMING	5	5	RECESSED CEILING, WALL, OR END MOUNT EDGE LIT LED EXIT SIGN. BRUSHED ALUMINUM TRIM FINISH WITH RED LETTERS ON MIRROR ACRYLIC PANEL. UNIVERSAL VOLTAGE 120/277 VAC OPERATION. CHEVRON ARROWS AS INDICATED ON DRAWINGS. WHERE SHOWN CEILING MOUNTED WITHOUT LAY-IN/GYP CEILING, PROVIDE PENDANT MOUNTING KIT TO MOUNT +9'-6" AFF TO TOP OF FIXTURE. UL 924 COMPLIANT, UL LISTED.	
X2	-	-	-	1	-	277	NON-DIMMING	5	5	SIMILAR TO X1 EXCEPT DOUBLE SIDED	
X3	EXITRONIX	QXT-R-WH-WG-S	DUALITE EMERGILITE	1	-	277	NON-DIMMING	5	5	UNIVERSAL MOUNT LED EXIT SIGN. THERMOPLASTIC HOUSING WITH RED LETTERS. UNIVERSAL VOLTAGE 120/277 VAC OPERATION. CHEVRON ARROWS AS INDICATED ON DRAWINGS. WHERE SHOWN CEILING MOUNTED WITHOUT LAY-IN/GYP CEILING, PROVIDE PENDANT MOUNTING KIT TO MOUNT +9'-6" AFF TO TOP OF FIXTURE. UL 924 COMPLIANT, UL LISTED.	

LIGHT FIXTURE SCHEDULE GENERAL NOTES:

A. VERIFY QUANTITIES, MODEL NUMBERS, AND DESCRIPTIONS WITH MANUFACTURER PRIOR TO PLACING ORDER.
B. VERIFY FINISH AND COLOR WITH ARCHITECT PRIOR TO PLACING ORDER.
C. REFER TO ARCHITECTURAL DRAWINGS AND DETAILS FOR EXACT LOCATIONS, MOUNTING HEIGHTS, AND ADDITIONAL MOUNTING INFORMATION. CONTACT ARCHITECT IMMEDIATELY IF THERE ARE DISCREPANCIES BETWEEN THE ARCHITECTURAL AND ELECTRICAL LIGHTING PLANS.
D. CATALOG NUMBERS SHALL NOT BE CONSIDERED COMPLETE AND MATERIAL SHALL NOT BE ORDERED BY THE MANUFACTURER AND CATALOG NUMBERS ONLY. FIRST READ THE COMPLETE DESCRIPTION, NOTES, AND SPECIFICATIONS IN CONJUNCTION WITH THE CATALOG NUMBER TO DETERMINE THE EXACT MATERIAL AND ACCESSORIES TO BE ORDERED. THE MANUFACTURERS LISTED ARE THE BASIS FOR THE DESIGN.
E. CONTRACTOR SHALL PROVIDE ALL LIGHT FIXTURES UNLESS NOTED OTHERWISE.
F. REFER TO DIVISION 26 SPECIFICATIONS FOR ACCEPTABLE LED AND RIVER MANUFACTURERS AND ADDITIONAL INFORMATION.
G. FOR DIMMABLE LIGHT FIXTURES, REFER TO DIVISION 26 SPECIFICATIONS FOR MORE INFORMATION REGARDING CONTROL WIRING AND COMPATIBILITY.

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EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: NS
DATE: 12.15.22 REVIEWED BY: HEI

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

01/24/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

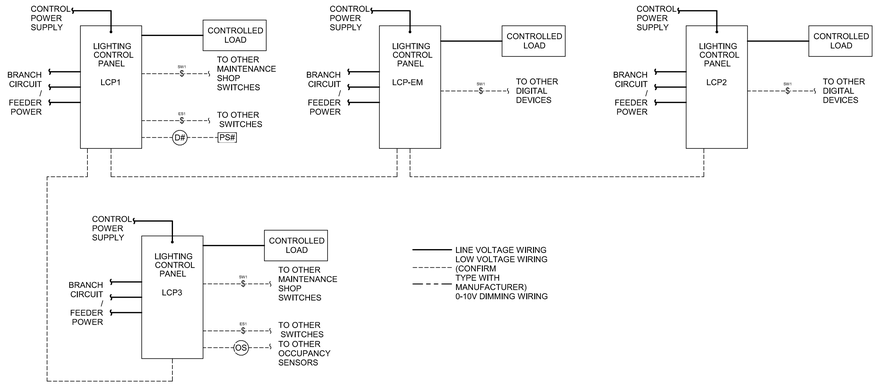
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

LIGHTING SCHEDULES

SHEET
E400

DOUGLAS M. EVERHART



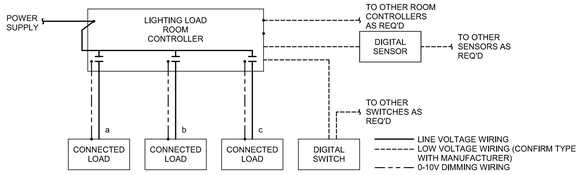
NOTES:

1. REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR DEVICE AND EQUIPMENT SPECIFICATIONS.
2. DETAIL IS DIAGRAMMATIC AND IS BASED ON LEGRAND. THIS REPRESENTS THE GENERAL SCOPE OF WORK AND LOCATION OF DEVICES IN RELATION TO EACH OTHER ALONG THE POWER CIRCUIT. DIAGRAMS MAY BE DIFFERENT FOR ALLOWED EQUIVALENT MANUFACTURERS. ELECTRICAL CONTRACTOR SHALL COORDINATE FULL SYSTEM REQUIREMENTS WITH SELECTED MANUFACTURER. PROVIDE ALL PARTS AND PIECES REQUIRED FOR A FULLY FUNCTIONAL SYSTEM. REFER TO FINAL APPROVED MANUFACTURER'S INSTALLATION INSTRUCTIONS AND WIRING DIAGRAMS FOR INSTALLATION.
3. CIRCUITING SHOWN ON PLAN(S) CORRESPONDS TO LIGHTING CONTROL INTENT. IF CIRCUITING IS FIELD-MODIFIED, ENSURE THAT SYSTEM PROGRAMMING WITH REVISED CIRCUITING MEETS ORIGINAL LIGHTING CONTROL INTENT. UPDATE LIGHTING CONTROL PANEL SCHEDULE(S) IN RECORD DRAWINGS. REFER TO LIGHTING CONTROL PANEL SCHEDULE(S) FOR MORE INFORMATION.
4. INTEGRAL TIMECLOCK SHALL BE ASTRONOMIC, PROGRAMMABLE WITH 7 DAY / HOLIDAY SCHEDULING, AND HAVE 24 HOUR BATTERY BACK-UP.
5. COORDINATE WITH OWNER FOR PROGRAMMABLE TIMECLOCK SCHEDULES. PROVIDE GENERAL CONTRACTOR WITH OPERATIONS MANUALS FOR ALL COMPONENTS OF LIGHTING CONTROL SYSTEM. LEAVE A TYPEWRITTEN SCHEDULE INCLUDING ANY FIELD CONDITION CHANGES IN EACH LIGHTING CONTROL PANEL DOOR.
6. PROVIDE SYSTEM PROGRAMMING AS REQUIRED FOR SYSTEM TO OPERATE PER THESE CONTRACT DOCUMENTS.
7. PROVIDE SYSTEM COMMISSIONING AS REQUIRED PER ENERGY CODE.

SITE VISITS:

1. CONTRACTOR IS RESPONSIBLE FOR COORDINATING ALL SITE VISITS WITH MANUFACTURER PER MANUFACTURER'S REQUIRED TIME FRAME.

1 LIGHTING CONTROL DIAGRAM
NONE

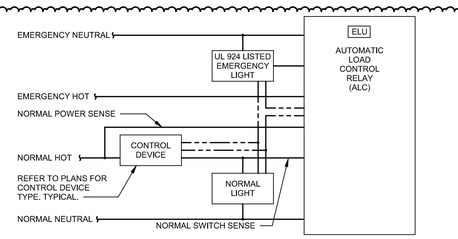


NOTES:

1. REFER TO LIGHTING CONTROL DEVICE SCHEDULE FOR DEVICE AND EQUIPMENT SPECIFICATIONS.
2. QUANTITY OF RELAYS SHOWN IS GENERIC. REFER TO PLANS, LIGHTING CONTROL DEVICE SCHEDULE, AND SHOP DRAWINGS FOR FINAL QUANTITY PER ROOM CONTROLLER.
3. DETAIL IS DIAGRAMMATIC AND IS BASED ON LEGRAND. THIS REPRESENTS THE GENERAL SCOPE OF WORK AND LOCATION OF DEVICES IN RELATION TO EACH OTHER ALONG THE POWER CIRCUIT. DIAGRAMS MAY BE DIFFERENT FOR ALLOWED EQUIVALENT MANUFACTURERS. ELECTRICAL CONTRACTOR SHALL COORDINATE FULL SYSTEM REQUIREMENTS WITH SELECTED MANUFACTURER. PROVIDE ALL PARTS AND PIECES REQUIRED FOR A FULLY FUNCTIONAL SYSTEM. REFER TO FINAL APPROVED MANUFACTURER'S INSTALLATION INSTRUCTIONS AND WIRING DIAGRAMS FOR INSTALLATION.
4. CIRCUITING SHOWN ON THE PLAN CORRESPONDS TO THE LIGHTING CONTROL INTENT. IF CIRCUITING IS CHANGED IN THE FIELD, ENSURE THAT SYSTEM PROGRAMMING WITH REVISED CIRCUITING MEETS THE ORIGINAL LIGHTING CONTROL INTENT. UPDATE LIGHTING CONTROL PANEL SCHEDULES IN RECORD DRAWINGS.
5. PROVIDE SYSTEM COMMISSIONING AS REQUIRED PER ENERGY CODE.

2 ROOM CONTROLLER DETAIL 2 ZONE - ON/OFF OR ON/OFF/0-10V DIMMING CONTROL
NONE

2



NOTES:

1. OPERATION: EMERGENCY AND NORMAL LIGHT FIXTURES ARE CONTROLLED TOGETHER. UPON NORMAL POWER LOSS, EMERGENCY LIGHT FIXTURES SHALL AUTOMATICALLY TURN ON TO FULL OUTPUT.
2. REFER TO SPECIFICATIONS FOR MORE INFORMATION. PROVIDE SUBMITTAL FOR ENGINEER'S REVIEW PRIOR TO PURCHASE.
3. LOCATE ALC WHERE ACCESSIBLE. REFER TO LIGHTING PLANS FOR MORE INFORMATION.
4. WIRING DETAIL IS DIAGRAMMATIC ONLY AND BASED ON LVS CONTROLS DEVICE. REFER TO MANUFACTURER'S INSTALLATION INSTRUCTIONS FOR SPECIFIC WIRING DIAGRAM.

EMERGENCY LIGHT FIXTURES MUST ALSO BE UL924 LISTED PER NEC 700.24.

3 (LOADS CONTROLLED TOGETHER) 0-10V AUTOMATIC LOAD CONTROL RELAY DETAIL
NTS

MULTI-BUTTON SWITCH SCHEDULE

**NOTE: PROVIDE FACTORY BUTTON ENGRAVING FOR ALL MULTI-BUTTON SWITCHES WITH MORE THAN ONE BUTTON UNLESS NOTED OTHERWISE. REFER TO BUTTON LABEL COLUMN FOR TEXT.

SWITCH	BUTTON	BUTTON LABEL	CONTROLLED LOAD	BUTTON OPERATION
SW1	1	GENERAL	ZONE A	ON
	2	GENERAL	ZONE A	OFF
	3	GENERAL	ZONE B	ON
	4	GENERAL	ZONE B	OFF
SW2	1	GENERAL	ZONE C	ON
	2	GENERAL	ZONE C	OFF
SW3	1	GENERAL	ZONE E	ON
	2	GENERAL	ZONE E	OFF
SW4	1	GENERAL	ZONE C	ON
	2	GENERAL	ZONE C	OFF
	3	GENERAL	ZONE D	ON
	4	GENERAL	ZONE D	OFF
SW5	1	GENERAL	ZONE C	ON
	2	GENERAL	ZONE C	OFF
	3	GENERAL	ZONE F	ON
	4	GENERAL	ZONE F	OFF
SW6	1	GENERAL	ZONE G	ON
	2	GENERAL	ZONE G	OFF
SW7	1	GENERAL	ZONE H	ON
	2	GENERAL	ZONE H	OFF
SW8	1	GENERAL	ZONE I	ON
	2	GENERAL	ZONE I	OFF
SW9	1	GENERAL	ZONE J	ON
	2	GENERAL	ZONE J	OFF
ES1	1	REAR EXT LTGS	ZONE EZ1	ON/OFF
	2	REAR EXT LTGS	ZONE EZ2	ON/OFF
	3	FRONT LTGS	ZONE EZ3	ON/OFF
	4	REAR CANOPY	ZONE EZ4	ON/OFF
ES2	1	REAR EXT LTGS	ZONE EZ1	ON/OFF
	2	REAR EXT LTGS	ZONE EZ2	ON/OFF
	3	FRONT LTGS	ZONE EZ3	ON/OFF
	4	REAR CANOPY	ZONE EZ4	ON/OFF

LIGHTING CONTROL PANEL SCHEDULE

PANEL NAME: LCP-EM — MOUNTING: SURFACE
LOCATION: ELECTRICAL ROOM — VOLTAGE: 277-480

RELAY	CIRCUIT	LOAD CONTROLLED	MODULE TYPE	LOAD (WATTS)	ZONE
1	LSF1-1	EXTERIOR WALL PACK - A	ON/OFF	252	EZ1
2	LSF1-1	EXTERIOR WALL PACK - B	ON/OFF	252	EZ2
3	LSF1-3	EXTERIOR CANOPY	ON/OFF	60	EZ3
4	LSF1-5	LTG - MAINTENANCE SHOP ZONE A	ON/OFF	360	A
5	LSF1-7	LTG - MAINTENANCE SHOP ZONE C	ON/OFF	270	C
6	LSF1-7	LTG - MAINTENANCE SHOP ZONE D	ON/OFF	180	D
7	LSF1-7	LTG - MAINTENANCE SHOP ZONE E	ON/OFF	90	E
8	LSF1-7	LTG - MAINTENANCE SHOP ZONE F	ON/OFF	180	F
9	LSF1-7	LTG - MAINTENANCE SHOP ZONE G	ON/OFF	360	G
10		SPARE			
11		SPARE			
12		SPARE			

2

NOTE: RELAY NUMBERING ON SCHEDULE IS INTENDED TO COMMUNICATE DESIGN INTENT AND IS FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING FINAL RELAY CONFIGURATION WITH LIGHTING CONTROL VENDOR AND FIELD CONDITIONS.

LIGHTING CONTROL PANEL NOTES

LIGHTING CONTROL PANEL SCHEDULE

PANEL NAME: LCP1 — MOUNTING: SURFACE
LOCATION: ELECTRICAL ROOM — VOLTAGE: 277-480

RELAY	CIRCUIT	LOAD CONTROLLED	MODULE TYPE	LOAD (WATTS)	ZONE
1	SBF1-17	LTG - MAINTENANCE SHOP ZONE A	ON/OFF	630	A
2	SBF1-17	LTG - MAINTENANCE SHOP ZONE B	ON/OFF	720	B
3	SBF1-19	LTG - MAINTENANCE SHOP ZONE C	ON/OFF	450	C
4	SBF1-19	LTG - MAINTENANCE SHOP ZONE D	ON/OFF	540	D
5	SBF1-19	LTG - MAINTENANCE SHOP ZONE E	ON/OFF	270	E
6	SBF1-19	LTG - MAINTENANCE SHOP ZONE F	ON/OFF	720	F
7	SBF1-21	LTG - MAINTENANCE SHOP ZONE G	ON/OFF	990	G
8		SPARE			
9		SPARE			
10	SBF1-1,3	SITE LIGHTING - FRONT PARKING LOT	ON/OFF	744	EZ3
11	SBF1-5	SITE LIGHTING - FRONT BUILDING WALL PACKS	ON/OFF	160	EZ3
12	SBF1-7	SITE LIGHTING - FRONT BUILDING CANOPY	ON/OFF	140	EZ3
13	SBF1-9	SITE LIGHTING - REAR CANOPY A	ON/OFF	610	EZ1
14	SBF1-9	SITE LIGHTING - REAR CANOPY B	ON/OFF	488	EZ2
15	SBF1-13,15	SITE PARKING - POLES EAST 1	ON/OFF	133	EZ1
16	SBF1-13,15	SITE PARKING - POLES EAST 2	ON/OFF	266	EZ2
17	SBFA-5	SITE - WALL WASHERS	ON/OFF	55	EZ3
18	SBFA-10	MECH FAN: ICF-1,2,3,4	ON/OFF	282	-
19	SBFA-12	MECH FAN: ICF-5,6,7,8	ON/OFF	282	-
20	SBFA-14	MECH FAN: ICF-9,10,11,12	ON/OFF	282	-
21		SPARE			-
22		SPARE			
23		SPARE			
24		SPARE			

NOTE: RELAY NUMBERING ON SCHEDULE IS INTENDED TO COMMUNICATE DESIGN INTENT AND IS FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING FINAL RELAY CONFIGURATION WITH LIGHTING CONTROL VENDOR AND FIELD CONDITIONS.

LIGHTING CONTROL PANEL NOTES

LIGHTING CONTROL PANEL SCHEDULE

PANEL NAME: LCP2 — MOUNTING: SURFACE
LOCATION: ELECTRICAL ROOM — VOLTAGE: 277-480

RELAY	CIRCUIT	LOAD CONTROLLED	MODULE TYPE	LOAD (WATTS)	ZONE
1	SBW1-1	BACK PARKING SITE CANOPY A	ON/OFF	304	EZ1
2	SBW1-1	BACK PARKING SITE CANOPY B	ON/OFF	182	EZ2
3,4	SBW1-3,5	BACK PARKING SITE POLES A	ON/OFF	1116	EZ1
5,6	SBW1-3,5	BACK PARKING SITE POLES B	ON/OFF	992	EZ2
7	SBW1-1	BACK PARKING SITE CANOPY B	ON/OFF	1464	EZ4
8		SPARE			

NOTE: RELAY NUMBERING ON SCHEDULE IS INTENDED TO COMMUNICATE DESIGN INTENT AND IS FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING FINAL RELAY CONFIGURATION WITH LIGHTING CONTROL VENDOR AND FIELD CONDITIONS.

LIGHTING CONTROL PANEL NOTES

LIGHTING CONTROL PANEL SCHEDULE

PANEL NAME: LCP3 — MOUNTING: SURFACE
LOCATION: ELECTRICAL ROOM — VOLTAGE: 277-480

RELAY	CIRCUIT	LOAD CONTROLLED	MODULE TYPE	LOAD (WATTS)	ZONE
1	SBA1-11	LTG - WATER SHOP	ON/OFF	325	H
2	SBA1-11	LTG - STREET SHOP MAINTENANCE	ON/OFF	175	I
3	SBA1-11	LTG - SIGN SHOP MAINTENANCE	ON/OFF	125	J
4		SPARE	ON/OFF		

NOTE: RELAY NUMBERING ON SCHEDULE IS INTENDED TO COMMUNICATE DESIGN INTENT AND IS FOR INFORMATIONAL PURPOSES ONLY. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING FINAL RELAY CONFIGURATION WITH LIGHTING CONTROL VENDOR AND FIELD CONDITIONS.

LIGHTING CONTROL PANEL NOTES

LIGHTING CONTROL SEQUENCE OF OPERATIONS

A. HOURS OF OPERATION

General Note: Confirm all timeclock schedules and sensor time delays with owner prior to final programming.

Occupied Hours: Mon-Sat 6:00 AM – 9:00 PM, Sun 8:00 AM – 7:00 PM
Business Hours: Mon-Sat 8:00 AM – 7:00 PM, Sun 10:00 AM – 5:00 PM

B. GENERAL REQUIREMENTS
1. Emergency Lighting: Emergency egress lighting is powered from generator/ats via dedicated emergency lighting panel. Upon loss of power, all lights designated as emergency shall turn on at full emergency output.

C. OPEN OFFICES/CONFERENCE ROOM/TRAINING ROOM/LARGE BREAK ROOM/WAREHOUSE/LARGE OFFICES
1. Timeclock: Space is networked to a room controller.
2. Manual Control: Occupant can manually turn lights on/off and adjust dimming level via local switch(es).
3. Occupancy: Lights shall automatically turn on to 50%. Occupant can then manually operate local switch to adjust dimming level of fixtures.
4. Vacancy: After 20 minutes, all controlled loads shall turn off.

D. CORRIDORS AND VESTIBULES
1. Timeclock: Space is networked to a room controller.
2. Manual Control: Occupant can manually turn lights on/off via local switch(es).
3. Occupancy: Lights shall automatically turn on to 100%.
4. Vacancy: After 20 minutes all controlled loads shall turn off.

E. RESTROOMS AND LOCKER ROOMS
1. Timeclock: Space is networked to a room controller.
2. Manual Control: Occupant can manually turn lights on/off via local switch(es).
3. Occupancy: Lights shall automatically turn on.
4. Vacancy: After 20 minutes all controlled loads shall turn off.

F. SMALL CLOSETS (<50 SF)/SMALL OFFICES
1. Timeclock: Space is stand-alone (not networked).
2. Manual Control: Occupant can manually control lights via local switch(es).
3. Occupancy: Occupant must manually turn on lights (and if applicable, controlled receptacles).
4. Vacancy: After 20 minutes, all controlled loads shall turn off.

G. ELECTRICAL / EQUIPMENT ROOMS
1. Timeclock: Space is stand-alone (not networked).
2. Manual Control: Occupant can manually control lights via local switch.

H. WATER SHOP/SIGN SHOP/ STREET SHOP
1. Timeclock: Space is networked to a central timeclock but is controlled locally.
2. Manual Control: Occupant can manually turn lights on/off via local switch(es).
3. Occupancy: Lights shall automatically turn on during occupied hours as determined by time clock schedule.
4. Vacancy: During occupied hours, after 20 minutes lights shall reduce to 50% minimum. During unoccupied hours, after 20 minutes all controlled loads shall turn off.

I. MAINTENANCE BAYS
1. Timeclock: Space is networked to a central timeclock but is controlled locally.
2. Manual Control: Occupant can manually turn lights on/off via local switch(es) for override for after hours operation when required.
3. Occupancy: Lights shall automatically turn on during occupied hours as determined by time clock schedule.
4. Vacancy: Lighting within bays shall turn off based on timeclock schedule.

J. SITE LIGHTING
1. Timeclock: Site lighting is networked to a central timeclock to turn on/off via time clock operation.
2. Manual Control: Occupant can manually turn lights on/off via exterior switch(es) for override for after hours operation when required via ES1 and ES2.
3. Occupancy: Lights shall automatically turn on during time clock schedule.

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CITY OF WENTZVILLE, MISSOURI
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PROJECT TEAM

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LIGHTING SCHEDULES

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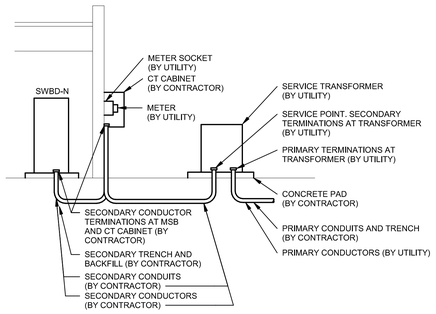
DOUGLAS M. EVERHART



4 UTILITY COORDINATION DETAIL
NONE

ELECTRICAL EQUIPMENT NAMING CONVENTION

TYPE
SWGR = SWITCHGEAR
SWBD = SWITCHBOARD
DP = DISTRIBUTION PANEL
PNL = BRANCH PANEL

BRANCH OF POWER
EM = EMERGENCY (COMBINED)
LS = LIFE SAFETY/EMERGENCY (NEC ART. 700)
SB = OPTIONAL STANDBY (NEC ART. 702)
N = NORMAL

BUILDING/AREA
A = ADMIN BUILDING
B = BRINE BUILDING
F = FLEET BUILDING
W = WASH BUILDING

VOLTAGE
1,2,3... = 480Y/277V
A,B,C... = 208Y/120V

ONE-LINE DIAGRAM GENERAL NOTES:

1. THE INFORMATION SHOWN IN THE SHORT-CIRCUIT AND VOLTAGE DROP CALCULATION SCHEDULE(S) ARE SHOWN FOR CALCULATION PURPOSES ONLY. CONTRACTOR SHALL NOT USE THE CONDUIT TYPES, CONDUCTOR TYPES, SIZES, QUANTITIES OR LENGTHS FOR TAKEOFFS OR BIDDING PURPOSES. CONTRACTOR SHALL NOTIFY ENGINEER OF ANY CONFLICTS BETWEEN THIS SCHEDULE AND OTHER PORTIONS OF THE CONSTRUCTION DOCUMENTS. CONTRACTOR SHALL NOTIFY ENGINEER OF AS-BUILT CONDITIONS THAT CONSTITUTE A CHANGE FROM WHAT IS SHOWN BELOW; THIS INCLUDES CONDUCTOR LENGTHS DIFFERING BY MORE THAN 10%.
2. REFER TO THE SHORT-CIRCUIT AND VOLTAGE DROP CALCULATIONS TABLE [ON THIS SHEET]. AVAILABLE FAULT CURRENT INFORMATION IS LISTED UNDER THE "FAULT CURRENT" COLUMN. VOLTAGE DROP VALUES ARE LISTED UNDER THE "CUMULATIVE VOLTAGE DROP" COLUMN. THE AIC/SCCR RATING OF THE EQUIPMENT SHALL NOT BE LESS THAN THE AVAILABLE 3-PHASE SYMMETRICAL FAULT CURRENT. ALL SERIES RATED EQUIPMENT SHALL BE PROPERLY LISTED AND LABELED PER CODE.
3. FEEDER NUMBER DESIGNATIONS PRECEDED BY "V" INDICATE THAT THE CONDUCTORS ARE UP-SIZED DUE TO VOLT-DROP CONSIDERATIONS. PROVIDE LUG ADAPTERS AS NEEDED IN ORDER TO PROPERLY LAND CONDUCTORS AT TERMINATION(S).
4. FEEDER SIZES ARE BASED ON COPPER (CU) THHN/THWN-2 INSULATION, UNLESS NOTED OTHERWISE. NUMBER DESIGNATIONS PRECEDED BY "A" INDICATE THAT THE SIZE IS BASED ON ALUMINUM (AL) WIRE. AL CONDUCTOR SIZES ARE BASED ON XHHW-2 INSULATION, UNLESS NOTED OTHERWISE. AL WIRE MAY BE SUBSTITUTED FOR CU FEEDERS AS ALLOWED BY CODE, SPECIFICATIONS AND OWNER, UNLESS NOTED OTHERWISE. AT CONTRACTOR'S OPTION, CU WIRE MAY BE SUBSTITUTED FOR AL, UNLESS NOTED OTHERWISE. ALL CONDUCTOR SIZES ARE BASED ON 75 DEG C RATED TERMINATIONS, UNLESS NOTED OTHERWISE. CONDUIT SIZES SHOWN ARE APPROPRIATE FOR SCHEDULE 40 PVC, EMT, GRS, IMC AND RMC; ADJUST SIZE AS NEEDED FOR OTHER RACEWAY TYPES. FOR ANY OTHER CONDITIONS MODIFY SIZES PER CODE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
5. BRANCH CIRCUIT SIZES ARE BASED ON COPPER (CU) THHN/THWN-2 INSULATION, UNLESS NOTED OTHERWISE. CONDUIT SIZES SHOWN ARE APPROPRIATE FOR SCHEDULE 40 PVC, EMT, GRS, IMC AND RMC; ADJUST SIZE AS NEEDED FOR OTHER RACEWAY TYPES. ALL CONDUCTOR SIZES ARE BASED ON 60 DEG C RATED TERMINATIONS, UNLESS NOTED OTHERWISE. FOR ANY OTHER CONDITIONS MODIFY SIZES PER CODE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
6. INSTALL FEEDERS OVERHEAD AS HIGH AS PRACTICABLE AND ORTHOGONALLY ALONG BUILDING STRUCTURE, UNLESS NOTED OTHERWISE. COORDINATE FINAL ROUTING WITH OTHER TRADES.
7. CIRCUIT BREAKERS RATED 1200A OR HIGHER SHALL HAVE APPROPRIATE DOCUMENTATION AND METHOD TO REDUCE CLEARING TIME IN ORDER TO REDUCE ARC FLASH ENERGY PER CODE. PROVIDE ELECTRONIC TRIP UNIT WITH INSTANTANEOUS TRIP AND ENERGY-REDUCING MAINTENANCE SWITCH WITH LOCAL STATUS INDICATOR FOR COMPLIANCE, UNLESS NOTED OTHERWISE. PROVIDE PROVISIONS TO INTERFACE WITH OWNER ALARM/MONITORING SYSTEM TO INDICATE STATUS.
8. FUSES RATED 1200A OR HIGHER SHALL HAVE APPROPRIATE DOCUMENTATION AND METHOD TO REDUCE CLEARING TIME IN ORDER TO REDUCE ARC FLASH ENERGY PER CODE. FUSES SHALL HAVE A CLEARING TIME OF .07 SECONDS OR LESS AT THE AVAILABLE ARCING CURRENT, OR ONE OF THE ALTERNATIVE, CODE ALLOWED MEANS SHALL BE PROVIDED TO REDUCE THE AVAILABLE ARCING CURRENT. REFER TO THE ONE-LINE DIAGRAM AND SPECIFICATIONS FOR MORE INFORMATION.
9. THIS FACILITY'S EMERGENCY SYSTEM RELIES ON A SINGLE ALTERNATE SOURCE OF BACK-UP POWER AND DOES NOT HAVE A PERMANENT SWITCHING MEANS TO CONNECT A PORTABLE OR TEMPORARY ALTERNATE SOURCE OF POWER. PROVIDE A PERMANENT LABEL NEARBY OR ON FRONT OF [EMERGENCY GENERATOR][INVERTER] EQUIPMENT ENCLOSURE; REFER TO SPECIFICATIONS FOR LABEL REQUIREMENTS. LABEL SHALL READ AS FOLLOWS:
"THIS EQUIPMENT SERVES AS THE ONLY ALTERNATE POWER SOURCE FOR THE EMERGENCY LIGHTING SYSTEM. THE BUILDING SHALL BE UNOCCUPIED AND THE FIRE SUPPRESSION SYSTEMS SHALL BE FULLY FUNCTIONAL FOR THE DURATION OF THE MAINTENANCE OR REPAIR OF THIS EMERGENCY EQUIPMENT."
10. PROVIDE A PERMANENT LABEL ON FRONT OF EQUIPMENT ENCLOSURE; REFER TO SPECIFICATIONS FOR LABEL REQUIREMENTS. LABEL SHALL READ AS FOLLOWS (INCLUDE RESPECTIVE NAMES IN BLANKS):

SERVICE EQUIPMENT LABEL:
LINE 1: NOMINAL VOLTAGE AND FREQUENCY IN HERTZ
LINE 2: SERVICE EQUIPMENT BUS RATING IN AMPS
LINE 3: SCCR OF SERVICE EQUIPMENT IN AMPS
LINE 4: MAXIMUM AVAILABLE FAULT CURRENT IN AMPS
LINE 5: DATE CALCULATED

EXAMPLE:
208Y/120V, 60HZ
800A
SCCR = 65,000A
MAX AVAILABLE FAULT CURRENT = 58,815A
CALCULATED: 01/01/2018

PANELBOARD/SWITCHBOARD LABEL:
LINE 1: PANELBOARD "_____" SUPPLIED BY UPSTREAM
LINE 2: PANELBOARD/SWITCHBOARD "_____"
LINE 3: LOCATED IN "_____"
LINE 4: PANELBOARD "_____" SUPPLIES DOWNSTREAM
LINE 5: PANELBOARD(S) "_____"

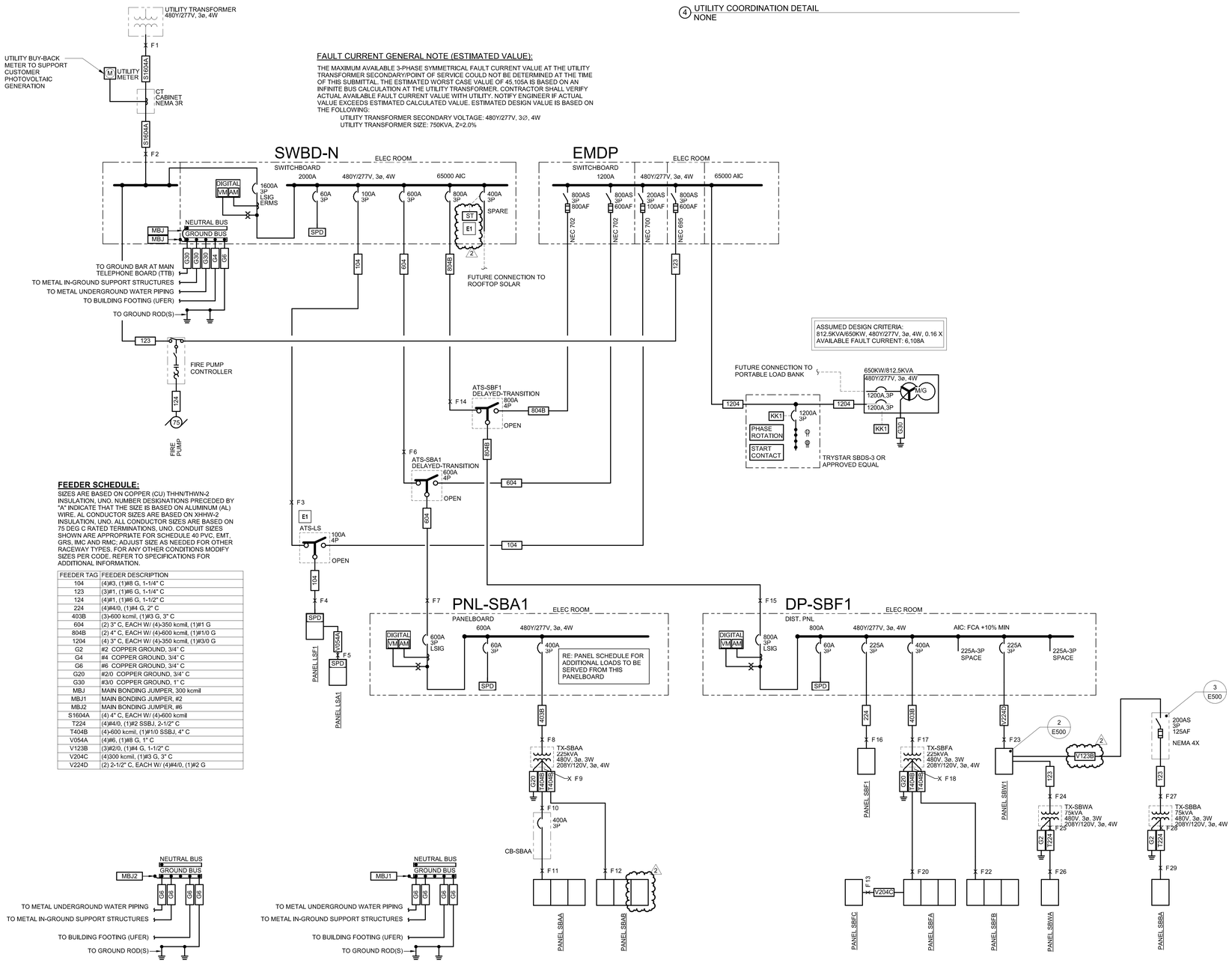
TRANSFORMERS LABEL:
LINE 1: TRANSFORMER "_____" SUPPLIED BY UPSTREAM
LINE 2: PANELBOARD/SWITCHBOARD "_____"
LINE 3: LOCATED IN "_____"
LINE 4: TRANSFORMER "_____" SUPPLIES DOWNSTREAM
LINE 5: PANELBOARD(S) "_____"

ONE-LINE DIAGRAM SUPPLEMENTAL SPECIFICATIONS:

1. GROUNDING ELECTRODE SYSTEM SHALL BE PER LOCAL REQUIREMENTS AND SHALL NOT BE LESS STRINGENT THAN THAT SPECIFIED IN THE CONSTRUCTION DOCUMENTS.
2. PROVIDE PROPERLY SIZED LUGS FOR ALL EQUIPMENT, CIRCUIT BREAKERS, AND OTHER ELECTRICAL DEVICES TO ACCOMMODATE INSTALLED CONDUCTORS. A LARGER FRAME, OVERSIZED LUGS OR NON-STANDARD PRODUCT MAY BE REQUIRED IN SOME INSTANCES. UTILIZE PIN ADAPTERS ONLY IF NECESSARY AND ONLY AS ALLOWED BY MANUFACTURER AND AHJ.
3. PROVIDE ANY AVAILABLE SPACE IN SWITCHBOARDS/PANELBOARDS WITH BUSSING.
4. PROVIDE (4) EMPTY 1" CONDUITS WITH PULL STRINGS FROM EACH RECESSED PANELBOARD UP TO ACCESSIBLE CEILING SPACE. CAP AND LABEL CONDUITS FOR FUTURE USE.
5. PROVIDE TYPED FINAL CIRCUIT DIRECTORY FOR ALL PANELBOARDS TO REFLECT ACTUAL AS-BUILT CONDITIONS. COORDINATE FINAL ROOM NAMES, NUMBERS AND DESCRIPTIONS WITH OWNER PRIOR TO COMPLETION. CIRCUIT DESCRIPTIONS SHALL BE PER CODE AND SHALL BE DISTINGUISHABLE FROM ALL OTHERS.

☐ ELECTRICAL PLAN NOTES:

E1 PROVIDE ADDITIONAL AUX CONTACTS AND WIRING TO SHUNT TRIP PV SOURCED CIRCUIT BREAKER IN SWBD-N UPON SENDING GENERATOR START SIGNAL.



ASSUMED DESIGN CRITERIA:
812.5KVA/650KW, 480Y/277V, 3ø, 4W, 0.16 X
AVAILABLE FAULT CURRENT: 6,108A

FAULT CURRENT GENERAL NOTE (ESTIMATED VALUE):

THE MAXIMUM AVAILABLE 3-PHASE SYMMETRICAL FAULT CURRENT VALUE AT THE UTILITY TRANSFORMER SECONDARY/POINT OF SERVICE COULD NOT BE DETERMINED AT THE TIME OF THIS SUBMITTAL. THE ESTIMATED WORST CASE VALUE OF 45,105A IS BASED ON AN INFINITE BUS CALCULATION AT THE UTILITY TRANSFORMER. CONTRACTOR SHALL VERIFY ACTUAL AVAILABLE FAULT CURRENT VALUE WITH UTILITY. NOTIFY ENGINEER IF ACTUAL VALUE EXCEEDS ESTIMATED CALCULATED VALUE. ESTIMATED DESIGN VALUE IS BASED ON THE FOLLOWING:
UTILITY TRANSFORMER SECONDARY VOLTAGE: 480Y/277V, 3Ø, 4W
UTILITY TRANSFORMER SIZE: 750KVA, Z=2.0%

FEEDER SCHEDULE:

SIZES ARE BASED ON COPPER (CU) THHN/THWN-2 INSULATION, UNO. NUMBER DESIGNATIONS PRECEDED BY "A" INDICATE THAT THE SIZE IS BASED ON ALUMINUM (AL) WIRE. AL CONDUCTOR SIZES ARE BASED ON XHHW-2 INSULATION, UNO. ALL CONDUCTOR SIZES ARE BASED ON 75 DEG C RATED TERMINATIONS, UNO. CONDUIT SIZES SHOWN ARE APPROPRIATE FOR SCHEDULE 40 PVC, EMT, GRS, IMC AND RMC; ADJUST SIZE AS NEEDED FOR OTHER RACEWAY TYPES. FOR ANY OTHER CONDITIONS MODIFY SIZES PER CODE. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

FEEDER TAG	FEEDER DESCRIPTION
104	(4)#3, (1)#8 G, 1-1/4" C
123	(3)#1, (1)#6 G, 1-1/4" C
124	(4)#1, (1)#6 G, 1-1/2" C
224	(4)#4/0, (1)#4 G, 2" C
403B	(3)-600 kcmil, (1)#3 G, 3" C
604	(2) 3" C, EACH W/ (4)-350 kcmil, (1)#1 G
804B	(2) 4" C, EACH W/ (4)-600 kcmil, (1)#1/0 G
1204	(4) 3" C, EACH W/ (4)-350 kcmil, (1)#3/0 G
G2	#2 COPPER GROUND, 3/4" C
G4	#4 COPPER GROUND, 3/4" C
G6	#6 COPPER GROUND, 3/4" C
G20	#2/0 COPPER GROUND, 3/4" C
G30	#3/0 COPPER GROUND, 1" C
MBJ	MAIN BONDING JUMPER, 300 kcmil
MBJ1	MAIN BONDING JUMPER, #2
MBJ2	MAIN BONDING JUMPER, #6
S1604A	(4) 4" C, EACH W/ (4)-600 kcmil
T224	(4)#4/0, (1)#2 SSBJ, 2-1/2" C
T404B	(4)-600 kcmil, (1)#1/0 SSBJ, 4" C
V054A	(4)#6, (1)#8 G, 1" C
V123B	(3)#2/0, (1)#4 G, 1-1/2" C
V204C	(4)300 kcmil, (1)#3 G, 3" C
V224D	(2) 2-1/2" C, EACH W/ (4)#4/0, (1)#2 G

3 ACCESSORIES BUILDING GROUNDING - TX-SBBA DISC
NTS

2 ACCESSORIES BUILDING GROUNDING - SBW1
NTS

1 ELECTRICAL ONE-LINE DIAGRAM
NTS

SERVICE LOAD SUMMARY (SWBD-N)

SERVICE OCCUPANCY: OFFICE BUILDING
SERVICE SQUARE FOOTAGE: 49000
SERVICE VOLTAGE: 480Y/277 V

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	143593 VA	0%	0 VA
HEATING (H)	185307 VA	100%	185307 VA
LIGHTING (L) (PER NEC-220)	171500 VA	125%	214375 VA
RECEPTACLES (R)	95714 VA	55%	52857 VA
MOTORS (M)	67342 VA	100%	67342 VA
SUPPLEMENTAL HEAT (U)	4900 VA	100%	4900 VA
MISC EQUIP (Z)	375102 VA	100%	375102 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	79811 VA	125%	99764 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA
TOTAL LOAD	1123269	VA	999647
TOTAL AMPACITY	1351	AMPS	1202
SERVICE AMPACITY		AMPS	1600
SPARE CAPACITY		AMPS	398

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EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: NS
DATE: 12.15.22 REVIEWED BY: HEI

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER
01/24/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY
PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

ELECTRICAL ONE-LINE DIAGRAM

SHEET
E500

DOUGLAS M. EVERHART

Short-Circuit and Voltage Drop Calculations

Version 2.12

Distances are for calculation purposes only and shall not be used for contractor takeoffs nor bidding - Contractor shall notify Engineer of any field condition that results in a change of 10% or greater circuit distance

The following calculations are based on the "Point-by-Point" method where:

ISC (2) = ISC(1) x M(1) M= 1/(1+f)

ISC (1) = short circuit current at fault point 1

ISC (2) = short circuit current at fault point 2

Feeder: f (3Ø) = 1.732 x L x Isc / C x E

Feeder: f (1Ø)= 2 x L x Isc / C x E

XFMR: f (3Ø) = IP(sca)x Vp x 1.73 x %Z / 100,000 x KVA

XFMR: f (1Ø)= IP(sca)x Vp x %Z / 100,000 x KVA

IS(sca)= Vp x M x IP(sca) / Vs

E = Line to line volts
IP = Primary short circuit current
Vp = Primary voltage
IS= Secondary short circuit current
Vs= Secondary voltage
L = Length of circuit
C = "C" Factor from Bussman table where "C" = 1 / impedance per linear foot

Feeder Types: NM - Non Magnetic Conduit, M - Magnetic Conduit, FB - Feeder Busway, PB - Plug-in Busway, TX - Transformer

VOLTAGE DROP (3Ø):
%VD = ((R x cos(arccos(pf)) + X x sin (arccos(pf))) x L/# x I x 1.73) / E
VOLTAGE DROP (1Ø):
%VD = ((R x cos(arccos(pf)) + X x sin(arccos(pf))) x 2 x L/# x I) / E

%VD CUM = Cumulative Voltage Drop from Fault Point 1 to Fault Point #
R = resistance in ohms per LF
X = reactances in ohms per LF

System Voltage: 480Y/277V - 3 phase

Date of Calculations: 12/06/2022

Fault Point (F#)	Bus/Feeder Description	Source (Fault Point)	Phase	Source Isc (amps)	Feeder: Conduit Type/ TX	Feeder: Material	Feeder: Quantity of Parallel Sets and Bus/ Phase & Neutral Size	Feeder: Conductor 'C' Value	Feeder: Busway 'C' Value	L-L Voltage (E)	Circuit Length (L)	Load Power Factor (pf)	Circuit Load (Amperage)	Conductor: Resistance (R)	Conductor: Reactance (X)	Conductor: Arccos (pf) (Radians)	Transformer: Type	Transformer: Degree Rise	Transformer: kVA	Transformer: New Xfmr Z	Transformer: Existing Xfmr Z	Transformer: Secondary Voltage	Transformer: Tap Setting	f	M	Fault Current (amps)	Voltage Drop (%VD)	Cumulative Voltage Drop (%VD)	Fault Point (F#)
1	Utility Service Point			45,105 at the secondary of the utility transformer																			Source Isc + 6X Motor Contribution =			48,945			1
	Motor Contribution			640 The connected full load motor amps (includes compressors) on the system																									
2	SWBD-N	1	3	48,945	M	CU	4 Set(s) of 600 kcmil	22965	--	480	70	0,9	1,000	0,000025	0,000048	0,451027								0,135	0,88	43,139	-0,27%	-0,27%	2
3	ATS-LS	2	3	43,139	M	CU	1 Set(s) of 3 AWG	4774	--	480	240	0,95	20	0,000250	0,000059	0,317560								7,826	0,11	4,888	-0,44%	-0,72%	3
4	PANEL LSF1	3	3	4,888	M	CU	1 Set(s) of 3 AWG	4774	--	480	10	0,95	20	0,000250	0,000059	0,317560								0,037	0,96	4,714	-0,02%	-0,74%	4
5	PANEL LSA1	4	3	4,714	M	CU	1 Set(s) of 6 AWG	2425	--	480	240	0,95	20	0,000490	0,000064	0,317560								1,683	0,37	1,757	-0,84%	-1,58%	5
6	ATS-SBA1	2	3	43,139	M	CU	2 Set(s) of 350 kcmil	19704	--	480	20	0,8	480	0,000039	0,000050	0,643501								0,079	0,93	39,981	-0,11%	-0,38%	6
7	PANEL SBA1	6	3	39,981	M	CU	2 Set(s) of 350 kcmil	19704	--	480	10	0,8	480	0,000039	0,000050	0,643501								0,037	0,96	38,569	-0,05%	-0,43%	7
8	PRIMARY TX-SBAA	7	3	38,569	M	CU	1 Set(s) of 600 kcmil	22965	--	480	20	0,8	480	0,000025	0,000048	0,643501								0,121	0,89	34,399	-0,17%	-0,60%	8
9	SECONDARY TX-SBAA	8	3	34,399	TX					480							DOE	150	225	4.29		208		5,453	0,15	12,302		-0,60%	9
10	CB-SBAA	9	3	12,302	M	CU	1 Set(s) of 600 kcmil	22965	--	208	20	0,7	240	0,000025	0,000048	0,795399								0,089	0,92	11,295	-0,21%	-0,81%	10
11	PANEL SBAA	10	3	11,295	M	CU	1 Set(s) of 600 kcmil	22965	--	208	120	0,7	240	0,000025	0,000048	0,795399								0,491	0,67	7,573	-1,24%	-2,05%	11
12	PANEL SBAB	9	3	12,302	M	CU	1 Set(s) of 600 kcmil	22965	--	208	20	0,7	200	0,000025	0,000048	0,795399								0,089	0,92	11,295	-0,17%	-0,77%	12
13	PANEL SBFC	20	3	10,395	M	CU	1 Set(s) of 300 kcmil	18177	--	208	185	0,7	100	0,000045	0,000051	0,795399								0,881	0,53	5,526	-1,05%	-2,76%	13
14	ATS-SBF1	2	3	43,139	M	CU	2 Set(s) of 600 kcmil	22965	--	480	240	0,9	550	0,000025	0,000048	0,451027								0,813	0,55	23,789	-1,03%	-1,31%	14
15	DP-SBF1	14	3	23,789	M	CU	2 Set(s) of 600 kcmil	22965	--	480	20	0,9	600	0,000025	0,000048	0,451027								0,037	0,96	22,932	-0,09%	-1,40%	15
16	PANEL SBF1	15	3	22,932	M	CU	1 Set(s) of 4/0 AWG	15082	--	480	20	0,9	150	0,000063	0,000051	0,451027								0,110	0,90	20,664	-0,09%	-1,49%	16
17	PRIMARY TX-SBFA	15	3	22,932	M	CU	1 Set(s) of 600 kcmil	22965	--	480	20	0,9	300	0,000025	0,000048	0,451027								0,072	0,93	21,390	-0,09%	-1,50%	17
18	SECONDARY TX-SBFA	17	3	21,390	TX					480							DOE	150	225	4.29		208		3,391	0,23	11,243		-1,50%	18
19	SPARE							--	--																				19
20	PANEL SBFA	18	3	11,243	M	CU	1 Set(s) of 600 kcmil	22965	--	208	20	0,9	300	0,000025	0,000048	0,451027								0,082	0,92	10,395	-0,22%	-1,71%	20
21	SPARE							--	--																				21
22	PANEL SBFB	18	3	11,243	M	CU	1 Set(s) of 600 kcmil	22965	--	208	20	0,9	300	0,000025	0,000048	0,451027								0,082	0,92	10,395	-0,22%	-1,71%	22
23	PANEL SBW1	15	3	22,932	M	CU	2 Set(s) of 4/0 AWG	15082	--	480	550	0,9	150	0,000063	0,000051	0,451027								1,509	0,40	9,141	-1,17%	-2,58%	23
24	PRIMARY TX-SBWA	23	3	9,141	M	CU	1 Set(s) of 1 AWG	7293	--	480	10	0,9	78	0,000160	0,000057	0,451027								0,045	0,96	8,745	-0,05%	-2,62%	24
25	SECONDARY TX-SBWA	24	3	8,745	TX					480							DOE	150	75	3,61		208		3,499	0,22	4,485		-2,62%	25
26	PANEL SBWA	25	3	4,485	M	CU	1 Set(s) of 4/0 AWG	15082	--	208	10	0,9	180	0,000063	0,000051	0,451027								0,025	0,98	4,377	-0,12%	-2,74%	26
27	PRIMARY TX-SBBA	23	3	9,141	M	CU	1 Set(s) of 2/0 AWG	10755	--	480	130	0,9	45	0,000100	0,000054	0,451027								0,399	0,71	6,535	-0,24%	-2,82%	27
28	SECONDARY TX-SBAA	27	3	6,535	TX					480							DOE	150	75	3,61		208		2,615	0,28	4,172		-2,82%	28
29	PANEL SBAA	28	3	4,172	M	CU	1 Set(s) of 4/0 AWG	15082	--	208	10	0,9	100	0,000063	0,000051	0,451027								0,023	0,98	4,078	-0,07%	-2,88%	29

GENERATOR LOAD SCHEDULE

GENERATOR TYPE:	**STATIONARY**
GENERATOR USAGE:	**STANDBY**
GENERATOR FUEL:	**DIESEL**
FUEL TANK LOCATION:	**SUB-BASE (BELLY TANK)**
OUTPUT VOLTAGE / HZ:	**480Y/277V, 60HZ**
GENERATOR LOCATION:	**EXTERIOR ON GRADE W/ SOUND ATTENUATION**
MAX AMBIENT AIR TEMP (°F):	**105 F**
ELEVATION AMSL (FT):	**1,000'**
MIN RUN-TIME W/ ON-SITE FUEL...	**36**
# OF GENSETS:	**BASIS OF DESIGN IS FOR 1 GENSET**

V2.00

ATS-#	LOAD STEP	PRIORITY	CODE CLASSIFIED LOAD TYPE: NEC ARTICLE 700 EMERGENCY	NEC ARTICLE 701 LEGALLY REQUIRED STANDBY	NEC ARTICLE 702 OPTIONAL STANDBY	LOAD DESCRIPTION	PANELBOARDS / LOADS INCLUDED IN STEP (INCLUDES DOWNSTREAM LOADS AND SUBPANELS)	MAX INSTANTANEOUS VOLTAGE DIP (%)	MAX FREQUENCY DIP (%)	FULL LOAD (RUNNING KVA): LIGHTING (LED)	COMPUTERS	INVERTER / UPS	FIRE PUMP (MOTOR)	ELEVATOR (MOTOR)	ELEC HEATING (RESISTIVE)	HVAC (MOTORS)	REFRIGERATION (MOTORS)	MISC MOTORS	WELDING EQUIPMENT	RECEPTACLES	MISC / OTHER	125% OF EXISTING PEAK LOAD	FUTURE LOAD	FULL LOAD (KVA)	NOTES (#)
ATS-LS	**1**	**1.1**	**X**			**EMERGENCY LIGHTING**		**20**	**20**	**4.9**													**5**	**3**
FIRE PUMP	**2**	**1.1**	**X**			**FIRE PUMP CONTROLLER**		**15**	**15**				**72.5**										**73**	**2,6**
ATS-SBF 1	**3**	**2.1**			**X**	**FLEET MAINTENANCE**		**15**	**15**	**14.7**	**28**	**2**			**20**	**36.3**	**3.4**	**69.8**	**27**		**100**		**301**	**1,4**
ATS-SB A1	**4**	**3.1**			**X**	**OFFICE AREA**		**15**	**15**	**8.4**	**33.5**	**2**			**73.8**		**53**	**23.4**		**20**	**25**		**239**	**1,5**
																						MAXIMUM FULL LOAD (KVA):	**618**	

GENERAL NOTES:

A. THE INFORMATION PROVIDED IN THIS SCHEDULE IS PRELIMINARY AND SUBJECT TO CHANGE. IT IS PROVIDED TO ASSIST IN GENERATOR SIZING AND SELECTION. THIS INFORMATION NEITHER EXTENDS NOR ALTERS ANY CONTRACTUAL OBLIGATIONS OF THE ENGINEER OR CONTRACTOR. FINAL LOADS AND RELATED INFORMATION IN THIS SCHEDULE SHOULD BE VERIFIED BY THE CONTRACTOR AND IS SUBJECT TO THE REVIEW AND APPROVAL OF THE ENGINEER OF RECORD, AUTHORITY HAVING JURISDICTION AND OWNER, PRIOR TO IMPLEMENTATION. REFER TO ONE-LINE/RISER DIAGRAM FOR TRANSFER SWITCH AND GROUNDING INFORMATION. REFER TO RELATED CONSTRUCTION DOCUMENTS INCLUDING SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

B. UNLESS NOTED OTHERWISE, PER NEC, 700.4, 701.4 & 702.4, THE GENERATOR SYSTEM CAPACITY SHALL BE CALCULATED IN ACCORDANCE WITH NEC 220 OR OTHER APPROVED METHOD. NOTE THAT THE ACTUAL PEAK LOAD MAY BE SIGNIFICANTLY LESS THAN THIS CODE MINIMUM VALUE UNDER MOST CONDITIONS. IN ADDITION, THE LOADS SHOWN IN THIS SCHEDULE ARE BASED ON RUNNING FULL LOAD CURRENTS AT NOMINAL VOLTAGES AND DO NOT ACCOUNT FOR TEMPORARY STARTING IN-RUSH CURRENTS.

C. THE FINAL GENERATOR SIZING SHALL BE PERFORMED BY AN APPROVED GENERATOR MANUFACTURER OR REPRESENTATIVE AND SUBMITTED TO THE ENGINEER FOR REVIEW AND APPROVAL PRIOR TO ORDER. GENERATOR SUPPLIER SHALL BE RESPONSIBLE TO INCLUDE WITH GENERATOR PACKAGE ALL NECESSARY COMPONENTS, INCLUDING: ALTERNATOR, BATTERY CHARGER, CONTROL PANEL, EMISSION/EXHAUST SYSTEM, ENCLOSURE, FUEL TANK, GAUGES AND STARTER IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL REQUIREMENTS. GENERATOR SET AND RELATED COMPONENTS SHALL BE SUITABLE FOR LOCAL ELEVATION, ENVIRONMENT AND SEISMIC DESIGN CATEGORY. DE-RATE GENERATOR AND PROVIDE NECESSARY COMPONENTS AS NEEDED BASED ON AMBIENT TEMPERATURE, ELEVATION AND OTHER RELEVANT FACTORS.

D. IF TRANSIENT RESPONSE REQUIREMENTS CANNOT BE REASONABLY MET WITH AVAILABLE PRODUCT OFFERINGS THEN PROVIDE SUBMITTAL WITH BEST FIT FOR ENGINEER EVALUATION. REFER TO SPECIFICATIONS FOR ALLOWED STEADY-STATE TOLERANCES.

E. MAXIMUM TIME DELAY FOR NEC ARTICLE 700 EMERGENCY LOADS IS 10 SECONDS, MAXIMUM TIME DELAY FOR LEGALLY REQUIRED STANDBY LOADS IS 60 SECONDS, UNLESS NOTED OTHERWISE.

F. MAXIMUM RECOVERY TIME SHALL NOT EXCEED 3 SECONDS, UNLESS NOTED OTHERWISE.

G. LOADS LISTED ABOVE ARE BASED ON A POWER FACTOR NO LESS THAN 0.80, UNLESS NOTED OTHERWISE.

NOTES:

1. AS ALLOWED PER NEC 702.4, AN ACTIVE LOAD MANAGEMENT SYSTEM SHALL BE INSTALLED TO AUTOMATICALLY MANAGE THE CONNECTED LOAD. THE STANDBY SOURCE SHALL HAVE CAPACITY SUFFICIENT TO SUPPLY THE MAXIMUM LOAD THAT WILL BE CONNECTED. LOADS ON THIS STEP SHALL DISCONNECT FROM STANDBY SOURCE IF INSUFFICIENT CAPACITY IS AVAILABLE.
2. SYSTEM SHALL COMPLY WITH NEC 695 FOR FIRE PUMPS.
3. THE MAJORITY OF THIS LOAD IS NON-LINEAR.
4. THIS STEP INCLUDES (2) 7.5-HP AHU MOTORS WITH VFD STARTER, 10-HP ACROSS-THE-LINE LIFT MOTOR, (2) 25-HP ACROSS-THE-LINE SHOP AIR COMPRESSOR MOTORS, AND 5-HP ACROSS-THE-LINE BRINE AIR COMPRESSOR.
5. THIS STEP INCLUDES (2) 7.5-HP DOMESTIC WATER BOOSTER PUMP MOTORS WITH VFD STARTER.
6. THIS STEP INCLUDES 75-HP FIRE PUMP WITH WYE-DELTA STARTER.
7. PROVIDE SUBMITTAL INFORMATION AND PRICING FOR SUB-BASE FUEL TANK WITH ON-SITE FUEL STORAGE FOR INDICATED MINIMUM RUN TIME AT FULL RATED LOAD.
8. PROVIDE WEATHERPROOF SOUND-ATTENUATED ENCLOSURE TO LIMIT MAXIMUM OPERATIONAL SOUND OUTPUT TO 70 d(B)A AT 23' FROM ENCLOSURE.
9. PROVIDE WITH ENCLOSURE WIND RATED TO 120 MPH.
10. GENERATOR SHALL COMPLY WITH EPA EMISSION STANDARDS FOR EMERGENCY (STAND-BY) APPLICATIONS.

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EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: Author
DATE: 12.15.22 REVIEWED BY: Checker

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

01/24/2023

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LICENSE # PE-2019007648

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
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WENTZVILLE, MO 63385

ELECTRICAL SCHEDULES

SHEET
E502

DOUGLAS M. EVERHART

PANELBOARD: SBA1 (NEW)

BUS AMPS: 600A
MAIN SIZE/TYPE: 600A MCB
VOLTS/PHASE: 480Y/277 V 3P/4W
SUPPLIED BY: SWBD-N

FAULT CURRENT: REFER TO SHORT CIRCUIT TABLE ON SHEET E502
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: GENRAL POWER
MOUNTING: SURFACE
LOCATION: ELECTRICAL 131

EQUIPMENT GROUND BUS
LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	BKR AMP	P	PHASE A		PHASE B		PHASE C		P	BKR AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1	LTG - WATER SHOP/OPEN OFF	L		12	20	1	2040	3200					2	20	12		H	PWR - VAV 3	2
3	LTG - A WING ROOMS (1)	L		12	20	1			1884	3200									4
5	LTG - A WING ROOMS (2)	L		12	20	1					1858	2250	2	20	12		H	PWR - VAV 21	6
7	LTG - B WING ROOMS (1)	L		12	20	1	1915	2250											8
9	SPARE				20	1			0	2200			2	15	12		H	PWR - VAV 11	10
11	LTG - WATER/SIGN/STREET	L		12	20	1					650	2200							12
13	SPARE				20	1	0	2533											14
15	SPARE				20	1			0	2533			3	20	12		H	PWR - VAV 12	16
17	PWR - VAV 1,2	H		12	15	1					1900	2533							18
19	PWR - VAV 4	H		12	15	1	1500	3667											20
21	PWR - VAV 5,6	H		12	15	1			2900	3667			3	40	8	VD	M	PWR - BP	22
23	PWR - VAV 7,8	H		12	15	1					2500	3667							24
25	PWR - VAV 9,10	H		12	15	1	1900	776											26
27	PWR - VAV 13,16	H		12	15	1			2900	776			3	15	12		M	JOCKEY PUMP CTRL	28
29	PWR - VAV 14	H		12	15	1					1400	776							30
31	PWR - VAV 15	H		12	20	1	3400	0					1	20				SPARE	32
33	PWR - VAV 17,18	H		12	15	1			2500	0			1	20				SPARE	34
35	PWR - VAV 19	H		12	15	1					1900	0	1	20				SPARE	36
37	PWR - VAV 20	H		12	20	1	3800	0					1					SPACE FOR BREAKER	38
39	PWR - VAV 22	H		12	15	1			900	0			1					SPACE FOR BREAKER	40
41	PWR - VAV 23	H		12	15	1					1500	42234							42
43	PWR - VAV 24	H	VD	10	20	1	3400	42234					3	175	2/0		C	MECH PWR - RTU 1	44
45	PWR - VAV 25	H	VD	8	25	1			5000	42234									46
47	PWR - VAV 26,27,28	H		12	15	1					1500	0	1					SPACE FOR BREAKER	48
49	SPARE				20	1	0	0					1					SPACE FOR BREAKER	50
51	SPARE				20	1			0	48758									52
53	SPARE				20	1					0	47417	3	400	OL		--	TX-SBAA	54
55	SPARE				20	1	0	47349											56
57	SPARE				20	1			0	0			1					SPACE FOR BREAKER	58
59	SPARE				20	1					0	0	1					SPACE FOR BREAKER	60
				TOTAL LOAD (VA):			119964 VA		119452 VA		114284 VA								
				TOTAL AMPS:			436 A		434 A		413 A								

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	139641 VA	100%	139641 VA
HEATING (H)	82300 VA	0%	0 VA
LIGHTING (L)	8347 VA	125%	10434 VA
RECEPTACLES (R)	58610 VA	59%	34305 VA
MOTORS (M)	6264 VA	100%	6264 VA
SUPPLEMENTAL HEAT (U)	0 VA	100%	0 VA
MISC EQUIP (Z)	49971 VA	100%	49971 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	11000 VA	125%	13750 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS	
TOTAL CONNECTED LOAD	356133 VA
TOTAL NEC LOAD	254365 VA
TOTAL CONNECTED CURRENT	428 A
TOTAL NEC DEMAND CURRENT	306 A

PANELBOARD: SBAA (NEW)

BUS AMPS: 400A
MAIN SIZE/TYPE: 400A MCB
VOLTS/PHASE: 208Y/120 V 3P/4W
SUPPLIED BY: SBA1 VIA TX-SBAA

FAULT CURRENT: REFER TO SHORT CIRCUIT TABLE ON SHEET E502
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: GENERAL BUILDING POWER
MOUNTING: RECESSED
LOCATION: CORRIDOR 106

EQUIPMENT GROUND BUS
LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	BKR AMP	P	PHASE A		PHASE B		PHASE C		P	BKR AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1	RCPT - FOREMAN 207-209	R		12	20	1	540	1080					1	20	12		R	RCPT - PW DIRC 110	2
3	RCPT - GIS 206	R	VD	10	20	1			900	720			1	20	12		R	RCPT - TRAF/SCADA 109 (1)	4
5	RCPT - WATER SUPV 205	R	VD	10	20	1					900	540	1	20	12		R	RCPT - TRAF/SCADA 109 (2)	6
7	RCPT - WATER SUPV 204	R		12	20	1	720	720					1	20	12		R	RCPT - RR 107/215	8
9	RCPT - ADMIN 203	R		12	20	1			900	373			1	20	12		M	PWR - EF4	10
11	RCPT - ADMIN 203	R		12	20	1					540	720	1	20	12		R	RCPT - CUST ADMIN 117	12
13	RCPT - WATER SUPV 202	R		12	20	1	900	900					1	20	12		R	RCPT - ASST DIR PW 113	14
15	RCPT - WATER SUPV 201	R		12	20	1			900	720			1	20	12		R	RCPT - DIR PW 114	16
17	RCPT - OPEN OFF 211 (1)	R		10	20	1					900	1440	1	20	12		R	RCPT - CONF 115	18
19	RCPT - OPEN OFF 211 (2)	R		12	20	1	900	360					1	20	12		R	RCPT - CONF 115 FB	20
21	OFFICE 211 FURN WHIP 1	R		12	20	1			900	720			1	20	12		R	RCPT - WELLNESS 123	22
23	OFFICE 211 FURN WHIP 2	R		12	20	1					900	360	1	20	12		R	RCPT - WELLNESS 123 COUNTER	24
25	OFFICE 211 FURN WHIP 3	R		12	20	1	900	1200					1	20	12		Z	WELLNESS 123 MICR	26
27	OFFICE 211 FURN WHIP 4	R		12	20	1			900	600			1	20	12		Z	WELLNESS 123 FRIDGE	28
29	OFFICE 211 FURN WHIP 5	R		12	20	1					900	360	1	20	12		R	CORRIDOR 116 COUNTER	30
31	OFFICE 211 FURN WHIP 6	R		12	20	1	900	600					1	20	12		Z	CORRIDOR 116 FRIDGE	32
33	OFFICE 211 MICROWAVE	Z		12	20	1			1200	1200			1	20	12		Z	CORRIDOR 116 MICRO	34
35	OFFICE 211 FRIDGE	Z		12	20	1					1200	360	1	20	12		R	RCPT - CORR 116 COUNTER	36
37	OFFICE 211 COUNTER RCPT	R		12	20	1	360	1000					1	20	12		Z	CORRIDOR 116 COPIER	38
39	OFFICE 211 COPIER	Z	VD	10	20	1			1200	540			1	20	12		R	RCPT - CORR 116 GEN	40
41	PWR - TV MONITOR	R		12	20	1					360	590	1	20	12		R	RCPT - RR/LCK 125/126	42
43	RCPT - UNISEX LCK 126	R		12	20	1	540	180					1	20	12	GF	R	EWC - UNISEX LCK 126	44
45	ICE MACHINE - LCK RM 126	Z		10	20	1			1400	900			1	20	12		R	RCPT - CONF 102	46
47	RCPT - CONF 102 FB	R		12	20	1					360	720	1	20	12		R	RCPT - CORR 105	48
49	RCPT - TRAIN RM 119	R		12	20	1	900	1200					1	20	12		Z	PWR - VEST 100 DR (1)	50
51	TRAIN RM 119 FB (1-3)	R		12	20	1			900	1200			1	20	12		Z	PWR - VEST 100 DR (2)	52
53	TRAIN RM 119 FB (4-6)	R		12	20	1					900	1080	1	20	10	VD	R	RCPT - WATER SHOP 217	54
55	TRAIN RM 119 FB (7-9)	R		12	20	1	360	500					1	20	12		Z	PWR - DOOR CHIME	56
57	PWR - VEST 100 DR TX	Z		12	20	1			500	720			1	20	12		R	RCPT - EXTERIOR WALL	58
59	TRAIN RM 119 COUNTER 1	R		12	20	1					780	960	1	20	10		Z	TABLE - GEN RCPT	60
61	TRAIN RM 119 COUNTER 2	R		12	20	1	180	500					1	20	12		Z	PWR - DR CARD READERS	62
63	TRAIN RM 119 FRIDGE	Z		12	20	1			1200	360			1	20	12		R	PWR - IT RM RCPT 1	64
65	TRAIN RM 119 MICRO.	Z		12	20	1					900	360	1	20	12		R	PWR - IT RM RCPT 2	66
67	RCPT - BREAK RM 120	R		12	20	1	900	360					1	20	12		R	PWR - IT RM RCPT 3	68
69	RCPT - BREAK RM 120 COUNTER 1	R		12	20	1			360	1600			1	20	12		Z	PWR - WASHER	70
71	RCPT - BREAK RM 120 COUNTER 2	R		12	20	1					360	2080	2	30	10		Z	PWR - DRYER	72
73	PWR - BREAK RM DISHWASH	Z		12	20	1	600	2080											74
75	PWR - BREAK RM FRIDGE 1	Z		12	20	1			600	0			1	20				SPARE	76
77	PWR - BREAK RM MICRO W	Z		12	20	1					1200	0	1	20				SPARE	78
79	PWR - BREAK RM MICRO E	Z		12	20	1	1200	720					1	20	12		R	RCPT - FOREMAN 207-209	80
81	RCPT - BREAK RM 120 COUNTER 3	R		12	20	1			180	0			1	20				SPARE	82
83	RCPT - CORR 106	R		12	20	1					360	0	1	20				SPARE	84
85	PWR - BREAK RM DISPOSER	Z		12	20	1	600	0					1	20				SPARE	86
87	SPARE				20	1			0	0			1	20				SPARE	88
89	PWR - BREAK RM FRIDGE 2	Z	VD	10	20	1					1200	0	1	20				SPARE	90
91	80201 - AIR COMPRESSOR	Z	VD	6	40	2	3203	960					1	20	10	VD	Z	TABLE - GEN RCPT 1	92
93									3203	960			1	20	8	VD	Z	2608 - DRILL PRESS	94
95	2692 - SAW CUTOFF	Z	VD	6	20	1					1800	360	1	20	12		R	PWR - AV RACK	96
97	2875 - GRINDER/BUFFER	Z		12	20	1	552	0					1	20				SPARE	98
99	PWR - UH2	H	VD	10	20	2			1500	0			1	20				SPARE	100
101											1500	1216	2	30	10		C M	PWR - CU5	102
103	PWR - CUH1	H		10	30	2	2000	1216											104
105									2000	74			1	20	12		M	PWR - EF5	106
107	PWR - UH1	H	VD	10	20	2					1500	0	1	20				SPARE	108
109							1500	0					1					EQUIPPED SPACE	110
111	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	112
113	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	114
115	EQUIPPED SPACE					1	0	0					1					EQUIPPED SPACE	116
117	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	118
119	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	120
121	EQUIPPED SPACE					1	0	0					1					EQUIPPED SPACE	122
123	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	124
125	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	126
				TOTAL LOAD (VA):			31331 VA		29430 VA		27706 VA								
				TOTAL AMPS:			263 A		247 A		231 A								

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	4719 VA	0%	0 VA
HEATING (H)	10000 VA	100%	10000 VA
LIGHTING (L)	0 VA	125%	0 VA
RECEPTACLES (R)	37190 VA	63%	23595 VA
MOTORS (M)	218 VA	100%	218 VA
SUPPLEMENTAL HEAT (U)	0 VA	100%	0 VA
MISC EQUIP (Z)	38399 VA	100%	38399 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	373 VA	125%	466 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS	
TOTAL CONNECTED LOAD	90899 VA
TOTAL NEC LOAD	72678 VA
TOTAL CONNECTED CURRENT	252 A
TOTAL NEC DEMAND CURRENT	202 A

PANELBOARD: SBAB (NEW)

BUS AMPS: 400A
MAIN SIZE/TYPE: 400A MCB
VOLTS/PHASE: 208Y/120 V 3P/4W
SUPPLIED BY: SBA1 VIA TX-SBAA

FAULT CURRENT: REFER TO SHORT CIRCUIT TABLE ON SHEET E502
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: GENERAL BUILDING POWER
MOUNTING: SURFACE
LOCATION: ELECTRICAL 131

EQUIPMENT GROUND BUS
LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	BKR AMP	P	PHASE A		PHASE B		PHASE C		P	BKR AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1	RCPT - SUPV STREET 303	R		12	20	1	900	1080					1	20	10	VD	R	OFFICE 309 FURN WHIP 1	2
3	PWR - EF3	M		12	20	1			127	360			1	20	12		R	RCPT - DATA RM 132	4
5	RCPT - DATA RM 132	R	LO	12	20	1					360	540	1	20	12		R	OFFICE 309 FURN WHIP 3	6
7	RCPT - LOBBY 129/VEST 130	R		12	20	1	540	720					1	20	10	VD	R	OFFICE 310 FURN WHIP 1	8
9	RCPT - MECH RM 133	R		12	20	1			540	720			1	20	10	VD	R	OFFICE 310 FURN WHIP 2	10
11	RCPT - DATA RM 132	R		12	20	1					720	720	1	20	10	VD	R	OFFICE 310 FURN WHIP 3	12
13	RCPT - SUPT SIGNAL 302	R		12	20	1	900	720					1	20	10	VD	R	OFFICE 310 FURN WHIP 4	14
15	PWR - EPO SWITCH	Z		12	20	1			0	1000			1	20	10	VD	Z	OFFICE 309 COPIER	16
17	RCPT - SUPV STREET 304	R		12	20	1					900	1000	1	20	10	VD	Z	OFFICE 310 FRIDGE	18
19	RCPT - SUPV STREET 305	R		12	20	1	900	1200					1	20	10	VD	Z	OFFICE 310 MICRO	20
21	RCPT - FOREMAN 306/307	R		12	20	1			1080	360			1	20	12		R	OFFICE 310 COUNTER 1	22
23	RCPT - FOREMAN 315/316	R	VD	10	20	1					1080	180	1	20	12		R	OFFICE 310 COUNTER 2	24
25	RCPT - LCK RM 311	R		12	20	1	360	720					1	20	10	VD	Z	OFFICE 314 FURN WHIP 1	26
27	PWR - EF2	M		12	20	1			74	0			1	20				SPARE	28
29	RCPT - RR 312/313	R		12	20	1					540	300	1	20	12		Z	PWR - DR CARD READERS	30
31	RCPT - SHOP 307	R		12	20	1	900	720					1	20	12		R	RCPT - STREET STOR 318	32
33	RCPT - OFFICE 310 GEN	R		12	20	1			540	3203			2	40	8	VD	Z	80201 - AIR COMPRESSOR	34
35	TABLE - GEN RCPT (1)	R		12	20	1					180	3203							36
37	TABLE - GEN RCPT (2)	R		12	20	1	180	180					1	20	12		Z	2460 - CUTTER/PLOTTER	38
39	RCPT - EXTERIOR WALL	R		12	20	1			540	0			1	20				SPARE	40
41	SPARE				20	1					0	0	1	20				SPARE	42
43	RCPT - MEN LCK 127	R		12	20	1	1080	0					1	20				SPARE	44
45	SPARE				20	1			0	2500			2	35	8	VD	H	PWR - UH3	46
47	SPARE				20	1					0	2500							48
49	OFFICE 309 FURN WHIP 2	R	VD	10	20	1	1080	180					1	20	12		R	RCPT - EF7	50
51	SPARE				20	1			0	180			1	20	12		R	RCPT - RTU1	52
53	PWR - CUH5	H	VD	10	20	1					1500	505	1	20	12		Z	PWR - WH	54
55	PWR - CU1	C M		10	30	2	2055	324					1	20	12		M	PWR - RP1	56
57									2055	74			1	20	12		M	PWR - EF17	58
59	PWR - CU2	C M		10	30	2					2055	0	1	20				SPARE	60
61							2055	0					1	20				SPARE	62
63	PWR - CUH2	H		10	30	2			2000	0			1	20				SPARE	64
65											2000	0	1	20				SPARE	66
67	PWR - EF7	M	VD	8	20	2	1373	0					1	20				SPARE	68
69									1373	0			1	20				SPARE	70
71	PWR - ELEC RM RCPT	R		12	20	1					360	500	1	20	12		Z	PWR - PA SYSTEM	72
73	PWR - FACP	Z	FA	12	20	1	360	100					1	20	12	LO	Z	PWR - SECURITY PANELS	74
75	RCPT - EXTERIOR WALL RCPT	R		12	20	1			360	900			1	20	10	VD	R	PWR - 309 GEN RCPT	76
77	SPARE				20	1					0	500	1	20	12		Z	BAS PANEL	78
79	SPARE				20	1	0	0					1	20				SPARE	80
81	SPARE				20	1			0	0			1	20				SPARE	82
83	SPARE				20	1					0	0	1	20				SPARE	84
85	EQUIPPED SPACE					1	0	0					1					EQUIPPED SPACE	86
87	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	88
89	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	90
91	EQUIPPED SPACE					1	0	0					1					EQUIPPED SPACE	92
93	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	94
95	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	96
97	EQUIPPED SPACE					1	0	0					1					EQUIPPED SPACE	98
99	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	100
101	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	102
103	EQUIPPED SPACE					1	0	0					1					DEDICATED VEHICLE CHARGING SPACE	104
105	EQUIPPED SPACE					1			0	0			1					DEDICATED VEHICLE CHARGING SPACE	106
107	EQUIPPED SPACE					1					0	0	1					DEDICATED VEHICLE CHARGING SPACE	108
109	EQUIPPED SPACE					1	0	0					1					DEDICATED VEHICLE CHARGING SPACE	110
111	DEDICATED VEHICLE CHARGING SPACE					1			0	0			1					DEDICATED VEHICLE CHARGING SPACE	112
113	DEDICATED VEHICLE CHARGING SPACE					1					0	0	1					DEDICATED VEHICLE CHARGING SPACE	114
115	DEDICATED VEHICLE CHARGING SPACE					1	0	0					1					DEDICATED VEHICLE CHARGING SPACE	116
117	DEDICATED VEHICLE CHARGING SPACE					1			0	0			1					DEDICATED VEHICLE CHARGING SPACE	118
119	DEDICATED VEHICLE CHARGING SPACE					1					0	0	1					DEDICATED VEHICLE CHARGING SPACE	120
121	DEDICATED VEHICLE CHARGING SPACE					1	0	0					1					DEDICATED VEHICLE CHARGING SPACE	122
123	DEDICATED VEHICLE CHARGING SPACE					1			0	0			1					DEDICATED VEHICLE CHARGING SPACE	124
125	DEDICATED VEHICLE CHARGING SPACE					1					0	0	1					DEDICATED VEHICLE CHARGING SPACE	126
				TOTAL LOAD (VA):			18627 VA		17986 VA		19643 VA								
				TOTAL AMPS:			156 A		150 A		165 A								

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	8220 VA	0%	0 VA
HEATING (H)	10500 VA	100%	10500 VA
LIGHTING (L)	0 VA	125%	0 VA
RECEPTACLES (R)	21420 VA	73%	15710 VA
MOTORS (M)	599 VA	100%	599 VA
SUPPLEMENTAL HEAT (U)	0 VA	100%	0 VA
MISC EQUIP (Z)	12772 VA	100%	12772 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	2746 VA	125%	3433 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS	
TOTAL CONNECTED LOAD	56257 VA
TOTAL NEC LOAD	43014 VA
TOTAL CONNECTED CURRENT	156 A
TOTAL NEC DEMAND CURRENT	119 A

PANELBOARD: SBFC (NEW)

BUS AMPS: 200A
MAIN SIZE/TYPE: 200A MCB
VOLTS/PHASE: 208Y/120 V 3P/4W
SUPPLIED BY: SBFA

FAULT CURRENT: REFER TO SHORT CIRCUIT TABLE ON SHEET E502
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: GENERAL BUILDING POWER
MOUNTING: SURFACE
LOCATION: STORAGE 405

EQUIPMENT GROUND BUS
LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	BKR AMP	P	PHASE A		PHASE B		PHASE C		P	BKR AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1	RCPT - FOREMAN 404/405	R		12	20	1	720	1080					1	20	12		R	RCPT - SUPVR 406	2
3	RCPT - FLEET SUP 407	R		12	20	1			900	900			1	20	12		R	RCPT - FACILTY SUP 408	4
5	RCPT - FOREMAN 409/410	R		12	20	1					720	360	1	20	12		R	RCPT - PRINT 403	6
7	OFFICE 402 FURN WHIP 1	R		12	20	1	1080	720					1	20	12		R	RCPT - WORK AREA 402	8
9	OFFICE 402 FURN WHIP 2	R		12	20	1			1080	0			1	20				SPARE	10
11	OFFICE 402 FURN WHIP 3	R	HT	12	20	1					720	400							12
13	OFFICE 402 FURN WHIP 4	R	HT	12	20	1	720	400					3	20	10		Z	WEST SLIDING GATE	14
15	OFFICE 402 FURN WHIP 5	R		12	20	1			360	400									16
17	RCPT - RR 401	R		12	20	1					900	2500	2	35	8		H	PWR - UH4	18
19	OFFICE 402 MICRO	Z		12	20	1	1200	2500											20
21	OFFICE 402 COUNTER	R		12	20	1			360	2000			2	30	10		H	PWR - CUH3	22
23	OFFICE 402 MICROWAVE	Z		12	20	1					1000	2000							24
25	PWR - OFFICE TV	R		12	20	1	180	2076					1	25	10		Z	PWR - UV1	26
27	SPARE				20	1			0	0			1	20				SPARE	28
29	SPARE				20	1					0	500	1	20	10	VD	Z	PWR - GENERATOR CHARGER	30
31	SPARE				20	1	0	2500					2	30	8	VD	Z	PWR - GENERATOR HTRS	32
33	SPARE				20	1			0	2500									34
35	SPARE				20	1					0	500	1	20	10	VD	Z	PWR - GENERATOR CNTLS	36
37	SPARE				20	1	0	500					1	20	10	VD	Z	PWR - ROLL UP GEN CHARGER	38
39	SPARE				20	1			0	2500			2	30	8	VD	Z	PWR - ROLL UP GEN HTRS	40
41	SPARE				20	1					0	2500							42
				TOTAL LOAD (VA):			13676 VA		11000 VA		12100 VA								
				TOTAL AMPS:			115 A		92 A		102 A								

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	0 VA	0%	0 VA
HEATING (H)	9000 VA	100%	9000 VA
LIGHTING (L)	0 VA	125%	0 VA
RECEPTACLES (R)	10800 VA	96%	10400 VA
MOTORS (M)	0 VA	100%	0 VA
SUPPLEMENTAL HEAT (U)	0 VA	100%	0 VA
MISC EQUIP (Z)	16976 VA	100%	16976 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	0 VA	125%	0 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS	
TOTAL CONNECTED LOAD	36776 VA
TOTAL NEC LOAD	36376 VA
TOTAL CONNECTED CURRENT	102 A
TOTAL NEC DEMAND CURRENT	101 A

PANELBOARD LEGEND

ABBREVIATIONS V1.00

AF	ARC FAULT CIRCUIT INTERRUPTER.
C#	CIRCUIT VIA LIGHTING CONTACTOR #.
CL	CIRCUIT VIA CURRENT LIMITING DEVICE.
D	DISCONNECT CIRCUITRY FOR REMOVED LOAD, UPDATE CIRCUIT DIRECTORY TO SPARE AND TURN OFF.
EM	EMERGENCY LIGHTING HANDLE-ON CLAMP.
EX	EXISTING.
F	FUTURE LOAD; NOTE AS SPARE AND TURN OFF.
FA	RED/HANDLE-ON CLAMP.
GF	GROUND-FAULT CIRCUIT INTERRUPTER TYPE CIRCUIT BREAKER (5 mA).
GFEP	GROUND FAULT EQUIPMENT PROTECTION BREAKER (30 mA).
HT	PROVIDE HANDLE-TIE FOR MULTI-WIRE BRANCH CIRCUIT PER CODE.
IG	ISOLATED GROUND CIRCUIT.
L#	LIGHTING CONTROL SCHEME NUMBER.
LCK	HANDLE PADLOCKABLE-OFF DEVICE.
LO	HANDLE-ON CLAMP.
N	PROVIDE NEW CIRCUIT BREAKER.
OL	REFER TO ELECTRICAL ONE-LINE/RISER DIAGRAM.
PS	POWER-SWITCHING CIRCUIT BREAKER.
PSE	EMERGENCY POWER-SWITCHING CIRCUIT BREAKER.
R	REUSE EXISTING CIRCUIT BREAKER FOR NEW/REVISED LOAD.
RP	CIRCUIT VIA RELAY PANEL.
ST	SHUNT TRIP CIRCUIT BREAKER.
V	VERIFY EXISTING LOAD AND UPDATE DIRECTORY, IF UNUSED, NOTE AS SPARE AND TURN OFF.
VD	BRANCH CIRCUITRY HAS BEEN UPSIZED TO REDUCE VOLTAGE DROP. ADJUST GROUND WIRE SIZE PER CODE. PROVIDE LUG ADAPTORS IF REQUIRED.
Z	CORRECT/REPAIR EXISTING HAZARD TO MAKE CODE COMPLIANT INSTALLATION.

NOT ALL ABBREVIATIONS ARE USED.

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EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: Author
DATE: 12.15.22 REVIEWED BY: Checker

STATE OF MISSOURI — DOUGLAS M. EVERHART — NUMBER PE-2019007648 — PROFESSIONAL ENGINEER

01/24/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

PANEL SCHEDULES

SHEET
E503

DOUGLAS M. EVERHART

PANELBOARD: SBF1 (NEW)

BUS AMPS: 225A
MAIN SIZE/TYPE: MLO
VOLTS/PHASE: 480Y/277 V 3P/4W
SUPPLIED BY: DP-SBF1

FAULT CURRENT: REFER TO SHORT CIRCUIT TABLE ON SHEET E502
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: MAINTENANCE BUILDING
MOUNTING: SURFACE
LOCATION: MECHANICAL 435

EQUIPMENT GROUND BUS
LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	BKR AMP	P	PHASE A		PHASE B		PHASE C		P	BKR AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1	SITE LTG - PARKING LOT FRONT	L	VD	10	20	2	393	5520					2	50	6	GF	Z	2742 - WELDER	2
3									393	5520									4
5	SITE LTG - FRONT WALLPACKS	L	VD	10	20	1					168	9411							6
7	SITE LTG - FRONT CANOPIES	L	VD	10	20	1	140	9411					3	80	6		Z	8198 - AIR COMPRESSOR 1	8
9	SITE LTG - REAR CANOPIES	L	VD	10	20	1			1098	9411									10
11	LTG - B WING ROOMS (2)/EF1	L M		12	20	1					1201	9411							12
13	SITE LTG - PARKING EAST 1	L		10	20	2	196	9411					3	80	6		Z	8198 - AIR COMPRESSOR 2	14
15									196	9411									16
17	LTG - MAINTENANCE SHOP 1	L		12	20	1					1485	3598							18
19	LTG - MAINTENANCE SHOP 2	L		12	20	1	2178	3598					3	25	12		Z	5631 - 3 POST LIFT	20
21	LTG - MAINTENANCE SHOP 3	L		12	20	1			1089	3598									22
23	LTG - WAREHOUSE	L		12	20	1					377	627							24
25	LTG - C WING ROOMS (1)	L		12	20	1	671	627					3	20	10	VD	Z	5225 - DOCK LEVELER	26
27									3321	627									28
29	PWR - EXHAUST REEL 1-4	Z	VD	10	20	3					3321	8858							30
31							3321	8858					3	50	6		Z	5010 - CRANE	32
33									3321	8858									34
35	PWR - EXHAUST REEL 5-8	Z	VD	10	20	3					3321	5820							36
37							3321	5820					3	45	8		Z M	PWR - MAU1	38
39	SPARE				20	1			0	5820									40
41	LTG - MEZZANINE	L		12	20	1					330	0	1	20				SPARE	42
43	SPARE				20	1	0	0					1	20				SPARE	44
45	SPARE				20	1			0	0			1	20				SPARE	46
47	SPARE				20	1					0	0	1	20				SPARE	48
49	EQUIPPED SPACE					1	0	0					1					EQUIPPED SPACE	50
51	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	52
53	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	54
55	EQUIPPED SPACE					1	0	0					1					EQUIPPED SPACE	56
57	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	58
59	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	60
			TOTAL LOAD (VA):				53466 VA		52664 VA		47928 VA								
			TOTAL AMPS:				196 A		193 A		173 A								

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	0 VA	0%	0 VA
HEATING (H)	0 VA	100%	0 VA
LIGHTING (L)	9916 VA	125%	12395 VA
RECEPTACLES (R)	0 VA	0%	0 VA
MOTORS (M)	0 VA	100%	0 VA
SUPPLEMENTAL HEAT (U)	0 VA	100%	0 VA
MISC EQUIP (Z)	126684 VA	100%	126684 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	17459 VA	125%	21824 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS	
TOTAL CONNECTED LOAD	154059 VA
TOTAL NEC LOAD	160903 VA
TOTAL CONNECTED CURRENT	185 A
TOTAL NEC DEMAND CURRENT	194 A

PANELBOARD: SBFB (NEW)

BUS AMPS: 400A
MAIN SIZE/TYPE: 400A MCB
VOLTS/PHASE: 208Y/120 V 3P/4W
SUPPLIED BY: DP-SBF1 VIA TX-SBFA

FAULT CURRENT: REFER TO SHORT CIRCUIT TABLE ON SHEET E502
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: MAINTENANCE BUILDING
MOUNTING: SURFACE
LOCATION: MECHANICAL 435

EQUIPMENT GROUND BUS
LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	BKR AMP	P	PHASE A		PHASE B		PHASE C		P	BKR AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1	5665 - 4 POST LIFT (413)	Z		10	30	2	1560	1800					1	20	8	VD	Z	4015 - ALIGNMENT SYSTEM	2
3									1560	1200			1	20	12		Z	23671 - TIRE SPREADER (1)	4
5											900	1200	1	20	12		Z	23671 - TIRE SPREADER (2)	6
7	57121 - 2 POST LIFT (415)	Z		12	20	3	900	1440					1	20	12		Z	23501 - TIRE CHANGER	8
9									900	360			1	20	12		Z	2365 - TIRE INFLATION	10
11											900	2880	1	35	8	VD	Z	22501 - LATHE, ENGINE	12
13	57121 - 2 POST LIFT (416)	Z		12	20	3	900	1200					1	20	10	VD	Z	2690 - SAW	14
15									900	2400			1	30	8		Z	3082 - SAND BLASTER	16
17	2363 - TIRE BALANCER	Z	GF	12	20	2					1144	1200	1	20	12		Z	3540 - CLEANING TANK	18
19							1144	360					1	20	12		Z	WORK BENCH RCPT	20
21	2780 - PLASMA CUTTER	Z	GF	10	30	2			1632	1800			1	20	10	VD	R	2150 - OIL FILTER CRUSHER	22
23											1632	180	1	20	10		Z	RCPT - FAB WORK AREA EQUIP	24
25	PWR - OVERHEAD MTR DR 1	Z	LCK	12	20	2	915	1656					1	20	8	VD	Z	26081 - DRILL PRESS	26
27									915	1654			1	20	8	VD	Z	2875 - GRINDER/BUFFER	28
29	PWR - OVERHEAD MTR DR 2	Z	LCK	12	20	2					915	1800	1	20	8	VD	Z	2698 - SAW CUTOFF	30
31							915	1400					1	20	10	VD	Z	3280 - FUME EXTRACTOR	32
33	PWR - OVERHEAD MTR DR 3	Z	LCK	12	20	2			915	864			1	20	10	VD	R	TABLE - GEN RCPT (1)	34
35											915	1560	1	20	12		Z	8525 - COMPRESSED AIR DYRER	36
37	PWR - OVERHEAD MTR DR 4	Z	LCK	12	20	2	915	500					1	20	12		Z	7510,7520,7531 - AIR COMP MONITOR	38
39									915	900			1	20	10	VD	Z	5840 - LIFT CHARGER (1-3)	40
41	PWR - OVERHEAD MTR DR 5	Z	LCK	12	20	2					915	900	1	20	10	VD	Z	5840 - LIFT CHARGER (4-6)	42
43							915	0					1	20				SPARE	44
45	PWR - OVERHEAD MTR DR 6	Z	LCK	12	20	2			915	0			1	20				SPARE	46
47											915	0	1	20				SPARE	48
49	PWR - OVERHEAD MTR DR 7	Z	LCK	12	20	2	915	180					1	20	12		Z	3085 - CABINET	50
51									915	1200			1	20	12		Z	2440 - FLOOR SCRUBBER	52
53	PWR - OVERHEAD MTR DR 8	Z	LCK	12	20	2					915	1440	1	20	10	VD	Z	PWR - MOTOR REEL CNT 1-4	54
55							915	1440					1	20	10	VD	Z	PWR - MOTOR REEL CNT 5-8	56
57	PWR - OVERHEAD MTR DR 9	Z	LCK	10	20	2			915	52			1	20	12		M	PWR - EF6	58
59											915	1560	1	15	12		Z	PWR - MAU1 GAS	60
61	PWR - OVERHEAD MTR DR 10	Z	LCK	10	20	2	915	1373					2	20	12		M	PWR - EF8	62
63									915	1373									64
65	PWR - OVERHEAD MTR DR 11	Z	LCK	10	20	2					915	180	1	15	12		R	RCPT - EF8	66
67							915	2243											68
69	PWR - OVERHEAD MTR DR 12	Z	LCK	10	20	2			915	2243			3	30	10		M	PWR - EF9	70
71											915	2243							72
73	PWR - OVERHEAD MTR DR 13	Z	LCK	12	20	2	915	180					1	15	12		R	RCPT - EF9	74
75									915	2243									76
77	PWR - OVERHEAD MTR DR 14	Z	LCK	12	20	2					915	2243	3	20	10	VD	M	PWR - EF10	78
79							915	2243											80
81	PWR - EF11	M	VD	10	20	2			1372	180			1	20	12		R	RCPT - EF10	82
83											1372	180	1	20	12		R	RCPT - EF11	84
85	PWR - WELDER	Z	VD	4	60	2	4992	660					2	20	12		Z	2045 - BATTERY CHARGER	86
87									4992	660									88
89	SPARE				20	1					0	0	1	20				SPARE	90
91	SPARE				20	1	0	0					1	20				SPARE	92
93	SPARE				20	1			0	0			1	20				SPARE	94
95	SPARE				20	1					0	0	1	20				SPARE	96
97	SPARE				20	1	0	0					1	20				SPARE	98
99	SPARE				20	1			0	0			1	20				SPARE	100
101	SPARE				20	1					0	0	1	20				SPARE	102
103	SPARE				20	1	0	0					1	20				SPARE	104
105	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	106
107	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	108
109	EQUIPPED SPACE					1	0	0					1					EQUIPPED SPACE	110
111	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	112
113	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	114
115	EQUIPPED SPACE					1	0	0					1					EQUIPPED SPACE	116
117	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	118
119	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	120
121	EQUIPPED SPACE					1	0	0					1					EQUIPPED SPACE	122
123	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	124
125	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	126
			TOTAL LOAD (VA):				35326 VA		36725 VA		31754 VA								
			TOTAL AMPS:				299 A		311 A		265 A								

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	0 VA	0%	0 VA
HEATING (H)	0 VA	100%	0 VA
LIGHTING (L)	0 VA	125%	0 VA
RECEPTACLES (R)	3384 VA	100%	3384 VA
MOTORS (M)	12272 VA	100%	12272 VA
SUPPLEMENTAL HEAT (U)	0 VA	100%	0 VA
MISC EQUIP (Z)	81421 VA	100%	81421 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	6729 VA	125%	8411 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS	
TOTAL CONNECTED LOAD	103806 VA
TOTAL NEC LOAD	105488 VA
TOTAL CONNECTED CURRENT	288 A
TOTAL NEC DEMAND CURRENT	293 A

PANELBOARD: DP-SBF1 (NEW)

BUS AMPS: 800A
MAIN SIZE/TYPE: MLO
VOLTS/PHASE: 480Y/277 V 3P/4W
SUPPLIED BY: SWBD-N

FAULT CURRENT: REFER TO SHORT CIRCUIT TABLE ON SHEET E502
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: MAINTENANCE BUILDING
MOUNTING: SURFACE
LOCATION: MECHANICAL 435

EQUIPMENT GROUND BUS
LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	BKR AMP	P	PHASE A		PHASE B		PHASE C		P	BKR AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1							53466	0											2
3	SBF1	L Z M		OL	225	3			52664	0			3					255A-3P EQUIPPED SPACE	4
5											47934	0							6
7							52839	0											8
9	SBW1	--		OL	225	3			45571	0			3					255A-3P EQUIPPED SPACE	10
11											44504	0							12
13							84094	0					1					EQUIPPED SPACE	14
15	TX-SBFA	--		OL	400	3			79474	0			1					EQUIPPED SPACE	16
17											73083	0	1					EQUIPPED SPACE	18
19	EQUIPPED SPACE					1	0	0					1					EQUIPPED SPACE	20
21	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	22
23	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	24
			TOTAL LOAD (VA):				190398 VA		177708 VA		165521 VA								
			TOTAL AMPS:				694 A		648 A		598 A								

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	3952 VA	0%	0 VA
HEATING (H)	103007 VA	100%	103007 VA
LIGHTING (L)	14771 VA	125%	18464 VA
RECEPTACLES (R)	37104 VA	63%	23552 VA
MOTORS (M)	32619 VA	100%	32619 VA
SUPPLEMENTAL HEAT (U)	4900 VA	100%	4900 VA
MISC EQUIP (Z)	323931 VA	100%	323931 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	17459 VA	125%	21824 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS	
TOTAL CONNECTED LOAD	537743 VA
TOTAL NEC LOAD	528297 VA
TOTAL CONNECTED CURRENT	647 A
TOTAL NEC DEMAND CURRENT	635 A

PANELBOARD: SBFA (NEW)

BUS AMPS: 400A
MAIN SIZE/TYPE: 400A MCB
VOLTS/PHASE: 208Y/120 V 3P/4W
SUPPLIED BY: DP-SBF1 VIA TX-SBFA

FAULT CURRENT: REFER TO SHORT CIRCUIT TABLE ON SHEET E502
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: MAINTENANCE BUILDING
MOUNTING: SURFACE
LOCATION: MECHANICAL 435

EQUIPMENT GROUND BUS
LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	BKR AMP	P	PHASE A		PHASE B		PHASE C		P	BKR AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1	SPARE				20	1	0	168					1	20	12		H Z	PWR - MECH RH UNITS 1-10	2
3	SPARE				20	1			0	101			1	20	12		H Z	PWR - MECH RH UNITS 11-16	4
5	LTG - BUILDING SIGN	L		12	20	1					136	1500	1	20	12		H Z	PWR - MECH GUH UNITS 1-3	6
7	PWR - LCP	Z		12	20	1	100	0					1	20				SPARE	8
9	412 WORKTABLE 1 - RCPT	R	VD	10	20	1			1080	282			1	20	12		M	PWR - ICF 1,2,3,4	10
11	412 WORKTABLE 2 - RCPT	R		12	20	1					720	282	1	20	12		M	PWR - ICF 7,8,9,10	12
13	417/416 WORKTABLE - RCPT	R		12	20	1	540	282					1	20	12		M	PWR - ICF 9,10,11,12	14
15	415/414 WORKTABLE - RCPT	R		12	20	1			720	360			1	20	6	LO,VD	R	PWR - SCADA RM RACK	16
17	413 WORKTABLE - RCPT	R		12	20	1					360	200	1	20	12	LO	Z	PWR - SECURITY PANELS	18
19	M.T BAY - GEN RCPT	R		12	20	1	720	0					1	20	12		Z	PWR - ICF 11, ICF 12	20
21	PWR - MT BAY EWC	R	GF	12	20	1			180	1320			1	20	10	VD	M	PWR - DAMPERS	22
23	PWR - MT BAY ICE MAC	Z	GF	12	20	1					1200	180	1	20	12		R	RCPT - EF12	24
25	PWR - MT BAY DESK 1-2	R		12	20	1	360	1656					1	20	10	VD	M	PWR - EF14	26
27	PWR - MT BAY DESK 3-4	R		12	20	1			360	150			1	20	12		M	PWR - EF15	28
29	PWR - MT BAY DESK 5-6	R		12	20	1					360	180	1	20	12		R	RCPT - EF14	30
31	PWR - MT BAY GEN RCPT 1	R	VD	8	20	1	1260	75					1	20	12		M	PWR - EF16	32
33	PWR - MT BAY GEN RCPT 2	R		12	20	1			540	180			1	20	12		R	RCPT - EF15	34
35	RCPT - GEN SHOP STORAGE	R		12	20	1					540	1372	2	20	10	VD	M	PWR - EF12	36
37	RR - GEN RCPT	R		12	20	1	720	1372											38
39	PWR - PART RM RCPT	R		12	20	1			540	1373			2	20	12		M	PWR - EF13	40
41	PWR- ELEC RM RCPT	R		12	20	1					360	1373							42
43	PWR - LUBE TANK MT 1-5	R	LO	12	20	1	1440	3750					2	50	6		H	PWR - UH7	44
45	PWR - LUBE TANK MT 6-9	R	LO	12	20	1			960	3750									46
47	PWR - DR CARD READERS 1	Z		12	20	1					200	2500	2	35	8		H	PWR - UH6	48
49	PWR - DR CARD READERS 2	Z	VD	10	20	1	1700	2500											50
51	PWR - MT BAY GEN RCPT 3	R	VD	10	20	1			720	2055			2	30	10		C M Z	PWR - CU4	52
53	PWR - MT BAY GEN RCPT 4	R	VD	10	20	1					720	2055							54
55	PWR - MT BAY EXT RCPT 1	R		12	20	1	720	0					1	20				SPARE	56
57	PWR - MT BAY EXT RCPT 2	R	VD	10	20	1			900	2055			2	30	10		Z	PWR - CU3	58
59	RCPT - WAREHOUSE 437 (1)	R		12	20	1					180	2055							60
61	RCPT - WAREHOUSE 437 (2)	R		12	20	1	540	5000											62
63	RCPT - WAREHOUSE 437 (3)	R		12	20	1			360	5000			3	60	4	VD	Z	PWR - UH 13	64
65	RCPT - WAREHOUSE 437 (4)	R		12	20	1					360	5000							66
67	PWR - IT RM RCPT 1	R		12	20	1	360	5000											68
69	PWR - IT RM IDF RACK	R	LO	12	20	1			360	5000			3	60	6		Z	PWR - UH 14	70
71	PWR - IT RM RCPT 2	R		12	20	1					360	5000							72
73	RCPT - PARTS W COUNTERTOP	R		12	20	1	900	2504					2	35	8		H	PWR - UH5	74
75	RCPT - PARTS E COUNTERTOP	R		12	20	1			720	2504									76
77	EMISSIONS CTRL PANEL	Z	LO	12	20	1					500	1176	1	20	12		M	PWR - EF18	78
79	BAS PANEL	Z		12	20	1	500	2746					1	20	8	VD	M	PWR - EF19	80
81	7541 - PUMP	Z		12	20	1			180	0			1	20				SPARE	82
83	7540 - PUMP	Z		12	20	1					360	0	1	20				SPARE	84
85	2150 - FLUID PUMP	Z		12	20	1	180	0					1	20				SPARE	86
87	SPARE				20	1			0	0			1	20				SPARE	88
89	SPARE				20	1					0	0	1	20				SPARE	90
91	SPARE				20	1	0	0					1	20				SPARE	92
93	SPARE				20	1			0	0			1	20				SPARE	94
95	SPARE				20	1					0	0	1	20				SPARE	96
97	SPARE				20	1	0	0					1	20				SPARE	98
99	SPARE				20	1			0	0			1	20				SPARE	100
101	SPARE				20	1					0	0	1	20				SPARE	102
103	SPARE				20	1	0	0					1	20				SPARE	104
105	SPARE				20	1			0	0			1					EQUIPPED SPACE	106
107	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	108
109	EQUIPPED SPACE					1	0	0					1					EQUIPPED SPACE	110
111	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	112
113	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	114
115	EQUIPPED SPACE					1	0	0					1					EQUIPPED SPACE	116
117	EQUIPPED SPACE					1			0	0			1					EQUIPPED SPACE	118
119	EQUIPPED SPACE					1					0	0	1					EQUIPPED SPACE	120
121							13676	0					1					EQUIPPED SPACE	122
123	SBAC	H R Z		OL	200	3			11000	0			1					EQUIPPED SPACE	124
125											12100	0	1					EQUIPPED SPACE	126
			TOTAL LOAD (VA):				48768 VA		42749 VA		41329 VA								
			TOTAL AMPS:				408 A		358 A		344 A								

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	3952 VA	0%	0 VA
HEATING (H)	28007 VA	100%	28007 VA
LIGHTING (L)	136 VA	125%	170 VA
RECEPTACLES (R)	30660 VA	66%	20330 VA
MOTORS (M)	10872 VA	100%	10872 VA
SUPPLEMENTAL HEAT (U)	0 VA	100%	0 VA
MISC EQUIP (Z)	60585 VA	100%	60585 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	2746 VA	125%	3433 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS	
TOTAL CONNECTED LOAD	136958 VA
TOTAL NEC LOAD	123397 VA
TOTAL CONNECTED CURRENT	380 A
TOTAL NEC DEMAND CURRENT	343 A

PANELBOARD LEGEND

ABBREVIATIONS V1.00

AF	ARC FAULT CIRCUIT INTERRUPTER.
C#	CIRCUIT VIA LIGHTING CONTACTOR #.
CL	CIRCUIT VIA CURRENT LIMITING DEVICE.
D	DISCONNECT CIRCUITRY FOR REMOVED LOAD, UPDATE CIRCUIT DIRECTORY TO SPARE AND TURN OFF.
EM	EMERGENCY LIGHTING HANDLE-ON CLAMP.
EX	EXISTING.
F	FUTURE LOAD; NOTE AS SPARE AND TURN OFF.
FA	RED/HANDLE-ON CLAMP.
GF	GROUND-FAULT CIRCUIT INTERRUPTER TYPE CIRCUIT BREAKER (5 mA).
GFEP	GROUND FAULT EQUIPMENT PROTECTION BREAKER (30 mA).
HT	PROVIDE HANDLE-TIE FOR MULTI-WIRE BRANCH CIRCUIT PER CODE.
IG	ISOLATED GROUND CIRCUIT.
L#	LIGHTING CONTROL SCHEME NUMBER.
LCK	HANDLE PADLOCKABLE-OFF DEVICE.
LO	HANDLE-ON CLAMP.
N	PROVIDE NEW CIRCUIT BREAKER.
OL	REFER TO ELECTRICAL ONE-LINE/RISER DIAGRAM.
PS	POWER-SWITCHING CIRCUIT BREAKER.
PSE	EMERGENCY POWER-SWITCHING CIRCUIT BREAKER.
R	REUSE EXISTING CIRCUIT BREAKER FOR NEW/REVISED LOAD.
RP	CIRCUIT VIA RELAY PANEL.
ST	SHUNT TRIP CIRCUIT BREAKER.
V	VERIFY EXISTING LOAD AND UPDATE DIRECTORY, IF UNUSED, NOTE AS SPARE AND TURN OFF.
VD	BRANCH CIRCUITRY HAS BEEN UPSIZED TO REDUCE VOLTAGE DROP. ADJUST GROUND WIRE SIZE PER CODE. PROVIDE LUG ADAPTORS IF REQUIRED.
Z	CORRECT/REPAIR EXISTING HAZARD TO MAKE CODE COMPLIANT INSTALLATION.

NOT ALL ABBREVIATIONS ARE USED.

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REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: Author
DATE: 12.15.22 REVIEWED BY: Checker

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

01/24/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

PANEL SCHEDULES

SHEET
E504

DOUGLAS M. EVERHART

PANELBOARD: SBW1 (NEW)

BUS AMPS: 225A
MAIN SIZE/TYPE: 225A MCB
VOLTS/PHASE: 480Y/277 V 3P/4W
SUPPLIED BY: DP-SBF1

FAULT CURRENT: REFER TO SHORT CIRCUIT TABLE ON SHEET E502
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: WASH AREA BUILDING
MOUNTING: SURFACE
LOCATION: STORAGE 602

EQUIPMENT GROUND BUS

LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	BKR AMP	P	PHASE A	PHASE B	PHASE C	P	BKR AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1	SITE LTG - BACK PARKING CANOPY	L		10	20	1	1956 0			1					EQUIPPED SPACE	2
3	SITE LTG - BACK PARKING POLE	L		10	20	2		982 0		1					EQUIPPED SPACE	4
5	LIGTHING								982 0						EQUIPPED SPACE	6
7	LTG - STORAGE/WASH BAY	L		12	20	1	762 7473									8
9	SPARE				20	1		0 7473		3	60	6	GF	Z	3720 - POWER WASHER 2	10
11	SPARE				20	1			0 7473							12
13	SPARE				20	1	0 5000									14
15	SPARE				20	1		0 5000		3	25	10		H Z	UH-11 WASHBAY HEAT	16
17	SPARE				20	1			0 5000							18
19	SPARE				20	1	0 1667									20
21	SPARE				20	1		0 1667		3	25	10		H Z	UH-10 WASHBAY HEAT	22
23	SPARE				20	1			0 1667							24
25							23445 12535									26
27	TX-SBWA	--		OL	175	3		19321 11127		3	125	OL		--	TX-SBAA	28
29									17915 11466							30
			TOTAL LOAD (VA):				52839 VA	45571 VA	44504 VA							
			TOTAL AMPS:				191 A	165 A	161 A							

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	0 VA	0%	0 VA
HEATING (H)	75000 VA	100%	75000 VA
LIGHTING (L)	4713 VA	125%	5891 VA
RECEPTACLES (R)	3060 VA	100%	3060 VA
MOTORS (M)	0 VA	100%	0 VA
SUPPLEMENTAL HEAT (U)	4900 VA	100%	4900 VA
MISC EQUIP (Z)	55241 VA	100%	55241 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	0 VA	125%	0 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS

TOTAL CONNECTED LOAD	142914 VA
TOTAL NEC LOAD	144092 VA
TOTAL CONNECTED CURRENT	172 A
TOTAL NEC DEMAND CURRENT	173 A

FUSIBLE PANELBOARD: LSA1 (NEW)

BUS AMPS: 60A
MAIN SIZE/TYPE: MLO
VOLTS/PHASE: 480Y/277 V 3P/4W
SUPPLIED BY: LSF1

FAULT CURRENT: REFER TO SHORT CIRCUIT TABLE ON SHEET E502
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: GENERAL BUILDING POWER
MOUNTING: SURFACE
LOCATION:

EQUIPMENT GROUND BUS

LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	FUSE AMP	P	PHASE A	PHASE B	PHASE C	P	FUSE AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1	LTG - WATER SHOP/OPEN OFF	L		12	20	1	357 0			1	20				SPARE	2
3	LTG - A WING ROOMS (1)	L		12	20	1		575 0		1	20				SPARE	4
5	LTG - A WING ROOMS (2)	L		12	20	1			395 0	1	20				SPARE	6
7	LTG - B WING ROOMS (1)	L		12	20	1	266 0			1	20				SPARE	8
9	LTG - B WING ROOMS (2)	L		12	20	1		187 0		1	20				SPARE	10
11	LTG - WATER SHOP	L		12	20	1			355 0	1	20				SPARE	12
13	SPARE				20	1	0 0			1					EQUIPPED SPACE	14
15	SPARE				20	1		0 0		1					EQUIPPED SPACE	16
17	SPARE				20	1			0 0	1					EQUIPPED SPACE	18
			TOTAL LOAD (VA):				623 VA	762 VA	750 VA							
			TOTAL AMPS:				2 A	3 A	3 A							

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	0 VA	0%	0 VA
HEATING (H)	0 VA	100%	0 VA
LIGHTING (L)	2135 VA	125%	2669 VA
RECEPTACLES (R)	0 VA	0%	0 VA
MOTORS (M)	0 VA	100%	0 VA
SUPPLEMENTAL HEAT (U)	0 VA	100%	0 VA
MISC EQUIP (Z)	0 VA	100%	0 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	0 VA	125%	0 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS

TOTAL CONNECTED LOAD	2135 VA
TOTAL NEC LOAD	2669 VA
TOTAL CONNECTED CURRENT	3 A
TOTAL NEC DEMAND CURRENT	3 A

FUSIBLE PANELBOARD: LSF1 (NEW)

BUS AMPS: 100A
MAIN SIZE/TYPE: 100A MCB
VOLTS/PHASE: 480Y/277 V 3P/4W
SUPPLIED BY: SWBD-N

FAULT CURRENT: REFER TO SHORT CIRCUIT TABLE ON SHEET E502
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: MAINTENANCE BUILDING
MOUNTING: SURFACE
LOCATION: MECHANICAL 435

EQUIPMENT GROUND BUS

LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	FUSE AMP	P	PHASE A	PHASE B	PHASE C	P	FUSE AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1	SITE LTG - WALL PACKS	L		12	20	1	525 0			1	20				SPARE	2
3	SITE LTG - CANOPY	L		12	20	1		60 0		1	20				SPARE	4
5	LTG - MAINTENANCE SHOP 1	L		12	20	1			203 0	1	20				SPARE	6
7	LTG - MAINTENANCE SHOP 2	L		12	20	1	1193 0			1	20				SPARE	8
9	LTG - WAREHOUSE	L		12	20	1		549 0		1	20				SPARE	10
11	SPARE				20	1			0 0	1	20				SPARE	12
13	LTG - SHOP ROOMS	L	VD	10	20	1	200 0			1	20				SPARE	14
15	SPARE				20	1		0 0		1	20				SPARE	16
17	SPARE				20	1			0 0	1	20				SPARE	18
19	EQUIPPED SPACE					1	0 0			1	20				SPARE	20
21	EQUIPPED SPACE					1		0 0		1	20				SPARE	22
23	EQUIPPED SPACE					1			0 0	1	20				SPARE	24
25							623 0			1					EQUIPPED SPACE	26
27	LSA1	L		OL	50	3		762 0		1					EQUIPPED SPACE	28
29									750 0	1					EQUIPPED SPACE	30
			TOTAL LOAD (VA):				2541 VA	1371 VA	953 VA							
			TOTAL AMPS:				9 A	5 A	3 A							

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	0 VA	0%	0 VA
HEATING (H)	0 VA	100%	0 VA
LIGHTING (L)	4865 VA	125%	6081 VA
RECEPTACLES (R)	0 VA	0%	0 VA
MOTORS (M)	0 VA	100%	0 VA
SUPPLEMENTAL HEAT (U)	0 VA	100%	0 VA
MISC EQUIP (Z)	0 VA	100%	0 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	0 VA	125%	0 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS

TOTAL CONNECTED LOAD	4865 VA
TOTAL NEC LOAD	6081 VA
TOTAL CONNECTED CURRENT	6 A
TOTAL NEC DEMAND CURRENT	7 A

PANELBOARD: SBWA (NEW)

BUS AMPS: 225A
MAIN SIZE/TYPE: 225A MCB
VOLTS/PHASE: 208Y/120 V 3P/4W
SUPPLIED BY: SBW1 VIA TX-SBWA

FAULT CURRENT: REFER TO SHORT CIRCUIT TABLE ON SHEET E502
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: WASH AREA BUILDING
MOUNTING: SURFACE
LOCATION: STORAGE 602

EQUIPMENT GROUND BUS

LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	BKR AMP	P	PHASE A	PHASE B	PHASE C	P	BKR AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1	PWR - STORAGE RCPT/LCP2	R		12	20	1	1080 2500			2	35	8		H	PWR - UH8	2
3	PWR - WASH BAY RCPT	R		12	20	1		540 2500								4
5	PWR - SITE BLOCK HT RCPT 1	H	VD	10	20	1			2000 2500	2	35	8		H	PWR - UH9	6
7	PWR - SITE BLOCK HT RCPT 2	H	VD	10	20	1	2000 2500									8
9	PWR - SITE BLOCK HT RCPT 3	H	VD	8	20	1		2000 0		1	20				SPARE	10
11	PWR - SITE BLOCK HT RCPT 4	H	VD	8	20	1			2000 0	1	20				SPARE	12
13	PWR - SITE BLOCK HT RCPT 5	H	VD	6	20	1	2000 0			1	20				SPARE	14
15	PWR - SITE BLOCK HT RCPT 6	H	VD	6	20	1		2000 0		1	20				SPARE	16
17	PWR - SITE BLOCK HT RCPT 7	H	VD	6	20	1			2000 2000	2	30	10		H	PWR - CUH4	18
19	PWR - SITE BLOCK HT RCPT 8	H	VD	6	20	1	2000 2000									20
21	PWR - SITE BLOCK HT RCPT 9	H	VD	6	20	1		2000 915		2	20	12		Z	PWR - OVERHEAD MTR DR 1	22
23	PWR - SITE BLOCK HT RCPT 10	H	VD	6	20	1			2000 915							24
25	PWR - SITE BLOCK HT RCPT 11	H	VD	8	20	1	2000 915			2	20	12		Z	PWR - OVERHEAD MTR DR 2	26
27	PWR - SITE BLOCK HT RCPT 12	H	VD	8	20	1		2000 915								28
29	PWR - SITE BLOCK HT RCPT 13	H	VD	10	20	1			2000 500	1	20	12		Z	PWR - LCP	30
31	PWR - SITE BLOCK HT RCPT 14	H	VD	10	20	1	2000 2450			2	30	10	LCK	U	RR WATER HEATER	32
33	PWR - SITE BLOCK HT RCPT 15	H	VD	10	20	1		2000 2450								34
35	PWR - SITE BLOCK HT RCPT 16	H	VD	10	20	1			2000 0	1	20				SPARE	36
37	PWR - SITE BLOCK HT RCPT 17	H	VD	10	20	1	2000 0			1	20				SPARE	38
39	PWR - SITE BLOCK HT RCPT 18	H	VD	10	20	1		2000 0		1	20				SPARE	40
41	SPARE				20	1			0 0	1	20				SPARE	42
43	SPARE				20	1	0 0			1					EQUIPPED SPACE	44
45	SPARE				20	1		0 0		1					EQUIPPED SPACE	46
47	SPARE				20	1			0 0	1					EQUIPPED SPACE	48
49	EQUIPPED SPACE					1	0 0			1					EQUIPPED SPACE	50
51	EQUIPPED SPACE					1		0 0		1					EQUIPPED SPACE	52
53	EQUIPPED SPACE					1			0 0	1					EQUIPPED SPACE	54
			TOTAL LOAD (VA):				23445 VA	19321 VA	17915 VA							
			TOTAL AMPS:				197 A	163 A	149 A							

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	0 VA	0%	0 VA
HEATING (H)	50000 VA	100%	50000 VA
LIGHTING (L)	0 VA	125%	0 VA
RECEPTACLES (R)	1620 VA	100%	1620 VA
MOTORS (M)	0 VA	100%	0 VA
SUPPLEMENTAL HEAT (U)	4900 VA	100%	4900 VA
MISC EQUIP (Z)	4162 VA	100%	4162 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	0 VA	125%	0 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS

TOTAL CONNECTED LOAD	60682 VA
TOTAL NEC LOAD	60682 VA
TOTAL CONNECTED CURRENT	168 A
TOTAL NEC DEMAND CURRENT	168 A

PANELBOARD: SBBA (NEW)

BUS AMPS: 225A
MAIN SIZE/TYPE: 225A MCB
VOLTS/PHASE: 208Y/120 V 3P/4W
SUPPLIED BY: SBW1 VIA TX-SBBA

FAULT CURRENT: REFER TO SHORT CIRCUIT TABLE ON SHEET E502
AIC RATED: FULLY RATED
AIC RATING: FCA +10% MINIMUM
SERVES: SALT BUILDING
MOUNTING: SURFACE
LOCATION: BRINE CONTROL 702

EQUIPMENT GROUND BUS
NEMA 4X

LINE-SIDE LUGS: MECHANICAL

CKT NO.	DESCRIPTION	LOAD TYPE	NOTES	WIRE SIZE	BKR AMP	P	PHASE A	PHASE B	PHASE C	P	BKR AMP	WIRE SIZE	NOTES	LOAD TYPE	DESCRIPTION	CKT NO.
1	SPARE				20	1	0 2500			2	35	8		H	PWR - UH12	2
3	PWR - BRINE CNT RCPT	R		12	20	1		900 2500								4
5	PWR- SALT STOR RCPT	R		12	20	1			540 3203	2	40	8		Z	8020 - AIR COMPRESSOR	6
7	LTG - BRINE ROOM	L		12	20	1	25 3203									8
9	LTG - SALT STORAGE	L		12	20	1		5 3203		2	40	8		Z	7250 - CONTROLS	10
11									400 3203							12
13	EAST SLIDING GATE	Z		10	20	3	400 3203			2	40	8		Z	7250 - MIXING STATION	14
15								400 3203								16
17	SPARE				20	1			0 3203	2	40	8		Z	7250 - FILLING STATION	18
19	SPARE				20	1	0 3203									20
21	SPARE				20	1		0 915		2	20	12		Z	PWR - OVERHEAD MTR DR 1	22
23	SPARE				20	1			0 915							24
25	SPARE				20	1	0 0			1	20				SPARE	26
27	SPARE				20	1		0 0		1	20				SPARE	28
29	SPARE				20	1			0 0	1	20				SPARE	30
			TOTAL LOAD (VA):				12535 VA	11127 VA	11466 VA							
			TOTAL AMPS:				105 A	93 A	96 A							

LOAD TYPE	CONNECTED LOAD	DEMAND FACTOR	NEC DEMAND
EXISTING LOAD (E)	0 VA	100%	0 VA
COOLING (C)	0 VA	0%	0 VA
HEATING (H)	5000 VA	100%	5000 VA
LIGHTING (L)	30 VA	125%	38 VA
RECEPTACLES (R)	1440 VA	100%	1440 VA
MOTORS (M)	0 VA	100%	0 VA
SUPPLEMENTAL HEAT (U)	0 VA	100%	0 VA
MISC EQUIP (Z)	28659 VA	100%	28659 VA
REFRIGERATION (F)	0 VA	100%	0 VA
SIGNAGE (S)	0 VA	125%	0 VA
KITCHEN (K)	0 VA	100%	0 VA
LARGEST MOTOR	0 VA	125%	0 VA
SHOW WINDOW (W)	0 VA	125%	0 VA
TRACK LIGHTING	0 VA	100%	0 VA

PANELBOARD NOTES

PANELBOARD TOTALS

TOTAL CONNECTED LOAD	35129 VA
TOTAL NEC LOAD	35137 VA
TOTAL CONNECTED CURRENT	98 A
TOTAL NEC DEMAND CURRENT	98 A

PANELBOARD LEGEND

ABBREVIATIONS V1.00

AF	ARC FAULT CIRCUIT INTERRUPTER.
C#	CIRCUIT VIA LIGHTING CONTACTOR #.
CL	CIRCUIT VIA CURRENT LIMITING DEVICE.
D	DISCONNECT CIRCUITRY FOR REMOVED LOAD, UPDATE CIRCUIT DIRECTORY TO SPARE AND TURN OFF.
EM	EMERGENCY LIGHTING HANDLE-ON CLAMP.
EX	EXISTING.
F	FUTURE LOAD; NOTE AS SPARE AND TURN OFF.
FA	RED/HANDLE-ON CLAMP.
GF	GROUND-FAULT CIRCUIT INTERRUPTER TYPE CIRCUIT BREAKER (5 mA).
GFEP	GROUND FAULT EQUIPMENT PROTECTION BREAKER (30 mA).
HT	PROVIDE HANDLE-TIE FOR MULTI-WIRE BRANCH CIRCUIT PER CODE.
IG	ISOLATED GROUND CIRCUIT.
L#	LIGHTING CONTROL SCHEME NUMBER.
LCK	HANDLE PADLOCKABLE-OFF DEVICE.
LO	HANDLE-ON CLAMP.
N	PROVIDE NEW CIRCUIT BREAKER.
OL	REFER TO ELECTRICAL ONE-LINE/RISER DIAGRAM.
PS	POWER-SWITCHING CIRCUIT BREAKER.
PSE	EMERGENCY POWER-SWITCHING CIRCUIT BREAKER.
R	REUSE EXISTING CIRCUIT BREAKER FOR NEW/REVISED LOAD.
RP	CIRCUIT VIA RELAY PANEL.
ST	SHUNT TRIP CIRCUIT BREAKER.
V	VERIFY EXISTING LOAD AND UPDATE DIRECTORY, IF UNUSED, NOTE AS SPARE AND TURN OFF.
VD	BRANCH CIRCUITRY HAS BEEN UPSIZED TO REDUCE VOLTAGE DROP. ADJUST GROUND WIRE SIZE PER CODE. PROVIDE LUG ADAPTORS IF REQUIRED.
Z	CORRECT/REPAIR EXISTING HAZARD TO MAKE CODE COMPLIANT INSTALLATION.

NOT ALL ABBREVIATIONS ARE USED.

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EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: Author
DATE: 12.15.22 REVIEWED BY: Checker

STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

01/24/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

PANEL SCHEDULES

SHEET
E505

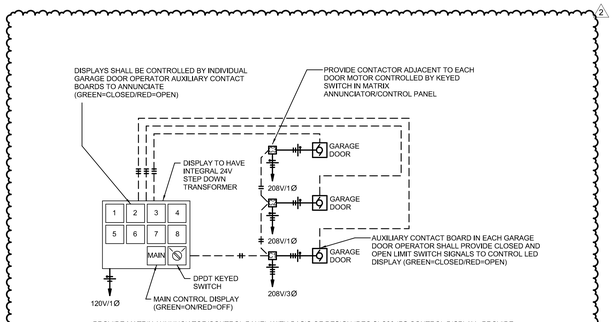
DOUGLAS M. EVERHART

FLOOR BOX SCHEDULE

v1.00

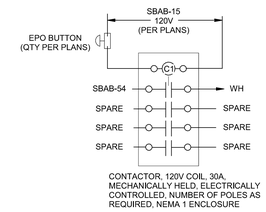
PLAN MARK	MANUFACTURER	ALTERNATE MANUFACTURER	TRIM	COVER	DESCRIPTION	POWER					DATA			AV			NOTES
						GANG(S)	DEVICE QTY	DEVICE TYPE	CONDUIT SIZE (IN)	CONDUIT QTY	GANG(S)	CONDUIT SIZE (IN.)	CONDUIT QTY	GANG(S)	CONDUIT SIZE (IN.)	CONDUIT QTY	
F	FSR	WIREMOLD HUBBELL STEEL CITY	TBD	FL-500P SERIES	SHALLOW MULTI GANG RECTANGLE BOX	1	1	DUPLEX TR	1	1	1	1	1	1	1-1/4"	1	

Notes:



2

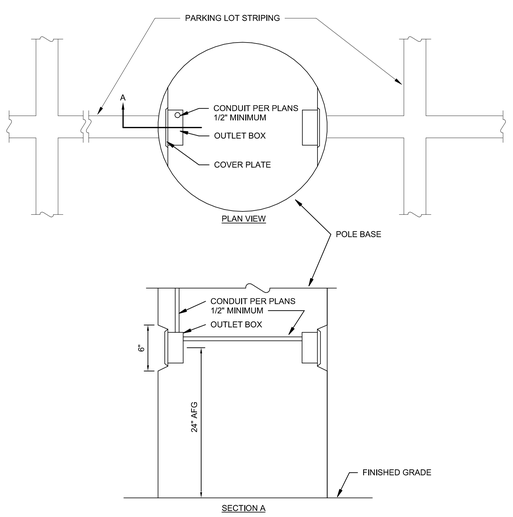
4 FLEET SERVICE GARAGE DOOR POSITION/MASTER CONTOL SYSTEM
NTS



3 EPO WIRING DIAGRAM
NONE

2

ORIENT POLE BASE RECEPTACLES TO BE PERPENDICULAR TO THE NORMAL PATH OF TRAVEL FOR PARKING STALL TO PROTECT FROM VEHICULAR IMPACT.



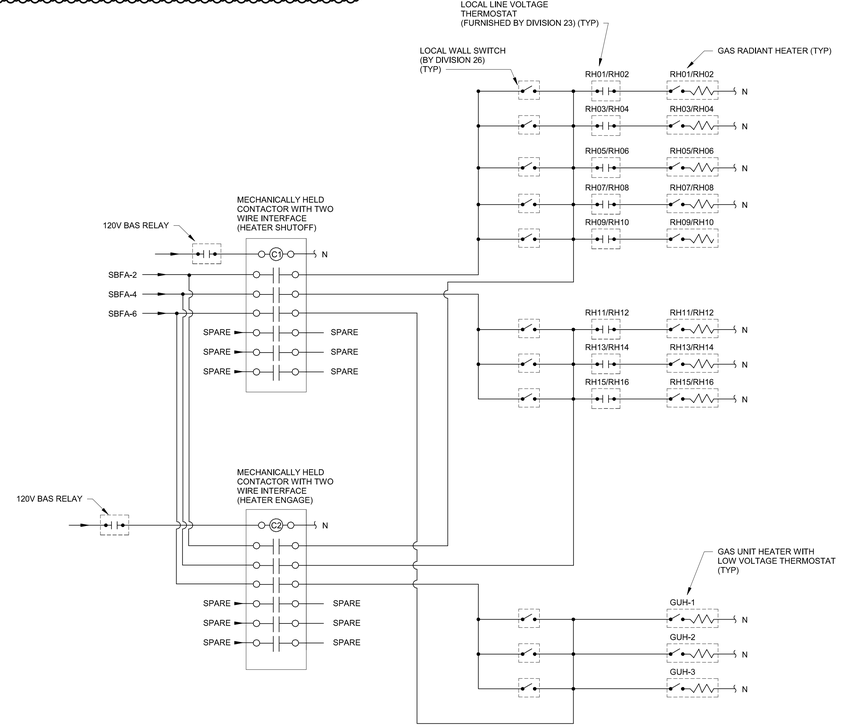
2 RECEPTACLE MOUNTED IN POLE BASE
NONE

CONTACTOR SCHEDULE

PANEL NAME:	C1		MOUNTING:	SURFACE
LOCATION:	ELECTRICAL ROOM		VOLTAGE:	120V
RELAY	CIRCUIT	LOAD CONTROLLED	MODULE TYPE	LOAD (WATTS)
R1	SBFA-2	HEATERS RH01 THROUGH RH10	ON/OFF	168
R2	SBFA-4	HEATERS RH11 THROUGH RH22	ON/OFF	168
R3	SBFA-6	HEATERS GUH1 THROUGH GUH3	ON/OFF	1500
R4	-	SPARE	-	
R5	-	SPARE	-	
R6	-	SPARE	-	

CONTACTOR SCHEDULE

PANEL NAME:	C2		MOUNTING:	SURFACE
LOCATION:	ELECTRICAL ROOM		VOLTAGE:	120V
RELAY	CIRCUIT	LOAD CONTROLLED	MODULE TYPE	LOAD (WATTS)
R1	SBFA-2	HEATERS RH01 THROUGH RH10	ON/OFF	168
R2	SBFA-4	HEATERS RH11 THROUGH RH16	ON/OFF	168
R3	SBFA-6	HEATERS GUH1 THROUGH GUH3	ON/OFF	1500
R4	-	SPARE	-	
R5	-	SPARE	-	
R6	-	SPARE	-	



1 HEATER CONTROL WIRING DIAGRAM
NONE

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EXPIRES 12/31/2023

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STATE OF MISSOURI
DOUGLAS M. EVERHART
NUMBER PE-2019007648
PROFESSIONAL ENGINEER

01/24/2023

DOUGLAS M. EVERHART
LICENSE # PE-2019007648

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
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ELECTRICAL DETAILS AND SCHEDULES

SHEET
E600

DOUGLAS M. EVERHART

FIRE PROTECTION PLAN NOTES:

F2 PROVIDE NEW REMOTE FIRE ALARM ANNUNCIATOR PANEL.

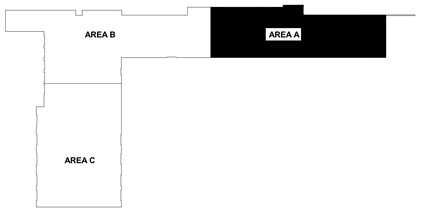
F4 PROVIDE FIRE DEPARTMENT KEY BOX FOR FIRE DEPARTMENT ACCESS. PROVIDE EQUIPMENT AND CONNECTIONS NECESSARY TO MONITOR KEY BOX INTERNAL SUPERVISORY SWITCH(ES), AS REQUIRED.

F53 INSTALL SPRINKLER PIPING TIGHT TO STRUCTURE.

F56 PROTECT AREA BELOW EXTERIOR CANOPY PROJECTION WITH ANTIFREEZE WET-PIPE SPRINKLER SYSTEM.

2 F57 PROVIDE WET SYSTEM WITH TYCO LFP ANTIFREEZE PLUS PER NFPA 13 STANDARD AND MANUFACTURER REQUIREMENTS.

F58 PROVIDE EXPANSION TANK TO SERVE TYCO ANTIFREEZE SYSTEMS SIZED PER MANUFACTURER'S INSTRUCTION.



KEY PLAN

1 FIRE PROTECTION LEVEL 1 PLAN - AREA A
1/8" = 1'-0"

0 4' 8' 12'
SCALE: 1/8"=1'-0"

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NO.	DESCRIPTION	DATE
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PROJECT NO.: 19-040 DRAWN BY: KPM
DATE: 12.15.22 REVIEWED BY: HEI

STATE OF MISSOURI
CHRISTOPHER J. CULP
NUMBER PE-2013037646
PROFESSIONAL ENGINEER

01/24/2023
CHRISTOPHER J. CULP
LICENSE # PE-2013037646

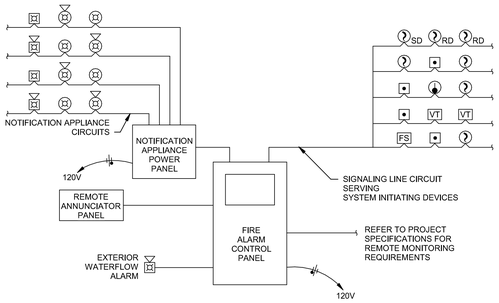
PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

FIRE PROTECTION LEVEL 1 PLAN - AREA A

SHEET
FP101A

CHRISTOPHER J. CULP

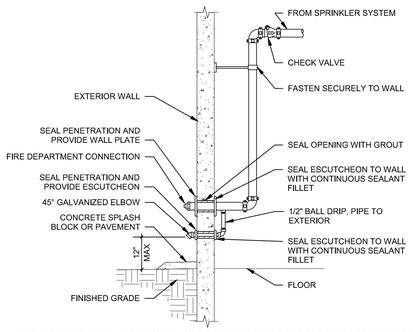


RISER DIAGRAM IS SCHEMATIC IN NATURE. NOT ALL DEVICES ARE SHOWN. REFER TO PLANS FOR EQUIPMENT QUANTITIES AND LOCATIONS.

DUCT DETECTORS MAY HAVE INTEGRAL RELAYS FOR AIR HANDLING UNIT SHUT-DOWN AND FIRE/SMOKE DAMPER CONTROL. WIRING FOR THIS FUNCTION HAS NOT BEEN SHOWN. COORDINATE WITH MECHANICAL SYSTEM INSTALLER.

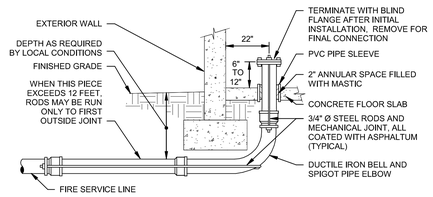
REFER TO PLANS AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.

1 FIRE ALARM RISER DIAGRAM - ADDRESSABLE SYSTEM (NON-VOICE)
NTS



ARRANGEMENT SHOWN IS SCHEMATIC. MODIFY TO SUIT CONDITIONS AND MEET APPLICABLE CODE REQUIREMENTS. EXTERIOR PIPING AND FITTINGS SHALL BE GALVANIZED. REFER TO DRAWINGS FOR APPROVED LOCATIONS.

2 FIRE DEPARTMENT CONNECTION
NTS



ARRANGEMENT SHOWN IS SCHEMATIC. MODIFY TO SUIT FIELD CONDITIONS AND MEET APPLICABLE CODE REQUIREMENTS. VERIFY FOUNDATION WITH ARCHITECTURAL DRAWINGS. COORDINATE WHO IS TO PROVIDE THE FIRE SERVICE ENTRY WITH THE GENERAL CONTRACTOR OR CONSTRUCTION MANAGER PRIOR TO SUBMITTING BID.

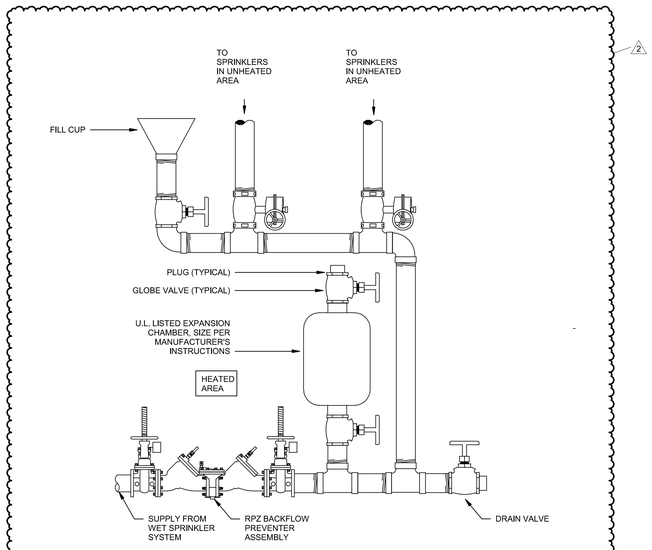
3 FIRE SERVICE ENTRY
NTS

SYSTEM INPUTS	ALARM	SUPERVISORY	TROUBLE	REPORT TO FIRE ALARM CONTROL PANEL	SIGNAL SUPERVISING STATION	ACTIVATE GENERAL FIRE ALARM AUDIBLE/VISIBLE NOTIFICATION APPLIANCES	ACTIVATE FDC NOTIFICATION APPLIANCE	SHUTDOWN NON/DUAL FAN POWERED MECHANICAL AIR HANDLING EQUIPMENT AND DAMPER(S)	SHUTDOWN ALL FAN POWERED MECHANICAL AIR HANDLING EQUIPMENT FOR AFFECTED HVAC SYSTEM	SHUTDOWN ALL FAN POWERED MECHANICAL AIR HANDLING EQUIPMENT
SIGNALING LINE OR NOTIFICATION APPLIANCE CIRCUIT - OPEN			●	●	●					
SIGNALING LINE OR NOTIFICATION APPLIANCE CIRCUIT - SHORT			●	●	●					
SIGNALING LINE OR NOTIFICATION APPLIANCE CIRCUIT - GROUND			●	●	●					
FIRE ALARM CONTROL PANEL LOSS OF POWER			●		●					
MANUAL PULL STATION	●			●	●	●				●
SMOKE DETECTOR - SPOT TYPE	●			●	●	●				●
SMOKE DETECTOR - DUCT MOUNTED		●		●	●			●	●	
WATERFLOW ALARM SWITCH	●			●	●	●	●			●
VALVE TAMPER SWITCH		●		●	●					
FIRE DEPARTMENT KEY BOX VALVE TAMPER SWITCH (KNOX BOX)		●		●	●					
FIRE PUMP RUNNING		●		●	●					
FIRE PUMP LOSS OF PHASE			●	●	●					
FIRE PUMP PHASE REVERSAL			●	●	●					
FIRE PUMP CONNECTED TO ALTERNATE POWER SOURECE / REMOVED FROM "AUTOMATIC"		●		●	●					
FIRE PUMP GENERAL TROUBLED CONDITIONS			●	●	●					

CONTRACTOR TO PROVIDE ALL NECESSARY EQUIPMENT AND CONNECTIONS REQUIRED TO ACCOMPLISH THE FUNCTIONS INDICATED, AT MINIMUM.

SEQUENCE OF OPERATIONS INDICATED IS SCHEMATIC. MODIFY TO SUIT CONDITIONS AND MEET APPLICABLE CODE REQUIREMENTS.

4 FIRE ALARM
SEQUENCE OF OPERATIONS
NTS



ARRANGEMENT SHOWN IS SCHEMATIC. MODIFY TO SUIT CONDITIONS AND MEET APPLICABLE CODE REQUIREMENTS. INSTALL BACKFLOW PREVENTER IN ACCORDANCE WITH AUTHORITY HAVING JURISDICTION. WHERE A REDUCE PRESSURE BACKFLOW PREVENTER IS REQUIRED ROUTE DRAIN LINE CAPABLE OF HANDLING FULL DISCHARGE TO APPROVED LOCATION.

5 FIRE PROTECTION ANTI-FREEZE SYSTEM WITH BACKFLOW PREVENTER
NTS

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OWNER

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EXPIRES 12/31/2023

REVISIONS

NO.	DESCRIPTION	DATE
2	ADD 02	01.25.23

PROJECT NO.: 19-040 DRAWN BY: Author
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STATE OF MISSOURI
CHRISTOPHER J. CULP
NUMBER PE-2013037646
PROFESSIONAL ENGINEER

01/24/2023
CHRISTOPHER J. CULP
LICENSE # PE-2013037646

PROJECT TITLE
CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

FIRE PROTECTION DETAILS

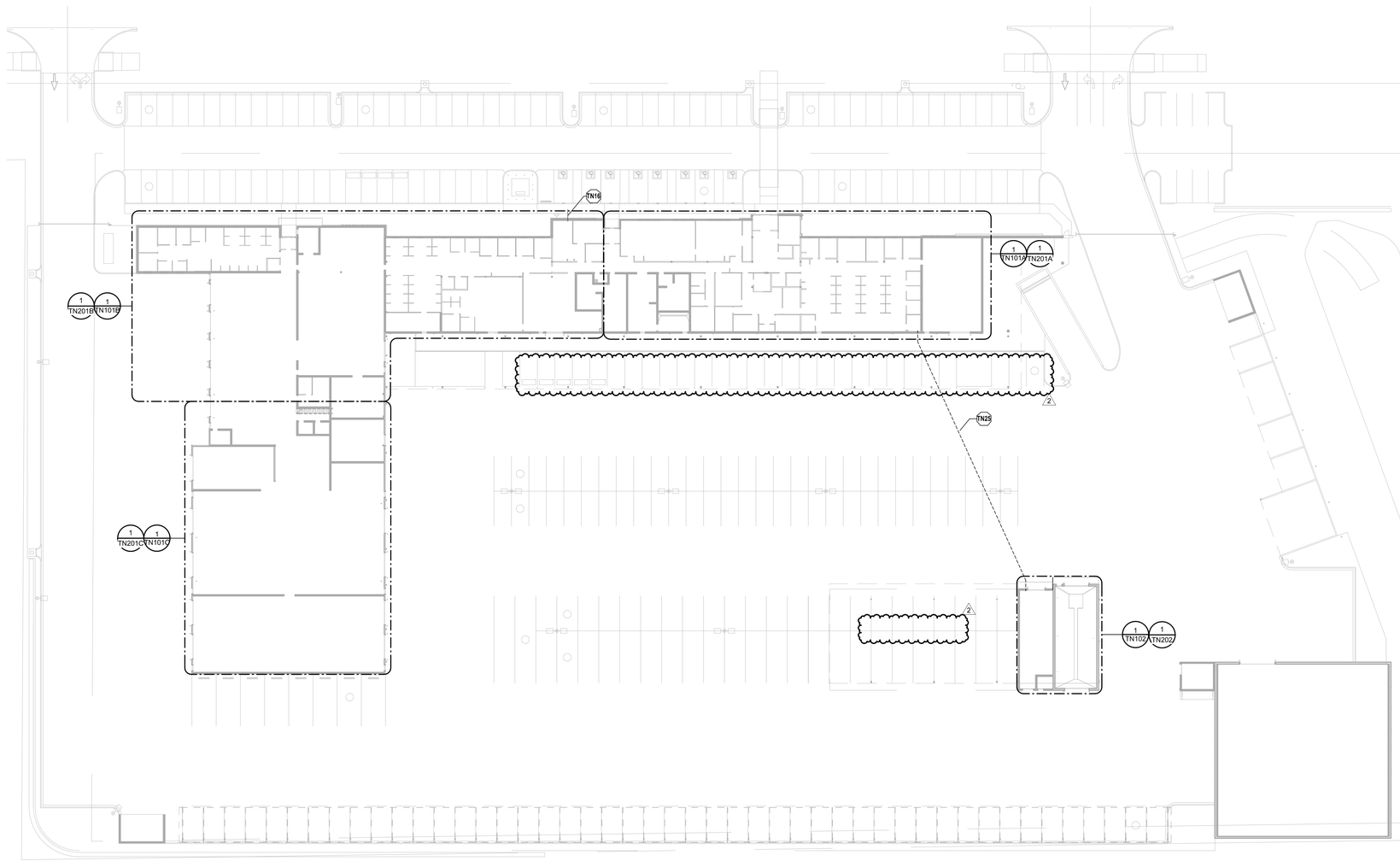
SHEET
FP500

CHRISTOPHER J. CULP

TECHNOLOGY PLAN NOTES:

TN16 PROVIDE (3) 2" ENTRANCE CONDUITS FOR INCOMING SERVICE PROVIDER CABLING. COORDINATE WITH OWNER AND CIVIL DRAWINGS.

TN25 PROVIDE 2" CONDUIT FOR FIBER FROM SCADA DATA/IT 210 IN THE MAIN BUILDING TO STORAGE 602 IN WASH BUILDING. SEE CIVIL PLANS FOR SITE ROUTING. 2



1 TECHNOLOGY SITE PLAN
1" = 30'-0"

N

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LICENSE # PE-2019007648

PROJECT TITLE

CITY OF WENTZVILLE, MO PUBLIC WORKS FACILITY

PROJECT ADDRESS:
1295 INTERSTATE DRIVE
WENTZVILLE, MO 63385

TECHNOLOGY SITE PLAN

SHEET
TN100

DOUGLAS M. EVERHART